



The International  
Association for  
Computational Mechanics



The European Community  
on Computational Methods  
in Applied Sciences

**8th World  
Congress on  
Computational  
Mechanics**

**5th European Congress  
on Computational Methods  
in Applied Sciences  
and Engineering**

**WCCM8**

**ECCOMAS 2008**

Venice, Italy, 30 June - 4 July 2008

**B. A. Schrefler and U. Perego (Eds.)**

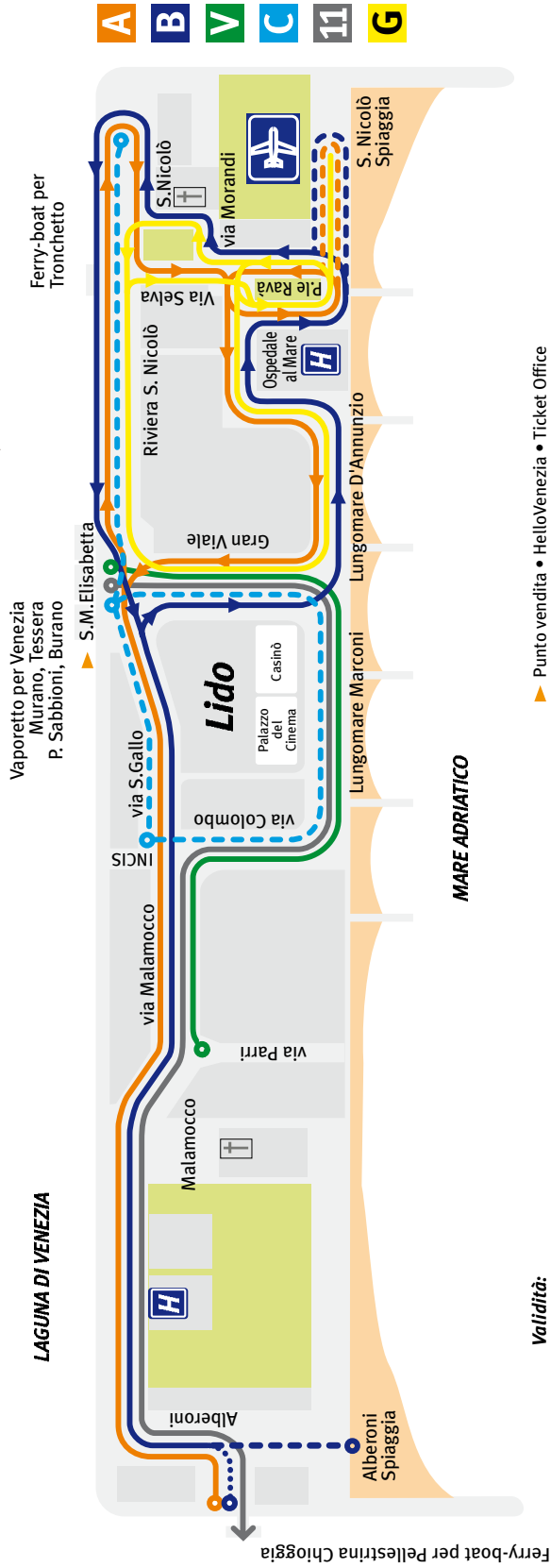
Department of Structural and Transport Engineering  
Faculty of Engineering, Università di Padova

Department of Structural Engineering  
Politecnico di Milano

**PROGRAMME**

# Bus Lines at the Lido

## SERVIZIO AUTOMOBILISTICO DI LIDO LINEE "GIRALIDO"



- Validità:**
- ◉ 01.06.2008 ~ 07.09.2008
  - ◉ 01.06.2008 ~ 07.09.2008
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# Jyväskylä, Finland

## The host of ECCOMAS 2004

Welcome to Jyväskylä - a compact meeting point right in the heart of Finland. In dynamic Jyväskylä the key factors from the viewpoint of your event are all located within walking distance.



The stylish premises of the University of Jyväskylä, the international-standard Congress and Trade Fair Centre, and the city's ample and diverse accommodation capacity are just a short walk away from each other, right in the city centre. Besides as an ideal town for congresses Jyväskylä can offer you plenty of experiences and to see: the widely regarded architect Alvar Aalto's building architecture, the speed of the world championship rally and relaxation in the beautiful surrounding countryside.

Welcome again to Jyväskylä -  
highly popular venue for congresses, conferences and events!

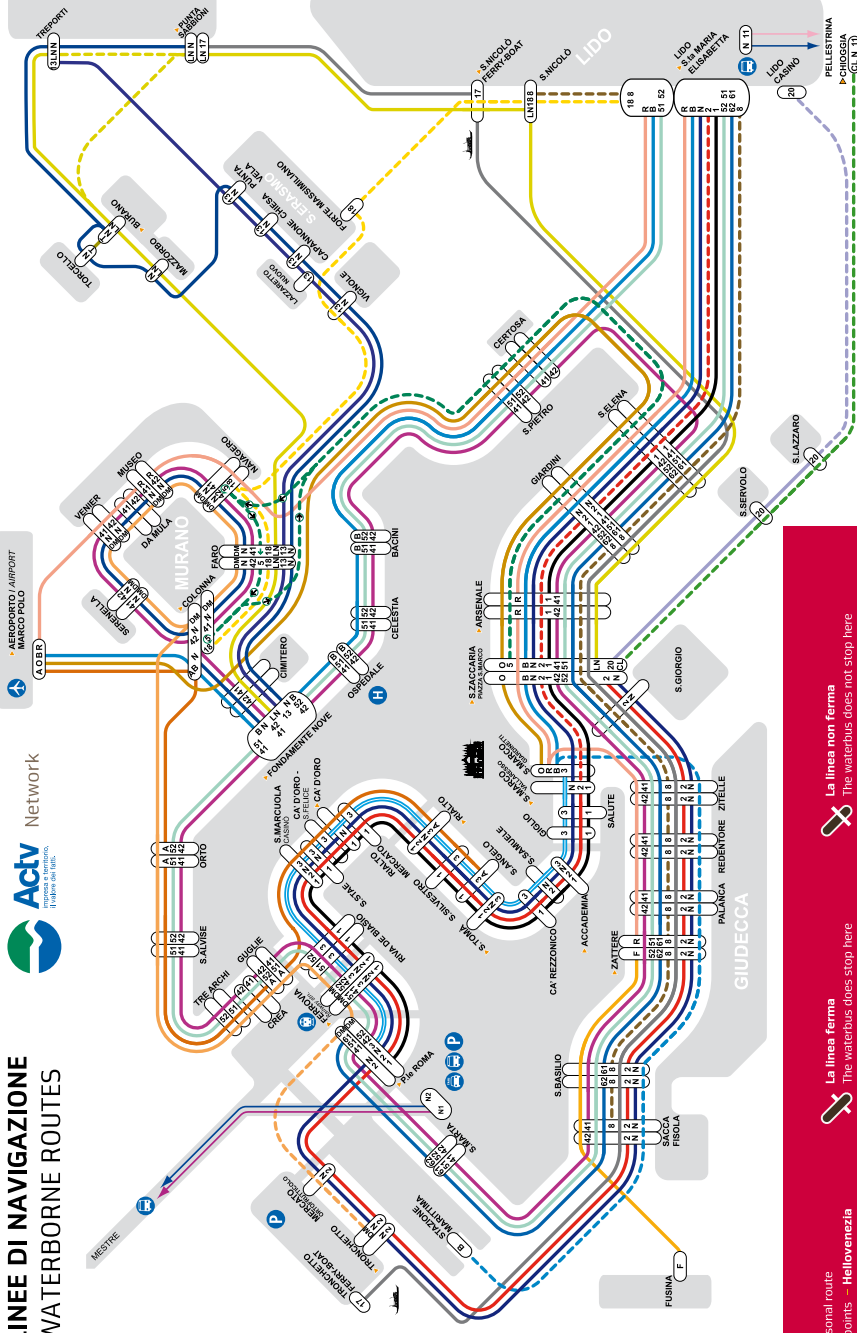


We are looking forward to  
meet you again in Jyväskylä!

<http://jyvaskylanseutu.fi/travel/congresses>



# LINEE DI NAVIGAZIONE WATERBORNE ROUTES



- 1
- 2
- 3
- 5
- 8
- 11
- 13
- 17
- 18
- 20
- 41
- 42
- 51
- 52

- A = ALLAGUNA  
ARANCIO**
- B = ALLAGUNA  
BLU**
- O = ALLAGUNA  
ORO**
- R = ALLAGUNA  
ROSSA**
- C = CLODIA**
- F = FUSINA  
ZATTERE**

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**Linea stagionale / Seasonal route**  
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**La linea ferma**  
The waterbus does stop here

**La linea non ferma**  
The waterbus does not stop here



**8th World  
Congress on  
Computational  
Mechanics**

**5th European Congress  
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and Engineering**

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5th European Congress on Computational Methods in Applied Sciences  
and Engineering ECCOMAS 2008

B. A. Schrefler and U. Perego (Eds.)

First edition, June 2008

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*Joint*  
**8th. World Congress on Computational Mechanics (WCCM8)**  
*and*  
**5th. European Congress on Computational Methods in Applied  
 Sciences and Engineering (ECCOMAS 2008)**

**IACM – ECCOMAS 2008**

*Lido Island, Venice, Italy*  
*30 June - 4 July 2008*

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## CONFERENCE VENUE

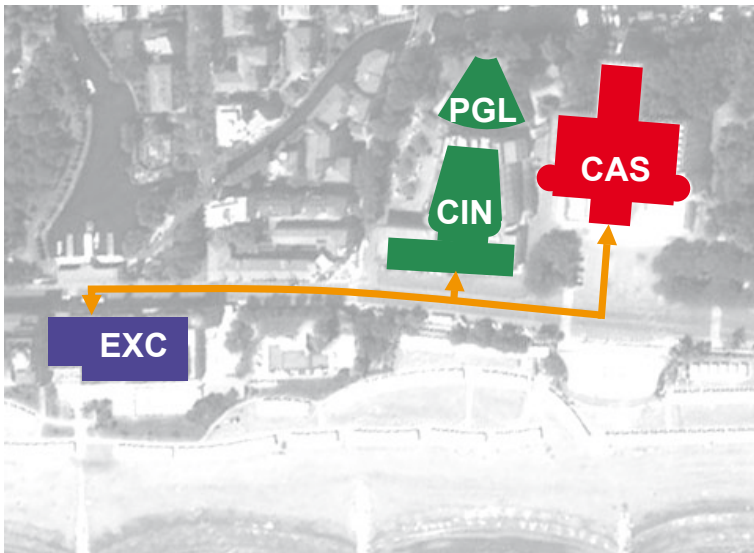
The Conference rooms are located in four different buildings, at a short walking distance as shown in the map below. The buildings are labeled as follows

**CAS** Casinò Palace

**CIN** Cinema Palace

**PGL** PalaGalileo

**EXC** Hotel Excelsior



The Opening Session and all Plenary Lectures will take place at **PGL** and will be broadcast also at **CIN** (room **CIN1.1**).

The conference secretariat is located at the first floor of the **CIN**.

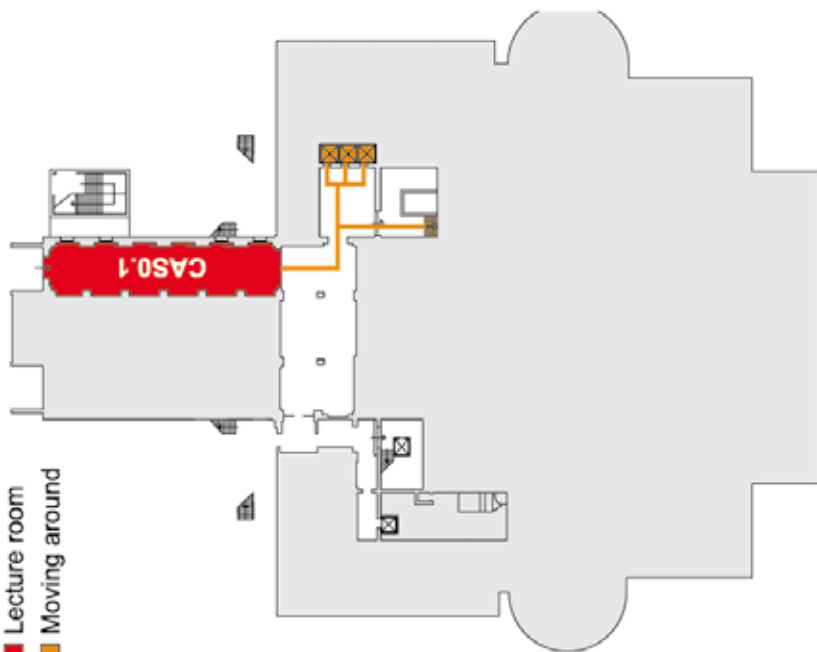
Lecture rooms are identified by the label of the palace followed by the number of the floor and by the number of the room, for example room **CAS1.6** is at the Casinò Palace, 1<sup>st</sup> floor, room 6, as shown in the following maps.



## CAS0

### CASINO GROUND FLOOR

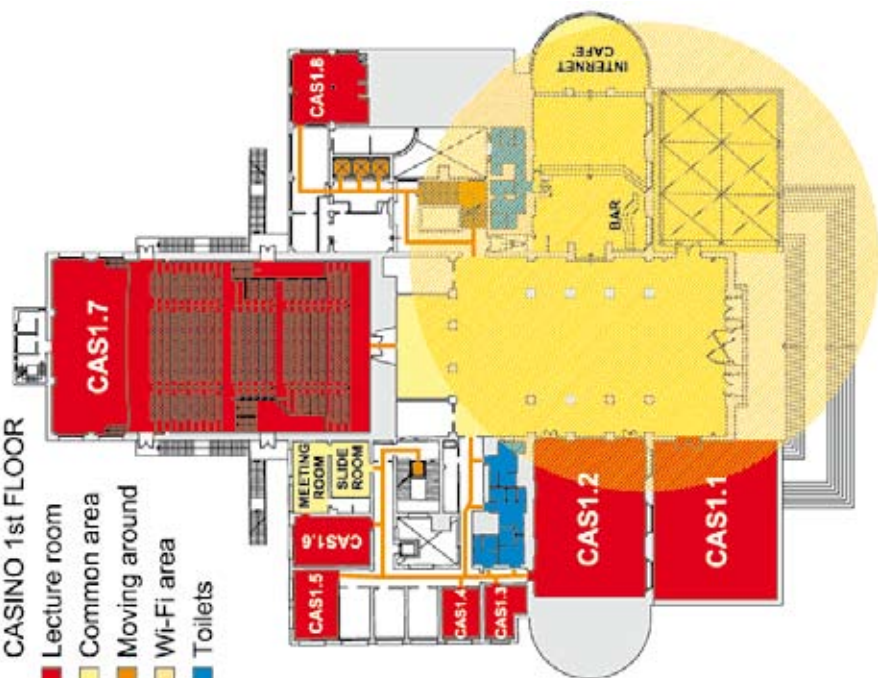
- Lecture room
- Moving around



## CAS1

### CASINO 1st FLOOR

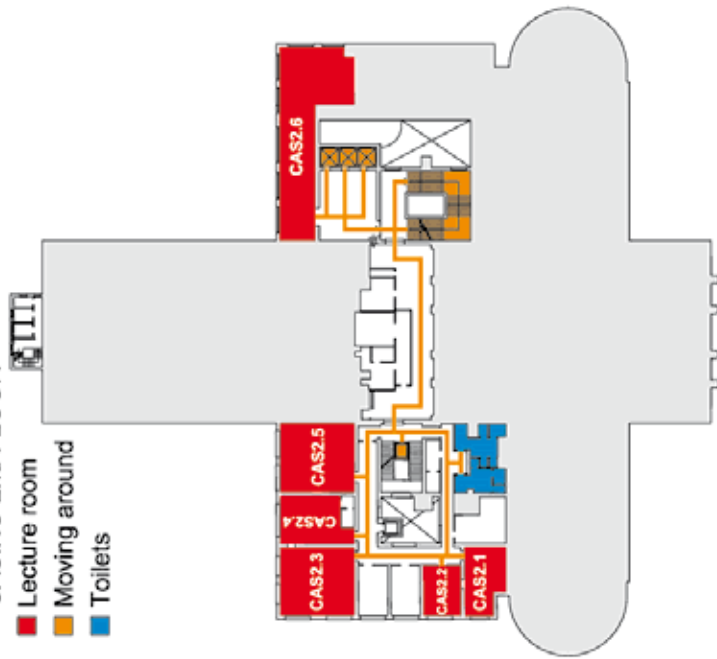
- Lecture room
- Common area
- Moving around
- Wi-Fi area
- Toilets



## CAS2

### CASINO 2nd FLOOR

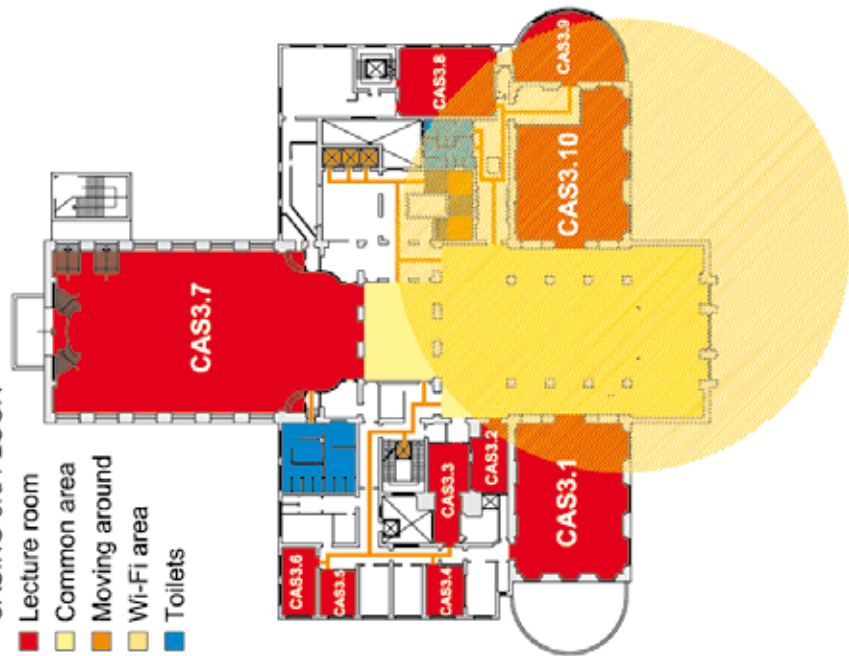
- Lecture room
- Moving around
- Toilets



## CAS3

### CASINO 3rd FLOOR

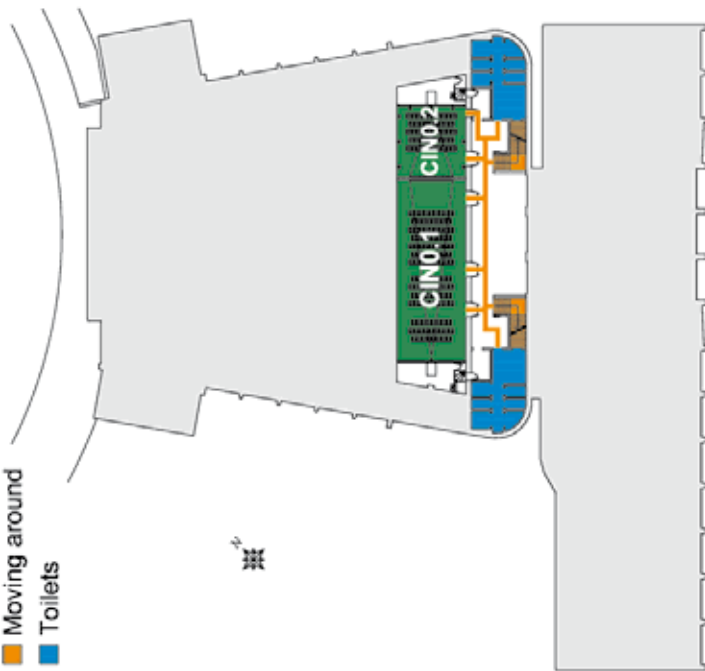
- Lecture room
- Common area
- Moving around
- Wi-Fi area
- Toilets



## CIN0

### CINEMA GROUND FLOOR

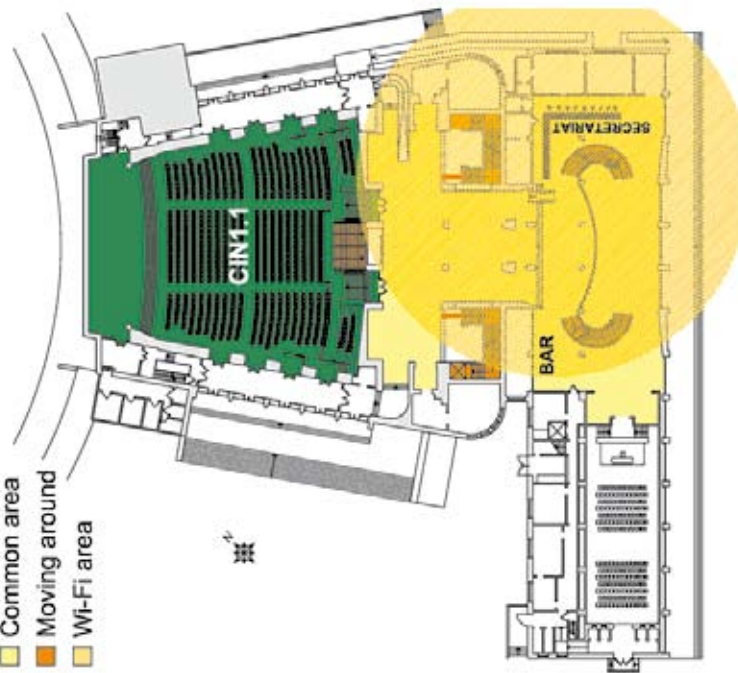
- Lecture room
- Moving around
- Toilets



## CIN1

### CINEMA 1st FLOOR

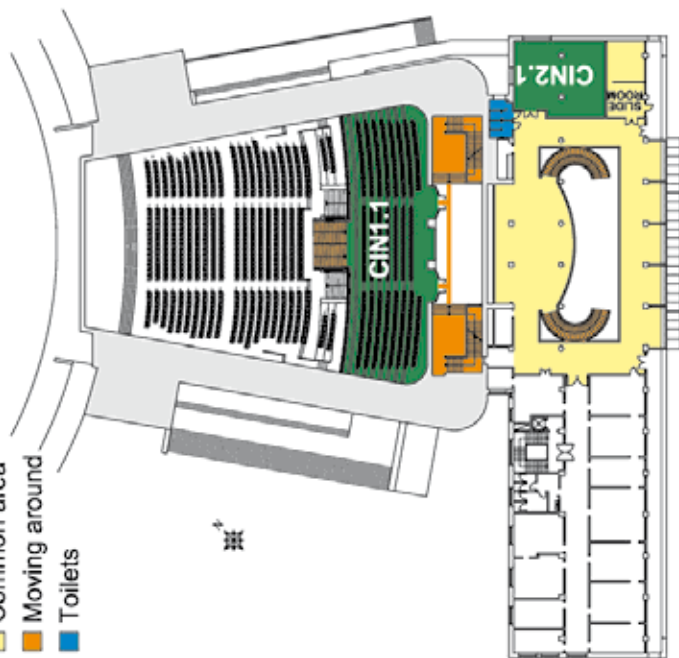
- Lecture room
- Common area
- Moving around
- Wi-Fi area



## CIN2

### CINEMA 2nd FLOOR

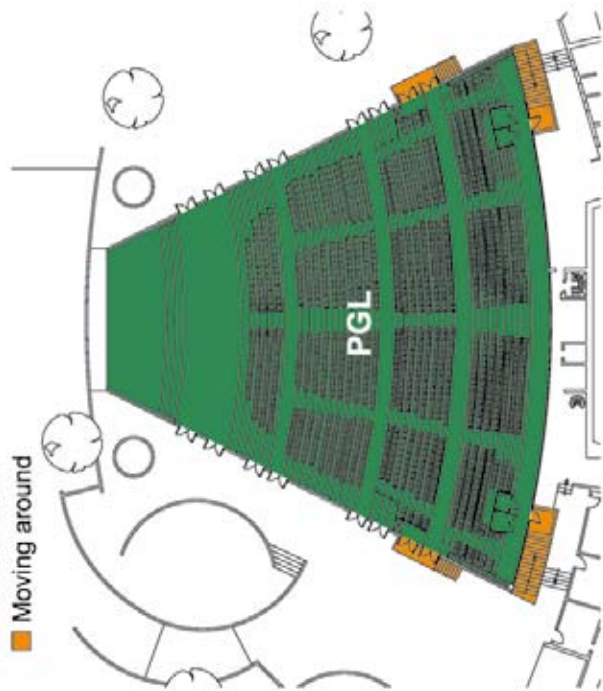
- Lecture room
- Common area
- Moving around
- Toilets

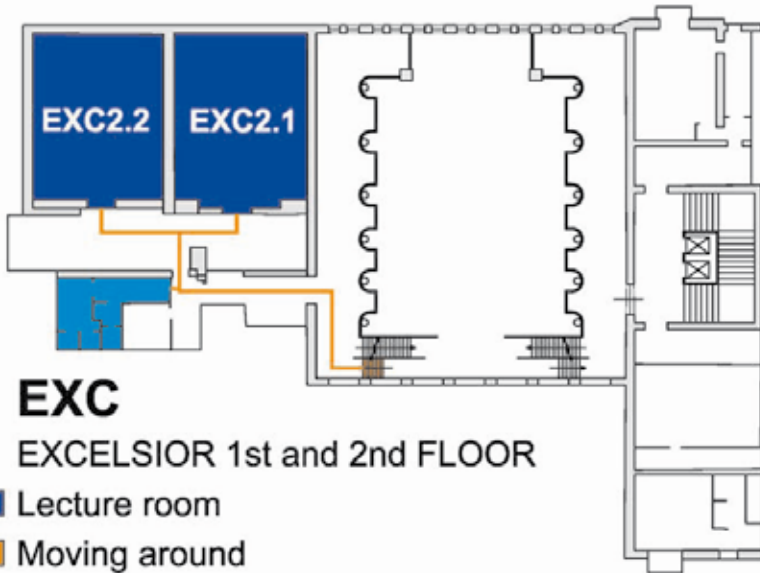


## PGL

### PalaGalileo

- Lecture room
- Moving around

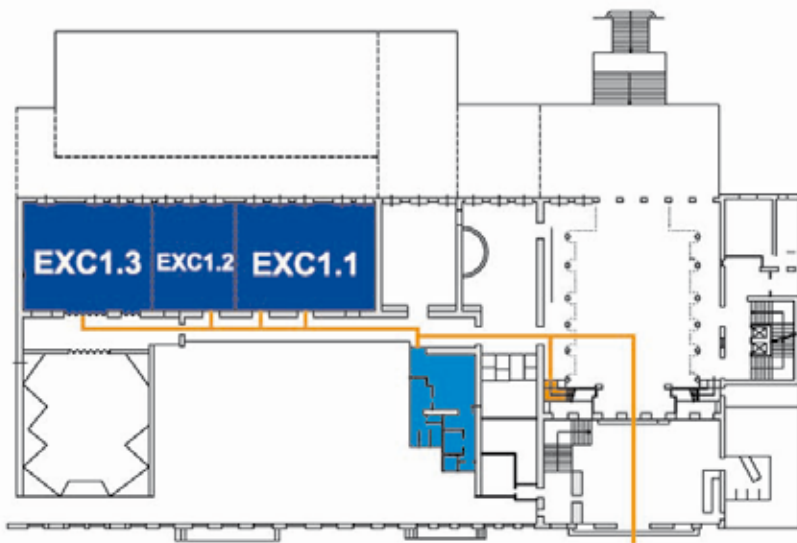




## EXC

### EXCELSIOR 1st and 2nd FLOOR

- Lecture room
- Moving around
- Toilets







## Greetings from the Co-Chairmen of the Congress



Welcome to the joint **Eighth World Congress of Computational Mechanics and Fifth European Congress on Computational Methods in Applied Sciences and Engineering WCCM8-ECCOMAS 2008** in Venice. Welcome to Venice which is considered among the most beautiful and best preserved historical cities in the world, unique in the fact that it is the only city built on water. In Venice you will experience the impact of history and culture, enjoy the flavour of the Adriatic sea and witness the problems which the preservation of such a unique cultural heritage poses. At the same time you will have the opportunity to discuss the latest developments in all aspects of computational mechanics and computational sciences and their application to traditional fields and new computation oriented areas in engineering and sciences.

This is the first time that IACM and ECCOMAS have joint their effort to set up a common conference and the outcome is probably the largest conference ever held in the field of mechanical sciences in its broader sense, with some 2600 papers to be presented. Several actions intended to promote the participation of young researchers have been undertaken: 37 scholarships for doctoral students have been offered by Eccomas, 25 by the US Association for Computational Mechanics (USACM), 10 by the Associazione Veneziana Albergatori (AVA) and 79 more have been supported on the congress budget. In addition to this, USACM also sponsored 25 Young Investigators Scholarships and 13 Scholarships for Retired Researchers have been supported on the congress budget. As an outcome of these actions, almost 500 participants registered as students, probably the best result ever achieved in congresses of this type.

The local organizing committee has been working very hard to set up a high quality technical programme. The selected papers have been accepted after a strong selection procedure, starting from 3457 submitted abstracts. The papers will be presented throughout the week in 35 parallel oral sessions, scheduled both in the morning and in the afternoon. Furthermore, there will be 10 plenary and 16 Semi-plenary lectures. This is a very dense programme and it will be surely a very intense week for all of us. Nevertheless, we hope that you will also have a chance to relax and take part in the social activities we have prepared. In particular we hope to see you in the Welcome Reception on Sunday evening at the Hotel Excelsior, at the Award ceremony on the occasion of the Conference Opening and at the banquet on Thursday evening in the harbour (Stazione Marittima). You should also take some time to visit the beautiful city of Venice and its museums. We have prepared on Tuesday and Wednesday, after the sessions, a guided visit to the basilica of San Marco, with all mosaics lit up, something which usually is not easy to see.

The selected conference venue is the Congress Center, located in the complex formed by the Palazzo del Cinema and the former Venice Casino on the Lido di Venezia. The Lido di Venezia is an island which limits the lagoon of Venice towards the Adriatic sea. The Conference Center is located close to the sea front. You have just to cross the road and you will be able to stroll along the beach or swim in the Adriatic sea. If your Hotel is on the Lido-Island, you can simply walk to your Hotel after the sessions or take a local bus. If your Hotel is elsewhere in the city, there exist frequent links between the island and other parts of the city. In that case you will experience the life in a city without cars and with historical buildings everywhere you look. You will also learn how not to be lost in its many alleys and bridges.

The organizers would like to thank the authors for submitting their contributions and for their patience in respecting the deadlines. The list of those who have worked at various stages of the preparation of the conference is long. We want to express our gratitude to all of them. In particular we want to thank the students of the Specialization School for Secondary Teaching (SSIS Veneto) at University of Cà Foscari in Venice for providing assistance in the lecture rooms. Special thanks go to the almost 400 colleagues who contributed to the organization of the Minisymposia and of the other Technical Sessions and to the many Referees who, with their work, contributed to enhance the scientific quality of this congress. Without their help this congress would have not been possible. We also want to thank the sponsors who have contributed generously to this conference.

We invite you to enjoy Venice and to experience an unforgettable week.

Bernhard Schrefler

Umberto Pereo

May 2008.

## Greetings from the President of IACM



Dear Colleague,

It is my great pleasure to welcome you in Venice from June 30th to July 4 2008 to the joint WCCM/ECCOMAS congress. The congress merges the 8<sup>th</sup> edition of the World Congress on Computational Mechanics of IACM and the 5<sup>th</sup> European Congress on Computational Mechanics in Applied Sciences and Engineering of ECCOMAS. The success of this joint venture is clearly shown by large number of participants, close to 3000. This is a landmark in the history of past congresses of IACM and ECCOMAS.

The success of the WCCM/ECCOMAS congress is also reflected in the content of the technical programme. Some 170 Minisymposia and Technical Sessions have been organized by leading scientists and engineers in topics covering most disciplines in computational science and engineering, ranging from advances in fundamental and emerging areas of computational mechanics such as nano-mechanics and material modelling, to innovative applications in technological fields, such as aeronautics, industrial forming processes, civil engineering and bio-mechanical engineering among others. The congress programme, therefore, covers the state of the art on the theory and practice of computational methods in many areas of engineering and applied sciences.

I thank ECCOMAS, and in particular its President Prof. Herbert Mang, for accepting to merge the 8<sup>th</sup> WCCM with the 5<sup>th</sup> ECCOMAS congress. I hope that this positive experience will be repeated in the future for the benefit of the computational community worldwide.

Last but not least, I would like to thank the co-organizers of the WCCM/ECCOMAS Congress, and particularly the two Co-Chairmen Profs. Bernard Schrefler and Umberto Perego and their teams at the Universities of Padova and Milano in Italy for an excellent and outstanding work.

I hope that you will enjoy attending the WCCM/ECCOMAS 2008 congress in the wonderful and inspiring city of Venice.

Best wishes,

Yours Sincerely,

Eugenio Oñate



## Greetings from the President of ECCOMAS



It is fair to say that the Joint 8th World Congress on Computational Mechanics (WCCM 8) and the 5th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008) is a mega-event in the history of these relatively young scientific fields at the forefront of technological progress. The organization of this Congress by the International Association for Computational Mechanics (IACM) and the European Community on Computational Methods in Applied Sciences (ECCOMAS) is a long-term consequence of an agreement signed by the former Presidents of ECCOMAS and IACM, Profs. Oskar Mahrenholtz and Alf Samuelsson. This co-operation shows that, irrespective of its geographic focus, ECCOMAS is acting globally to fulfill its mission to “encourage the exchange of information and to enable the transfer of knowledge between research and industry”.

Today we are confronted with problems in engineering and in the applied sciences with levels of complexity never encountered before in the history of mankind. The solution of problems characterized e.g. by the interaction of fluids and structures, not to forget materials, is of paramount importance in a technical world of rapidly increasing sophistication, referred to as the *Leonardo World* by the eminent philosopher Jürgen Mittelstraß.

WCCM 8/ECCOMAS 2008 is the ideal forum to report on and discuss solutions of complex problems in engineering and in the applied sciences with special emphasis on interdisciplinary research activities. Not the least it is a place where researchers and practicing engineers of different age groups and from all parts of the globe can exchange their ideas on these problems and at the same time renew old friendships and establish new ones in one of the most beautiful cities in the world.

On behalf of ECCOMAS I wish to thank the Chairmen of the Joint IACM and ECCOMAS Congress, Profs. Bernhard A. Schrefler and Umberto Perego, for the excellent organization of the Congress. Their dedicated efforts guarantee that the participants of WCCM 8/ECCOMAS 2008 will return home from Venice under the impression of an unforgettable scientific and social event.

Prof. Herbert A. Mang



## Sponsors and Exhibitors



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European Community on Computational Methods in Applied Sciences (ECCOMAS)

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Faculty of Engineering, Università di Padova

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35131 Padova

##### Department of Structural Engineering

Politecnico di Milano

Piazza L. da Vinci, 32

20133 Milano

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# Congress Information

## Registration and Check in

All attendees are required to check in at the registration desks, located at the Lobby of the Cinema Palace (Ground Floor). They will get there their badges.

The Congress documentation will be handed over at the Multifunction Room (Cinema Palace Ground Floor, near the registration desk).

### **Service hours of operation:**

*Sunday 29 June, 5 p.m. to 8 p.m.*

*Monday 30 June, 7.30 a.m. to 6:30 p.m.*

*Tuesday 1 July to Friday 4 July, 8:00 a.m. to 6:30 p.m.*

## Badge Distribution

Participants are reminded to wear name badges at all times while in the congress area or at congress-sponsored events. Access will be prohibited to the exhibit, break and technical session areas if a name badge is not visible.

Accompanying persons are not allowed to attend technical sessions.

## Technical and Administrative Office

Located at the Lobby of the Cinema Palace (Ground Floor).

The organizing committee will answer questions regarding technical program and the overall conference.

The secretariat will be attending all the issues related to registration.

### **Service hours of operation:**

*Monday 30 June, 7.30 a.m. to 6:30 p.m.*

*Tuesday 1 July to Friday 4 July, 8:00 a.m. to 6:30 p.m.*

## Lunch Options

### **1. Lunch boxes**

For those who have bought the option online, lunch boxes will be distributed at the congress venue for each of the 5-days: Monday 30th - Friday 4th.

The vouchers will be handed over at the check-in secretariat desks, together with your badge.

The lunch box consists of a full airplane-style lunch contained in a box distributed in the congress venue, it includes first and second courses, dessert, a bottle of mineral water.

**Eating is not permitted inside the lecture rooms.**

### **2. Taverna Excelsior lunch seats**

For those who have bought the option online, lunch buffet seats will be available at the Taverna of Hotel Excelsior.

The vouchers will be handed over at the check-in secretariat desks, together with your badge.

## Internet Access

Internet access will be possible within the congress venue in two different ways:

- using one of the desktop PCs available in the Internet Café, located at the first floor of the Casinò Palace;
- using the delegate own notebook computer, via wireless connection. Wireless connection will be available at the first floor and third floor of the Casinò Palace and at the first floor of the Cinema Palace.

Please, note that according to Italian laws, ALL internet connections can occur only upon release of an individual user ID and password. If you are willing to connect within the congress venue, you must obtain a user ID and password from the Congress Secretariat.

To get your user ID and password, you will have to:

1. Fill in, sign and hand in to the Congress Secretariat the request form.
2. Provide a copy of a valid IDENTITY DOCUMENT.

Please note that Italian laws are very strict and wireless connection will not be available for those people that did not register.

**IF YOU HAVE ALREADY SUBMITTED YOUR FORM ONLINE, YOU DO NOT NEED TO TAKE ANY FURTHER ACTION. THE USERID AND PASSWORD WILL BE HANDED OVER TO YOU TOGETHER WITH YOUR DELEGATE BAG.**

## Oral Presentations

- ✓ All oral presentations should be made using the English language.
- ✓ A 15 min. presentation + 5 min. discussion time is allowed for each regular paper. Some sessions are opened by a sequence of two Keynote Lectures which are allowed a 25 min. presentation + 5 min. discussion time.
- ✓ All rooms are equipped with a PC, a screen and a LCD Projector. *Please note that no overhead projectors will be available onsite. Authors with special needs are kindly requested to contact the Congress Secretariat well in advance.*
- ✓ Presentation files may be created in Adobe Acrobat .pdf (recommended) or Power Point. The operating system of all PCs is Windows XP SP2. Microsoft Office 2007 PowerPoint and Acrobat Reader is installed on each computer.
- ✓ A limited number of PCs, with the same software which is installed in the lecture rooms, is available onsite in the two rooms marked as "slide room" in the maps, for testing and modifying the presentations. Authors whose presentations contain animations, videos or special effects are strongly encouraged to test the system before their session.
- ✓ A laser pointer, to be used during the presentation, has been given to each delegate together with the other registration material.

*It is the authors' responsibility to check in advance that their presentation works fine with the available version of the installed software.*

## Events

### **WELCOME COCKTAIL**

**Sunday June 29<sup>th</sup> evening**

c/o Hotel Excelsior Lido Venice (nearby Venice Convention)

### **OPENING CEREMONY**

**Monday 30 June, 8:30**

Palagalileo (broadcast live also in CIN1.1)

### **VISIT TO SAN MARCO**

**Wednesday July 2<sup>nd</sup>, 19:30-21:30**

No transportation provided by the Congress

**Visitors are recommended to respect the sacred place, in particular:**

- Clothes be appropriate for a place of worship;
- You cannot enter the basilica with luggage. Luggage must be deposited in Ateneo San Basso (Piazzetta dei Leoncini - in front of the Gate of Flowers, north façade);
- Photos and filming are forbidden;
- Loud explanations are not allowed, the use of earphones is permitted.

### **CONGRESS BANQUET**

**Thursday July 3<sup>rd</sup>, 20:30**

Venice Cruise Terminal (Stazione Marittima)

Boat service from Lido and from San Marco at 20:00 hs.

### **ASSOCIATION MEETINGS**

#### **IACM Executive Council Meeting**

**Tuesday July 1<sup>st</sup>, 12.30-14.00**

c/o Hotel Excelsior Lido Venice (nearby Venice Convention)

#### **IACM General Assembly**

**Thursday July 3<sup>rd</sup>, 18:30**

Casinò Palace

#### **ECCOMAS General Assembly**

**Sunday June 29<sup>th</sup>, 18:30**

Cinema Palace

#### **ECCOMAS Managing Board Meeting**

**Monday 30 June, 12:30-14:00**

c/o Hotel Excelsior Lido Venice (nearby Venice Convention)

## Opening Ceremony Schedule

Welcome Address by the Congress Chairmen

Welcome Address by the IACM President

Welcome Address by the ECCOMAS President

Welcome Address by a representative of the Town of Venice

Keynote Address by Dr. A.Siegler, EU DG RTD - Directorate H - Transport

Presentation of IACM Awards

Presentation of ECCOMAS Awards

Presentation of John Argyris Award

Information on the Congress and opening of the first Plenary Session  
by the Congress Chairmen



# Moving Around in Venice

## Venice Local Transportation

### Waterbus

The public boats called *vaporetti* and *motoscafi* run almost constantly, and you'll seldom have to wait more than a few minutes for one to come along.

The waterbus you'll use most often is the No. 1, the local that stops 13 times between the Piazzale Roma and the Piazza San Marco (for details on boat routes, see the [ACTV](http://www.actv.it/english/home.php) web site <http://www.actv.it/english/home.php> )

The standard waterbus or autobus fare is a painfully steep €6. However, you can save money with a 1-, 3-, or 7-day [Venice Card](http://www.hellovenezia.com/jsp/en/venicecard/index.jsp) (see <http://www.hellovenezia.com/jsp/en/venicecard/index.jsp> ).

### Water taxi

The sleek, wood-trimmed [water taxis](#) of Venice are priced for the limousine crowd, with extra fees for radio-dispatched service, trips after 10 p.m., and Sunday travel. Aquatic cabs don't have meters, so know what you're paying before the skipper casts off.

### Gondola

The city of Venice sets official rates for gondola rides, which started at €80 for 40 minutes (rates may change). Additional 20-minute increments are €40. After 7 p.m., the base rate climbs to €100, with €50 for an additional 20 minutes. Up to six people can share a gondola.

### Traghetto

With only a handful of bridges crossing the Grand Canal's four-kilometer length, Venetians rely on gondola ferries called *traghetti* at seven points between the railroad station and the Santa Maria della Salute church. Follow the yellow gondola signs down to the water, where you'll pay only a small fee to reach the other side.

### Bus Travel on the Lido

*(See bus map on the inside front cover)*

Buses on the Lido leave from the vaporetto landing at **Santa Maria Elisabetta**.

**Orange Line A** goes to San Nicolò and back.

**Dark blue Line B** goes to the Alberoni/Faro Rocchetta (Malamocco) and, in the opposite direction, to the Ospedale al Mare.

**Blue Line C** serves along Via Sandro Gallo.



**Green Line V** goes to Malamocco (Via Parri).

**Line 11** goes to Pellestrina.

Lido bus routes and schedules are included in the same guide that lists vaporetto information. You'll find these on sale at ACTV ticket sellers for EUR .60, and the staff there generally speaks English, French, and Spanish.

The driver does not sell tickets. Buy them at ticket offices or at tobacco shops before boarding. These tickets must then be validated when entering the bus.

## Tips for moving around:

1. At smaller stops, boats will come from both directions. Pay attention so you'll board the right waterbus!
  2. Occasionally, a boat will ignore certain stops or will terminate its run before the end of the line. The placard or electronic signboard on the boat will indicate any such deviations.
  3. Some lines are defined as "summer only," but "summer" usually means April through October on the Venice tourist calendar.
  4. Routes marked with the  icon are easily wheelchair-accessible (e.g., with *vaporetti* that have flat or single-level decks). Routes marked  have at least some wheelchair-accessible boats (e.g., new *motoscafi* on the *circolare* routes that have covered wheelchair positions and belts on the entrance deck).
  5. Actv (the Venice public transportation system) has a free printed timetable (*orario*) that you can request at any ticket booth. Actv also has a Web site (<http://www.actv.it/>) with a journey planner that's reasonably convenient if you know your departure and arrival stops.
  6. If you board at a stop that doesn't have a ticket office, approach the conductor immediately after boarding and ask for a *biglietto*. Otherwise, you could be fined heavily for traveling without a ticket.
  7. Be sure to validate your ticket before boarding the boat. Simply insert it in the yellow ticket machine near the floating platform, and the ticket will be stamped automatically. If you're using a travel card (see below), validate the card the first time it's used.
  8. You can save money on public transportation by purchasing a 12- to 72-hour travel card from any Actv ticket booth. Another (and slightly more expensive) option is the Venice Card, which is available in 1-, 3-, or 7-day versions and includes benefits such as admission to city-owned museums and free use of public toilets.
  9. For convenience, "*vaporetto*" is often used as a generic synonym for "water bus," but technically there are three types of boat: the "*vaporetto*," a flat-decked boat used on routes such as No. 1 (Grand Canal) and No. 2; the "*motoscafo*" (used for routes that go into the Lagoon); and the "*motonave*" (a large double-decked vessel that looks like a ship and is used for commuter service to the Lido, Punta Sabioni, and Treporti).
- The No. 82 express line is now the No. 2, and the old No. 3 summer express is gone, having been replaced by a No. 3 route for Venice residents only.

## Important Links

<http://www.comune.venezia.it>

Web site of the Municipality of Venice. It offers information about institutional matters related with the city and their inhabitants as well as the cultural and social events.

<http://www.veneto.to/portal/faces/public/guest?portal:componentId=portal&portal:action=changeLanguage&portal:language=en>

Necessary information visiting the Veneto Region

<http://www.actv.it/english/home.php>

Public Transport in Venice.

[http://www.venicecard.com/index\\_eng.jsp](http://www.venicecard.com/index_eng.jsp)

Information about the Venice card, with discounts for going around in Venice.

<http://www.alilaguna.com/?lang=en>

The private Venetian transportation company.

<http://www.atnlagunasud.it/condizioni.htm>

Tours in the Venice Lagoon (in Italian).

<http://www.museiciviviceneziani.it/main.asp?lin=EN>

Website dedicated to the Venetian museum and collections.

<http://www.labiennale.org>

The Venice Biennale.

<http://www.museoebraico.it/english/home.asp>

The Jewish Museum.

<http://www.guggenheim-venice.it>

The most important museum in Italy for European and American art of the first half of the 20th century.

<http://www.teatrolafenice.it>

Theatre La Fenice.

<http://www.comune.venezia.it/flex/cm/pages/ServeBLOB.php/L/EN/IDPagina/14>

Venice interactive map

## ***Restaurants at the Lido di Venezia***

### **Da Valentino**

Via Sandro Gallo Nr. 81

### **Al Pescatore "Da Salvo & Gigi"**

Lungomare Guglielmo Marconi Nr. 76

### **Artigliere "Da Rino"**

Via Sandro Gallo Nr. 83

### **La Terrazza del Lido**

Via Enrico Dandolo Nr. 29

### **Rosanna**

Lungomare Guglielmo Marconi Nr. 76

### **Albergo Rivamare**

Lungomare Guglielmo Marconi Nr. 44

### **Parco delle Rose**

Gran Viale Santa Maria Elisabetta Nr. 59

### **Ristorante al Passator Cortese**

Via Lepanto Nr. 8

### **Seta Orientale**

Via Sandro Gallo Nr. 57

### **Trattoria Africa di Diana Daniela & C.**

Via Lazzaro Mocenigo Nr. 9

### **Valentino**

Via Sandro Gallo Nr. 81

Telefono +39 0415260128

## ***Pizzerie***

### **Al Nuovo Cason**

Via Giovanni Pividor Nr. 1

### **Pizzeria 161**

Via Sandro Gallo Nr. 161

### **Venezia 2000**

Lungomare Gabriele D'annunzio Nr. 2

### **Al Passator Cortese**

Via Lepanto Nr. 11

### **La Rotonda**

Via Sandro Gallo Nr. 173

### **Miramare**

Lungomare Guglielmo Marconi Nr. 61

### **Pizzeria La Rotonda**

Via Sandro Gallo Nr. 173

### **Al Fortunale**

Gran Viale Santa Maria Elisabetta Nr. 49

### **La Taverna di Venturini Lucia & C.**

Via Tiro Nr. 9

### **Zanon G.**

Via Tiro Nr. 19

## ***Trattorie***

### **Al Vecio Cantier**

Strada Della Droma Nr. 74

### **Al Ponte di Borgo**

Merceria Nr. 27

### **Andri**

Via Lepanto Nr. 21

### **Favorita**

Via Francesco Duodo Nr. 33

## **La Battigia**

Via Nicosia Nr. 14

## ***Bars***

### **Il Baffo**

Gran Viale Santa Maria Elisabetta Nr. 23

### **La Sfera**

Via Enrico Dandolo Nr. 19

### **Bigli bar**

Via Sandro Gallo Nr. 71

### **Da Tito**

Riviera San Nicolo' Nr. 15

### **Edy**

Via Sandro Gallo Nr. 49

### **Ge. Bar di Conte Michele & C.**

Via Sandro Gallo Nr. 159

### **La Sfera**

Via Lepanto Nr. 11

### **Lyon's**

Lungomare Guglielmo Marconi Nr. 31

### **Maletti Giorgio**

Gran Viale Santa Maria Elisabetta Nr. 45

### **Righibar**

VIA SANDRO GALLO Nr. 135

### **Sacchetto**

Lido, Venezia: Isole

### **Spiaggia G.I.T.**

Lungomare Guglielmo Marconi Nr. 58

### **Sport**

Via Smirne Nr. 18

### **Telebar**

Via Sandro Gallo Nr. 142

### **Trento**

Via Sandro Gallo Nr. 82

### **Vianello M.**

Gran Viale Santa Maria Elisabetta Nr. 59

### **Roxi Bar Ristorante di Cimò Sebastiano**

Gran Viale Santa Maria Elisabetta Nr. 59

## ***Pubs***

### **Acropolis**

Lungomare Guglielmo Marconi Nr. 22

## ***Food Markets***

### **Cedive S.p.A.**

Via Sandro Gallo Nr. 163

### **Coop**

Via Doge Domenico Michiel Nr. 16

### **Iniziative Commerciali S.p.A.**

Via Giusto Fuga Nr. 12

### **Standa S.p.A.**

Via Corfu' Nr. 1



# Scientific Programme Overview

## Introduction

In accordance with the tradition of previous issues of IACM and ECCOMAS Congresses, in the preparation of the scientific programme the Congress has been opened to the latest developments in all aspects of computational mechanics. Specific actions have been undertaken to broaden the fields of application of the discipline to new computation oriented areas of engineering and sciences. In particular, a bottom up approach has been adopted for the organization of Minisymposia, with a two-stage call for proposal allowing a capillary coverage of well established and new emerging topics. All proposed Minisymposia have undergone a review process helping to reduce overlapping and repetitions to a minimum. Among all the proposed Minisymposia, 32 have been sanctioned by the International Union of Theoretical and Applied Mechanics (IUTAM) through the cooperative agreement between IACM and IUTAM. Minisymposia Organizers have had the merit to attract state-of-the-art contributions in the field of their Minisymposium. In addition to the abstracts submitted to Minisymposia, more than 750 other abstracts have been submitted directly to the Congress Organizing Committee, reaching a total of 3457 abstracts submitted.

All abstracts have been reviewed by at least one referee. All rejected abstracts have been reviewed by at least two, in some cases three, referees. At the end of the review and registration process, 2583 papers have been included in the Scientific Programme.

The Scientific Programme is subdivided in sessions of different types:

- Plenary Sessions (P), with 10 Plenary Lectures, 2 per day
- Semi-Plenary Sessions (SP), with 16 Semi-Plenary Lectures, 4 per day
- 138 MiniSymposia (MS), organized by 358 researchers from all over the world
- 15 Thematic Sessions (TS), managed directly by the Organizing Committee
- 14 Special Technology Sessions (STS), in the area of Aeronautics Technologies, supervised by dr. Jacques Periaux and dr. Dietrich Knoerzer

## A short guide to the Scientific Programme

The Congress will be opened on Monday, June 30, by the Opening Session. The IACM and ECCOMAS Awards will be presented to the awardees in this session.

Every day, the Scientific Programme includes 1 Plenary Session (2 lectures) and 1 Semi-Plenary Session (with the exception of Monday) (4 parallel lectures).

The scientific contributions are presented in 35 parallel sessions labelled as: MORNING SESSIONS, AFTERNOON SESSIONS and EVENING SESSIONS.

Subsequent sessions are separated by Coffee Breaks (CB) and by the Lunch Break (LB). A Short Break (SB) of 10 min. between Plenary and Semi-Plenary Sessions will give attendants the time to reach the desired lecture room.

MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
08.30-10.00	OPENING SESSION	08.20-9.20	P	P	P	P	P	P	P
		09.20-9.30	SB	SB	SB	SB	SB	SB	SB
		09.30-10.00	SP	SP	SP	SP	SP	SP	SP
10.00-11.00	P	10.00-10.30	CB	CB	CB	CB	CB	CB	
11.00-11.30	CB	10.30-12.30	MORNING SESSION	MORNING SESSION	MORNING SESSION	MORNING SESSION	MORNING SESSION	MORNING SESSION	
11.30-12.30	MORNING SESSION		MORNING SESSION	MORNING SESSION	MORNING SESSION	MORNING SESSION	MORNING SESSION		
12.30-14.00	LB	12.30-14.00	LB	LB	LB	LB	LB	LB	
14.00-16.00	AFTERNOON SESSION	14.00-16.00	AFTERNOON SESSION	AFTERNOON SESSION	AFTERNOON SESSION	AFTERNOON SESSION	AFTERNOON SESSION	AFTERNOON SESSION	
16.00-16.30	CB	16.00-16.30	CB	CB	CB	CB	CB	CB	
16.30-18.30	EVENING SESSION	16.30-18.30	EVENING SESSION	EVENING SESSION	EVENING SESSION	EVENING SESSION	EVENING SESSION	EVENING SESSION	

P = Plenary Session  
SP = Semi-Plenary Session

SB = 10 min. Short Break  
CB = 30 min. Coffee Break

LB = 90 min. Lunch Break

## Plenary Lectures (P)

All Plenary Lectures will take place in the PalaGalileo (PGL) lecture room and will be also broadcast in the CIN1.1 lecture room.

- P1. Monday 10.00 – PGL: Michael Ortiz**  
California Institute of Technology, Pasadena, United States  
*Electronic-Structure Calculations at Macroscopic Scales*
- P2. Monday 10.30 – PGL: Alfio Quarteroni**  
Ecole Polytechnique Fédérale de Lausanne, Switzerland  
Politecnico di Milano, Italy  
*Mathematical Modeling for Medicine, Sports, and the Environment*
- P3. Tuesday 08.20 – PGL: Herbert Mang**  
Vienna University of Technology, Austria  
*Computational Multi-Scale Analysis in Civil Engineering*
- P4. Tuesday 08.50 – PGL: Kazuhiro Nakahashi**  
Tohoku University, Japan  
*Building-Cube Method: A CFD Approach for Near-Future PetaFlops Computers*
- P5. Wednesday 08.20 – PGL: Robert Taylor**  
University of California at Berkeley, United States  
*My Fifty Years with Finite Elements!*
- P6. Wednesday 08.50 – PGL: Olivier Pironneau**  
Université Paris VI, France  
*Numerical Challenge for Option Pricing*
- P7. Thursday 08.20 – PGL: Ted Belytschko**  
Northwestern University, United States  
*Multiscale Computational Methods for Failure*
- P8. Thursday 08.50 – PGL: Pierre Ladevèze**  
LMT-Cachan, Paris 6 University, France  
*The Latin Method: A Paradigm for Multiscale and Multiphysics Computational Methods*
- P9. Friday 08.20 – PGL: Barbara Wohlmuth**  
University of Stuttgart, Germany  
*Stable Hybridization Techniques in Computational Mechanics*
- P10. Friday 08.50 – PGL: Roger Owen**  
University of Wales Swansea, United Kingdom  
*Multi-Field Coupling Strategies for Large Scale Problems Involving Multi-Fracturing Rock and Particulate Media*

## Semi-Plenary Lectures (SP)

Tuesday 09.30

### SP0. CAS1.2: ECCOMAS Best PhD Theses Lectures

**Jeroen Wackers (The Netherlands)**

*Surface Capturing and Multigrid for Steady Free-Surface Water Flows*

**Lukasz Madej (Poland)**

*Development of the Multi-Scale Analysis Model to Simulate Strain Localization Occurring During Material Processing*

### SP1. CAS1.7: Ernst Rank

Technical University München, Germany

*Computational Steering: Towards Advanced Interactive High Performance Computing in Engineering Sciences*

### SP2. CAS3.7: Scott Sloan

University of Newcastle, Australia

*Limit Analysis with Adaptive Mesh Refinement*

### SP3. CIN1.1: STS Lecture

### SP4. PGL: Takashi Yabe

Tokyo Institute of Technology, Japan

*Robust Multi-Phase Flow Solvers with Mesh-Free Adaptive Grid CIP Method*

Wednesday 09.30

### SP5. CAS1.7: Zdenek Bazant

Northwestern University, United States

*Computing Quasibrittle Failure Probability: from Nano to Macro*

### SP6. CAS3.7: Wolfgang Wall

Technical University of Munich, Germany

*Computational modeling of the respiratory system*

### SP7. CIN1.1: Sergio Idelsohn

CIMNE, Spain

Universidad Nacional del Litoral, Argentina

*Fluid-Structure-Interaction Problems Including "Added-Mass Effects"*

### SP8. PGL: Wing Kam Liu

Northwestern University, United States

*Multiresolution Mechanics: Linking Material Properties to Evolving Microstructure*

**Thursday 09.30**

**SP9. CAS1.7: Nicolas Moës**

Ecole Centrale de Nantes, France

*The eXtended Finite Element Method: State of the Art and Challenges Ahead*

**SP10. CAS3.7: Javier Bonet**

University of Wales Swansea, United Kingdom

*Two Step Taylor-Galerkin Solution of Lagrangian Explicit Dynamic Solid Mechanics*

**SP11. CIN1.1: Worsak Kanok-Nukulchai**

Asian Institute Of Technology, Thailand

*Advances in Kriging-Based Finite Element Method*

**SP12. PGL: Tom Hughes**

The University of Texas at Austin, United States

*Isogeometric Analysis: Progress and Challenges*

**Friday 09.30**

**SP13. CAS1.7: Rainald Löhner**

George Mason University, United States

*Combination of Body-Fitted and Embedded/Immersed Methods for Complex CFD Applications*

**SP14. CAS3.7: Ferdinando Auricchio**

Università di Pavia, Italy

*On the Stability of Finite Element Schemes for Finite Strain Incompressible Elasticity*

**SP15. CIN1.1: Gengdong Cheng**

Dalian University of Technology, China

*Multi-Scale Design Optimization*

**SP16. PGL: Charbel Farhat**

Stanford University, United States

*Reduced-Order Modeling, Differential Geometry and Physics-Based Near-Real-Time Predictions*



# List of Minisymposia (MS)

The beginning section and lecture room for each Minisymposium are indicated below the title

**A Background to Several Computational Difficulties: The Non-Smooth Evolution of Mechanical Systems due to Discontinuities of the Velocities in Time or in Space [MS143]**

*Eric Dimnet and Federico Tochetti*

TUESDAY EVENING - CAS3.6

**Accomplishments and Challenges in Verification & Validation [MS030]**

*Luis Eça, Len Schwer, Martin Hoekstra and Bill Oberkampf*

THURSDAY MORNING - CAS1.8

**Accuracy Assessment of the eXtended Finite Element Method: Adaptivity, Comparison with Competing Methods, Industrialisation [MS141]**

*Stephane Bordas, Marc Duflot and Pierre-Olivier Bouchard*

MONDAY MORNING - EXC1.3

**Adaptive Higher Order Variational Methods for Aerospace Applications [MS057]**

*Norbert Kroll, Jaap van der Vegt and Remi Abgrall*

THURSDAY EVENING - CAS2.4

**Adaptive Methods for Material Processing [MS122]**

*Thierry Coupez, Jean-François Hetu and José César de Sa*

THURSDAY MORNING - CAS1.1

**Adaptive Modeling in Computational Mechanics [MS236]**

*J. Tinsley Oden and Serge Prudhomme*

WEDNESDAY EVENING - CAS3.2

**Advanced Computational Descriptions of Macromolecular Materials: from the Atom to the Flow [MS026]**

*Francisco Chinesta, Elias Cueto, Martin Kroger and Tim Phillips*

WEDNESDAY MORNING - CAS3.6

**Advanced Computational Methods for Wave Motion [MS036]**

*Dan Givoli and Geza Seriani*

TUESDAY MORNING - CAS3.9

**Advanced Materials: Computational Analysis of Properties and Performance [MS209]**

*Vadim Silberschmidt and Valery Matveenko*

THURSDAY AFTERNOON - CAS3.1

**Advanced Numerical Approaches for Complex Multi-phase Flows [MS140]**

*Takashi Yabe, Nobuatsu Tanaka and Feng Xiao*

MONDAY MORNING - CAS2.6

**Advancement in Numerical and Physical Modeling of Free-Surface Flows [MS044]**

*Lian Shen and Feng Xiao*

FRIDAY MORNING - CAS2.5

**Advances in Boundary Element Methods [MS043]**

*Yijun Liu, Martin Schanz, Naoshi Nishimura, Zhenhan Yao, Marc Bonnet, Ernie Pan, Attilio Frangi and Mitch Denda*

WEDNESDAY AFTERNOON - CIN2.1

**Advances in CFD Simulation of In-Flight Icing [MS212]**

*Wagdi Habashi and Mark Potapczuk*

THURSDAY EVENING - CAS2.5

**Advances in Computational Mechanics in Honor of Professor Maier [MS155]**

*Eugenio Onate, Claudia Comi and Giorgio Novati*

MONDAY EVENING - EXC1.1

**Advances in Computational Modeling for Environmental Engineering [MS198]**

*Agustí Pérez-Foguet and Rafael Montenegro*

TUESDAY MORNING - CAS1.4

**Advances in Computational Stochastic Mechanics [MS125]**

*Vissarion Papadopoulos, Dimos Charmpis and Manolis Papadrakakis*

WEDNESDAY MORNING - CAS3.3

**Advances in Multiphysics Simulation and Experimental Testing of MEMS and NEMS [MS151]**  
*Attilio Frangi, Narayan Aluru and Subrata Mukherjee*  
 MONDAY MORNING - CIN1.1

**Advances in Multiscale and Multiphysics Methods: From Quantum to Continuum [MS265]**  
*Dong Qian, Wing Kam Liu and Jacob Fish*  
 TUESDAY MORNING - CAS3.3

**Advances in Particle Methods - Minisymposium Sponsored by the Zienkiewicz Foundation [MS238]**  
*Roger Owen and Sergio Idelsohn*  
 MONDAY MORNING - EXC2.1

**Advances in Time-Integration [MS084]**  
*Adrian Lew, Eric Darve and Isaac Harari*  
 FRIDAY MORNING - EXC2.1

**Application of Computational Mechanics to Geoscience Problems: Computational Geosciences [MS178]**  
*Chongbin Zhao, A. Murakami and K. T. Chau*  
 THURSDAY AFTERNOON - CAS1.7

**Biofluids and Coupled Problems in Biomechanics [MS080]**  
*Wolfgang Wall, Marek Behr, Matteo Pasquali and Alberto Figueroa*  
 WEDNESDAY AFTERNOON - CIN0.1

**Biological Cells and Capsules [MS194]**  
*Takuji Ishikawa, Dominique Barthes-Biesel, Petia Vlahovska and Takami Yamaguchi*  
 MONDAY MORNING - CIN0.1

**Challenges in Mechanics for Nuclear Plants [MS123]**  
*Pierre Verpeaux and Stéphane Andrieux*  
 TUESDAY MORNING - CAS1.5

**Composite Materials and Multiscale Modeling and Design in Medicine and Engineering [MS193]**  
*Michel C. Delfour and Marc Thiriet*  
 TUESDAY MORNING - CIN0.2

**Computational Bioimaging and Visualization [MS016]**  
*João Tavares, Renato Natal Jorge, Thomas J. R. Hughes and Chandrajit Bajaj*  
 TUESDAY MORNING - CIN2.1

**Computational Contact Mechanics [MS168]**  
*Peter Wriggers, Tod A. Laursen and Giorgio Zavarise*  
 MONDAY MORNING - CAS1.2

**Computational Electro-Magneto-Hydro-Dynamics (EMHD) [MS042]**  
*Gunter Gerbeth, George S. Dulikravich and Koulis Pericleous*  
 MONDAY MORNING - CAS3.5

**Computational Fracture Mechanics of Heterogeneous Materials and Structures [MS109]**  
*Noriyuki Miyazaki and Toru Ikeda*  
 WEDNESDAY AFTERNOON - CAS3.8

**Computational Fusion Technology [MS121]**  
*Ettore Salpietro and Daniela P. Boso*  
 MONDAY MORNING - CAS1.5

**Computational Geomechanics Minisymposium [MS029]**  
*Boris Jeremic, Claudio Tamagnini, Richard Regueiro, Ronaldo Borja, Fusao Oka and Stein Sture*  
 MONDAY MORNING - PGL

**Computational Mechanics of Biological and Bio-Inspired Materials and Structures [MS202]**  
*Christian Hellmich and Dinesh Katti*  
 TUESDAY AFTERNOON - CIN0.1

**Computational Methods for Generalized Continua [MS028]**  
*Richard Regueiro, Krishna Garikipati, Carlo Sansour, Paul Steinmann, Harm Askes and Jerzy Pamin*  
 MONDAY MORNING - EXC1.2

**Computational Methods in Composite Materials and Structures [MS119]**

*Anastasia Muliana, Rami Haj-Ali and Marcin Kaminski*

WEDNESDAY MORNING - CAS3.1

**Computational Methods in Impact Engineering [MS017]**

*Ashkan Vaziri, Zhenyu Xue, Dirk Mohr and Horacio Espinosa*

FRIDAY MORNING - CIN0.1

**Computational Methods in Multibody Dynamics Simulation [MS019]**

*Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee*

MONDAY MORNING - CAS1.7

**Computational Methods in Nonlinear Dynamics [MS038]**

*Stefano Lenci and Marian Wiercigroch*

MONDAY MORNING - CAS2.5

**Computational Methods in Virtual and Computer Planned Surgery [MS127]**

*Suvranu De and Anna Pandolfi*

WEDNESDAY MORNING - CIN0.2

**Computational Modeling in Cardiovascular Mechanics [MS099]**

*Gerhard A. Holzapfel, Jay D. Humphrey, Charles A. Taylor and David A. Vorp*

THURSDAY AFTERNOON - CIN1.1

**Computational Modelling in Bone Mechanobiology [MS180]**

*Jose Manuel Garcia-Aznar, Danny Kelly, Manuel Doblare and Patrick Prendergast*

MONDAY MORNING - CIN2.1

**Computational Modelling of Locomotor Systems [MS208]**

*Markus Böl, Stefanie Reese and Bob Svendsen*

WEDNESDAY MORNING – PGL

**Computational Procedures and Models for Quasi-brittle Materials [MS114]**

*Anthony Jefferson and Günter Hofstetter*

TUESDAY MORNING - CAS3.10

**Computations of Fluid Flows at the Solid-Fluid Interfaces [MS203]**

*Dimitrios Papavassiliou and Lloyd Lee*

WEDNESDAY EVENING - CAS2.2

**Concrete Subject to High Temperature and Fire [MS100]**

*Carmelo Majorana and Gabriel Khoury*

FRIDAY MORNING - CAS3.10

**Constitutive Stability and Fracture: Models and Applications [MS064]**

*Pedro Areias and José César de Sá*

TUESDAY EVENING - CAS3.8

**Contact Mechanics : Modelling, Analysis and Applications [MS039]**

*Mircea Sofonea, José R. Fernandez and Georgios E. Stavroulakis*

TUESDAY AFTERNOON - CAS0.1

**Continuum Models for Composite And Nano-Materials, Mems/Nems Devices [MS078]**

*Toshiro Matsumoto and Vladimir Kompis*

MONDAY MORNING - CIN0.2

**Coupled Multifield Problems and Smart Structures [MS086]**

*Thomas Wallmersperger, Bernd Kröplin and Erasmo Carrera*

THURSDAY MORNING - CAS3.4

**Damage and Interfacial Delamination Modelling in Composite Materials [MS103]**

*Domenico Bruno, Frédéric Lebon and Elio Sacco*

THURSDAY MORNING - CAS3.10

**Delamination Including Internal Contact. [MS097]**

*Mieczyslaw Kuczma and Bernd Zastra*

WEDNESDAY AFTERNOON - CAS2.5

**Development of a Computational Testbed for Studying Near-Surface Phenomena [MS171]**

*Owen Eslinger*

TUESDAY EVENING - CAS1.5

**Dynamics of Nonlinear Structures with Contact Interfaces [MS142]**

*Evgeny Petrov and Kai Willner*  
THURSDAY MORNING - CAS1.6

**Efficient Computational Methods for Coupled Problems [MS096]**

*Harald van Brummelen and Tayfun Tezduyar*  
FRIDAY MORNING - CAS3.4

**Extended / Generalized Finite Element Method [MS037]**

*Ted Belytschko, Elisa Budyn, John Dolbow, Nicolas Moës and Giulio Ventura*  
WEDNESDAY MORNING - EXC1.3

**Finite Element Technology and Meshfree approaches: innovative formulation applied to metal forming [MS025]**

*Renato Natal Jorge, Robertt Fontes Valente, Stefanie Reese and Elias Cueto*  
FRIDAY MORNING - CAS1.5

**Fluid Dynamics of Compressible Flows of Substances Governed by Complex Thermodynamic Models [MS049]**

*Piero Colonna, Stefano Rebay, Alberto Guardone and John Harinck*  
MONDAY AFTERNOON - CAS3.3

**High-performance Computing in Computational Mechanics [MS199]**

*Shahrouz Aliabadi, Omar Ghattas, Robert B. Haber, Guillaume Houzeaux, Abani Patra and Mariano Vázquez*  
WEDNESDAY MORNING - CAS2.1

**Image-Based Computational Modelling of Materials [MS210]**

*M.A. Siddiq Qidwai and Andrew B. Geltmacher*  
WEDNESDAY AFTERNOON - CAS3.7

**Immersed Boundary and Immersed Interface Methods [MS175]**

*Pietro De Palma, Michele Napolitano, Giuseppe Pascazio and Roberto Verzicco*  
TUESDAY EVENING - CAS2.6

**Innovative and Advanced Methods for Computational Dynamics [MS104]**

*Carlos Felippa and Ekkehard Ramm*  
MONDAY MORNING - CAS3.9

**Innovative Methods for Fluid-Structure Interaction [MS128]**

*Trond Kvamsdal, Roger Ohayon and Harald van Brummelen*  
MONDAY AFTERNOON - CAS2.3

**Intelligent Multi-tasking Computer Aided Engineering Systems [MS067]**

*Pedro Marcal and Nobuki Yamagata*  
MONDAY EVENING - CAS2.2

**Inverse Problems [MS102]**

*Bojan Guzina and Marc Bonnet*  
MONDAY MORNING - CAS1.8

**Inverse Problems for Parameter Identification [MS167]**

*George Dulikravich, Giulio Maier and Helcio Orlande*  
WEDNESDAY EVENING - CAS1.2

**Inverse Problems: Recent Advances in Methodology and Techniques [MS054]**

*Barbara Kaltenbacher and Roland Potthast*  
TUESDAY EVENING - CAS1.8

**Iterative Solvers for the Incompressible Navier Stokes Equations [MS052]**

*Michele Benzi and Kees Vuik*  
THURSDAY MORNING - CAS2.5

**Large Scale Eigenvalue Problems [MS023]**

*Heinrich Voss, Peter Arbenz, Zhaojun Bai, Ren-Cang Li, Yvan Notay, Richard Lehoucq, Michiel Hochstenbach, Qiang Ye, Chao Yang and Andrew Knyazev*  
FRIDAY AFTERNOON - EXC1.1

**Length Scale Effects in Dynamic Failure of Materials [MS112]**

*Shailendra Joshi, J.F. Molinari and K.T. Ramesh*  
MONDAY MORNING - CAS3.1

**Mathematical Analysis of Generalized Finite Element Method [MS088]**

*Uday Banerjee and Mark Alexander Schweitzer*

MONDAY MORNING - EXC1.1

**Mathematical and Practical Aspects of Advanced Computational Methods in Complex Systems [MS159]**

*Mario-Cesar Suarez Arriaga, Jochen Bunschuh, Francisco Domínguez-Mota and Karsten Pruess*

TUESDAY MORNING - CAS3.

**Mathematical Foundations of Computational Mechanics [MS117]**

*Susanne C. Brenner and Carsten Carstensen*

THURSDAY AFTERNOON - CIN0.2

**Mechanical Modeling of Wood and Wood Based Materials [MS187]**

*Josef Eberhardsteiner, Michael Kaliske and Karin Hofstetter*

WEDNESDAY EVENING - CAS3.6

**Mechanics of Tires and Pavements: Material and Computational Modeling [MS182]**

*Michael Kaliske and Markus Oeser*

WEDNESDAY MORNING - CAS1.5

**Meshfree and Generalized/Extended Finite Element Methods [MS107]**

*J. S. Chen, Ivo Babuska, Ted Belytschko, C. Armando Duarte, Vitor Leitão, Wing Kam Liu, Hirohisa Noguchi and Angelo Simone*

THURSDAY MORNING - EXC1.2

**Meshfree Multiscale Methods Mini-Symposium [MS089]**

*Michael Griebel, Antonio Huerta, Wing Kam Liu and Marc Alexander Schweitzer*

TUESDAY MORNING - CAS3.4

**Meshless and Related Methods [MS098]**

*Janusz Orkisz, Sergio Idelsohn and Suvranu De*

THURSDAY AFTERNOON - EXC1.3

**Metamodels for High Dimensionality Response Surfaces in Multiobjective Optimization [MS045]**

*George Dulikravich and Marcelo Colaco*

WEDNESDAY MORNING - CAS1.3

**Micro-fluidic / Lab-on-a-chip Systems [MS020]**

*Friedhelm Schönfeld and David Emerson*

MONDAY EVENING - CIN0.2

**Minisymposium in Honor of Prof. O.C. Zienkiewicz [MS053]**

*Robert Taylor and Perumal Nithiarasu*

WEDNESDAY MORNING - EXC1.1

**Minisymposium in the Honor of Michel Bernadou's 65th Birthday [MS073]**

*John Cagnol and Roland Glowinski*

TUESDAY EVENING - EXC1.2

**Minisymposium on "Mathematical Modeling and Numerical Simulation of Coupled Multiphysics Systems in Nano- and Biotechnologies" [MS116]**

*Roderick Melnik and Riccardo Sacco*

TUESDAY EVENING - CAS2.2

**Minisymposium on Advances in Mesh-Reduction Techniques: BEM and Meshless Methods [MS075]**

*Eduardo Divo, Alain Kassab, Bozidar Sarler and Ryszard Bialecki*

FRIDAY AFTERNOON - CIN2.1

**Minisymposium on Computational Methods for Seismic Analysis and Design [MS136]**

*Manolis Papadarakakis, Dimos Charmpis and Nikos Lagaros*

FRIDAY AFTERNOON - CAS1.1

**Minisymposium on Inverse Problems in Heat Transfer [MS074]**

*Alain Kassab, Richard Bialecki and Eduardo Divo*

MONDAY MORNING - CAS2.1

**Minisymposium on PDE Constrained Optimization [MS071]**

*Michael Hintermueller and Ronald H W Hoppe*

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- Minisymposium on Performance-Based Structural Design Optimization [MS047]**  
*Nikos Lagaros , Christopher Foley and Hongbing Fang*  
 WEDNESDAY MORNING - CAS1.6
- Modeling Robustness and Structural Reliability Analysis [MS063]**  
*James Beck, Gerhart Schuëller and Hector Jensen*  
 MONDAY EVENING - CAS2.4
- Modelling and Optimisation for Coupled Multi-Physics Processes [MS059]**  
*Francois Bay and Mark Cross*  
 FRIDAY AFTERNOON - CAS1.7
- Modern Approaches for Fluid-structure Interaction Problems on Lightweight Structures [MS120]**  
*Roland Wüchner and Riccardo Rossi*  
 THURSDAY MORNING - CAS2.6
- Multiobjective Optimization in Industrial Applications [MS176]**  
*Jussi Hakanen and Elina Madetoja*  
 TUESDAY AFTERNOON - CAS1.3
- Multi-phase and Multi-scale Modelling of Concrete and Concrete Structures [MS118]**  
*Pavao Marovic, Nenad Bicanic and Adnan Ibrahimbegovic*  
 MONDAY MORNING - CAS3.6
- Multiphysics Modelling of Porous Media: Geomaterials, Biomaterials and Others [MS079]**  
*Younane N. Abousleiman, Stefan Diebels and Lorenzo Sanavia*  
 THURSDAY EVENING – PGL
- Multiscale Damage and Failure Mechanics of Engineering Materials [MS149]**  
*J. Woody Ju, Lizhi Sun, Pierre Ladeveze and Olivier Allix*  
 THURSDAY AFTERNOON - CAS3.7
- Multiscale Mechanics in Durability of Materials [MS082]**  
*Roman Lackner and Josef Eberhardsteiner*  
 WEDNESDAY MORNING - CAS3.4
- Multiscale Mechanics of Interfaces [MS115]**  
*Christoph Eberl, Abhijit Mukherjee, Siegfried Schmauder and Shailendra Joshi*  
 MONDAY EVENING - CAS3.4
- Multiscale Methods in Computer Materials Science [MS033]**  
*Maciej Pietrzyk, Peter Hodgson and Tadeusz Burczynski*  
 FRIDAY MORNING - CAS3.6
- Multiscale Model-Based Simulation with Applications to Nano and Bio Systems [MS169]**  
*Zhen Chen, Er Ping Chen, H. Eliot Fang, Hongwu Zhang and Zhuo Zhuang*  
 TUESDAY MORNING - EXC1.2
- Multiscale Modeling and Uncertainty Quantification of Heterogeneous Materials [MS150]**  
*Manolis Papadrakakis, George Stefanou, X. Frank Xu and Nicholas Zabarar*  
 MONDAY MORNING - CAS3.10
- Multiscale Modelling of Material Behaviour [MS124]**  
*Chris Pearce and Eduardo de Souza Neto*  
 TUESDAY AFTERNOON - EXC1.3
- Multiscale Problems in the Life Sciences [MS131]**  
*Vincenzo Capasso and Willi Jaeger*  
 FRIDAY MORNING - CIN0.2
- Multiscale Simulations for Composite Materials and Mechanical Systems [MS110]**  
*Junzhi Cui, Xiu-Tian Yan, Geng Liu, Liyan Wu, Tianxiang Liu, Qin Xie and Qian Li*  
 MONDAY MORNING - CAS3.4
- New Trends for Evolutionary Optimization Methods Applied to Multidisciplinary Problems [MS076]**  
*William Annicchiarico, George Dulikravich and Miguel Cerrolaza*  
 TUESDAY MORNING - CAS1.6
- Numerical and Computational Aspects of Interface Problems [MS050]**  
*Frederic Gibou and Christian Ratsch*  
 MONDAY EVENING - CAS3.8

**Numerical Dynamical Systems Analysis of Nonlinear Climate Models [MS184]**

*Fred Wubs, Kurt Lust and Henk Dijkstra*

MONDAY EVENING - CAS1.4

**Numerical Methods and Technological Solutions for CSP Systems [MS207]**

*Valentina Salomoni and Giannuzzi Mauro*

MONDAY EVENING - CAS1.5

**Numerical Methods for Fluid-structure Interactions [MS087]**

*Hester Bijl and Jan Vierendeels*

WEDNESDAY MORNING - CAS3.5

**Numerical Methods for Gas-Liquid Two-Phase Flow [MS085]**

*Byeong Rog SHIN and Takeo Kajishima*

TUESDAY EVENING - CAS2.5

**Numerical Modeling and Simulation on Micro and Nanoscale Materials and Devices [MS170]**

*Marisol Koslowski and Richard Lesar*

WEDNESDAY MORNING - CIN1.1

**Numerical Modeling in Reinforced Concrete and Its Validation [MS200]**

*Rena C. Yu, Giulio Ventura, Gonzalo Ruiz and Jacinto R. Carmona*

TUESDAY MORNING - CAS3.6

**Numerical Modeling of Coupled Problems in Geo- and Durability Mechanics [MS148]**

*Günther Meschke and Xikui Li*

THURSDAY MORNING - CAS1.4

**Numerical Modelling of High Speed or Innovative Metal Forming Processes [MS032]**

*jean-loup chenot, fabricio micari and katia mocellin*

WEDNESDAY MORNING - CAS1.2

**Numerical Modelling of Hydrodynamic Geophysical Flows. Honouring Fausto Saleri [MS062]**

*Tomas Chacon Rebollo and Edie Miglio*

THURSDAY EVENING - CAS2.6

**Numerical Techniques for the Modelling of Material Failure in Solids [MS237]**

*Xavier Oliver and Francisco Armero*

MONDAY MORNING - CAS3.7

**Optimization and Inverse Engineering for Industrial Applications [MS106]**

*Michele Chiumenti and Valentino Pediroda*

FRIDAY MORNING - CAS1.8

**Patient Specific Computational Modelling [MS070]**

*Perumal Nithiarasu and Rainald Lohner*

FRIDAY MORNING - CAS1.4

**Propagation of Electron, Elastic, and Electromagnetic Waves in Nonhomogeneous Waveguides and Nanostructures [MS066]**

*Lev Baskin, Pekka Neittaanmäki and Boris Plamenevsky*

THURSDAY MORNING - CIN0.2

**RANS/LES Coupling for the Simulation of Complex Flows [MS186]**

*Jochen Fröhlich and Ivan Mary*

TUESDAY AFTERNOON - CAS2.3

**Recent Advances in Numerical Methods for Hyperbolic Problems [MS060]**

*Sergey Karabasov, Vassily Golovizin, Tatyana Kozubskaya, Yoko Takakura, Ralf Deiterding and Maria Lukacova*

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**Recent Developments in Computational Methods for Structural Optimization [MS069]**

*H Alicia Kim, Gengdong Cheng, David Kennedy, Michal Kocvara, Tae Hee Lee, Kurt Maute and Mathias Stolpe*

MONDAY MORNING - CAS0.1

**Role of Heterogeneities and Uncertainties in Inelastic Response of Materials [MS111]**

*Adnan Imbrahimbegovic and Hermann Matthies*

MONDAY EVENING - CAS3.6

**Scale Bridging in Science and Engineering [MS024]**

*Jacob Fish and Kenjiro Terada*

FRIDAY MORNING - CAS3.2

**Second Level Preconditioners for Krylov Subspace Methods [MS048]**

*Reinhard Nabben and Kees Vuik*

FRIDAY AFTERNOON - CAS2.4

**Simulation Technology towards the Hydrogen Use World. [MS056]**

*Hiroshi Kanayama and Noriyuki Miyazaki*

MONDAY MORNING - CAS1.4

**Soft Computing Methods [MS094]**

*Tadeusz Burczynski, Jamshid Ghaboussi and Zenon Waszczyszyn*

MONDAY EVENING - CAS2.1

**Sparse Linear System Solvers for Large-Scale Finite Element Applications [MS158]**

*Alberto Bertoldo and Mauro Bianco*

THURSDAY MORNING - CAS0.1

**Special Symposium in Honour of 75th Birthday of Professor S. Valliappan [MS185]**

*Nasser Khalili and Scott Sloan*

THURSDAY AFTERNOON - EXC1.1

**Stabilized, Multiscale and Multiphysics Methods [MS055]**

*Tayfun Tezduyar, Arif Masud and Thomas Hughes*

MONDAY AFTERNOON - EXC2.2

**Structural Stability [MS083]**

*Herbert Mang and Zsolt Gaspar*

FRIDAY MORNING - EXC2.2

**Subgrid Scales, A-Posteriori Error Estimation and Adaptivity for Computational Mechanics [MS081]**

*Guillermo Hauke and James R. Stewart*

MONDAY MORNING - CAS3.8

**Theory and Applications of Discontinuous Galerkin Methods [MS130]**

*Slimane Adjerid, Clint Dawson, Adrian Lew, Beatrice Riviere and Chi-Wang Shu*

THURSDAY MORNING - CAS2.3

**Thermodynamics Aspects of Metal Behavior at Extreme Loading Rates [MS177]**

*Aleksander Zubelewicz and Wojciech Nowacki*

TUESDAY AFTERNOON - CAS3.4

**Time- and Spatial Decomposition Methods for Multi-physical and Multi-field Problems [MS139]**

*Jürgen Geiser and Qin Sheng*

WEDNESDAY EVENING - CAS1.5

**Topology Optimization in Civil and Structural Engineering [MS065]**

*Matthew Gilbert and Tomasz Lewinski*

THURSDAY AFTERNOON - CAS0.1

**Transition Modelling [MS192]**

*Erik Dick, Mark Savill, Witold Elsner and Franco Magagnato*

WEDNESDAY AFTERNOON - CAS2.3

**Uncertainties in Computational Mechanics with Emphasis on Structural Optimization Applications [MS035]**

*Dan Frangopol and Yiannis Tsompanakis*

MONDAY MORNING - CAS1.6

**Uncertainty Modeling and Quantification in Computational Mechanics [MS021]**

*Roger Ghanem, Christian Soize and Gerhart Schueller*

MONDAY MORNING - CAS1.1

**Uncertainty Quantification Methods for CFD and FSI [MS090]**

*Hester Bijl and Chris Lacor*

MONDAY EVENING - CAS1.3

**Virtual Fracture Testing of Composite Materials and Structures [MS154]**

*Javier LLorca and Brian Cox*

MONDAY EVENING - CAS3.1



## Thematic Sessions (TS)

*Thematic Sessions collect technical contributions which have not been submitted directly to a Minisymposium.*

### **Advancements in Finite Element Method [TS315]**

FRIDAY MORNING - CAS2.1

### **Boundary Element Method [TS300]**

FRIDAY AFTERNOON - CIN0.2

### **Computational Dynamics [TS309]**

TUESDAY AFTERNOON - CAS3.5

### **Computational Fluid Dynamics [TS303]**

WEDNESDAY AFTERNOON - CAS3.9

### **Computational Geomechanics [TS314]**

WEDNESDAY EVENING - CIN0.2

### **Computational Materials Mechanics [TS318]**

THURSDAY AFTERNOON - CAS3.8

### **Computational Mathematics and Numerical Methods [TS319]**

THURSDAY MORNING - CAS3.3

### **Computational Structural Mechanics [TS328]**

MONDAY MORNING - CAS3.2

### **Computer Simulation in Vehicle Design and Transport [TS321]**

THURSDAY AFTERNOON - CAS1.5

### **Environment [TS310]**

WEDNESDAY AFTERNOON - CAS1.4

### **Fracture Mechanics [TS313]**

WEDNESDAY MORNING - CAS3.10

### **Industrial Applications [TS316]**

FRIDAY MORNING - CAS1.6

### **Multiple-Scale Physics and Computation [TS322]**

WEDNESDAY AFTERNOON - CAS3.4

### **Optimization and Control [TS325]**

THURSDAY MORNING - CAS1.3

### **Parallel Computing [TS326]**

TUESDAY MORNING - CAS2.2

## Special Technology Sessions (STS)

*Special thematic sessions devoted to industry oriented problems, mainly in the areas of Aeronautics Technologies.*

### **STS01: Flow Simulation and Validation in Aeronautics**

*Dietrich Knoerzer*

WEDNESDAY AFTERNOON - EXC2.1

### **STS02: Large Eddy Simulation: Research and Industrial Applications**

*Charles Hirsch*

WEDNESDAY EVENING - EXC2.1

### **STS03: Drag Reduction Technologies**

*David Sawyers*

TUESDAY AFTERNOON - EXC2.1

### **STS04: Introduction to Optimisation Methods and Tools for Multidisciplinary Design in Aeronautics and Turbo-Machinery (VKI Course summary session)**

*Herman Deconinck*

WEDNESDAY EVENING - EXC2.2

### **STS06: Wake Vortex Research in Europe**

*Thilo Schönfeld*

THURSDAY EVENING - EXC2.1

### **STS07.1: MDO Tools for High Quality Design in Aeronautics**

*Jacques Pèriaux*

THURSDAY MORNING - EXC2.2

### **STS07.2: MDO Tools for High Quality Design in Aeronautics**

*Jacques Pèriaux*

THURSDAY AFTERNOON - EXC2.2

### **STS07.3: MDO Tools for High Quality Design in Aeronautics**

*Jacques Pèriaux*

THURSDAY EVENING - EXC2.2

### **STS08: New Technologies in Aero-Engines**

*Remy Denos*

THURSDAY MORNING - EXC2.1

### **STS09: Simulation and Validation of the Combustion of Advanced Aero-Engines**

*Ralf von der Bank*

THURSDAY AFTERNOON - EXC2.1

### **STS10: Computational Aero-acoustics**

WEDNESDAY AFTERNOON - EXC2.2

### **STS11: Models and Tools for the Design of a Supersonic Transport Aircraft with Reduced Impact on the Environment**

*Michel Mallet*

TUESDAY EVENING - EXC2.1

### **STS12: High Reynolds Number Aerodynamics**

*Winfried Kühn*

WEDNESDAY MORNING - EXC2.1

### **STS13: Advanced Methods for Aerospace Structures**

*Peter Horst*

WEDNESDAY MORNING - EXC2.2

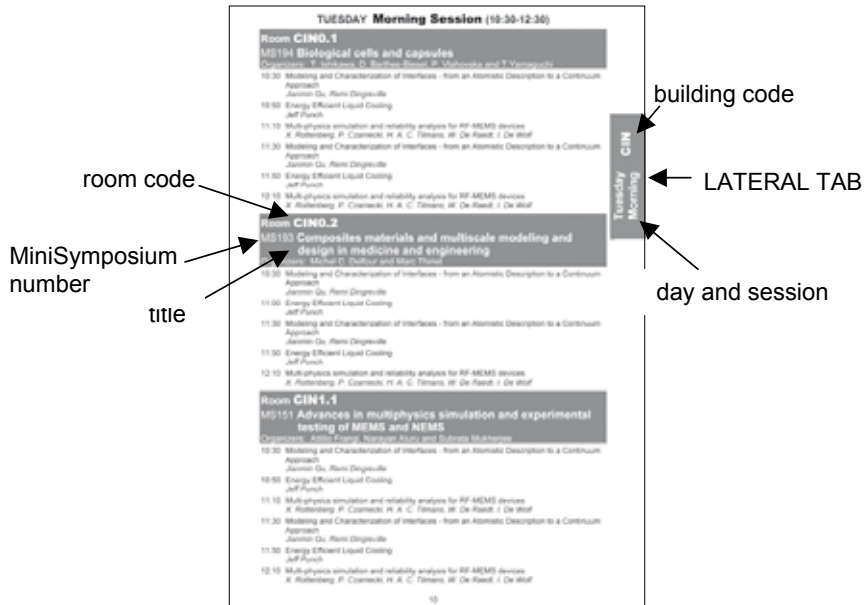
# Technical Programme

In the following pages the Programme is presented day by day.

The day is marked on the lateral tab of the page.

Each day is preceded by an overview table containing the schedule and the lecture rooms of the technical sessions of the day.

The following pages contain the listing of the papers for each session grouped per building, floor by floor. The code of the building is also shown on the lateral tab (see figure below).



The Lecture Rooms are distributed within four buildings, at a walking distance one from the other. The buildings are identified by a code made by three capital letters

**CAS** = Casinò Palace;

**CIN** = Cinema Palace;

**PGL** = Palagalileo;

**EXC** = Excelsior Hotel.

Different scales of grey are used to identify the four buildings.

The Lecture Rooms are identified by the building code followed by a 2 digit code containing the floor number and the sequential room number for that floor. For instance **CIN2.1** means the first room at the second floor of the Cinema Palace. Detailed maps of the venue, with the location of the lecture rooms, can be found in the first pages of the Programme Book.

# INDEX OF SESSIONS

## Monday June 30<sup>th</sup>.

Room	8:30	10:00	11:00	11:30	12:30	14:00	16:00	16:30
	10:00	11:00	11:30	12:30	14:00	16:00	16:30	18:30
CAS0.1			<b>COFFEE BREAK</b>	MS069	<b>LUNCH</b>	MS069	<b>COFFEE BREAK</b>	MS069
CAS1.1				MS021		MS021		
CAS1.2				MS168		MS168		
CAS1.3								MS090
CAS1.4				MS056		MS056		MS184
CAS1.5				MS121		MS121		MS207
CAS1.6				MS035		MS035		MS035
CAS1.7				MS019		MS019		MS019
CAS1.8				MS102		MS102		MS102
CAS2.1				MS074		MS074		MS094
CAS2.2								MS067
CAS2.3								MS128
CAS2.4								MS063
CAS2.5				MS038		MS038		MS038
CAS2.6				MS140		MS140		MS140
CAS3.1				MS112		MS112		MS154
CAS3.2				TS328		TS328		TS328
CAS3.3								MS049
CAS3.4				MS110		MS110		MS115
CAS3.5				MS042		MS042		MS042
CAS3.6			MS118	MS118	MS111			
CAS3.7			MS237	MS237	MS237			
CAS3.8			MS081	MS081	MS050			
CAS3.9			MS104	MS104	MS104			
CAS3.10			MS150	MS150	MS150			
CIN0.1			MS194	MS194	MS194			
CIN0.2			MS078	MS078	MS020			
CIN1.1	Opening	P1–P2	MS151	MS151	MS151			
CIN2.1			MS180	MS180	MS180			
PGL	Opening	P1–P2	MS029	MS029	MS029			
EXC1.1			MS088	MS088	MS155			
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EXC2.1			MS238	MS238	MS238			
EXC2.2					MS055			

P = Plenary Lecture  
 MS = Minisymposium  
 TS = Thematic Session  
 STS = Special Technology Session

# Opening Ceremony and Plenary Lectures (P)

## **Opening Ceremony. Monday 08.30 – PGL:**

Welcome Address by the Congress Chairmen

Welcome Address by the IACM President

Welcome Address by the ECCOMAS President

Welcome Address by a representative of the Town of Venice

Keynote Address by Dr. A.Siegler, EU DG RTD - Directorate H - Transport

Presentation of IACM Awards

Presentation of ECCOMAS Awards

Presentation of John Argyris Award

Information on the Congress and opening of the first Plenary Session  
by the Congress Chairmen

## **P1. Monday 10.00 – PGL: Michael Ortiz**

California Institute of Technology, Pasadena, United States  
*Electronic-Structure Calculations at Macroscopic Scales*

## **P2. Monday 10.30 – PGL: Alfio Quarteroni**

Ecole Polytechnique Fédérale de Lausanne, Switzerland  
Politecnico di Milano, Italy  
*Mathematical Modeling for Medicine, Sports, and the  
Environment*

**Room: CAS0.1**

**MS069 Recent Developments in Computational Methods for Structural Optimization I**

Organizers: H Alicia Kim, Gengdong Cheng, David Kennedy, Michal Kocvara, Tae Hee Lee, Kurt Maute and Mathias Stolpe

- 11:30 **On Topology Optimization With Vanishing Constraints (Keynote Lecture)**  
*Wolfgang Achziger and Christoph Schürhoff*
- 12:00 **Multi-Material Topology Optimization of Geometrically Nonlinear Multi-Layered Composite Shell Structures (Keynote Lecture)**  
*Erik Lund, Leon Johansen, Christian Gram Hvejsel and Esben Lindgaard Olesen*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics I**

**Joint IACM – IUTAM Minisymposium**

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 11:30 Validation of Cielo, an Integrated Modeling Tool, using a Thermo-Opto-Mechanical Testbed  
*Claus Hoff, Mike Chainyk, Eric Larour, Greg Moore and John Schiermeier*
- 11:50 Recent Experiences and Future Developments on the Validation of Finite Element Models for Spaceflight Hardware  
*Adriano Calvi, Jurij D'Amico and Richard Degenhardt*
- 12:10 Polynomial-Chaos applied to Lorenz's Model for Quantification of Growth of Initial Uncertainties  
*Colin Shen, Thomas Evans and Thomas Finette*

**Room: CAS1.2**

**MS168 Computational Contact Mechanics I**

Organizers: Peter Wriggers, Tod A. Laursen and Giorgio Zavarise

- 11:30 Covariant Description for Contact between Arbitrary Curves: General Approach for Beams, Cables and Surface Edges  
*Alexander Konyukhov and Karl Schweizerhof*
- 11:50 A 3D Curve Smoothing Method preserving Nodes for the Beam-to-Beam Contact  
*Przemyslaw Litewka*
- 12:10 A p-Version Finite Element Model for Simple Straight Wire Rope Strands  
*Istvan Paczelt and Robert Beleznai*

## Monday Morning Sessions (11:30 - 12:30)

### Room: **CAS1.4**

#### MS056 **Simulation Technology towards the Hydrogen Use World. I**

Organizers: Hiroshi Kanayama and Noriyuki Miyazaki

- 11:30 Stationary Analysis by a Thermal Convection Solver with Hierarchical Domain Decomposition Method  
*Hiroshi Kanayama, Kouichi Komori and Daigo Sato*
- 11:50 Boussinesq Approximation of Hydrogen Dispersion in a Ventilation Model Using Finite Element Analysis  
*Hiroshi Kanayama, Hisayoshi Tsukikawa, Osamu Sakuragi and Mohamed Fathy El-Amin*
- 12:10 Numerical Analysis of Material Transportation Problems in Fuel Cell with Micro Porous Layers  
*Yuya Tachikawa, Hiroshi Kanayama, Chiaki Ishii and Hiroshi Hasegawa*

### Room: **CAS1.5**

#### MS121 **Computational Fusion Technology I**

Organizers: Ettore Salpietro and Daniela P. Boso

- 11:30 Electromagnetic Analysis of a ITER Superconducting Coil using Three-Dimensional Integral Formulation  
*R. Fresa, G. Rubinacci, S. Ventre, F. Villone and Walter Zamboni*
- 11:50 Finite Element Simulation of Forming and Mechanical Loading of CIC Conductors for the Optimization of their Superconducting Properties  
*Hugues Bajas, Damien Durville, Denis Bessette and Daniel Ciazynski*
- 12:10 Strain-Dependence of the Superconducting Critical Temperature  $T_c$  in Al, Nb and Nb<sub>3</sub>Sn Crystals  
*Matteo F. Salvetti, David M. Parks, Joseph Minervini and Nicola Marzari*

### Room: **CAS1.6**

#### MS035 **Uncertainties in Computational Mechanics with Emphasis on Structural Optimization Applications**

Organizers: Dan Frangopol and Yiannis Tsompanakis

- 11:30 **Robust Stochastic System Design: Optimization Treating Model Uncertainty (Keynote Lecture)**  
*James Beck and Alexandros Taflanidis*
- 12:00 **Stochastic Reduced Order Modeling Techniques for Design under Uncertainty (Keynote Lecture)**  
*Kurt Maute, Gary Weickum and Mike Eldred*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation I**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 11:30 Multiphysics Simulation and Control Development Environment for Modern Hybrid Electric Drive Military Vehicles  
*Ken Chung, Andrew Reid, Bahram Fatemi and Greg Fryer*
- 11:50 Exploiting Parallelism in Ground Vehicle Dynamics  
*Michael McCullough, William C. Prescott and Ashok Khubchandani*
- 12:10 Analytical Study on the Derailment of High Speed Rail Vehicle by Track Excitations on Earthquakes  
*Kazuhiko Nishimura, Yoshiaki Terumichi, Tsutomu Morimura and Kiyoshi Sogabe*

**Room: CAS1.8**

**MS102 Inverse Problems I**

Organizers: Bojan Guzina and Marc Bonnet

- 11:30 Wave Splitting as a Tool for Inversion Algorithms and Analysis  
*Roland Potthast*
- 11:50 Energy Methods for Boundary Conditions Identification for Dynamic Problems  
*Thouraya Nouri Baranger and Stephane Andrieux*
- 12:10 A Posteriori Initial Imperfection Identification in Shell Buckling Problems  
*Christopher Stull, Wilkins Aquino and Christopher Earls*

**Room: CAS2.1**

**MS074 Minisymposium on Inverse Problems in Heat Transfer I**

Organizers: Alain Kassab, Richard Bialecki and Eduardo Divo

- 11:30 Rapid Technique of Retrieving the Heat Transfer Coefficient  
*Arkadiusz Ryfa and Ryszard Bialecki*
- 11:50 Inverse Point Load Superposition Thermoelastic-BEM Cavity Detection Technique  
*Eduardo Divo, Alain Kassab, David Ojeda and Miguel Cerrolaza*
- 12:10 Identification of Relaxation Time in Bio-Heat Transfer Equation  
*Ewa Majchrzak*



## Monday Morning Sessions (11:30 - 12:30)

### Room: **CAS2.5**

#### MS038 Computational Methods in Nonlinear Dynamics I

Organizers: Stefano Lenci and Marian Wiercigroch

- 11:30 Nonlinear Flapping Dynamics: Effects of Flexibility and Kinematics  
*Marcos Vanella, Timothy Fitzgerald, Sergio Preidikman, Elias Balaras and Balakumar Balachandran*
- 11:50 A New Development Platform for Parameter Continuation and Bifurcation Analysis in Nonlinear Dynamical Systems  
*Harry Dankowicz and Frank Schilder*
- 12:10 Spectral Decomposition of Transient Vector Flow: Duffing System and Chaos  
*Takashi Hikihara and Takumi Ikenoue*

### Room: **CAS2.6**

#### MS140 Advanced Numerical Approaches for Complex Multi-phase Flows I

Organizers: Takashi Yabe, Nobuatsu Tanaka and Feng Xiao

- 11:30 Adaptive Mesh Refinement for Multi-Material Volume-Tacking Computation with Moment-of-Fluid Method  
*Hyung Taek Ahn and Mikhail Shashkov*
- 11:50 Numerical Analysis of Boiling and Condensing Phenomena using Gas-Liquid Unified Algorithm  
*Nobuatsu Tanaka, Nobuyuki Nakamura and Ken Nishimura*
- 12:10 Numerical Resolution of a Two Fluid-Two Pressure Model by a Relaxation Approach  
*Annalisa Ambroso, Christophe Chalons, Frederic Coquel and Thomas Galie*

### Room: **CAS3.1**

#### MS112 Length Scale Effects in Dynamic Failure of Materials I

Organizers: Shailendra Joshi, Jean-François Molinari and K.T. Ramesh

- 11:30 Plasticity in Nanocrystalline Metals: A Molecular Dynamics Study  
*Peter Derlet and Helena Van Swygenhoven*
- 11:50 Molecular Dynamics Simulations of Nanocrystalline Tantalum under Uniaxial Tension  
*Yulong Li, Qiuming Wei and Zhiliang Pan*
- 12:10 A Strain Gradient Crystal Plasticity Model for the Length Scale Dependence of Free-Standing Thin Films  
*Isa Erturk, Boudewijn van Schaik, Hans van Dommelen and Marc Geers*

**Room: CAS3.2**

**TS328 Computational Structural Mechanics I**

- 11:30 A New Accurate Yet Simple Shear Flexible Triangular Plate Element with Linear Bending Strains  
*Lars Damkilde*
- 11:50 A Quadratic Triangular Finite Element for the Nonlinear Analysis of Thin Shells  
*Edgard Almeida Neto, Paulo Pimenta and Eduardo Campello*
- 12:10 Bifurcation Analysis of an Elastic Ring supported by Springs  
*Takashi Manabe and Nobuyoshi Tosaka*

**Room: CAS3.4**

**MS110 Multiscale Simulations for Composite Materials and Mechanical Systems I**

Organizers: Junzhi Cui, Xiu-Tian Yan, Geng Liu, Liyan Wu, Tianxiang Liu, Qin Xie and Qian Li

- 11:30 Two-Order and Two-Scale Analysis Method for the Structures of Composites with Quasi-Periodicity  
*Fang Su and Junzhi Cui*
- 11:50 The Two-order and Two-scale Method in Cylindrical Coordinates for Mechanical Properties of Laminated Composite Cylindrical Structure  
*Fei Han, JunXhi Cui and YuFeng Nie*
- 12:10 The Multiscale Analysis for Incompressible Flow of Maxwell Fluid  
*Jie Ouyang and Ling Zhang*

**Room: CAS3.5**

**MS042 Computational Electro-Magneto-Hydro-Dynamics (EMHD) I**

Organizers: Gunter Gerbeth, George S. Dulikravich and Koulis Pericleous

- 11:30 Effects of Magnetic Fields on Crystal Growth  
*Andrew Kao, Koulis Pericleous and Vaughan Voller*
- 11:50 A Hybrid Finite Volume-Boundary Element Method (FV-BEM) for the Numerical Solution of the Kinematic Induction Equation  
*Andre Giesecke, Frank Stefani and Gunther Gerbeth*
- 12:10 Investigating Multi-phase Effects in Electrochemical Machining  
*Ryo Tsuboi and Makoto Yamamoto*

**Room: CAS3.6**

**MS118 Multi-phase and Multi-scale Modelling of Concrete and Concrete Structures I**

Joint IACM – IUTAM Minisymposium

Organizers: Pavao Marovic, Nenad Bicanic and Adnan Ibrahimbegovic

- 10:30 Damage and Fracture of Concrete and Brick Walls after Explosion  
*Tomasz Jankowiak, Tomasz Lodygowski and Piotr Sielicki*
- 10:50 Modelling of Concrete under High Confinement: A Mesoscale Approach with Damage Behaviour  
*Fabrice Dupray, Yann Malécot and Eric Buzaud*
- 11:10 Rate Dependent Effects in the Simulation of Progressive Collapse of RC Structures  
*Berta Santafé, Thierry Massart, Philippe Bouillard and John Vantomme*

**Room: CAS3.7**

**MS237 Numerical Techniques for the Modelling of Material Failure in Solids I**

Organizers: Xavier Oliver and Francisco Armero

- 11:30 **Spalling of Concrete: Micro - and Macro Experiments and Simulations (Keynote Lecture)**  
*Kaspar Willam, Keun Lee, Jaesung Lee and Yunping Xi*
- 12:00 **3D Higher Order X-Fem Model for Hygro-Mechanical Analysis of Cracked Cementitious Materials (Keynote Lecture)**  
*Stefan Jox, Christian Becker and Günther Meschke*

**Room: CAS3.8**

**MS081 Subgrid Scales, a-Posteriori Error Estimation and Adaptivity for Computational Mechanics I**

Organizers: Guillermo Hauke and James R. Stewart

- 11:30 Anisotropic 3D Delaunay Mesh Adaptation for High Speed Compressible Flows  
*Z. Xie, L. Remaki, Oubay Hassan, Kenneth Morgan and N. P. Weatherill*
- 11:50 Exact Error Bounds for Linear Outputs of the Convection-diffusion-reaction Equation using Flux-free Error Estimators  
*Núria Parés, Yolanda Vidal, Pedro Díez and Antonio Huerta*
- 12:10 A-Posteriori Error Estimation for Linear Functionals of Solutions Computed with Stabilized Methods  
*Guillermo Hauke and Daniel Fuster*

**Room: CAS3.9**

**MS104 Innovative and Advanced Methods for Computational Dynamics I**

Organizers: Carlos A. Felippa and Ekkehard Ramm

- 11:30 **Geometrically Exact Shells in Flexible Multibody Dynamics (Keynote Lecture)**  
*Nicolas Sanger and Peter Betsch*
- 12:00 **High Order Dispersive Homogenization of Multidimensional Periodic Materials by Mode Decomposition (Keynote Lecture)**  
*Mahmoud Hussein*

**Room: CAS3.10**

**MS150 Multiscale Modeling and Uncertainty Quantification of Heterogeneous Materials**

Joint IACM – IUTAM Minisymposium

Organizers: Manolis Papadrakakis, George Stefanou, X. Frank Xu and Nicholas Zabaras

- 10:30 **Failure Initiation and Uncertainty Inside Multi-Scale Random Media (Keynote Lecture)**  
*Robert Lipton*
- 11:00 **Theories of Scale-Coupling Mechanics and Application of Multiscale Stochastic FEM (Keynote Lecture)**  
*Frank Xu and Xi Chen*



**Room: CIN0.1**

**MS194 Biological Cells and Capsules I**

Joint IACM – IUTAM Minisymposium

Organizers: Takuji Ishikawa , Dominique Barthes-Biesel , Petia Vlahovska and Takami Yamaguchi

10:30 **The Role of Fluid-Structure Interactions in Artificial Capsule Mechanics (Keynote Lecture)**

*Dominique Barthès-Biesel*

11:00 **Flagella Dynamics and the Evolution of Multicellularity (Keynote Lecture)**

*Raymond E. Goldstein*

**Room: CIN0.2**

**MS078 Continuum Models for Composite and Nano-Materials, Mems/Nems Devices I**

Joint IACM – IUTAM Minisymposium

Organizers: Toshiro Matsumoto and Vladimir Kompis

10:30 Thermoelastic Damping Analysis of Quartz SAW Resonator

*Toshiro Matsumoto, Toru Takahashi, Hironori Ito and Yuri Sakaki*

10:50 Press Molding Simulation of Thermo-Plastic Resin Reinforced by Carbon Nanofiber

*Masahiro Arai, Hiroki Tanaka, Kazutoshi Matsushita and Koh-ichi Sugimoto*

11:10 Reactive Nano-Films of Al and Pt

*Michael Hobbs and David Adams*

**Room: CIN1.1**

**MS151 Advances in Multiphysics Simulation and Experimental Testing of MEMS and NEMS I**

Joint IACM – IUTAM Minisymposium

Organizers: Attilio Frangi, Narayan Aluru and Subrata Mukherjee

10:30 MEMS Consumer World: Products and Applications

*Benedetto Vigna*

10:50 First-Order Size Effects in the Mechanics of Miniaturised Components

*Peter Janssen, Johan Hoefnagels, Staf de Keijser and Marc Geers*

11:10 On Mechanisms of Energy Dissipation and Transfer in MEMS Vibratory Gyroscopes operated in Vacuum

*Alexander A. Trusov, Adam R. Schofield and Andrei M. Shkel*

## Monday Morning Sessions (11:30 - 12:30)

### Room: **CIN2.1**

#### MS180 Computational Modelling in Bone Mechanobiology I

Organizers: Jose Manuel Garcia-Aznar, Danny Kelly, Manuel Doblare and Patrick Prendergast

- 11:30 A Bone Remodelling Model for Apparent Density and Trabecular Architecture  
*Paulo Fernandes, Pedro G. Coelho, Jose M. Guedes and Helder Rodrigues*
- 11:50 BMU Steering and its Influence on Bone Anisotropy  
*Javier Martínez-Reina, José Manuel García-Aznar, Jaime Domínguez and Manuel Doblare*
- 12:10 Influence of Microstructure Dimensions on Prediction of Local Tissue Strain in Bone  
*Despina Deligianni and Charis Apostolopoulos*

### Room: **PGL**

#### MS029 Computational Geomechanics Minisymposium I

Organizers: Boris Jeremic, Claudio Tamagnini, Richard Regueiro, Ronaldo Borja, Fusao Oka and Stein Sture

- 11:30 3D Finite Element Modelling of Slope Reliability  
*Michael Hicks and William Spencer*
- 11:50 A Constitutive Model for Unsaturated Soils with Structure Degradation  
*Mohamed Rouainia and Jean Michel Pereira*
- 12:10 A Modified Block Element Method  
*Qingwen Ren, Xiaomin Lu and Yin Zhao*

**Room: EXC1.1**

**MS088 Mathematical Analysis of Generalized Finite Element Method I**

Organizers: Uday Banerjee and Mark Alexander Schweitzer

- 11:30 Generalized Finite Element Methods, Meshless Methods, and Quadrature  
*John Osborn, Ivo Babuska and Uday Banerjee*
- 11:50 Plane Wave Discontinuous Galerkin Methods  
*Ralf Hiptmair, Claude Gittelsohn and Ilaria Perugia*
- 12:10 GFEM for Dirichlet Data with Low Regularity  
*Ivo Babuska, Victor Nistor and Nicolae Tarfulea*

**Room: EXC1.2**

**MS028 Computational Methods for Generalized Continua I**

Organizers: Richard Regueiro, Krishna Garikipati, Carlo Sansour, Paul Steinmann, Harm Askes and Jerzy Pamin

- 11:30 Generalized Electro-Mechanical Coupling with Straining Gradients and Meshfree Computations  
*Carlo Sansour, S. Skatulla and A. Arunachalakasi*
- 11:50 Nonlocal Thermoelastic Dissipation in Micron - and Submicron - Resonators  
*Raffaele Ardito, Claudia Comi, Alberto Corigliano and Attilio Frangi*
- 12:10 Computational Multiscale Modelling of Microstructure Material Layers  
*C. Britta Hirschberger, Natarajan Sukumar and Paul Steinmann*

**Room: EXC1.3**

**MS141 Accuracy Assessment of the eXtended Finite Element Method: Adaptivity, Comparison with Competing Methods, Industrialisation I**

Organizers: Stephane Bordas, Marc Duflot and Pierre-Olivier Bouchard

- 11:30 Definition of 'Best Modeling Practice' for the Propagation of 3D Cracks with Level Sets and the XFEM. Application to Multi-Site Crack Propagation in an Aeroengine Component  
*Eric Wyart, Marc Duflot, Sébastien Sagnier, Philippe Martiny and Frédéric Lani*
- 11:50 Computation of Stress Intensity Factors for 3D Cracks in a Turbine Rear Fan Blade: Comparison of FEM and XFEM Solutions  
*Hacène Cherouali, Didier Soria, Arnaud Suffis, Eric Wyart, Marc Duflot and Frédéric Lani*
- 12:10 Industrial Applications of the X-Fem: Security in Nuclear Powerplants  
*Samuel Geniaut and Erwan Galenne*



## Monday Morning Sessions (11:30 - 12:30)

**Room: EXC2.1**

**MS238 Advances in Particle Methods - Minisymposium sponsored  
by the Zienkiewicz Foundation I**

Organizers: Roger Owen and Sergio Idelsohn

11:30 The Discrete Element Method: Advances and Fundamental Issues

*Y. T. Feng, K. Han and D.R.J. Owen*

11:50 A Coupled Discrete-Finite Element Method Modeling the Interaction of Granular Materials and Solid Structures

*Christian Wellmann, Claudia Lillie and Peter Wriggers*

12:10 Parallel Programming Techniques for DEM Models on Distributed Memory Machines

*Raju Kala, John Peters and Robert Maier*

**Room: CAS0.1**

**MS069 Recent Developments in Computational Methods for Structural Optimization II**

Organizers: H Alicia Kim, Gengdong Cheng, David Kennedy, Michal Kocvara, Tae Hee Lee, Kurt Maute and Mathias Stolpe

- 14:00 A New Structural Optimization Method based on the Level Set Method and its Applications  
*Shintaro Yamasaki, Shinji Nishiwaki, Kazuhiro Izui and Masataka Yoshimura*
- 14:20 Structural Optimization for the design of Compliant Thermal Actuators based on the Level Set Method  
*Takayuki Yamada, Shintaro Yamasaki, Shinji Nishiwaki, Kazuhiro Izui and Masataka Yoshimura*
- 14:40 Topology Optimization using an Enhanced Implementation of the Spectral Level Set Methodology  
*Alexandra A. Gomes*
- 15:00 Integrated Structural Optimization with T-Spline Finite Element Method (TSFEM)  
*Yu-Deok Seo and Sung-Kie Youn*
- 15:20 Stress Constrained Topology and Shape Optimization: Specific Character and Large Scale Optimization Algorithms  
*Pierre Duysinx, Claude Fleury, Laurent Van Mieghroet, Etienne Lemaire, Olivier Bruls and Michael Bruyneel*
- 15:40 Topology Optimization for Thermal Problems including Design-Dependent Heat Convection Loads  
*Atsuro Iga, Shinji Nishiwaki, Kazuhiro Izui and Masataka Yoshimura*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics II**

Joint IACM – IUTAM Minisymposium

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 14:00 **Uncertain Coupling between Substructures: A Nonparametric Stochastic Modeling (Keynote Lecture)**  
*Marc P. Mignolet and Christian Soize*
- 14:30 **A Particle Method for Stochastic Convection Diffusion Equations (Keynote Lecture)**  
*Olivier Le Maitre, Serge Huberson and Lionel Mathelin*
- 15:00 A Least-Squares Approximation of High-Dimensional Uncertain Systems  
*Alireza Doostan and Gianluca Iaccarino*
- 15:20 Quantification of Uncertainty in Computational Mechanics Solutions using Experimental Uncertainty Analysis Concepts  
*W. Glenn Steele and Hugh Coleman*
- 15:40 Grid-Aided Stochastic Finite Element using Ninf-G  
*Yohei Sato and Hiroshi Okuda*

**Room: CAS1.2**

**MS168 Computational Contact Mechanics II**

Organizers: Peter Wriggers, Tod A. Laursen and Giorgio Zavarise

- 14:00 A Dual Preconditioned Projected Conjugate Gradient Algorithm for Solving Contact Problems  
*Nicolas Tardieu, Eric Chamberland and Fabien Youbissi*
- 14:20 Combination of Interior-Point Method and Semismooth Newton Method for Large-Scale Frictionless Contact Problems  
*Tomoshi Miyamura, Yoshihiro Kanno and Makoto Ohsaki*
- 14:40 Solution of Contact Problems with Large Displacements and Deformations using P-Version Finite Elements  
*Tamas Szabo, Frigyes Nandori and Istvan Paczelt*
- 15:00 A Modified Node-To-Segment Algorithm Passing the Contact Patch Test  
*Giorgio Zavarise and Laura De Lorenzis*
- 15:20 Different Time Integration Schemes for Mortar Contact Methods  
*Christian Hesch and Peter Betsch*
- 15:40 Challenges in Code Development for Parallel and Multimechanics Contact  
*Michael Puso, Tony Degroot, Robert Ferencz, Dennis Parsons, Jerome Solberg and Ed Zywick*

**Room: CAS1.4**

**MS056 Simulation Technology towards the Hydrogen Use World. II**

Organizers: Hiroshi Kanayama and Noriyuki Miyazaki

- 14:00 Modelling of Hydrogen Transport, Trapping and Embrittlement in Plastically Deforming Materials  
*Santiago A. Serebrinsky, María J. Cancio, Richard Bravo, Sebastián Cravero, Teresa E. Pérez and Hugo A. Ernst*
- 14:20 Numerical Simulation of the Crack Tip Elastic-Plastic State  
*Reza Miresmeili, Masao Ogino, Ryuji Shioya, Hiroshi Kawai and Hiroshi Kanayama*
- 14:40 Finite Element Analysis of Hydrogen Diffusion Problems in Materials  
*Hiroshi Kanayama, Stephane Ndong-Mefane, Masao Ogino and Takuya Nakagawa*
- 15:00 Atomistic Study of Interaction between Hydrogen Atoms and Dislocations around Mode I Crack Tip  
*Ryosuke Matsumoto, Shinya Taketomi, Sohei Matsumoto, Yoshinori Inoue and Noriyuki Miyazaki*
- 15:20 Molecular Dynamics Study on Dislocation Activities in Iron Specimens including Hydrogen  
*Kenji Nishimura, Ryosuke Matsumoto, Shinya Taketomi and Noriyuki Miyazaki*
- 15:40 Effect of Hydrogen on (110)[111] Edge Dislocation Mobility in Alpha Iron  
*Shinya Taketomi, Ryosuke Matsumoto and Noriyuki Miyazaki*

**Room: CAS1.5**

**MS121 Computational Fusion Technology II**

Organizers: Ettore Salpietro and Daniela P. Boso

- 14:00 **A Solution for Transverse Load Degradation in ITER Nb3Sn CICC's; Longer Cable Pitches and Related Aspects for Short Sample Conductor Qualifications (Keynote Lecture)**  
*Arend Nijhuis, Yasuyuki Miyoshi and Ezra van Lanen*
- 14:30 **Electromagnetic Modeling of an ITER Full Size Conductor Test (Keynote Lecture)**  
*Fabrizio Bellina, Marco Breschi and Pier Luigi Ribani*
- 15:00 Finite Difference Numerical Simulation of Nb3Sn Performances when subjected to Bending Straining  
*Chiarasole Fiamozzi Zignani, V. Corato, A. della Corte, G. Messina and L. Muzzi*
- 15:20 Non Linear, Thermo-Mechanical Analysis of Nb3Sn Strands  
*Luigi Reccia, A. della Corte, Daniela P. Boso and Ettore Salpietro*
- 15:40 Multiscale Analysis of the Hierarchical Structure of a Strand Bundle  
*Marek J. Lefik, Daniela P. Boso and Bernhard A. Schrefler*

**Room: CAS1.6**

**MS035 Uncertainties in Computational Mechanics with Emphasis on Structural Optimization Applications**

Organizers: Dan Frangopol and Yiannis Tsompanakis

- 14:00 Probabilistic Life-Cycle Optimization of Concrete Structures  
*Fabio Biondini and Dan Frangopol*
- 14:20 Probabilistic Optimization of Friction Damping Devices  
*Christian Bucher*
- 14:40 Comparison on Different Approaches for Robust Optimum Design of Tuned Mass Dampers  
*Giuseppe Carlo Marano, Sara Sgobba, Giuseppe Quaranta, Emiliano Morrone, Giuseppe Palombella and Francesco Trentadue*
- 15:00 Structural Optimization for Performance-Based Design in Earthquake Engineering: Application of Neural Networks  
*Oscar Möller, Ricardo Foschi, Laura Quiroz and Marcelo Rubinstein*
- 15:20 Soft Computing Approaches for Probabilistic Design Optimization of Structures  
*Nikos Lagaros, Anargyri Garavelas and Manolis Papadrakakis*
- 15:40 Reliability-based Optimization of RC Structures  
*Michalis Fragiadakis and Manolis Papadrakakis*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation II**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 14:00 Ball-Beam System Modeling using Nonlinear State-Space Equations Approach aided by Bond-Graphs  
*Celso Negrao, Euler Barbosa and Nazem Nascimento*
- 14:20 Parallelization of the Spatial Operator Algebra for Dynamics of Multibody Systems  
*Rudranarayan Mukherjee and Abhinandan Jain*
- 14:40 Spatial Operator Algebra Perspective for Computational Multibody Dynamics  
*Abhinandan Jain*
- 15:00 Subsystem Based Recursive Formulation for Repeated Topology of Multibody Systems  
*Sung-Soo Kim, Chang Ho Lee and Seonghoon Kim*
- 15:20 Automated Modeling of Complex Mechanical Systems using Bond Graph  
*Ryotaro Magoshi and Hiroaki Yoshimura*
- 15:40 Design Optimization Procedures for the Validation of Generic Road Vehicles  
*Marta Carvalho, Jorge Ambrosio and Luis Sousa*

**Room: CAS1.8**

**MS102 Inverse Problems II**

Organizers: Bojan Guzina and Marc Bonnet

- 14:00 A Variational Approach to solve Cauchy Problem for Steady State Stokes Flow  
*Xavier Escriva and Thouraya Nouri Baranger*
- 14:20 Identification of Lumped Parameter Systems and Optimal Experiment Design  
*Oleg M. Alifanov, Aleksey V. Nenarokomov and Vivaldo M. Gonzales*
- 14:40 A Bayesian Inference Approach for Structural Dynamic Transfer Function Identification  
*Erliang Zhang, Pierre Feissel, Jérôme Antoni and Claude Blanzé*
- 15:00 A Direct Identification Algorithm for the Estimation of the Stiffness Distribution of Frame Structures  
*Yiska Goldfeld*
- 15:20 Nondestructive Measurement of LSI Electroplating Current Distribution using Magnetic Sensors  
*Yoshinao Kishimoto and Kenji Amaya*
- 15:40 The Multidimensional Refinement Indicators Algorithm for Adaptive Parameterization  
*Hend Ben Ameer, François Clément, Pierre Weis and Guy Chavent*

**Room: CAS2.1**

**MS074 Minisymposium on Inverse Problems in Heat Transfer II**

Organizers: Alain Kassab, Richard Bialecki and Eduardo Divo

- 14:00 An Original Inverse Method for Characterization of Heat Flux in Grinding  
*Alexandre Brosse, Pierre Naisson, Alexandre Delalleau, Hedi Hamdi and Jean Michel Bergeau*
- 14:20 The Measurement of Radiant Heat Flux in Combustion Chambers of Large Steam Boilers  
*Tomasz Sobota and Dawid Taler*
- 14:40 Initial Inverse Problem in the Vacuum Paper Drying Process  
*Zbigniew Bulinski, Andrzej Nowak, Krzysztof Kasza and Lukasz Matysiak*
- 15:00 Thermal Optimization of Polymer Injection Mould : Application of Conformal Cooling Design  
*Jacques Duysens, Didier Delaunay, V. Sobotka, David Garcia and Steve Langlois*
- 15:20 Numerical Estimation for Intumescent Thermal Protection using One-Dimensional IHCP  
*Luis Mesquita, Paulo Piloto, Mario Vaz and Tiago Pinto*
- 15:40 Substitute Thermal Capacity of Alloy. An Inverse Problem Solution  
*Ewa Majchrzak, Bohdan Mochnecki and Jozef S. Suchy*

## Monday Afternoon Sessions (14:00 - 16:00)

### Room: **CAS2.3**

#### MS128 Innovative Methods for Fluid-Structure Interaction I

Organizers: Trond Kvamsdal, Roger Ohayon and Harald van Brummelen

- 14:00 **A Powerful New Fixed-Grid Approach for Fluid-Structure Interaction (Keynote Lecture)**  
*Wolfgang A. Wall, Axel Gerstenberger, Ursula M. Mayer and Ulrich Küttler*
- 14:30 **A Fully Integrated Fluid-Structure Interaction Methodology and Applications (Keynote Lecture)**  
*Yuri Bazilevs, Victor Calo, Jeff Gohean, Thomas J.R. Hughes, Tor Ingebrigtsen, Jorgen Isaksen, Trond Kvamsdal, Robert Moser and Yongjie Zhang*
- 15:00 Computing the Artificial Compressibility Field for Partitioned Fluid-Structure Interaction Simulations  
*Peter Råback, Esko Järvinen and Juha Ruokolainen*
- 15:20 An Analysis of Fluid-Structure Methods with Fictitious Domains using Spectral/hp Elements  
*Raoul van Loon, Peter Vos and Spencer J. Sherwin*

### Room: **CAS2.5**

#### MS038 Computational Methods in Nonlinear Dynamics II

Organizers: Stefano Lenci and Marian Wiercigroch

- 14:00 Bifurcation Analysis using Nonlinear Dynamics for the Multi-Folding Structures  
*Ichiro Ario, Andrew Watson, Masatoshi Nakazawa and Simon Wang*
- 14:20 Dynamic Modeling and Simulation of Multi-Tethered Satellite Formations in Halo Orbits  
*Jun Zhao and Zhiqin Cai*
- 14:40 Transition Radiation in High-Speed Lines Applications  
*Zuzana Dimitrovová*
- 15:00 Nonlinear Dynamic Behaviour of Flexible Risers  
*Seyed Ali Hosseini Kordkheili and Hamid Bahai*
- 15:20 A Unified Approach for the Nonlinear Dynamics of Rods and Shells  
*Paulo Pimenta and Eduardo Campello*
- 15:40 Non-Linear Dynamic Analysis of a Cable based on Hamilton's Principle and Hellinger-Reissner Functional  
*Piotr L. Sawinski and Kazimierz Myslecki*

### Room: **CAS2.6**

#### MS140 Advanced Numerical Approaches for Complex Multi-phase Flows II

Organizers: Takashi Yabe, Nobuatsu Tanaka and Feng Xiao

- 14:00 CIP-DEM Combined Multi-Phase Solver for a Soil Compaction Mechanism  
*Yu Nagano and Takashi Nakamura*
- 14:20 Numerical Investigation of the Agglomerating Behavior of Particles governed by van der Waals forces  
*Takayuki Yukimoto, Takeo Kajishima and Shintaro Takeuchi*
- 14:40 A Regularized Stabilized Mixed FEM Formulation for Bingham Fluids  
*Cristiane Faria and José Karam*
- 15:00 Seepage Failure Analysis with Air Bubbles using Smoothed Particle Hydrodynamics  
*Kenichi Maeda and Hiroataka Sakai*
- 15:20 Large-Scale Discrete Element Modeling in Gas-Solid Flows  
*Mikio Sakai and Seiichi Koshizuka*

**Room: CAS3.1**

**MS112 Length Scale Effects in Dynamic Failure of Materials II**

Organizers: Shailendra Joshi, Jean-François Molinari and K.T. Ramesh

- 14:00 Molecular Simulation of Elementary Shear Banding in Model Metallic Glasses  
*Craig Maloney and Mark Robbins*
- 14:20 Numerical Applications of Distributed Damage in Confined Brittle Materials  
*Anna Pandolfi and Michael Ortiz*
- 14:40 3D Fragmentation of Nanocrystals by Molecular Dynamics  
*Kristopher Baker and Derek Warner*
- 15:00 A Micromechanics-Based Multiscale Approach for Simulating Dynamic Crack Propagation  
*Reuben Kraft, Jean-François Molinari and K.T. Ramesh*
- 15:20 Dynamic Penetration of Ceramics  
*Vikram Deshpande and Anthony Evans*
- 15:40 Rate-Dependent Failure of Hierarchical Nano-composites  
*Shailendra Joshi, Emily Huskins and K.T. Ramesh*

**Room: CAS3.2**

**TS328 Computational Structural Mechanics II**

- 14:00 Automation of the Process of Limit Analysis of Pressure Vessels with CAD/CAE Technologies - A New Shell Element to Include Bending and Membrane Effects  
*Jose Franco and Felicio Barros*
- 14:20 Duality in the Geometrically Exact Analysis of Reissner-Simo Beams  
*Hugo Santos, Jose Almeida and Paulo Pimenta*
- 14:40 Evolution of Strain Fields in Young Concrete Structure  
*Yong Yuan and Xian Liu*
- 15:00 Strength Equations and Finite Element Modelling of JIB Crane Construction  
*C.Erdem Imrak, Ismail Gerdemeli and Derya Özer*
- 15:20 The Integration of the Classical Geometrically Exact Beam Theory into the Absolute Nodal Coordinate Formulation  
*Johannes Gerstmayr, Marko Matikainen and Aki Mikkola*
- 15:40 Using Axial Force Iterative Integration in Plastic Zone Inelastic Analysis  
*Arthur Alvarenga and Ricardo Silveira*

**Room: CAS3.3**

**MS049 Fluid Dynamics of Compressible Flows of Substances Governed by Complex Thermodynamic Models I**

Joint IACM – IUTAM Minisymposium

Organizers: Piero Colonna, Stefano Rebay, Alberto Guardone and John Harinck

- 14:00 **A Reynolds-Averaged Navier Stokes Solver Coupled to Accurate Thermodynamic and Transport Property Models (Keynote Lecture)**  
*Stefano Rebay, David Pasquale, John Harinck and Piero Colonna*
- 14:30 Computationally Efficient Models for the Numerical Simulation of Thermodynamically Complex Flows  
*Paola Cinnella and Pietro Marco Congedo*
- 14:50 Efficient Numerical Simulation of 3D Bethe-Zel'dovich-Thompson Fluid flows  
*Pietro Marco Congedo, Paola Cinnella and Christophe Corre*
- 15:10 A CFD Model for Real Gas Effects in Turbomachinery  
*Filippo Rubechini, Michele Marconcini and Andrea Arnone*
- 15:30 Some Experiences on the use of Real Gas modelling in Hybrid Solver  
*Francesco Martelli and Simone Salvadori*

**Room: CAS3.4**

**MS110 Multiscale Simulations for Composite Materials and Mechanical Systems II**

Organizers: Junzhi Cui, Xiu-Tian Yan, Geng Liu, Liyan Wu, Tianxiang Liu, Qin Xie and Qian Li

- 14:00 A Quasi-Static Molecular Dynamics-Continuum Multiscale Model for Nano-Scale Contact Problems  
*Tianxiang Liu, Peter Wriggers and Geng Liu*
- 14:20 An Adaptive Meshless Model for Thermal Elasto-Plastic Contact of Rough Surfaces  
*Geng Liu, Zheng Zhang and Tianxiang Liu*
- 14:40 Domain Decomposition Method for Nonlinear Multiscale Analysis of Structures  
*Christian Rey, Julien Pebreil and Pierre Gosselet*
- 15:00 Meshing Stiffness and Stress Analyses of Herringbone Gears  
*Liyan Wu, Geng Liu and Zhonghong Bu*
- 15:20 Solution with a Domain-Decomposition Solver of a Multi-Altered Structures Modeled in the Arlequin Framework  
*Nadia Elkhodja, François-Xavier Roux and Hachmi Ben Dhia*
- 15:40 The Architecture of Collaborative Simulation Environment for Mechanical Product based on SRM  
*Xiaohui Yang, Geng Liu, Haiwei Wang, Zhaoxia He and Bing Han*

**Room: CAS3.5**

**MS042 Computational Electro-Magneto-Hydro-Dynamics (EMHD) II**

Organizers: Gunter Gerbeth, George S. Dulikravich and Koulis Pericleous

- 14:00 **Levitated Droplet Oscillations and Rayleigh Frequency Corrections: Effect of Internal Flow (Keynote Lecture)**  
*Valdis Bojarevics and Koulis Pericleous*
- 14:30 **Progress Simulating Low Temperature Collisional Plasmas with a PIC-DSMC Method (Keynote Lecture)**  
*Matthew Hopkins, Paul Crozier, Russell Hooper, Polly Hopkins, Steven Plimpton and Alan Williams*
- 15:00 Linear Stability Analysis of an Alternating Magnetic Field Driven Flow in a Spinning Container  
*Gunter Gerbeth, Victor Shatrov and Regina Hermann*
- 15:20 Reduced Order Modeling of Thermal Convection under a Magnetic Field  
*Hakan I. Tarkan*
- 15:40 Numerical Study of the Turbulent Two-Phase Flow in a Steel Mould  
*Xincheng Miao, Vladimir Galindo, Gunter Gerbeth and Zhongming Ren*

**Room: CAS3.6**

**MS118 Multi-phase and Multi-scale Modelling of Concrete and Concrete Structures II**

Joint IACM – IUTAM Minisymposium

Organizers: Pavao Marovic, Nenad Bicanic and Adnan Ibrahimbegovic

- 14:00 Operator Split Fe Solution Method for RC Structures  
*Adnan Ibrahimbegovic, Amor Boukertous and Luc Davenne*
- 14:20 On the Computation of Seismic Energy Dissipation in Reinforced Concrete Frame Elements  
*Pierre Jehel, Adnan Ibrahimbegovic, Pierre Leger and Luc Davenne*
- 14:40 Neural Networks for Bridging the Scales in a Multiscale Simulation of Concrete  
*Jörg F. Unger and Carsten Könke*
- 15:00 Numerical Modeling of a Test assessing the Tensile Strength of Steel Fiber Reinforced Concrete  
*Alba Pros, Climent Molins and Pedro Diez*
- 15:20 Grandstand Terraces. Experimental & Computational Modal Analysis  
*John N. Karadelis*
- 15:40 The New Macro-Scale Numerical Model for Analyzing Reinforced Concrete Structures  
*Mirela Galić, Pavao Marović and Željana Nikolić*

**Room: CAS3.7**

**MS237 Numerical Techniques for the Modelling of Material Failure in Solids II**

Organizers: Xavier Oliver and Francisco Armero

- 14:00 Modelling Concrete Cracking due to Rebar Corrosion using Finite Elements  
*Beatriz Sanz, Jaime Planas and José M. Sancho*
- 14:20 Modeling of Concrete Cracking Induced by Steel Corrosion Expansion  
*Santiago Guzmán, Jaime C. Galvez and José M. Sancho*
- 14:40 Numerical Modelling of the Load Carrying Capacity Degradation in Concrete Beams due to Reinforcement Corrosion  
*Pablo Sánchez, Alfredo Huespe, Javier Oliver and Sebastián Toro*
- 15:00 A Viscous Cohesive Model to Analyze Rate-Dependent Fracture in Concrete  
*Gonzalo Ruiz, Rena C. Yu and Alaor Rosa*
- 15:20 A Mixture Continuum Approach for Three-Dimensional Analysis of Reinforced Concrete Members using Embedded Crack Finite Elements  
*Oswaldo Manzoli, Javier Oliver, Alfredo Huespe and Guillermo Diaz*
- 15:40 The Performance Dependent Failure Criterion for Normal and High Strength Concretes  
*Paula Folino, Guillermo Etse and Adrián Will*

**Room: CAS3.8**

**MS081 Subgrid Scales, a-Posteriori Error Estimation and Adaptivity for Computational Mechanics II**

Organizers: Guillermo Hauke and James R. Stewart

- 14:00 Adaptive Reduction of Finite Element Models of Geometrically Complex Mechanical Components  
*Mats G. Larson and Hakan Jakobsson*
- 14:20 Hybrid Mesh Generation for Reservoir Flow Simulation: Extension to CPG Grids  
*Thibaud Mouton, Houman Borouchaki and Chakib Bennis*
- 14:40 On Grid and Scheme Resolution for Supersonic Jet Acoustics  
*Taku Nonomura and Kozo Fujii*
- 15:00 Third-Order Method for Compressible Flows on Unstructured Meshes  
*Jacek Rokicki and Robert Wieteska*
- 15:20 Adaptive hp-FEM for the Stabilized Navier-Stokes Equations  
*Rathinam Paneer Selvam*
- 15:40 A Free Parameter Space-Time Nonlinear Subgrid Method for Transport Problems  
*Regina Almeida and Isaac Santos*

**Room: CAS3.9**

**MS104 Innovative and Advanced Methods for Computational Dynamics II**

Organizers: Carlos A. Felippa and Ekkehard Ramm

- 14:00 Variationally Based Partitioned Transient and Quasi-Static Structural Analysis Procedures, Part I: Algorithm Description  
*K. C. Park, Carlos A. Felippa and Jose A. González*
- 14:20 Variationally Based Partitioned Transient and Quasi-Static Structural Analysis Procedures, Part II: Implementation and Performance Evaluation  
*José A. Gonzalez, K. C. Park and Carlos A. Felippa*
- 14:40 X-FEM Explicit Dynamics for Large Deformation of Foam Seats  
*Celine Dubois, Nicolas Moës, Steven Le Corre, Patrick Rozycki and Malek Zarroug*
- 15:00 Transient Response of Composite Axisymmetric Shells Submitted to Pyrotechnic Shocks. Application to a Payload Adapter  
*Antoine Legay and Jean-François Deü*
- 15:20 Computing Elastodynamic Response using Cellular Automata  
*Michael Leamy*
- 15:40 Direct Integration Method for Substructure Pseudo Dynamic Test Having Rotational Degree of Freedom  
*Hiroyuki Tamai, Takao Takamatsu and Teruaki Yamanishi*



**Room: CAS3.10**

**MS150 Multiscale Modeling and Uncertainty Quantification of Heterogeneous Materials II**

Joint IACM – IUTAM Minisymposium

Organizers: Manolis Papadrakakis, George Stefanou, X. Frank Xu and Nicholas Zabararas

- 14:00 Generalized Plane Approaches to the Homogenization of Heterogeneous Bi-Dimensional Solids  
*Nicola Cavalagli, Federico Cluni and Vittorio Gusella*
- 14:20 Macroscopic Stiffness of Nanocomposites with Random Distributed Carbon Nanotubes  
*Antonio Culla, Annalisa Fregolent, Luca Guj and Paola Nardinocchi*
- 14:40 Simulation of Irregular Stone Masonry based on Image Processing  
*Alessandra Barbanera, Seymour Spence and Massimiliano Gioffrè*
- 15:00 On Stochastic Homogenization of Fiber Reinforced Composites exhibiting a Randomly Fluctuating Volume Fraction  
*Johann Guilleminot, Christian Soize, Djimedo Kondo and Christophe Binetruy*
- 15:20 A Multiscale, Non-Parametric, Bayesian Framework for Identification of Model Parameters  
*Phaedon-Stelios Koutsourelakis*
- 15:40 Failure Analysis of Polysilicon MEMS allowing for Randomness at the Micro-Scale  
*Stefano Mariani, Fabio Fachin, Aldo Ghisi and Fabrizio Cacchione*

**Room: CIN0.1**

**MS194 Biological Cells and Capsules II**

Joint IACM – IUTAM Minisymposium

Organizers: Takuji Ishikawa , Dominique Barthes-Biesel , Petia Vlahovska and Takami Yamaguchi

- 14:00 Motion of a Capsule in a Simple Shear Flow: Effect of Membrane Description and Bending Stiffness  
*Johann Walter, Anne-Virginie Salsac, Hakim Naceur, Jean-Louis Batoz and Dominique Barthès-Biesel*
- 14:20 Dynamics of Artificial Capsules and Erythrocytes  
*Walter Dodson and Panagiotis Dimitrakopoulos*
- 14:40 Dynamics of Fluid Membranes and Budding of Vesicles  
*Marino Arroyo and Antonio DeSimone*
- 15:00 Numerical Vesicle Dynamics and Rheology: a Phase Field Approach  
*Giovanni Ghigliotti*
- 15:20 Stress Controlled Analysis of Morphogenesis  
*Vito Conte, Jose Munoz and Mark Miodownik*

**Room: CIN0.2**

**MS078 Continuum Models for Composite and Nano-Materials, Mems/Nems Devices II**

Joint IACM – IUTAM Minisymposium

Organizers: Toshiro Matsumoto and Vladimir Kompis

- 14:00 Discrete and Continuous Source Functions for Modeling of Composites Reinforced with Particles and Short Fibers  
*Vladimir Kompis, Mario Stivnický and Pihua Wen*
- 14:20 Predicting the Strength of Superalloys by 3D Dislocation Dynamics  
*Aurelien Vattre, Arjen Roos and Benoit Devincré*
- 14:40 Vibration of Nanostructures  
*Fernando Ramirez, Paul R. Heyliger, Anthony K. Rappe and Robert Leisure*
- 15:00 A Micromechanics Model of Particle-Reinforced Composites taking account of Debonding Damage and Particle Size Effect  
*Keiichiro Tohgo, Yu Itoh and Yoshinobu Shimamura*
- 15:20 Numerical Modelling of Thick-Interface Multi-Component Diffusional Phase Transformation  
*Jiri Vala*
- 15:40 Ab Initio DFT Calculations of Surface Stress and Stretch of Charged au Films  
*Yoshitaka Umeno, Christian Elsässer, Bernd Meyer, Peter Gumbsch and Joerg Weissmüller*

**Room: CIN1.1**

**MS151 Advances in Multiphysics Simulation and Experimental Testing of MEMS and NEMS II**

Joint IACM – IUTAM Minisymposium

Organizers: Attilio Frangi, Narayan Aluru and Subrata Mukherjee

- 14:00 **Design Tools for Emerging Technologies (Keynote Lecture)**  
*J. Bardhan, C. Coelho, S. Johnson, H. Reid, L. Zhang and Jacob White*
- 14:30 **Multi-Physics Modelling for the Fabrication, Packaging and Reliability of Micro-Systems Components (Keynote Lecture)**  
*Chris Bailey, Stoyan Stoyanov, Ying-Kit Tang, Xiandong Xue and Tim Tilford*
- 15:00 Multiphysics Modeling and Optimization of a Polymeric Thermal Micro-Actuator with an Embedded Skeleton  
*Gih-Keong Lau, Johannes F. L. Goosen and Fred van Keulen*
- 15:20 Influence of the Casimir Force on Electrostatically Actuated MEMS and NEMS  
*André Gusso*
- 15:40 Modal Analysis of Nano-wires with Coupled DFT/FEM Calculation  
*Nathan Hallquist, Daryl Chrzan and Panayiotis Papadopoulos*

## Monday Afternoon Sessions (14:00 - 16:00)

### Room: CIN2.1

#### MS180 Computational Modelling in Bone Mechanobiology II

Organizers: Jose Manuel Garcia-Aznar, Danny Kelly, Manuel Doblare and Patrick Prendergast

- 14:00 **Biomechanics of Bone Structure and Strength: From In-Vitro to In-Silico Analysis (Keynote Lecture)**  
*Bert van Rietbergen*
- 14:30 Multiphysics Two-Scales Analysis of Bone Regeneration in Tissue Engineering Problems  
*José Antonio Sanz-Herrera, José Manuel García-Aznar and Manuel Doblare*
- 14:50 Bone Remodelling due to Dental Prosthesis  
*Wei Li, Daniel Lin, Qing Li and Michael Swain*
- 15:10 A Mechanobiological Model for Bone Ingrowth on Dental Implants  
*Pedro Moreo, José Manuel García-Aznar and Manuel Doblare*
- 15:30 A 3D Bioactive Contact Element for Finite Element Bone Remodelling Simulation  
*Andre Lutz and Udo Nackenhorst*

### Room: PGL

#### MS029 Computational Geomechanics Minisymposium II

Organizers: Boris Jeremic, Claudio Tamagnini, Richard Regueiro, Ronaldo Borja, Fusao Oka and Stein Sture

- 14:00 A Lagrangian Method for Two-Phase Flow Simulation  
*Matthias Preisig and Thomas Zimmermann*
- 14:20 An Interface Model for the Analysis of Anisotropy of Friction and Wear of Contact Surfaces  
*Giuseppe Fileccia Scimemi and Giuseppe Giambanco*
- 14:40 Analysis of Failure in Partially Saturated Soils  
*Ricardo Schiava and Guillermo Etse*
- 15:00 Automatic Web-Based Numerical Modelling of Shield Tunnelling  
*Janosch Stascheit, Felix Nagel and Günther Meschke*
- 15:20 Bounds and Adaptivity for 3D Limit Analysis  
*Jose Munoz, Javier Bonet, Antonio Huerta and Jaime Peraire*
- 15:40 Comparison between Two Material Point Methods for Applications in Geotechnics  
*Dorival M. Pedroso, Kristian Krabbenhoft and Daichao Sheng*

**Room: EXC1.1**

**MS088 Mathematical Analysis of Generalized Finite Element Method II**

Organizers: Uday Banerjee and Mark Alexander Schweitzer

- 14:00 Local Approximation Error for Generalized FEM for Problems with Discontinuous Coefficients  
*Ivo Babuska, Robert Lipton and Michael Stuebner*
- 14:20 Robust and Accurate Global-Local Analysis with the Generalized Finite Element Method  
*Carlos Armando Duarte, Dae-Jin Kim and Jeronymo Pereira*
- 14:40 Numerical Simulation of Cellular Transport and Reaction Systems with Generalised Meshfree  
*Markus Kirkilionis, Martin Eigel and Erwin George*
- 15:00 Hierarchical Enrichment in the Particle-Partition of Unity Method  
*Marc Alexander Schweitzer*
- 15:20 Application of SPH Method for Modelling Particulate Composites  
*Sivakumar Kulasegaram and Yongqiang Chen*
- 15:40 Superconvergence in Generalized Finite Element Method  
*Cosmin Anitescu and Uday Banerjee*

**Room: EXC1.2**

**MS028 Computational Methods for Generalized Continua II**

Organizers: Richard Regueiro, Krishna Garikipati, Carlo Sansour, Paul Steinmann, Harm Askes and Jerzy Pamin

- 14:00 **Computational Analysis of Size Effects using Advanced Crystal Plasticity Models (Keynote Lecture)**  
*Marc Geers, Anish Roy, Ron Peerlings and Johan Hoefnagels*
- 14:30 **Variational and Computational Aspects of Problems in Single-Crystal Gradient Plasticity (Keynote Lecture)**  
*Daya Reddy and Andrew McBride*
- 15:00 Implicit Gradient Plasticity Modelling of Size Effects  
*Ron H.J. Peerlings*
- 15:20 A Cosserat Finite Element with Damage and Plasticity for the In-Plane Response of Masonry  
*Daniela Addessi, Vincenzo Ciampi and Achille Paolone*
- 15:40 A Constitutive Formulation of Nonlocal Plasticity  
*Fabio De Angelis*

**Room: EXC1.3**

**MS141 Accuracy Assessment of the eXtended Finite Element Method: Adaptivity, Comparison with Competing Methods, Industrialisation II**

Organizers: Stephane Bordas, Marc Duflot and Pierre-Olivier Bouchard

- 14:00 **Improving the Accuracy of XFEM Crack Tip Fields in Linear Elastic and Cohesive Materials (Keynote Lecture)**  
*Bhushan Karihaloo and Qizhi Xiao*
- 14:30 **Modeling of Metal Forming Processes Via the Enriched X-Ale-Fem Technique (Keynote Lecture)**  
*Amir Khoei, Masoud Anahid and Omid Reza Biabanaki*
- 15:00 A Global Explicit Residual Based Error Estimator for the Extended Finite Element Method in Code\_Aster  
*Jossélin Delmas and Samuel Geniaut*
- 15:20 A Posteriori Error Estimations for Frictional Contact Problems approximated by the Extended Finite Element Method  
*Vanessa Lleras, Patrick Hild and Yves Renard*
- 15:40 Comparison of Recently Developed Recovery-Type Discretization Error Estimators for the Extended Finite Element Method  
*Juan José Ródenas, Marc Duflot, Stephane Bordas, Eugenio Giner, Octavio Andrés González Estrada and Francisco Javier Fuenmayor*

## Monday Afternoon Sessions (14:00 - 16:00)

### Room: **EXC2.1**

#### **MS238 Advances in Particle Methods - Minisymposium sponsored by the Zienkiewicz Foundation II**

Organizers: Roger Owen and Sergio Idelsohn

- 14:00 Multi-physics Simulation for Micro Fluidic Devices Using Moving Particle Semi-implicit Method  
*Seiichi Koshizuka, Yukihiro Suzuki and Takahiro Harada*
- 14:20 A Large-scale Three Dimensional Fluid Analysis by SPH Method  
*Jun Imasato and Yuzuru Sakai*
- 14:40 A Wall Boundary Computation Model by Polygons for Moving Particle Semi-Implicit Method  
*Takahiro Harada, Seiichi Koshizuka and Katsunori Shimazaki*
- 15:00 Simulation of Impact, Perforation, and Fragmentation in Augmented Fabrics  
*Eric Fahrenthold, Kwon Joong Son and April Bohannon*
- 15:20 Adaptive Material Point Method for Shaped Charge Simulation  
*Shang Ma, Xiong Zhang and Xinming Qiu*
- 15:40 Investigating Mass Transfer in Reactive Turbulent Flow using Passive Particle Tracking  
*Dimitrios Papavassiliou and Kien Nguyen*

### Room: **EXC2.2**

#### **MS055 Stabilized, Multiscale and Multiphysics Methods I**

Organizers: Tayfun Tezduyar, Arif Masud and Thomas J. R. Hughes

- 14:00 **Cochain Discretizations of PDE Problems (Keynote Lecture)**  
*Franco Brezzi*
- 14:30 **High Intensity Focused Ultrasound in a Human Body (Keynote Lecture)**  
*Kohei Okita, Kenji Ono, Shu Takagi and Yoichiro Matsumoto*
- 15:00 A Stabilized Mixed Finite Element Method for the First-Order Form of Advection-Diffusion Equation  
*Arif Masud and JaeHyuk Kwack*
- 15:20 Adaptive Multiscale Methods for Elliptic Problems  
*Trond Kvamsdal and Knut Morten Økstad*
- 15:40 A Framework for Deriving Stable Finite Element Formulations for Incompressible Viscous Flows  
*Paulo De Sampaio*

**Room: CAS0.1**

**MS069 Recent Developments in Computational Methods for Structural Optimization III**

Organizers: H Alicia Kim, Gengdong Cheng, David Kennedy, Michal Kocvara, Tae Hee Lee, Kurt Maute and Mathias Stolpe

- 16:30 Topology Optimization with Uncertain Node Locations  
*James K. Guest and Tak Igusa*
- 16:50 On Solving Discrete Topology Optimization Problems with Stress Constraints to Global Optimality  
*Mathias Stolpe, Nam Nguyen Canh and Roman Stainko*
- 17:10 Multiphase Topology Optimization for Fiber Reinforced Composites with Damage  
*Junji Kato and Ekkehard Ramm*
- 17:30 Towards Local Design Criteria in Discrete Material Optimization  
*Christian Gram Hvejsel and Erik Lund*
- 17:50 Recent Progress in Free Material Optimization  
*Michal Kocvara and Michael Stingl*
- 18:10 Integrated Design Optimization of Flexible Piezoelectric Structures for Required Deformation  
*Xiaoming Wang and Zhan Kang*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics III**

Joint IACM – IUTAM Minisymposium

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 16:30 Representing Acoustic Field Uncertainty in Ocean Waveguides  
*Steven Finette and Yu Yu Khine*
- 16:50 Experimental Identification of a Stochastic Computational Model for an Uncertain Vibroacoustic System  
*Charles Fernandez, Christian Soize and Laurent Gagliardini*
- 17:10 Efficient Polynomial Uncertainty Computations for Phase in Underwater Acoustic Propagation  
*Roger Oba*
- 17:30 Stochastic Data Assimilation with a Karhunen-Loeve / Polynomial Chaos Statistical Reduction  
*Lionel Mathelin and M. Yousuff Hussaini*
- 17:50 Numerical Treatment of Shallow Water Equations with Uncertain Parameters  
*Dishi Liu and Hermann Matthies*
- 18:10 Effect of Base Flow Uncertainty on Couette Flow Stability  
*Didier Lucor, Jordan Ko and Pierre Sagaut*

**Room: CAS1.2**

**MS168 Computational Contact Mechanics III**

Organizers: Peter Wriggers, Tod A. Laursen and Giorgio Zavarise

- 16:30 A Multicontact Problem: The Virtual Testing of Joints for the Prediction of Damping  
*David Néron, Pierre Ladevèze, Alain Caignot and Jean-François Durand*
- 16:50 Combined Multibody Dynamics, Finite Elements and CAD Methodologies for the Design of Road Structures  
*João M. P. Dias, Ana Freitas and Rui Silva*
- 17:10 Modelling the Asperity Degradation of a Sheared Rock Joint using Fem  
*Anna Giacomini, Olivier Buzzi and Kristian Krabbenhoft*
- 17:30 Nonlinear Analysis of Arches under Contact Constraints  
*Ricardo Silveira and Paulo Gonçalves*
- 17:50 Numerical Simulation of Bullet Heating while travelling in Grooved Barrel  
*Moshe Arad, David Touati and Sharon Peles*
- 18:10 Penetration of Steel Anchor into a Concrete Block  
*Ivica Kožar, Josko Ožbolt and Vanja Travaš*

## Monday Evening Sessions (16:30 - 18:30)

### Room: **CAS1.3**

#### MS090 Uncertainty Quantification Methods for CFD and FSI I

Organizers: Hester Bijl and Chris Lacor

- 16:30 Non-Deterministic Compressible Navier-Stokes Simulations using Polynomial Chaos  
*Sergey Smirnov and Chris Lacor*
- 16:50 Radial Basis Functions applied to Uncertainty Propagation in CFD  
*Alex Loeven and Hester Bijl*
- 17:10 Management of Uncertainties at the Level of Preliminary Design  
*Gilbert Rogé and Ludovic Martin*
- 17:30 Uncertainty Propagation in CFD using Surrogates and Automatic Differentiation  
*Régis Duvigneau, Massimiliano Martinelli and Praveen Chandrashekarappa*

### Room: **CAS1.4**

#### MS184 Numerical Dynamical Systems Analysis of Nonlinear Climate Models I

Organizers: Fred Wubs, Kurt Lust and Henk Dijkstra

- 16:30 Computation of Invariant Manifolds in Large-Scale Dissipative Systems  
*Juan Sánchez, Marta Net and Carles Simó*
- 16:50 A Time Simulation Based Approach to Numerical Bifurcation Analysis of Fluid Problems  
*Kurt Lust*
- 17:10 A Method to Reduce the Spin-up Time of Ocean Models  
*Erik Bernsen, Henk Dijkstra, Fred Wubs and Jonas Thies*
- 17:30 A Parallel Version of the Fully Implicit Ocean Model THCM  
*Jonas Thies*
- 17:50 Finite Volume Simulations for the Generation and Propagation of Long Waves  
*Anargiros Delis and Maria Kazolea*
- 18:10 The Prediction and Evaluation of Contamination in the Large Clean Room for Manufacturing Electronic Components  
*Giho Jeong, Hyangeun Byun and Minjoo Kim*

### Room: **CAS1.5**

#### MS207 Numerical Methods and Technological Solutions for CSP Systems I

Organizers: Valentina Salomoni and Giannuzzi Mauro

- 16:30 Radiative Transfer in High-Temperature Multi-Phase Solar Thermochemical Reactors  
*W. Lipinski and A. Steinfeld*
- 16:50 Coupling Radiation and Convection: Effect of Radiation Mesh on Both Results and Performance  
*Guillem Colomer, Oriol Lehmkuhl, Ricard Borrell and Roser Capdevila*
- 17:10 Innovative Heat Storage Concrete Systems for Solar Power Plants  
*Giuseppe Mauro Giannuzzi, Valentina Salomoni, Adio Miliozzi and Carmelo Majorana*
- 17:30 Risk Profiling the Design & Management of Concentrated Solar Power Technologies  
*Ennio Bianchi*
- 17:50 Numerical Evaluation of Wind Actions on Parabolic trough Collectors  
*Adio Miliozzi, Daniele Nicolini, Giacomo Arsuffi and Luigi Sipione*
- 18:10 Structural Steel Components Optimization of Parabolic-trough Solar Concentrators  
*Valentina Salomoni, Giuseppe Mauro Giannuzzi, Carmelo Majorana and Adio Miliozzi*

**Room: CAS1.6**

**MS035 Uncertainties in Computational Mechanics with Emphasis on Structural Optimization Applications**

Organizers: Dan Frangopol and Yiannis Tsompanakis

- 16:30 A Method for Reliability-Based Design Mixing Support Vector Machines and Particle Swarm Optimization  
*Jorge E. Hurtado and Julián M. Londoño*
- 16:50 A Multi-Objective Approach for Reliability-Based Design Optimization  
*Dimos C. Charmpis*
- 17:10 Stochastic and Sensitivity Analysis with Missing Data  
*Abayomi Omishore and Zdenek Kala*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation III**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 16:30 A Three Dimensional Collision with Friction  
*Shlomo Djerassi*
- 16:50 A Time-Stepping Scheme to Model Inelastic Collisions in Multi-Rigid-Body Systems  
*Kishor Bhalerao, Kurt Anderson and Jeffrey Trinkle*
- 17:10 Convergence of a Time-Stepping Scheme for Multibody Dynamics with Unilateral Constraints  
*Laetitia Paoli*
- 17:30 Using Volume Metrics as an Alternative to Penalty or Finite Element Methods for Modelling Contacts  
*Yves Gonthier, Christian Lange and John McPhee*
- 17:50 The Hertz Contact Model Algorithms and their Implementation on Modelica Language  
*Ivan Kosenko and Evgeniy Alexandrov*
- 18:10 The Drift Phenomena of a Rigid Body Colliding Against an Oscillated Plane  
*Caishan Liu and Zhen Zhao*

**Room: CAS1.8**

**MS102 Inverse Problems III**

Organizers: Bojan Guzina and Marc Bonnet

- 16:30 A Non-iterative FEM-based Cavity Identification Method using Topological Sensitivity for 2-D and 3-D Time-domain Elastodynamics  
*Cédric Bellis and Marc Bonnet*
- 16:50 An Inverse Elliptic Source Problem from Boundary Measurements  
*Abdellatif El Badia*
- 17:10 Shape-Material Sensitivity Framework for Elastic-Wave Identification of Penetrable Defects  
*Bojan B. Guzina and Marc Bonnet*
- 17:30 Full Waveform Tomography for Seismic Velocity and Anelastic Losses in Heterogeneous Structures including Model Uncertainty  
*Aysegul Askan, Volkan Akcelik, Jacobo Bielak and Omar Ghattas*
- 17:50 On Some Inverse Problems of Parameter Identification in Linear Elasticity  
*Bernd Hofmann and Marcus Meyer*
- 18:10 Proper Orthogonal Decomposition Reduced Order Modeling for Acoustic-Structure Interaction and Inverse Vibro-Acoustic Problems  
*John Brigham and Wilkins Aquino*



## Monday Evening Sessions (16:30 - 18:30)

### Room: **CAS2.1**

#### MS094 Soft Computing Methods I

Organizers: Tadeusz Burczyński, Jamshid Ghaboussi and Zenon Waszczyszyn

- 16:30 **Bayesian Neural Networks in the Regression Analysis of Structural Mechanics Problems (Keynote Lecture)**  
*Zenon Waszczyszyn, Marek Słoński, Bartosz Miller and Grzegorz Piątkowski*
- 17:00 **Structural Optimization based on the Particle Swarm Global Optimization Method (Keynote Lecture)**  
*Vagelis Plevris, Nikos Lagaros and Manolis Papadrakakis*
- 17:30 Soft Computing Methods in Computational Grids  
*Wacław Kus and Tadeusz Burczyński*
- 17:50 Grid Based Evolutionary Optimization of Strength Parameters in Heat Affected Zone of Welded Joints  
*Grzegorz Kokot, Antoni John and Wacław Kuś*
- 18:10 Application of EES Software and AI Tools for Conceptual Synthesis of CHP Systems  
*Andrzej Nowak, Jacek Smolka, Zbigniew Bulinski, Ziemowit Ostrowski, Marcin Liszka and Andrzej Ziebiak*

### Room: **CAS2.2**

#### MS067 Intelligent Multi-tasking Computer Aided Engineering Systems I

Organizers: Pedro Marcal and Nobuki Yamagata

- 16:30 On Intelligent Conversations with a Computer  
*Pedro Marcal and Nobuki Yamagata*
- 16:50 The Automatic Development of Expert Systems for Stress Analysis  
*Nobuki Yamagata and Pedro V. Marcal*
- 17:10 The Automated Modeling System for FEA Analysis by Navia Integral  
*Hirokazu Nishiura*
- 17:30 An Intelligent Flaw Monitoring System: From Flaw Size Uncertainty to fatigue Life Prediction with Confidence Bounds in 24 Hours  
*Jeffrey Fong, James Filliben, Alan Heckert and Pedro Marcal*
- 17:50 Grid Computing for the Bi-CGSTAB method Applied to Solution of the Finite-Element Hermite Collocation for Elliptic PDEs  
*Emmanuel Mathioudakis and Elena Papadopoulou*
- 18:10 Parallel Computing of the Multibody Systems of Large Dimensions  
*Alexander Gorobtsov*

### Room: **CAS2.3**

#### MS128 Innovative Methods for Fluid-Structure Interaction II

Organizers: Trond Kvamsdal, Roger Ohayon and Harald van Brummelen

- 16:30 A-Posteriori Error-Estimation and Optimal-Adaptive Refinement for Fluid-Solid-Interaction Problems  
*Harald van Brummelen and Kristoffer van der Zee*
- 16:50 A Class of High-Order and Multivariate Interpolation Methods for Adapting Reduced-Order Models to Continuous Parameter Changes  
*David Amsallem, Charbel Farhat, Julien Cortial and Kevin Carlberg*
- 17:10 On the Solution of the Three-Field Coupling Approach for Aeroelastic Applications  
*Ralf Unger, Matthias Haupt and Peter Horst*
- 17:30 General Galerkin Ale Methods for Turbulent Fluid-Structure Interaction using a Unified Continuum Formulation  
*Johan Jansson, Johan Hoffman and Murtazo Nazarov*
- 17:50 Numerical Simulations of Viscous Compressible Flows in Moving Domains with High Order Discontinuous Galerkin Methods  
*Vinh-Tan Nguyen*
- 18:10 Fast Transient Fluid-Structure Interaction with Failure and Fragmentation  
*Folco Casadei*

**Room: CAS2.4**

**MS063 Modeling Robustness and Structural Reliability Analysis I**

Joint IACM – IUTAM Minisymposium

Organizers: James Beck, Gerhart I. Schuëller and Hector Jensen

- 16:30 **Robust Reliability-Based Design Optimization of Structural Systems under Stochastic Excitation (Keynote Lecture)**  
*Hector Jensen and Macarena Ferre*
- 17:00 **Reliability Evaluation for Uncertain Non-Linear Structural Systems under Stochastic Dynamic Excitation (Keynote Lecture)**  
*Helmut Pradlwarter and Gerhart I. Schuëller*
- 17:30 Stochastic Optimization of Reliability in Design and Influence of Model Prediction Error  
*Alexandros Taflanidis and James Beck*
- 17:50 Using Markov Chain Monte Carlo Simulation for Robust Reliability Assessment of Existing Structures Based on the Inspection Results  
*Fatemeh Jalayer, Iunio Iervolino and Gaetano Manfredi*
- 18:10 Quality Assurance of Uncertain Mechanical Systems Considering the Effects of Fatigue and Fracture  
*Marcos A. Valdebenito and Gerhart I. Schuëller*

**Room: CAS2.5**

**MS038 Computational Methods in Nonlinear Dynamics III**

Organizers: Stefano Lenci and Marian Wiercigroch

- 16:30 Finite Element Analysis of Dynamic Responses for Honeycomb Sandwich Plates Initially Damaged by Skin/Core Partial Debonding  
*Vyacheslav Burlayenko and Tomasz Sadowski*
- 16:50 Nonlinear Dynamic Response of a Simply-Supported Laminated Composite Plate subjected to Explosive Pressure Pulses  
*Zafer Kazanci and Zahit Mecitoglu*
- 17:10 Steady-State Response of a Non-Linear Harmonically Excited Duffing Oscillator with Zero Linear Restoring Force  
*Ivana Kovacic and Michael J. Brennan*
- 17:30 Computational Aspects in the Study of a Model for the Pedestrians-Induced Lateral Vibrations of Footbridges  
*Stefano Lenci and Laura Marcheggiani*
- 17:50 Energy-Based Analysis of Mutual Entrainment in Vibro-Exciters on Oscillatory Base  
*Yuuichi Yokoi, Yoshihiko Susuki and Takashi Hikiyama*
- 18:10 The Approach to Computational Analysis of Vibration of Vertical Rotors supported by Fluid Film Bearings and having a Disc Submerged in Inwetable Liquid  
*Jaroslav Zapomel*

**Room: CAS2.6**

**MS140 Advanced Numerical Approaches for Complex Multi-phase Flows III**

Organizers: Takashi Yabe, Nobuatsu Tanaka and Feng Xiao

- 16:30 Multi-Scale Numerical Solver for an Estuary River Flow using Cip-Soroban Method  
*Takashi Nakamura and Tadaharu Ishikawa*
- 16:50 Development of a Practical Numerical Model for Multi-Phase Flows with Improved Interface Capturing and Geometry Representation  
*Feng Xiao, Keita Matsumoto and Noyuki Onodera*
- 17:10 Isogeometric Analysis of Phase-field Models: Application to the Cahn-Hilliard and Navier-Stokes-Korteweg Equations  
*Hector Gomez, Victor Calo, Thomas J. R. Hughes and Yuri Bazilevs*
- 17:30 A New Micro-Macro Algorithm for Simulation of Polymer Flows  
*Juan Luis Prieto, Juan Luis Bermejo and Manuel Laso*
- 17:50 Modeling of Gas-Particle Flows - Applications to Safety Studies in ITER Fusion Reactor  
*Thibaud Kloczko and Hervé Guillard*
- 18:10 Direct Numerical Simulation of Bubble-Particle Interaction by Combination of Immersed-Boundary and Volume-of-Fluid Methods  
*Ryuichi Iwata, Shintaro Takeuchi, Takeo Kajishima and Masahiro Taniguchi*

## Monday Evening Sessions (16:30 - 18:30)

### Room: **CAS3.1**

#### MS154 Virtual Fracture Testing of Composite Materials and Structures I

Joint IACM – IUTAM Minisymposium

Organizers: Javier LLorca and Brian Cox

- 16:30 Practical Challenges in Formulating Virtual Tests  
*Brian N. Cox*
- 16:50 A Three-Dimensional Damage Model for Composite Laminates  
*Pedro Camanho, Pere Maimí and Joan Andreu Mayugo Majó*
- 17:10 Crack Initiation and Tunneling in Laminated Composites  
*Qingda Yang*
- 17:30 Efficient Damage Tolerance Assessment of Composite Sandwich Structures  
*Luise Kärger, Anja Wetzel, Jens Baaran and Jan Teßmer*
- 17:50 Multi-Disciplinary Analysis and Optimisation of Large Composite Structures in the Early Design Phase: Issues and Challenges  
*Xavier Mencaglia, Christophe Friebe, Hiromasa Kato, Yves-Henri Grunevald, Norbert Lidon and Frédéric Lani*

### Room: **CAS3.2**

#### TS328 Computational Structural Mechanics III

- 16:30 A Simple Procedure for Analysis of Hyperelastic 3D Cable Structures  
*Katalin Klinka and Vinicius Arcaro*
- 16:50 A Truly Large Strain Rod Model that incorporates General Cross-Sectional In-Plane Changes and Out-of-Plane Warping  
*Evandro Dasambiagio, Paulo Pimenta and Eduardo Campello*
- 17:10 Generalized Rotation Parameters for the Nonlinear Analysis of Rod and Shells  
*Maria de Lourdes Moreira, Paulo Pimenta and Eduardo Campello*
- 17:30 Dynamic Nonlinear Finite Element Analysis of Elasto-Plastic Collapse Behavior including the Local Buckling for the Square Steel Tube using the Mixture of BEAM Element and SHELL Element  
*Tatsuhiko Ine, Kohei Yuge, Tukasa Takayama, Yuta Hashimoto and Koichi Kajiwara*
- 17:50 Stability of Elastic Pipes Conveying Fluid with Rigid Body Degrees of Freedom  
*Michael Stangl, Johannes Gerstmayr and Hans Irschik*
- 18:10 Uniform-Stress Catenary simulated by Unstable Truss Structure  
*Takeshi Tamura and Kaori Nishibayashi*

### Room: **CAS3.3**

#### MS049 Fluid Dynamics of Compressible Flows of Substances Governed by Complex Thermodynamic Models II

Joint IACM – IUTAM Minisymposium

Organizers: Piero Colonna, Stefano Rebay, Alberto Guardone and John Harinck

- 16:30 Transonic Viscous Inviscid Interactions of Dense Gases in Narrow Channels  
*Alfred Klumick and Georg Meyer*
- 16:50 Numerical Modelling of Cavitating Flow with Special Emphasis on Shock Induced Dynamic Loads  
*Steffen J. Schmidt, Ismail H. Sezal and Günther H. Schnerr*
- 17:10 3D Simulation of a Radial ORC Turbine Stator Nozzle using Accurate Thermodynamic Models  
*Piero Colonna, Antonio Ghidoni, John Harinck, Stefano Rebay and F. Sussarellu*
- 17:30 Modeling of Spray Behavior of a Diesel Fuel Surrogate  
*Michael Boot, Dennis van Erp, Peter Frijters, Carlo Luijten and Rik Baert*
- 17:50 Analysis of the Influence of Thermodynamic Speed of Sound in Modeling the Rapid Vaporization of Superheated Liquid (BLEVE) by employing the Method of Characteristics  
*Mengmeng Xie and Dirk Roekaerts*
- 18:10 Features of the Flow of a Compressible Liquid in Flowing Parts of Control Valves of Steam Turbines  
*Sergey Arianov, Arkadiy Zaryankin, Nikolay Zroychikov and Andrey Rogalev*

**Room: CAS3.4**

**MS115 Multiscale Mechanics of Interfaces**

Joint IACM – IUTAM Minisymposium

Organizers: Christoph Eberl, Abhijit Mukherjee, Siegfried Schmauder and Shailendra Joshi

- 16:30 Dislocation Motion and Plasticity in Small Scale Structures: The Influence of Surfaces/ Interfaces and Boundary Constraints  
*Daniel Weygand*
- 16:50 Interfacial Strength: Ab-Initio Calculation of Cohesive Zone Parameters  
*Rebecca Janisch, Andreas Böhner and Alexander Hartmaier*
- 17:10 Multiscale Modeling of Heterogeneous Adhesives - Effects of Particle Decohesion  
*Mohan G. Kulkarni, Philippe H. Geubelle and Karel Matous*
- 17:30 Simulation of Delamination in Brittle Interfaces using an Enriched Cohesive Zone Model  
*Mohammad Samimi, Bas van Hal, Ron H.J. Peerlings, Hans van Dommelen and Marc Geers*
- 17:50 Multiscale Understanding of Biocell-Gold Adhesion  
*Jinghong Fan and Mauro Chinappi*
- 18:10 Atomistic Mechanisms of Adhesion and Hysteresis during Contact  
*Haneesh Kesari, Adrian Lew and Wei Cai*

**Room: CAS3.5**

**MS042 Computational Electro-Magneto-Hydro-Dynamics (EMHD) III**

Organizers: Gunter Gerbeth, George S. Dulikravich and Koulis Pericleous

- 16:30 Magneto-Hydrodynamic Simulations using Radial Basis Functions  
*Marcelo Colaco and George Dulikravich*
- 16:50 Tridiagonal Factorization Algorithm for Chebyshev-Tau Method with an Exponential Coordinate Mapping  
*Janis Friede, Ilmars Grants and Gunter Gerbeth*
- 17:10 Treatment of Electric Field Singularities at Solid-Liquid-Air Junctions in Electrowetting-on-Dielectric Computations  
*George Pashos, Athanasios Papathanasiou and Andreas Boudouvis*
- 17:30 The Flow around an Electromagnetically Self-Propelled Sphere  
*Victor Shatrov and Gunter Gerbeth*

**Room: CAS3.6**

**MS111 Role of Heterogeneities and Uncertainties in Inelastic Response of Materials**

Joint IACM – IUTAM Minisymposium

Organizers: Adnan Imbrahimbegovic and Hermann Matthies

- 16:30 Computational Approaches for Inelastic Media with Uncertain Parameters  
*Bojana Rosic and Hermann Matthies*
- 16:50 On a Multiscale Framework to Model Heterogeneous Material with Strongly Coupled Scales  
*Martin Hautefeuille, Jean-Baptiste Colliat and Adnan Ibrahimbegovic*
- 17:10 Cosserat Homogenization of Elastic Periodic Blocky Masonry  
*Luigi Gambarotta and Andrea Bacigalupo*
- 17:30 Modelling Damage in Brickwork Joints  
*Antonio Di Carlo, Giovanni Formica and Valerio Varano*
- 17:50 Fracture Energy and Homogenization of Masonry Structures  
*Nicola Cavalagli, Federico Cluni and Vittorio Gusella*
- 18:10 Effects of Heterogeneities in Dynamical Response of Reinforced Concrete Structures  
*Norberto Dominguez, Esteban Flores and Adnan Ibrahimbegovic*

## Monday Evening Sessions (16:30 - 18:30)

### Room: **CAS3.7**

#### MS237 Numerical Techniques for the Modelling of Material Failure in Solids III

Organizers: Xavier Oliver and Francisco Armero

- 16:30 Three Dimensional Numerical Modelling of Brittle Fracture in Solids  
*Philippe Jäger, Paul Steinmann and Ellen Kuhl*
- 16:50 Localization, Damage and Fracture Modelling in Shell Structures  
*Pawel Woelke, Najib Abboud, Raymond Daddazio and George Voyiadjis*
- 17:10 Application of Coupled Elasto-Plastic-Damage Model with Non-Local Softening to Concrete Materials  
*Irek Marzec and Jacek Tejchman*
- 17:30 A Discontinuous Galerkin Formulation for Gradient Plasticity at Finite Deformations  
*Andrew McBride and Daya Reddy*
- 17:50 Fracture Energy-Based Gradient Plasticity Formulation for Concrete  
*Guillermo Etse and Sonia Vrech*
- 18:10 Alternative Aspects of Cohesive Crack Modeling with MPM  
*Jason Sanchez, Howard Schreyer and Deborah Sulsky*

### Room: **CAS3.8**

#### MS050 Numerical and Computational Aspects of Interface Problems I

Organizers: Frederic Gibou and Christian Ratsch

- 16:30 **Interface and Defect Dynamics Study Via the Phase Field Crystal Model (Keynote Lecture)**  
*Jonathan Dantzig and Nigel Goldenfeld*
- 17:00 **Simulation for Epitaxial Growth and Pattern Formation (Keynote Lecture)**  
*Russel Caflisch, Christian Ratsch and Xiaobin Niu*
- 17:30 Modeling Strain Induced Pattern Formation and Self Organization of Quantum Dots during Heteroepitaxial Growth  
*Christian Ratsch, Xiaobin Niu, Young-Ju Lee, Peter Smereka, Jason DeVita and Russel Caflisch*
- 17:50 Using Kinetic Monte Carlo to Simulate Dendritic Growth  
*Tim Schulze*
- 18:10 Dissipative Dynamics of Fluid Vesicles  
*Frank Hauffer, John Lowengrub, Andreas Rätz and Axel Voigt*

### Room: **CAS3.9**

#### MS104 Innovative and Advanced Methods for Computational Dynamics III

Organizers: Carlos A. Felippa and Ekkehard Ramm

- 16:30 Construction of Customized Mass-Stiffness Pairs using Templates  
*Carlos A. Felippa*
- 16:50 Optimization of Lumping Schemes for Plane Square Quadratic Finite Element in Elastodynamics  
*Radek Kolman, Jiri Plesek and Dusan Gabriel*
- 17:10 Asymptotic Annihilation Algorithm for Non-Linear Dynamics  
*Jose Laier*
- 17:30 Free Vibrations of Thick Plates; Analysis of a Displacement-Based Formulation  
*Nicola Ivan Giannoccaro, Arcangelo Messina and Giulio Reina*
- 17:50 Numerical Method for the Problem Bending Vibration of a Thin Elastic Plate and its Application in the Problem of a Floating Ice Vibration  
*Andrey Kuleshov and Vyacheslav Mymrin*

**Room: CAS3.10**

**MS150 Multiscale Modeling and Uncertainty Quantification of Heterogeneous Materials III**

Joint IACM – IUTAM Minisymposium

Organizers: Manolis Papadrakakis, George Stefanou, X. Frank Xu and Nicholas Zabarlas

- 16:30 Low-rank updating algorithms for disordered materials systems  
*Phani Nukala*
- 16:50 Modeling Large Networks of Fibers  
*Katerina Papoulia*
- 17:10 Stochastic Analysis for Homogenization Problem considering Microscopic Uncertainty using Kriging Approximation  
*Sei-ichiro Sakata, Fumihiko Ashida and Masaru Zako*
- 17:30 Enhanced Hybrid Simulation of Non-Homogeneous Non-Gaussian Stochastic Fields  
*George Stefanou, Vissarion Papadopoulos and Nikos Lagaros*
- 17:50 Probabilistic Characterisation of Surface Imperfections in Piezoelectric Ceramics  
*Clemens Verhoosel, Miguel Gutiérrez and Rene de Borst*
- 18:10 Probabilistic Analysis of Non-local Random Media  
*Giulio Cottone, Mario Di Paola and Massimiliano Zingales*



**Room: CIN0.1**

**MS194 Biological Cells and Capsules III**

Joint IACM – IUTAM Minisymposium

Organizers: Takuji Ishikawa , Dominique Barthes-Biesel , Petia Vlahovska and Takami Yamaguchi

- 16:30 Analytical Study of Vesicle Dynamics and Rheology  
*Gerrit Danker and Chaouqi Misbah*
- 16:50 Electrohydrodynamic Deformation of Vesicles and Cells  
*Petia Vlahovska, Ruben Gracia, Said Aranda and Rumiana Dimova*
- 17:10 Three-Dimensional Simulation of Blood Flow arising from Malaria Infection  
*Hitoshi Kondo, Yohsuke Imai, Takuji Ishikawa, Ken-ichi Tsubota, Chwee Teck Lim and Takami Yamaguchi*
- 17:30 Adhesive Dynamics Simulations of Leukocyte Rolling and Firm Adhesion  
*Daniel Hammer, Kelly Caputo, Michael Beste and Ellen Krasik*
- 17:50 Molecular Biomechanics and Thermodynamics of Cell Adhesion  
*Muhammad Zaman*
- 18:10 Cell Traction on Micro-Patterned Substrate  
*Fong-Yew Leong, Vincent Chan and Keng-Hwee Chiam*

**Room: CIN0.2**

**MS020 Micro-fluidic / Lab-on-a-chip Systems I**

Organizers: Friedhelm Schönfeld and David Emerson

- 16:30 A Simple Method for Capturing some Complex Physics of Gas Flows in MEMS  
*Duncan Lockerby and Jason Reese*
- 16:50 Simulation of Ligands Competing for Binding Sites in a Multi-Solute System  
*Remo Winz, Eric von Lieres and Wolfgang Wiechert*
- 17:10 Computational Study of Microfluidic Two-Fluid Mixing  
*Thierry Colin, Mathieu Colin, Julien Dambrine and Jean-Baptiste Salmon*
- 17:30 Finite Element Modelling of Micro Heat Pipes  
*Meysam Rahmat and Pascal Hubert*
- 17:50 Towards a Multi-Flagella Architecture for E.Coli inspired Swimming Microrobot Propulsion  
*Arash Taheri and Meysam Mohammadi-Amin*

**Room: CIN1.1**

**MS151 Advances in Multiphysics Simulation and Experimental Testing of MEMS and NEMS III**

Joint IACM – IUTAM Minisymposium

Organizers: Attilio Frangi, Narayan Aluru and Subrata Mukherjee

- 16:30 Dynamic Properties of Piecewise Homogeneous Layers Resting on Elastic Substrates: Band Gaps, Localized Modes and Effect of Prestress  
*Massimiliano Gei, Alexander Movchan and Davide Bigoni*
- 16:50 Cad of MEMS. Computations and Simulations for LGS Resonant Sensors  
*Colette Tellier, Thérèse Leblois and Stéphane Durand*
- 17:10 Design of Nonlinear Microswitches for Radiofrequency Applications  
*Eugenio Brusa and Mircea Gheorghe Munteanu*
- 17:30 From MEMS to NEMS: Modelling and Characterization of the Non Linear Dynamics of Resonators, a Way to Enhance the Dynamic Range  
*Najib Kacem, Sebastien Hentz, Herve Fontaine, Valerie Nguyen, Marie Therese Delaye, Henri Blanc, Philippe Robert, Nicolas Driot and Regis Dufour*
- 17:50 Influence of the Silicon Membrane Geometry on the Mechanical Behaviour for a Piezoresistive Pressure Sensor  
*Jean-Francois Le Neal, Sebastiano Brida, Hikmat Hachkar and Patrick Pons*
- 18:10 A New Modelling Methodology of MEMS based on Cosserat Theory  
*Mustafa Calis, Omar Laghrouche and Marc Desmulliez*



## Monday Evening Sessions (16:30 - 18:30)

### Room: CIN2.1

#### MS180 Computational Modelling in Bone Mechanobiology III

Organizers: Jose Manuel Garcia-Aznar, Danny Kelly, Manuel Doblare and Patrick Prendergast

- 16:30 Different Animal Models of Bone Distraction  
*Esther Reina-Romo, Maria José Gómez-Benito, José Manuel García-Aznar, Jaime Domínguez and Manuel Doblare*
- 16:50 Understanding the Process of Force-Induced Bone Growth and Adaptation by a Mathematical Model  
*Solvey Maldonado, Rolf Findeisen and Frank Allgöwer*
- 17:10 Bovine Bone Remodeling Analysis for Veterinary Applications  
*Luciano Rodrigues, Daniel Lopes, João Folgado, Paulo Fernandes, Eduardo Borges Pires, João Martins, Estevam Las Casas and Rafael Faleiros*
- 17:30 Computer Simulations of Osteoporotic Changes in Human Pelvis Joint Region  
*Antoni John and Piotr Wysota*
- 17:50 A Multibody Model of the Human Cervical Spine for the Simulation of Traumatic and Degenerative Disorders  
*Artur Ferreira, Miguel Silva and João Levy-Melancia*
- 18:10 Prediction of apparent material properties of human femoral cancellous bone using finite element method  
*Soo-Won Chae, Junghwa Hong, Young Eun Kim, Seung-Ho Han, Sangbaek Park and Jihwan Kim*

### Room: PGL

#### MS029 Computational Geomechanics Minisymposium III

Organizers: Boris Jeremic, Claudio Tamagnini, Richard Regueiro, Ronaldo Borja, Fusao Oka and Stein Sture

- 16:30 Computational Approach for Compaction Bands in Porous Sandstones  
*Jun Kato and A.J.L. Crook*
- 16:50 Existence and Uniqueness of Solutions in Nonassociated Mohr-Coulomb Elastoplasticity  
*Johan Clausen and Kristian Krabbenhoft*
- 17:10 Deformation Analysis of Cement-Treated Soil by FEM Implemented with Particle Discretization  
*Yoshihisa Miyata and Shin-ichi Shigehisa*
- 17:30 Constitutive Modeling for Geotechnical Materials using Thermodynamic Potentials: Classical Drucker-Prager and Drucker-Prager Cap Model  
*Larissa Utiyama de Freitas, Mildred Hecke and Néstor Zouain*
- 17:50 Computational Simulation of Irreversible Deforming, Micro and Macrofracture of Rock in the Vicinity of a Borehole in its Dynamical Unloading  
*Alexey Kiselev and Pavel Zacharov*
- 18:10 Effect of Distribution of Initial Void Ratio and Boundary Roughness on Shear Localization in Granular Bodies  
*Jacek Tejchman and Jarek Gorski*

**Room: EXC1.1**

**MS155 Advances in Computational Mechanics in Honor of Professor Maier I**

Organizers: Eugenio Oñate, Claudia Comi and Giorgio Novati

- 16:30 Microplane Modeling of Damage and Fracturing in Particulate and Fiber Composites and Bio-Materials  
*Zdeněk P. Bažant, Ferhun C. Caner, Christian Hoover and Zaoyang Guo*
- 16:50 Fatigue Shape Optimization of Notched Machine Parts Made of Metallic or Two-Phase Composite Materials  
*Bogdan Wilczynski and Zenon Mróz*
- 17:10 Assessing Instability Effects on the Collapse of Thick Tubes: The Role of Numerical Analysis  
*Leone Corradi*
- 17:30 Performance Evaluation of Masonry Infill Walls Subjected to Axial and In-Plane Shear: Meso- and Macro Experiments and Simulations  
*Kaspar Willam, Ben Blackard and Carlo Cotto*
- 17:50 Effective Stress Principle in Modelling Shrinkage and Creep of Concrete at Early Ages and Beyond  
*Francesco Pesavento, Bernhard A. Schrefler, Dariusz Gawin and Mateusz Wyrzykowski*
- 18:10 Modeling of Crack Behavior of Cementitious Materials under Cyclic Loads  
*Ioannis Koutromanos and Benson Shing*

**Room: EXC1.2**

**MS028 Computational Methods for Generalized Continua III**

Organizers: Richard Regueiro, Krishna Garikipati, Carlo Sansour, Paul Steinmann, Harm Askes and Jerzy Pamin

- 16:30 A C1 Finite Element for Three-Dimensional Gradient Elasticity  
*Stefanos-Aldo Papanicolopoulos, Antonis Zervos and Ioannis Vardoulakis*
- 16:50 Finite Elements for Gradient and Cosserat Elasticity: A Penalty Approach  
*Antonios Zervos*
- 17:10 An Analytical / Numerical Approach based on Integral Equations for Crack Problems of Gradient Elasticity  
*Haralambos Georgiadis and Panagiotis Gourgiotis*
- 17:30 A 2D FE Approach for Nonlocal Elastic Problems  
*Alba Sofi, Aurora A. Pisano and Paolo Fuschi*
- 17:50 Stabilized Four-noded Element for Gradient Damage  
*Adam Wosatko and Jerzy Pamin*
- 18:10 A Variational Damage Model via Gradient Enhancement of the Free Energy  
*Bojan J. Dimitrijevic and Klaus Hackl*

**Room: EXC1.3**

**MS141 Accuracy Assessment of the eXtended Finite Element Method: Adaptivity, Comparison with Competing Methods, Industrialisation III**

Organizers: Stephane Bordas, Marc Duflot and Pierre-Olivier Bouchard

- 16:30 XFEM and Mesh Adaptation: A Marriage of Convenience  
*Marc Duflot and Stephane Bordas*
- 16:50 The Smoothed Extended Finite Element Method (SmXFEM)  
*Stephane Bordas, Sundararajan Natarajan, Marc Duflot, Nguyen-Xuan Hung and Timon Rabczuk*
- 17:10 A Multigrid X-FEM Strategy for 3-D Fatigue Crack Growth Simulation  
*Johann Rannou, Anthony Gravouil and Marie-Christine Baietto-Dubourg*
- 17:30 A New Strong Discontinuity Modeling Element without Additional Degrees of Freedom for Delamination Propagation Simulations  
*Tadayoshi Yamanaka and Larry Lessard*
- 17:50 Robust and Direct Evaluation of J2 in Linear Elastic Fracture Mechanics with the X-FEM  
*Grégory Legrain, Nicolas Moës and Erwan Verron*

**Room: EXC2.1**

**MS238 Advances in Particle Methods - Minisymposium sponsored by the Zienkiewicz Foundation III**

Organizers: Roger Owen and Sergio Idelsohn

- 16:30 A Particle Finite Element Approach for the Powder Filling  
*Juan C. Cante, Javier Oliver and Rafael Weyler*
- 16:50 A Particle Method with Remeshing for Compressible Multifluids  
*Lisl Weynans*
- 17:10 Large Deformations Fluid-Structure Interactions by Means of Lagrangian Finite Element Method  
*Massimiliano Cremonesi, Attilio Frangi and Umberto Perego*
- 17:30 Simulation of Ground Excavation Processes with the Particle Finite Element Method (PFEM)  
*Josep Maria Carbonell, Eugenio Oñate and Benjamin Suarez*
- 17:50 Coupling Solids in Fluids Applied to Petroleum Reservoir Simulation  
*John R. Williams, David Boutt and Benjamin Cook*
- 18:10 Parallel Processing of Material Point Analyses using OpenMP  
*Zdzislaw Wieckowski*

**Room: EXC2.2**

**MS055 Stabilized, Multiscale and Multiphysics Methods II**

Organizers: Tayfun Tezduyar, Arif Masud and Thomas J. R. Hughes

- 16:30 Stabilized Finite Element Formulation for Convective Transport Problems with Sharp Gradients Via Higher Order Finite Calculus  
*Eugenio Oñate, Francisco Zárate and Sergio Idelsohn*
- 16:50 Variational Multiscale Methods in Heat Transfer and Fluid Mechanics  
*David Gartling*
- 17:10 Some Remarks on Quadrilateral Finite Elements  
*Daniele Boffi and Lucia Gastaldi*
- 17:30 Biomechanical Factors Influencing Patient-Specific FSI Simulation of Cerebral Aneurysms  
*Ryo Torii, Marie Oshima, Toshio Kobayashi, Kiyoshi Takagi and Tayfun Tezduyar*
- 17:50 Consistent Interface Capturing Technique for Fluid-Shell Interaction Problems based on Discontinuous Interpolation at Level Set Interfaces  
*Tomohiro Sawada, Shogo Nakasumi and Akira Tezuka*
- 18:10 Modeling of Air-Fabric Interactions  
*Tayfun Tezduyar*

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## Tuesday July 1<sup>st</sup>.

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CAS1.2				MS168		MS168		MS168
CAS1.3				MS090		MS176		MS176
CAS1.4				MS198		MS198		MS198
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Tuesday

P = Plenary Lecture  
 SP = Semi-Plenary Lecture  
 MS = Minisymposium  
 TS = Thematic Session  
 STS = Special Technology Session

## Plenary Lectures (P)

- P3. Tuesday 08.20 – PGL: Herbert Mang**  
Vienna University of Technology, Austria  
*Computational Multi-Scale Analysis in Civil Engineering*
- P4. Tuesday 08.50 – PGL: Kazuhiro Nakahashi**  
Tohoku University, Japan  
*Building-Cube Method: A CFD Approach for Near-Future PetaFlops Computers*

## Semi-Plenary Lectures (SP)

Tuesday 09.30

### SP0. CAS1.2: ECCOMAS Best PhD Theses Lectures

**Jeroen Wackers (The Netherlands)**  
*Surface Capturing and Multigrid for Steady Free-Surface Water Flows*

**Lukasz Madej (Poland)**  
*Development of the Multi-Scale Analysis Model to Simulate Strain Localization Occurring During Material Processing*

### SP1. CAS1.7: Ernst Rank

Technical University München, Germany  
*Computational Steering: Towards Advanced Interactive High Performance Computing in Engineering Sciences*

### SP2. CAS3.7: Scott Sloan

University of Newcastle, Australia  
*Limit Analysis with Adaptive Mesh Refinement*

### SP3. CIN1.1: Axel Flaig

Vice-president Aerodynamics, Airbus Deutschland  
*Eco-efficient by Design - Challenges for Aerodynamics Engineers for Future Aircraft Design*

### SP4. PGL: Takashi Yabe

Tokyo Institute of Technology, Japan  
*Robust Multi-Phase Flow Solvers with Mesh-Free Adaptive Grid CIP Method*

**Room: CAS0.1**

**MS069 Recent Developments in Computational Methods for Structural Optimization IV**

Organizers: H Alicia Kim, Gengdong Cheng, David Kennedy, Michal Kocvara, Tae Hee Lee, Kurt Maute and Mathias Stolpe

- 10:30 Unified Kriging Metamodel for Deterministic and Noise Information  
*Tae Hee Lee and Jae Jun Jung*
- 10:50 Approximate Reanalysis in Topology Optimization  
*Oded Amir, Martin P. Bendsøe and Ole Sigmund*
- 11:10 Decomposition Techniques for Global Optimization of Discrete Topology Design Problems  
*Eduardo Muñoz, Mathias Stolpe and Martin P. Bendsøe*
- 11:30 Multilevel Postbuckling Design of Aerospace Structures  
*Shuang Qu, David Kennedy and Carol A. Featherston*
- 11:50 Topology Optimization of Multi-panel Structures Lined with Poroelectric Materials for Sound Transmission Loss Maximization  
*Yong Jin Kim, Joong Seok Lee, Yoon Young Kim and Yeon June Kang*
- 12:10 Methodological Aspects of Regularization for Shape Optimization Problems  
*Matthias Firl, Roland Wüchner and Kai-Uwe Bletzinger*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics IV**

Joint IACM – IUTAM Minisymposium

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 10:30 Robust Updating of Uncertain Computational Models from Experimental Modal Data  
*Evangeline Capiez-Lernout, Christian Soize and Roger Ohayon*
- 10:50 Robust Ground Vibration Predictions based on SASW Tests  
*Mattias Schevenels, Sayed Ali Badsar, Geert Lombaert and Geert Degrande*
- 11:10 Stochastic Modal Analysis of Structures with Random Shape Using X-FEM  
*Severine Lepage, Laurent Van Mieghem and Pierre Duysinx*
- 11:30 Accurate and Efficient Interweaving of Substructure Uncertainties and Component Mode Synthesis  
*Hilde De Gerssem, David Moens, Wim Desmet and Dirk Vandepitte*
- 11:50 Tackling Geometric Uncertainty with Stochastic Projection Schemes  
*Prasanth Nair*
- 12:10 An Extended Stochastic Finite Element Method to deal with Geometrical Uncertainties in Structural Analysis  
*Alexandre Clément, Anthony Nouy and Franck Schoefs*

**Room: CAS1.2**

**MS168 Computational Contact Mechanics IV**

Organizers: Peter Wriggers, Tod A. Laursen and Giorgio Zavarise

- 10:30 Frictional Contact of Elastomer Materials on Rough Rigid Surfaces  
*Peter Wriggers and Jana Nettingsmeier*
- 10:50 Effect of Multi-Scale Contact Deformation on Interfacial Forces  
*Kyriakos Komvopoulos*
- 11:10 A Unified Approach to Computational Contact Problems at Multiple Length Scales using Adaptive Homogenization of Nanoscale Contact  
*Roger Sauer and Peter Wriggers*
- 11:30 A Multiscale Projection Method for Contact on Rough Surfaces  
*Ralf Nitsche, Peter Wriggers and Ali Rezgui*
- 11:50 Debonding Contact: Models, Formulations, Solvers and Applications  
*Michel Raous, Mathieu Schryve and Nazihe Terfaya*
- 12:10 Finite Element Simulation of Contact between Rough Surfaces and Sealing Behavior  
*Chen Feng and Jean-François Molinari*

## Tuesday Morning Sessions (10:30 - 12:30)

### Room: **CAS1.3**

#### MS090 Uncertainty Quantification Methods for CFD and FSI II

Organizers: Hester Bijl and Chris Lacor

- 10:30 An Unsteady Adaptive Stochastic Finite Elements Uncertainty Quantification Method for Fluid-Structure Interaction Problems  
*Jeroen Witteveen and Hester Bijl*
- 10:50 Uncertainty Quantification for Conservation Laws  
*Gael Poette, Bruno Després and Didier Lucor*
- 11:10 Airfoil Performance at Stochastic Transonic Flow Regimes  
*Jean-Camille Chassaing and Didier Lucor*
- 11:30 Parameter Estimation for Noisy Models using Total Least Squares  
*Ashley Emery, Dawn Bardot and Elisabetta Valenti*

### Room: **CAS1.4**

#### MS198 Advances in Computational Modeling for Environmental Engineering I

Organizers: Agustí Pérez-Foguet and Rafael Montenegro Armas

- 10:30 **Automatic Tetrahedral Mesh Generation for Environmental Problems (Keynote Lecture)**  
*J.M. Cascón, G. Cascón, Rafael Armas Montenegro, Eduardo Rodríguez and José María Escobar*
- 11:00 **Large Eddy Simulation of Buoyant Jets for Airport Local Air Quality Studies (Keynote Lecture)**  
*Syoginus Aloysius and Luiz Wrobel*
- 11:30 A Combined Approach to Local Scale Wind Prediction  
*Eduardo Rodríguez, Gustavo Montero, Rafael Montenegro Armas, José María Escobar and Elba Rodríguez-Jiménez*
- 11:50 Finite Element Local Air Quality Modeling of Punctual Emissions  
*Albert Oliver, José María Escobar, Eduardo Rodríguez and Agustí Pérez-Foguet*
- 12:10 Coupling Regional and Local Air Quality Models for Short-Time Prediction around Punctual Pollutant Sources using Finite Elements  
*Agustí Pérez-Foguet and Albert Oliver*

### Room: **CAS1.5**

#### MS123 Challenges in Mechanics for Nuclear Plants I

Joint IACM – IUTAM Minisymposium

Organizers: Pierre Verpeaux and Stephane Andrieux

- 10:30 Challenges in Numerical Simulation of Welding of Nuclear Components  
*Philippe Gilles, Elisabeth Keim, Andre Thomas and Josette Devaux*
- 10:50 Modelling Complex Fluid-Structure Interaction Problems with EUROPLEXUS Fast Dynamic Software  
*Pascal Galon, Vincent Faucher, Folco Casadei and Sergueï Potapov*
- 11:10 Advanced Modelling with the X-FEM of Dynamic Crack Propagation and Arrest in Ferritic Steel  
*Benoit Prabel, Stéphane Marie and Alain Combescure*
- 11:30 Fully Automated 3d-Crack Propagation Analyses based on Tetrahedral Finite Elements  
*Hiroshi Okada, Hiroshi Kawai, Yasuyuki Kanda, Toshimitsu Fujisawa and Genki Yagawa*
- 11:50 Advanced Modelling of the Reinforced Concrete Structures under Soft Impact  
*Serguei Potapov, Pierre Koechlin, Stephane Andrieux and Laurent Daudeville*
- 12:10 1D vs 3D Modelling of the Tendons in a Representative Structural Volume of a Concrete Containment Building  
*Ludovic Jason, Shahrokh Ghavamian and Alexis Courtois*

**Room: CAS1.6**

**MS076 New Trends for Evolutionary Optimization Methods Applied to Multidisciplinary Problems I**

Organizers: William Annicchiarico, George Dulikravich and Miguel Cerrolaza

- 10:30 **Multi-Objective Design Exploration (MODE) - Visualization of Design Space and Knowledge Mining (Keynote Lecture)**  
*Shigeru Obayashi, Shinkyu Jeong and Takayasu Kumano*
- 11:00 **Multidisciplinary/Multiobjective Design Optimization of Structures by Means of a Novel Dynamic Particle Swarm (Keynote Lecture)**  
*William Annicchiarico*
- 11:30 **Robust Design of a Semi-Active Suspension System by Means of Simplified Physical Models and Constrained Multi-Objective Evolutionary Optimization**  
*Bruno Loyer, Louis Jézéquel and Emmanuel Arnoux*
- 11:50 **Optimization of Component Distribution in a Picosatellite based on Inertial Constraints**  
*Victor E. Ruiz*
- 12:10 **Towards Optimizing Stents for Coronary Application**  
*Karkenahalli Srinivas*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation IV**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 10:30 **An Innovative Algorithm for the Evaluation of Wheel - Rail Contact Points based on Neural Networks**  
*Stefano Falomi, Enrico Meli, Monica Malvezzi and Mirko Rinchi*
- 10:50 **General Algorithm for the Dynamic Calculus of the Planar Mechanisms with Clearances**  
*Jan-Cristian Grigore, Nicolae-Doru Stanescu and Nicolae Pandrea*
- 11:10 **Influence of Vehicle and Environmental Perturbations on the Quality of the Pantograph Catenary Contact**  
*João Pombo and Jorge Ambrosio*
- 11:30 **Pattern Formation in Wear Development of Rotating Disks**  
*Yoshiaki Terumichi and Kiyoshi Sogabe*
- 11:50 **Development of an Interface for Design Sensitivity and Optimization of Multibody Models**  
*Luis Sousa and Jorge Ambrosio*
- 12:10 **Influence of SAM Degradation on MEMS-Gear Dynamics**  
*Mircea Teodorescu, Stephanos Theodossiades and Homer Rahnejat*

**Room: CAS1.8**

**MS102 Inverse Problems IV**

Organizers: Bojan Guzina and Marc Bonnet

- 10:30 **Parameters Identification for the Nonlinear Time-Dependent Model of Rubber Bushings in Multibody Simulations**  
*Beatrice Bourgeteau, Denis Aubry and Guillaume Puel*
- 10:50 **An Inverse Method for Predicting Shock Levels induced by Pyrotechnic Separation**  
*Bernard Trochet, Stephane Alestra, Vassili Srithammavanh and Isabelle Terrasse*
- 11:10 **On the Solution of Inverse Problems in Semiconductor Metrology**  
*Gonzalo R. Feijoo*
- 11:30 **Multi Resolution Inverse Analysis for Corrosion Detection with Net Element and Genetic Algorithm**  
*Kazuhiro Suga, Koichi Minagawa and Shigeru Aoki*
- 11:50 **Misfit Functionals for recovering Data in Electrocardiography Problems**  
*Nejla Hariga, Thouraya Nouri Baranger, Amel Ben Abda and Jocelyne Erhel*



## Tuesday Morning Sessions (10:30 - 12:30)

### Room: **CAS2.1**

#### MS094 **Soft Computing Methods II**

Organizers: Tadeusz Burczyński, Jamshid Ghaboussi and Zenon Waszczyszyn

- 10:30 A Fuzzy Finite Element Model to Study Knowledge Transfer Processes  
*Renato Silva, Sonia Limoeiro Monteiro, Luiz Bevilacqua and Augusto Cesar Galeão*
- 10:50 The Granular Evolutionary Algorithms in Uncertain Identification Problems  
*Tadeusz Burczyński and Piotr Orantek*
- 11:10 Designing Multi-Stage Fuzzy Guidance Law via Genetic Algorithms  
*Hanafy Omar*
- 11:30 Fusion of Intelligent Systems based on Information Granulation Approach to Analysis of Hydro Cyclone Performance  
*Hamed Owladeghaffari, Majid Ejtemaei and Mehdi Irannajad*
- 11:50 The Identification of Stochastic Parameters in Laminate Structures by means of Evolutionary Computations  
*Witold Beluch, Tadeusz Burczyński and Piotr Orantek*
- 12:10 Sampling the Probability of Rare Events  
*Carsten Hartmann and Christof Schütte*

### Room: **CAS2.2**

#### TS326 **Parallel Computing I**

- 10:30 Distributed Parallel Global Optimisation Architecture  
*Petri Giovanni Hanninen and Michèle R. Lavagna*
- 10:50 Distributed Workflows for Multiphysics Applications  
*Toan Nguyen and Jean-Antoine Desideri*
- 11:10 Parallel Processing applied to an Upper Bound Formulation for 3d Limit Analysis Computations  
*Mário Vicente da Silva and Armando Antão*
- 11:30 Parallel Solution of the Generalized Dirichlet-Neumann Map for Elliptic PDEs on Regular Polygon Domains  
*Anastasis Sifalakis, Elena Papadopoulou and Yiannis Saridakis*
- 11:50 Parallel Computational Algorithm of the Solution of Dynamic Problems for Elastic-Plastic and Granular Materials  
*Oxana Sadovskaya*

### Room: **CAS2.3**

#### MS128 **Innovative Methods for Fluid-Structure Interaction III**

Organizers: Trond Kvamsdal, Roger Ohayon and Harald van Brummelen

- 10:30 Improved Approximation for External Acoustic-Structure Interaction Via Combined Retarded and Advanced Potential, Part I: Formulation  
*K. C. Park, Moonseok Lee, Youn-sik Park and Youngjin Park*
- 10:50 Improved Approximation for External Acoustic-Structure Interaction Via Combined Retarded and Advanced Potential, Part II: Validation  
*Moonseok Lee, Youn-sik Park, Youngjin Park and K. C. Park*
- 11:10 Effect of Capillarity on the Sloshing of Liquids for Applications in Microgravity  
*Jean-Sebastien Schotte, Mahdi El-Kamali and Roger Ohayon*
- 11:30 Vortex Structures around a Sphere moving in the Stratified Fluid  
*Pavel Matyushin and Valentin Gushchin*
- 11:50 Application of the Chimera Method for the Simulation of the Flow around a Fixed Sphere in a Tube  
*Thibaut Deloze, Yannick Hoarau and Jan Dusek*
- 12:10 Dam-Reservoir-Foundation Interaction in Time Domain  
*Reza Attarnejad and Sanaz Mahmoudpour*

**Room: CAS2.4**

**MS063 Modeling Robustness and Structural Reliability Analysis II**

Joint IACM – IUTAM Minisymposium

Organizers: James Beck, Gerhart I. Schuëller and Hector Jensen

- 10:30 Intrusive Stochastic Finite Element Methods - Computational Aspects and Applications  
*Huseyin Panayirci and Manuel Pellissetti*
- 10:50 Object-Oriented Time Variant Reliability Analysis  
*Andre Beck*
- 11:10 Random Eigenvalue Problem in the Robustness Analysis of Large-scale Structures  
*Manuel Pellissetti and Gerhart I. Schuëller*
- 11:30 Validation & Verification for a Metamodel of the Eigensolution  
*Lukas Pichler, Helmut Pradlwarter and Gerhart I. Schuëller*
- 11:50 Modelling Criteria for FE Simulation of Shock Transfer Processes in Concrete Structures  
*Norbert J. Krutzik*
- 12:10 A Kriging Based Optimisation Algorithm for Interval and Fuzzy FRF Analysis  
*Maarten De Munck, David Moens, Wim Desmet and Dirk Vandepitte*

**Room: CAS2.5**

**MS038 Computational Methods in Nonlinear Dynamics IV**

Organizers: Stefano Lenci and Marian Wiercigroch

- 10:30 Numerical Continuation Methods for Models with Nonsmooth Dynamics  
*David Barton*
- 10:50 Invariant Manifold Identification from Phase Space Trajectories  
*Joe Kuehl and David Chelidze*
- 11:10 Numerical Treatment of Ordinary Differential Equations with Multiple Mixture of Integer and Fractional Derivatives  
*Tomasz Blaszczyk and Jacek Leszczynski*
- 11:30 Application of Dimension Reduction Methods to the Dynamics of a Fluid Conveying Tube  
*Alois Steindl*

**Room: CAS2.6**

**MS140 Advanced Numerical Approaches for Complex Multi-phase Flows IV**

Organizers: Takashi Yabe, Nobuatsu Tanaka and Feng Xiao

- 10:30 Dusty Gas Flow through the Moving and Stationary Cascades of Airfoils  
*Denis Romanyuk and Yury Tsirkunov*
- 10:50 Coupled Finite Element and Immersed Boundary Method for the Computation of Interaction of Multiple Deformable Particles/Structures with a Fluid Flow  
*Atsushi Ueyama, Kousuke Tamura, Shintaro Takeuchi and Takeo Kajishima*
- 11:10 Gas-Solid Flow Simulation in a Venturi Scrubber  
*Ángela Silva, Senhorinha Teixeira and José. Teixeira*
- 11:30 Numerical Simulation of Sand-Air Mixtures for the Casting Industry  
*Dariusz Niedziela and Arnulf Latz*
- 11:50 Two-Phase Flow Simulations through a Contraction  
*Sander Rhebergen, Onno Bokhove and Jaap van der Vegt*
- 12:10 Performance of the Water/Glycerine Separation by Hydrocyclone  
*Fabiana P.M. Farias, Severino R. de Farias Neto, Antonio G.B. de Lima and Cidronia J.O. Buriti*

## Tuesday Morning Sessions (10:30 - 12:30)

### Room: **CAS3.1**

#### MS154 Virtual Fracture Testing of Composite Materials and Structures II

Joint IACM – IUTAM Minisymposium

Organizers: Javier LLorca and Brian Cox

- 10:30 **The Open Hole Tensile Test – A Challenge for Virtual Testing of Composites (Keynote Lecture)**  
*Stephen Hallett and Michael Wisnom*
- 11:00 **Three-Dimensional Parallel Simulation of Dynamic Fracture and Fragmentation using a Hybrid DG/Cohesive Method (Keynote Lecture)**  
*Andrew Seagraves, Antoine Jerusalem, Ludovic Noels and Raul Radovitzky*
- 11:30 Virtual Testing of Composite Laminate Coupons  
*Sergio Sadaba, Carlos Gonzalez and Javier LLorca*
- 11:50 Mesh Independent Modelling of Cracks and Delaminations in Composites with Holes  
*Endel Larve, David Mollenhauer and Thomas Whitney*
- 12:10 Mesolevel Representation of Splitting in Laminates  
*Frans van der Meer and L. J. Sluys*

### Room: **CAS3.2**

#### TS328 Computational Structural Mechanics IV

- 10:30 Assessing the Robustness of a Long Span Suspension Bridge  
*Laszlo Ciampoli, Franco Bontempi and Luisa Giuliani*
- 10:50 Experimental and Numerical Study of Rigid Three-Pile Caps subjected to Centred Forces  
*Miriam Gonçalves Miguel, Joao Batista de Paiva, Toshiaki Takeya and José Samuel Giongo*
- 11:10 Numerical Analysis of Special Modular Bridges  
*Krason Wieslaw and Jerzy Malachowski*
- 11:30 Nonlinear Analysis of Isolated Bridges under Near-Field Ground Motions  
*Tzu-Ying Lee, Po-Hung Chen and Ren-Zuo Wang*
- 11:50 Seismic Performance of Steel Bridge Piers  
*Eiki Yamaguchi, Yuta Matsuki, Eri Nakamura and Kiyoshi Ono*
- 12:10 Ultimate Resisting Capacity of Slender RC Columns subject to Long-term Biaxial Bending  
*Hyo-Gyoung Kwak and Ji-Hyun Kwak*

### Room: **CAS3.3**

#### MS265 Advances in Multiscale and Multiphysics Methods: From Quantum to Continuum I

Joint IACM – IUTAM Minisymposium

Organizers: Dong Qian, Wing Kam Liu and Jacob Fish

- 10:30 **Characterization and Manipulation of Complex Biological/Nano Molecules (Keynote Lecture)**  
*Wing Kam Liu*
- 11:00 **Partition of Unity Finite Element Method to Solve the Kohn-Sham Equations of Density Functional Theory (Keynote Lecture)**  
*Natarajan Sukumar and John Pask*
- 11:30 Thermal and Mechanical Field Decomposition in Nonequilibrium Molecular Dynamics Simulations  
*Albert To and Wing Kam Liu*
- 11:50 Algorithmic Aspects of a Localized Bridging Scale Method  
*Satoshi Suzuki and Hiroshi Takeda*

**Room: CAS3.4**

**MS089 Meshfree Multiscale Methods Mini-Symposium I**

Organizers: Michael Griebel, Antonio Huerta, Wing Kam Liu and Marc Alexander Schweitzer

- 10:30 A Time Split Strategy for Coupling Mechanical Stress Fields with Grain Scale Phenomena using MPM  
*Timothy J. Bartel, Mark Lusk and Elizabeth A. Holm*
- 10:50 "SPH - Finite Element" Coupling in Explicit Dynamics  
*Yann Chuzel-Marmot and Alain Combescure*
- 11:10 Hybrid PCM/FEM for Rigid-Plastic Analysis of Axisymmetric Forming Problem  
*Yong-Ming Guo*
- 11:30 Manifold Processing from Scattered Points: Application to Thin Shell Analysis  
*Raúl Daniel Millán, Adrian Rosolen and Marino Arroyo*
- 11:50 Multiscale Simulation based on Moving Kriging Method  
*Wichain Sommanawat and Worsak Kanok-Nukulchai*
- 12:10 Two-Scale Optimal Design of Aeration Filters using Homogenization Method for Solid-Fluid Mixtures and X-FE Discretizations  
*Tomohiro Sawada, Shogo Nakasumi, Manabu Fukushima, Yu-ichi Yoshizawa and Akira Tezuka*

**Room: CAS3.5**

**MS159 Mathematical and Practical Aspects of Advanced Computational Methods in Complex Systems I**

Organizers: Mario-Cesar Suarez Arriaga, Jochen Bunschuh, Francisco Domínguez-Mota and Karsten Pruess

- 10:30 Domain Decomposition Methods: Iterative Substructuring Methods without Lagrange Multipliers  
*Ismael Herrera*
- 10:50 Simulation of Soil Contamination by Petroleum Products  
*Marina Trapeznikova, Boris Chetverushkin, Natalia Churbanova, Dmitrij Morozov and Eugene Shilnikov*
- 11:10 Groundwater Withdrawal and Subsidence in the Basin of Mexico  
*Guillermo de Jesus Hernández-García and Ismael Herrera*
- 11:30 Accelerated Convergence of the Numerical Simulation of the Incompressible Flow in General Curvilinear Co-Ordinates by Discretization on the Double Staggered Grids  
*Alexander Shklyar and Avraham Arbel*
- 11:50 The Efficient Calculation of the Critical  $\epsilon$  Value for Convexity on Irregular Planar Regions in the Variational Grid Generation Problem  
*Pablo Barrera-Sánchez, Longina Castellanos Noda, Francisco Domínguez-Mota, Guilmer González-Flores and Gerardo Tinoco Ruiz*
- 12:10 Hybrid Computational Methods in the Mechanics of Complex Natural Systems  
*Mario-Cesar Suarez Arriaga*

**Room: CAS3.6**

**MS200 Numerical Modeling in Reinforced Concrete and Its Validation I**

Organizers: Rena C. Yu, Giulio Ventura, Gonzalo Ruiz and Jacinto R. Carmona

- 10:30 **Different Collapse Modes in RC Beams: A Unified Fracture Mechanics Approach to Interpret Experimental Transitions (Keynote Lecture)**  
*Alberto Carpinteri, Jacinto R. Carmona and Giulio Ventura*
- 11:00 **Influence of the Loading Rate on the Measurement of the Fracture Energy of a High Strength Concrete (Keynote Lecture)**  
*Gonzalo Ruiz, Xiaoxin Zhang, Javier Rodríguez del Viso, Rena C. Yu and Jacinto Ruiz Carmona*
- 11:30 Fracture Toughness Variation induced by Stress Corrosion Cracking of Prestressing Steels  
*Javier Sanchez, Carmen Andrade and Jose Fulla*
- 11:50 Hysteresis, Damage and Moisture Effects in Quasi-brittle Porous Materials  
*Stijn Mertens, Jan Carmeliet and John Vantomme*
- 12:10 An Efficient Computational Model for Fibre Reinforced Concrete Incorporating Information From Multiple Scales  
*Frank Radtke, Angelo Simone and L.J. Sluys*

## Tuesday Morning Sessions (10:30 - 12:30)

### Room: **CAS3.7**

#### MS237 Numerical Techniques for the Modelling of Material Failure in Solids IV

Organizers: Xavier Oliver and Francisco Armero

- 10:30 Analysis of Strong Discontinuities in Partially-Saturated Poroplastic Solids  
*Carlo Callari, Francisco Armero and Andrea Abati*
- 10:50 Modelling of Failure in Solids by Embedded Discontinuities. Displacements and Strain-Displacements Formulations of Finite Element  
*Jaime Retama and Gustavo Ayala*
- 11:10 Approximation of the Displacement and Mixed Formulations of Solids with Embedded Discontinuities using the Meshless Element Free Galerkin Method  
*Félix Saucedo, Gustavo Ayala and Gelacio Juárez*
- 11:30 Numerical Modelling of Growth and Propagation of Interfaces by Means of the Embedded Discontinuities Approach  
*Loredana Contrafatto and Massimo Cuomo*
- 11:50 Mixed Finite Approximation of the Material Failure Process with Continuum Damage Models: Shear Failure Material Mode  
*Gelacio Juárez and Gustavo Ayala*
- 12:10 Modeling of Discontinuous Failures in Beams and Plates  
*Jaka Dujc, Bostjan Brank and Adnan Ibrahimbegovic*

### Room: **CAS3.8**

#### MS050 Numerical and Computational Aspects of Interface Problems II

Organizers: Frederic Gibou and Christian Ratsch

- 10:30 Coupled Composition-Deformation Phase-Field Method for Lipid Membranes with Asymmetric Leaflet Compositions  
*Chloe M. Funkhouser, Francisco J. Solis and Katsuyo Thornton*
- 10:50 A Robust, Fully Adaptive Hybrid Method for Two-Phase Flows  
*Héctor D. Cenicerós, Alexandre M. Roma, Aristeu da Silveira-Neto and Millena M. Villar*
- 11:10 Dynamics of Cells in Interaction with a Substrate using a Level Set Method  
*Didier Bresch, Edouard Oudet and Paul Vigneaux*
- 11:30 Collective Behaviors in Bacterial Systems  
*Joeline Lega*
- 11:50 Numerical Simulation of Tridimensional Micro-Mixing  
*Thierry Colin, Charles-Henri Bruneau and Sandra Tancogne*
- 12:10 A Level Set Approach to Interface Problems on Cartesian Adaptive Grids  
*Frederic Gibou and Chohong Min*

### Room: **CAS3.9**

#### MS036 Advanced Computational Methods for Wave Motion I

Organizers: Dan Givoli and Geza Seriani

- 10:30 **Wave-Based Numerical Methods for Acoustics (Keynote Lecture)**  
*Jeremy Astley, Pablo Gamallo and Gwenael Gabard*
- 11:00 **Earthquake Simulation: From Rupture to Virtual City Response (Keynote Lecture)**  
*Jacobo Bielak, Ricardo Taborda, Leonardo Ramirez-Guzman and Antonio Fernandez*
- 11:30 Selective Array Imaging of Cracks in Homogeneous and Random Media  
*Liliana Borcea, George Papanicolaou and Chrysoula Tsogka*
- 11:50 ADER-DG Methods for Geophysical Applications  
*Cristóbal E. Castro, Josep de la Puente and Martin Käser*
- 12:10 High Order Non-Periodic Homogenization for Seismic Wave Propagation in Layered Media and for the 2D SH Case  
*Yann Capdeville, Laurent Guillot and Jean-Jacques Marigo*

**Room: CAS3.10**

**MS114 Computational Procedures and Models for Quasi-brittle Materials I**

Organizers: Anthony Jefferson and Günter Hofstetter

- 10:30 Multiscale Assessment of Early-Age Performance of Shotcrete Tunnel Linings  
*Christian Pichler and Roman Lackner*
- 10:50 A Two-Scale Strong Coupling Framework for Softening Materials  
*Oriol Lloberas Valls, Angelo Simone and Bert Sluys*
- 11:10 Modelling of Rate Effects at Multiple Scales  
*Ronnie Pedersen, Angelo Simone and Bert Sluys*
- 11:30 Modelling of Reinforced Concrete by Means of Homogenization Approach including Steel-Concrete Interactions  
*Erkan Rumanus and Günther Meschke*
- 11:50 A Development of Crack Growth Simulator for Plated Structure using Damage Mechanics  
*Dae Suk Han, Myung-Hyun Kim, Min Sung Chun, Tak Kee Lee and Jae Myung Lee*
- 12:10 Modelling of Gradual Construction of Road Bridge and Its Creep  
*Jaroslav Broz and Jaroslav Kruis*



## Tuesday Morning Sessions (10:30 - 12:30)

### Room: CIN0.1

#### MS194 Biological Cells and Capsules IV

##### Joint IACM – IUTAM Minisymposium

Organizers: Takuji Ishikawa , Dominique Barthes-Biesel , Petia Vlahovska and Takami Yamaguchi

- 10:30 Agent-based and Continuum Approaches to Growing Cell Aggregates  
*Dirk Drasdo, Helen Byrne and Stefan Hoehme*
- 10:50 Computational Models of Dendritic Cell Chemotaxis in Tissue Engineered Microenvironments  
*Margherita Cioffi, Simone Bottan, Ulrike Haessler, Brandon Dixon, Melody Swartz and Federica Boschetti*
- 11:10 Propulsion and Locomotion in Complex Fluids  
*Eric Lauga*
- 11:30 Stokesian-Dynamics Simulation of a Suspension of Swimming Micro-Organisms  
*Takuji Ishikawa, J. T. Locsei, T. J. Pedley and Takami Yamaguchi*
- 11:50 Continuum Modeling and Finite Element Simulation of Cell Motility  
*Neil Hodge and Panayiotis Papadopoulos*
- 12:10 Computational Models Reveal that Cell-Cell Interactions are Different in 2D than in 3D  
*G. Wayne Brodland, Justina Yang and Jim H. Veldhuis*

### Room: CIN0.2

#### MS193 Composite Materials and Multiscale Modeling and Design in Medicine and Engineering I

##### Joint IACM – IUTAM Minisymposium

Organizers: Michel C. Delfour and Marc Thiriet

- 10:30 **Steady State Carotid Flow In-Vitro PIV Measurements (Keynote Lecture)**  
*Jérôme Vétel, André Garon, Marie-Isabelle Farinas and Marc Thiriet*
- 11:00 **Multiscale Modelling of Drug Release from Stents (Keynote Lecture)**  
*Luca Formaggia, Christian Vergara and Paolo Zunino*
- 11:30 Mathematical Modelling of Controlled Drug Release from Eroding Matrices  
*Sara Minisini, Pietro Santagati and Luca Formaggia*
- 11:50 New Equations for the Dose under Pulsative Conditions in the Design of Coated Stents  
*Michel Delfour and André Garon*
- 12:10 Active Catheters pPrototyping: Application for Neuroradiology  
*Emilie Marchandise, Laurent Royon, Patrice Flaud and Jérôme Szweczyk*

### Room: CIN1.1

#### MS151 Advances in Multiphysics Simulation and Experimental Testing of MEMS and NEMS IV

##### Joint IACM – IUTAM Minisymposium

Organizers: Attilio Frangi, Narayan Aluru and Subrata Mukherjee

- 10:30 Reduced-Order Modeling and Coupled Multi-Energy Domain Simulation of Damped Highly Perforated Microstructures  
*Martin Niessner, Gabriele Schrag and Gerhard Wachutka*
- 10:50 Effects of Viscoelastic and Fluid Damping on the Quality Factor for a Resonant Microcantilever  
*Russel Cox, Michael Wenzel, Fabien Josse, Stephen Heinrich and Isabelle Dufour*
- 11:10 Fluid Property Variations in Micro-Convection  
*Shripad Mahulikar and Heinz Herwig*
- 11:30 Energetic Method for Non Linear Dynamic Characterization of MEMS Squeeze Film Damping  
*Giorgio De Pasquale and Aurelio Somà*
- 11:50 A Kinetic Model for Gas-Surface Interaction  
*Aldo Frezzotti and Livio Gibelli*
- 12:10 Experimental Validation of Models for Gas Damping from Continuum to Free Molecular Flow  
*Attilio Frangi and Aldo Ghisi*



## Tuesday Morning Sessions (10:30 - 12:30)

### Room: CIN2.1

#### MS016 Computational Bioimaging and Visualization I

Organizers: João Tavares, Renato Natal Jorge, Thomas J. R. Hughes and Chandrajit Bajaj

- 10:30 A Model of the Ca<sup>2+</sup> and Na<sup>+</sup> Waves Kinetics in Astrocytes and its Relevance to Functional Brain Imaging  
*Paola Lecca and Michela Lecca*
- 10:50 A Comparative Study between Eardrum Perforations and Myringosclerosis  
*Fernanda Gentil, Renato Natal Jorge, António Ferreira, Marco Parente, Pedro Martins and Eurico Almeida*
- 11:10 A Multi-Resolution Stochastic Level Set Method for the Mumford-Shah Segmentation of Bioimages  
*Yan Nei Law, Hwee Kuan Lee and Andy M. Yip*
- 11:30 Introduction and Benchmark Test of Parallel FE Structural Analysis System, DIAMOND/IPSAP, as Free Software  
*Seung Jo Kim, Jong Keun Moon, MinKi Kim and JungEun Lee*

### Room: PGL

#### MS029 Computational Geomechanics Minisymposium IV

Organizers: Boris Jeremic, Claudio Tamagnini, Richard Regueiro, Ronaldo Borja, Fusao Oka and Stein Sture

- 10:30 FE Modelling of Coupled Electrokinetic Consolidation Processes in Unsaturated Soils  
*Claudio Tamagnini, Cristina Jommi and Fabio Cattaneo*
- 10:50 Finite Element Analysis of Hydrodynamic Influence on Multi-layer Deformable Coal Seam with Different Input Data  
*Anna Nasedkina, Andrey Nasedkin and Gerardo Iovane*
- 11:10 Finite Element Analysis of Underground Openings in Hoek-Brown Rock with Dilatancy  
*Shailendra Sharan and Rashida Naznin*
- 11:30 Finite Element Modeling of Large Deformation Faulting Contact Problems with Variable Friction  
*Pablo F. Sanz, Ronaldo Borja and David Pollard*
- 11:50 Fractional Numerical Methods in Geotechnics  
*Roberto Magaña, Armando Hermsillo and Marcelo Pérez*
- 12:10 Hardening Plasticity for Geomaterials: Micromechanical Roots and Alternative Formulations  
*Itai Einav and Giang Nguyen*

**Room: EXC1.1**

**MS155 Advances in Computational Mechanics in Honor of Professor Maier II**

Organizers: Eugenio Oñate, Claudia Comi and Giorgio Novati

- 10:30 **Nonconvex Plasticity and Microstructure (Keynote Lecture)**  
*Michael Ortiz*
- 11:00 **Two-Scale Models for Fracture in Fluid-Saturated Porous Media (Keynote Lecture)**  
*Rene de Borst, Julien Réthoré and Marie-Angele Abellan*
- 11:30 Bifurcation, Localization and Ill-Posedness for the Time Discretized Boundary-Value Problem  
*Ahmed Benallal*
- 11:50 Shear Bands, Perturbations and Boundary Elements in Incremental Nonlinear Elasticity  
*Davide Bigoni*
- 12:10 Energy-Residual-Based Approach to Gradient Plasticity  
*Guido Borino and Castrenze Polizzotto*

**Room: EXC1.2**

**MS169 Multiscale Model-Based Simulation with Applications to Nano and Bio Systems I**

Organizers: Zhen Chen, Er Ping Chen, H. Eliot Fang, Hongwu Zhang and Zhuo Zhuang

- 10:30 **A Multi-Scale Investigation of Crystal Plasticity Theory (Keynote Lecture)**  
*Zhuo Zhuang, Xiaochuan You and Zhanli Liu*
- 11:00 **Coarse-Grained Molecular Dynamics Simulations of Nano-Particle Internalization into Bilayer Membranes (Keynote Lecture)**  
*Sulin Zhang, Ju Li, George Lykotrafitis and Subra Suresh*
- 11:30 A Comparison of Nanowire Young's Modulus Obtained Via Resonance and Bending  
*Harold S. Park and Geng Yun*
- 11:50 A Mixed Finite-element/spectral Approach to solving the Boltzmann Equation  
*Wijnand Hoitinga, Harald van Brummelen and Rene de Borst*
- 12:10 Combined Atomistic and Continuum Modelling of Nonlinear Elasticity in Nanostructured Materials  
*Luciano Colombo, Stefano Giordano, Alessandro Mattoni and Pierluca Palla*

**Room: EXC1.3**

**MS141 Accuracy Assessment of the eXtended Finite Element Method: Adaptivity, Comparison with Competing Methods, Industrialisation IV**

Organizers: Stephane Bordas, Marc Duflot and Pierre-Olivier Bouchard

- 10:30 A Non Intrusive Implementation of the Extended Finite Element Method in the Z-Set Finite Element Toolkit  
*Frédéric Feyel and Ronald Foerch*
- 10:50 Generic Implementation of Galerkin Methods including Partition of Unity Enrichment  
*Cyrille Dunant, Stephane Bordas and Karen Scrivener*
- 11:10 Three Dimensional Implementation of Non-Local Ductile Damage and Fracture Modelling  
*Hamid Reza Javani Joni, Ron H.J. Peerlings, Marc Geers and A. van Egdorn*
- 11:30 A Comparative Study on Dynamic Fracture with Finite Element Methods  
*Jeong-Hoon Song, Dong-Jo Kim, Sang-Ho Lee and Ted Belytschko*
- 11:50 Fem- and XFEM-Based Biomechanical Models for Advanced Image-Guided Neurosurgery  
*Lara Vigneron, Romain Boman, Ludovic Noels, Jean-Philippe Ponthot, Simon Warfield, Pierre Robe and Jacques Verly*
- 12:10 Finite Element Simulation of Ductile Damage using a Three Field Formulation Based Nonlocal Model  
*Jacques Besson, Renaud Bargellini, Sylvie Michel-Ponelle and Eric Lorentz*

**Room: EXC2.1**

**MS238 Advances in Particle Methods - Minisymposium sponsored by the Zienkiewicz Foundation IV**

Organizers: Roger Owen and Sergio Idelsohn

- 10:30 Grain-Scale Modeling of Coupled Flow and Mechanics: Implications for Methane Hydrate in Ocean Sediments  
*Antone Jain and Ruben Juanes*
- 10:50 Simulation of Fines Migration using a Coupled Non-Newtonian Lattice Boltzmann Model and Discrete Element Method  
*Christopher Leonardi, Roger Owen and Y. T. Feng*
- 11:10 Numerical Simulations on the Fracture Behavior of Concrete Material by Particle Method  
*Masuhiko Beppu and Yoshimi Sonoda*
- 11:30 Discrete Element Simulation of the Interaction between a Granular Material and a Three-Dimensional Cutting Blade  
*Jeffrey Loughran and Patrick Meehan*
- 11:50 Discrete Element Simulation of Granular Material by Elongated Multi-Sphere Particles  
*Darius Markauskas and Rimantas Kačianauskas*
- 12:10 Effect of the Particle Size in DEM Simulations of the Material Flow in Hopper  
*Robertas Balevičius and Rimantas Kačianauskas*

**Room: EXC2.2**

**MS055 Stabilized, Multiscale and Multiphysics Methods III**

Organizers: Tayfun Tezduyar, Arif Masud and Thomas J. R. Hughes

- 10:30 Hierarchical Meshing and Its Applications to Adaptive Large-Scale FEM  
*Kohei Murotani and Genki Yagawa*
- 10:50 On the Reliability of Krylov Subspace Methods and Alternatives  
*Maxim Naumov and Ahmed Sameh*
- 11:10 General-Purpose Coupling Analysis Platform in Parallel Environments  
*Shinobu Yoshimura, Nozomu Yonemura and Tomonori Yamada*
- 11:30 Edge-By-Edge Implementation of Residual-Based Variational Multiscale Method  
*Erb Lins, Renato Elias, Gabriel Guerra, Fernando Rochinha and Alvaro Coutinho*
- 11:50 Variational Germano for Stabilized Stokes and Oseen Flow  
*Ido Akkerman, Kristoffer van der Zee, Steve J. Hulshoff and Rene de Borst*

**Room: CAS0.1**

**MS039 Contact Mechanics : Modelling, Analysis and Applications I**

Joint IACM – IUTAM Minisymposium

Organizers: Mircea Sofonea, José R. Fernandez and Georgios E. Stavroulakis

- 14:00 Numerical Analysis of a Dynamic Viscoelastic Contact Problem with Damage  
*Marco Campo, José R. Fernandez and Juan M. Viaño*
- 14:20 Augmented Macro-Hybrid Mixed Finite Element Schemes for Elastic Contact Problems  
*Gonzalo Alduncin*
- 14:40 Asymptotic Homogenization of Hemivariational Inequalities in Elasticity  
*Stanislaw Migorski and Anna Ochal*
- 15:00 Detection of Obstacles with a New Piezoelectric Plate Model  
*Isabel Figueiredo and Georg Stadler*
- 15:20 Analysis and Numerical Approach of a Piezoelectric Contact Problem  
*Mikael Barboteu and Mircea Sofonea*
- 15:40 Modelling and Variational Analysis of an Electro-Viscoelastic Contact Problem  
*Mircea Sofonea and Mikael Barboteu*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics V**

Joint IACM – IUTAM Minisymposium

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 14:00 Representation of Vector-Valued Random Variables  
*John Red-Horse and Roger Ghanem*
- 14:20 An Anisotropic Sparse Grid Stochastic Collocation Method for Partial Differential Equations with High-Dimensional Random Input Data  
*Fabio Nobile, Raul Tempone and Clayton Webster*
- 14:40 A Numerical Method for Solving Elliptic PDEs with Coefficients perturbed by Spatial White Noise  
*Xiaoliang Wan, Boris Rozovsky and George Karniadakis*
- 15:00 On the construction of Generalized Spectral Bases for solving Stochastic Partial Differential Equations  
*Anthony Nouy*
- 15:20 Constrasts and Connections between Computational Methods for SPDEs  
*Max Gunzburger and Clayton Webster*
- 15:40 Numerical Simulation of Heat Conduction in Elementary Random Media  
*Chenfeng Li, Y. T. Feng, D.R.J. Owen and I.M. Davies*

**Room: CAS1.2**

**MS168 Computational Contact Mechanics V**

Organizers: Peter Wriggers, Tod A. Laursen and Giorgio Zavarise

- 14:00 A New Contact Method Based on a Contact Domain  
*Stefan Hartmann, Javier Oliver, Juan Cante and Rafael Weyler*
- 14:20 A Two-Scale Approach to contact Problems between a Rigid Rough Surface and an Elastic or Viscoelastic Half-Space  
*Honoré Yin, Denis Duhamel, Julien Cesbron, Ivan Kozhevnikov and Fabienne Anfosso-lédée*
- 14:40 A Study on Solid Contact Problem using Nodeless Method based on the Unified Energy Principle  
*Kazuto Yamamura, Atsushi Kikuchi and Tadahiko Kawai*
- 15:00 A Unifying Framework for Contact Problems in Plasticity  
*Corinna Hager, Stefan Hübner and Barbara Wohlmuth*
- 15:20 An Improved Contact Algorithm for Multimaterial Continuum Codes  
*David L. Littlefield and Kenneth C. Walls*
- 15:40 Segment-to-Segment Contact Smoothing Method for Finite Deformation  
*Manuel Tur, Javier Fuenmayor and Peter Wriggers*

## Tuesday Afternoon Sessions (14:00 - 16:00)

### Room: **CAS1.3**

#### MS176 Multiobjective Optimization in Industrial Applications I

Organizers: Jussi Hakanen and Elina Madetoja

- 14:00 Some Remarks on Multiobjective Optimization in Industrial Applications  
*Hiroataka Nakayama*
- 14:20 Split of Territories for Optimum-Shape Design in Aerodynamics and Coupled Disciplines  
*Jean-Antoine Desideri, Régis Duvigneau, Badr Abou El Majd, Hongquan Chen, Zhili Tang and Jacques Pèriaux*
- 14:40 Sparse forward Mode Automatic Differentiation applied to Shape Optimization  
*Jukka Toivanen and Raino Mäkinen*
- 15:00 Formulations for the Optimal Design of RC Wind Turbine Towers  
*Marcelo Silva, Jasbir S. Arora and Reyolando Brasil*

### Room: **CAS1.4**

#### MS198 Advances in Computational Modeling for Environmental Engineering II

Organizers: Agustí Pérez-Foguet and Rafael Montenegro Armas

- 14:00 Scientific Advances in Fire Modelling and its Integration in FFDS for Practical Fire Fighting Activities  
*Luis Ferragut, Isabel Asensio, Santiago Monedero and Joaquín Ramírez*
- 14:20 The CRIMSON Project: Simulating Populations in Massive Urban Environments  
*Olivier Balet, Jacques Duysens, Jerome Compdaer, Enrico Gobetti and Roberto Scopigno*
- 14:40 Adaptive Numerical Model for Solar Radiation  
*Gustavo Montero, José María Escobar, Eduardo Rodríguez and Rafael Montenegro Armas*
- 15:00 Model Tsunami Impact on Coastal Protections by a Multi-Scale Partitioned Strategy  
*Christophe Kassiotis, Adnan Ibrahimbegovic and Hermann Matthies*
- 15:20 Impact of a Twin Jet's Initial Transverse Inclination on its Dynamic Evolution within a Cool Crossflow  
*Amina Radhouane, Nejla Mahjoub Said, Hatem Mhiri, Georges Le Palec and Philippe Bournot*

### Room: **CAS1.5**

#### MS123 Challenges in Mechanics for Nuclear Plants II

Joint IACM – IUTAM Minisymposium

Organizers: Pierre Verpeaux and Stéphane Andrieux

- 14:00 Parallel Computing for Mechanical Nuclear Analysis  
*Jean-Yves Cognard and Pierre Verpeaux*
- 14:20 Coupled 1D Thermohydraulic - 3D Thermomechanical Study of a Space Nuclear Reactor  
*Serge Pascal*
- 14:40 TOUTATIS: Pellet-Cladding Interaction (PCI) Modelling with the Cast3M Finite Element Code  
*Fabrice Bentejac, Nicolas Hourdequin, Claude Strub and Jean Marc Humbert*
- 15:00 Multi-scale Modelling Integration Platform: Computation of the Irradiation Damage on Nuclear Materials  
*Stéphane Bugat, Joumana El Gharib, Jean-Michel Proix and Asmahana Zeghadi*
- 15:20 Fully Coupled Time-Varying Links using Lagrange Multipliers for Fast Transient Dynamics using EUROPLEXUS  
*Vincent Faucher, Hariddh Bung and Folco Casadei*

**Room: CAS1.6**

**MS076 New Trends for Evolutionary Optimization Methods Applied to Multidisciplinary Problems II**

Organizers: William Annicchiarico, George Dulikravich and Miguel Cerrolaza

- 14:00 Reliability-Based Multidisciplinary Design Optimization (Invited Lecturer)  
*Jorge Núñez McLeod*
- 14:20 Material Parameters Identification using Parallel Evolutionary Multi-Objective Algorithm  
*Matej Leps*
- 14:40 Multiobjective Heat Transfer Optimization in Corrugated Wall Channels by Hybrid Genetic Algorithms  
*Diego Copiello and Giampietro Fabbri*
- 15:00 Bounding the Archive Size in Multiobjective Optimization  
*Daniilo Di Stefano and Silvia Poles*
- 15:20 Optimization of Alveolar Recruitment based on the Pulmonary Pressure-Volume Curve  
*Uchiro Narusawa*
- 15:40 Topology Optimization of Transmission Housings for Minimizing the Gear Rattling Noise  
*Cheol Kim, Byong-kee Han, Min-kyo Cho and Chae-hong Lim*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation V**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 14:00 Energy Consistent Integrators for Dissipative Multibody Systems  
*Stefan Uhlar and Peter Betsch*
- 14:20 A Comparison of Integration Formulas for Molecular Dynamics Simulation  
*Nicholas Schafer, Radu Serban and Dan Negrut*
- 14:40 Control Constraints in the Computer Simulation of Multibody Dynamics  
*Peter Betsch, Stefan Uhlar and Mahmud Quasem*
- 15:00 On  $\Gamma$ -Convergence of Variational Integrators for Constrained Systems  
*Sigrid Leyendecker, Bernd Schmidt and Michael Ortiz*
- 15:20 Geometrically Consistent Formulations for Constrained System Dynamics  
*Marco Borri and Lorenzo Trainelli*
- 15:40 Design and Implementation of a Multibody Code Oriented to HIL Simulation  
*Paolo Righettini, Alberto Oldani, Roberto Strada and Steven Chatterton*

**Room: CAS1.8**

**MS102 Inverse Problems V**

Organizers: Bojan Guzina and Marc Bonnet

- 14:00 Estimation of Inlet Velocity based on Pod Inverse Solution of the Unsteady Heat Transfer Problem  
*Adam Fic, Ryszard Bialecki and Ziemowit Ostrowski*
- 14:20 Inverse Analysis in Geotechnics: Soil Parameter Identification by Genetic Algorithm  
*Séverine Levasseur, Yann Malécot, Marc Boulon and Etienne Flavigny*
- 14:40 Estimation of the Strain Field from Full-Field Displacement Noisy Data: Can a Filtering Technique Improve the Identification of Elastic Properties?  
*Stephane Avril, Pierre Feissel, Fabrice Pierron and Pierre Villon*
- 15:00 On the Identification of Material Properties of Composite Laminates using Genetic Algorithms  
*Paulius Ragauskas and Rimantas Belevicius*
- 15:20 Sensitivity to Measured Data in Corrosion Detection Problem  
*Antonio Bilotta and Emilio Turco*
- 15:40 Wind Load Identification on a Tower Structure  
*Eliz-Mari Lourens, Geert Lombaert, Geert Degrande and Guido De Roeck*

## Tuesday Afternoon Sessions (14:00 - 16:00)

### Room: **CAS2.1**

#### MS094 **Soft Computing Methods III**

Organizers: Tadeusz Burczyński, Jamshid Ghaboussi and Zenon Waszczyszyn

- 14:00 Multicriteria Shape Optimization of Thermoelastic Structures using Evolutionary Algorithms  
*Adam Dlugosz and Tadeusz Burczyński*
- 14:20 Multiobjective Optimum Design of Metallic Structural Frames considering the Constrained Weight and the Number of Different Cross-Section Types using DENSEA  
*David Greiner, Jose Maria Emperador, Gabriel Winter and Blas Galván*
- 14:40 Artificial Immune Optimization: Tests and Comparison with Evolutionary Algorithm  
*Arkadiusz Poteralski and Mirosław Szczepanik*
- 15:00 Advanced Optimal Design using Artificial Immune System  
*Arkadiusz Poteralski, Mirosław Szczepanik and Tadeusz Burczyński*
- 15:20 Modifications of Self-learning FEM/NMM approach to Identification of Equivalent Material Models for Plane Stress Problems  
*Ewa Pabisek and Zenon Waszczyszyn*
- 15:40 Generating the Strong Ground Motion based on the First Oncoming Signal using Artificial Neural Network  
*Amin Zahedi Khameneh and Raimar J. Scherer*

### Room: **CAS2.2**

#### TS326 **Parallel Computing II**

- 14:00 High-Performance Computing in Radiative Hydrodynamics Simulation  
*Vladimir Gasilov, Alexei Boldarev, Sergei Boldyrev, Sergei D'yachenko, Elena Kartasheva and Olga Olkhovskaya*
- 14:20 MPI Simulation of Dynamics of Flames  
*Vladimir Karlin*
- 14:40 Interactive Flow Simulation with FPGA-based Acceleration of 2D Lattice Boltzmann Method  
*Kentaro Sano and Satoru Yamamoto*
- 15:00 Numerical Simulation of Radiation Transport Problem around Reentry Vehicle  
*Tatiana Kudryashova, Serge Polyakov, Eldar Kononov and Alex Sverdlin*
- 15:20 Grid Computations of a Parallel Finite Volume Method for the Simulation of Free Surface Shallow Water Flows  
*Anargiros Delis and Emmanouel Mathioudakis*

### Room: **CAS2.3**

#### MS186 **RANS/LES Coupling for the Simulation of Complex Flows I**

Organizers: Jochen Fröhlich and Ivan Mary

- 14:00 Hybrid LES-RANS: Estimation of Resolution using Two-Point Correlations, Energy Spectra and Dissipation Spectra in Re-Circulating Flow  
*Lars Davidson*
- 14:20 Assessment of a Hybrid LES-RANS Concept based on Eddy-Viscosity Reduction using Resolved Reynolds Stresses  
*Tellervo Brandt, Antti Hellsten, Dominic von Terzi and Jochen Fröhlich*
- 14:40 Interface Issues in LES/RANS Coupling Strategies: Location, Variables Exchange and Turbulence Level Adjustment  
*Bjoern Kniesner and Suad Jakirlic*
- 15:00 Scale-Resolving Modelling of Complex Turbulent Flows  
*Florian Menter, Fabrice Mathey and Davor Cokljat*

**Room: CAS2.4**

**MS063 Modeling Robustness and Structural Reliability Analysis III**

**Joint IACM – IUTAM Minisymposium**

Organizers: James Beck, Gerhart I. Schuëller and Hector Jensen

- 14:00 Building a Robustness Index  
*Sara Casciati and Lucia Faravelli*
- 14:20 Robust Model Updating for Insufficient Data  
*Barbara Goller, Helmut Pradlwarter and Gerhart I. Schuëller*
- 14:40 Reliability Analysis of Shells based on Direct Plasticity Methods  
*Thanh Ngoc Tran, Phu Tinh Pham and Manfred Staat*
- 15:00 Online Estimation of Fatigue Crack Growth by Monte Carlo-Based Filtering  
*Francesco Cadini, Enrico Zio and Diana Avram*
- 15:20 Uncertainty Representation and Propagation in the Prediction of Structural Response: A Comparison of Different Approaches  
*Piero Baraldi, Enrico Zio and Irina Crenguta Popescu*
- 15:40 Predicting Reliability by Recurrent Neural Networks  
*Enrico Zio, M. Broggi, Lucia Golea and N. Pedroni*

**Room: CAS2.5**

**MS038 Computational Methods in Nonlinear Dynamics V**

Organizers: Stefano Lenci and Marian Wiercigroch

- 14:00 Chattering: A Novel Route to Chaos in Cam-Follower Impacting Systems  
*Ricardo Álzate, Mario di Bernardo and Petri Piironen*
- 14:20 Analysis of the Non Linear Dynamic Behaviour of an Assembly. Determination of the Friction-Induced Damping  
*Nicolas Peyret, Jean-luc Dion and Gael Chevallier*
- 14:40 Amplitude Dependent Stiffness in the Two-Degree-of-Freedom System with Clearances  
*Nenad Kranjcevic, Milenko Stegic and Nikola Vrankovic*
- 15:00 Influence of Contact Force Models on the Global and Local Dynamics of Drifting Impact Oscillator  
*Olusegun Ajibose, Marian Wiercigroch, Ekaterina Pavlovskaja and Alfred Akisanya*
- 15:20 Bifurcations of an Electro-Vibroimpact System with Friction  
*Jee-Hou Ho and Ko-Choong Woo*
- 15:40 Stable Manifold Computations in a Non-Smooth Dynamical System  
*Ugo Galvanetto*

**Room: CAS2.6**

**MS140 Advanced Numerical Approaches for Complex Multi-phase Flows V**

Organizers: Takashi Yabe, Nobuatsu Tanaka and Feng Xiao

- 14:00 A CFD Study of Novel Technologies for Fluidization in a Centrifugal Field  
*Axel de Broqueville and Juray De Wilde*
- 14:20 Thermo-Chemical Euler-Lagrange CFD Analysis applied to Wet Flue Gas Desulphurisation Technology  
*Emanuela Colombo, Fabio Inzoli, Luca Marocco and Riccardo Mereu*
- 14:40 A Computational Approach in Designing New Paint Scrubber with Improved Efficiency  
*Heidar Javaheri, Hamidreza Nazif, Hassan Golab Bakhsh and Hassan Basirat Tabrizi*
- 15:00 Turbulent Two-Phase Flow Simulation with Heat Transfer by Stochastic Particle Collision Model  
*Zohreh Mansoori, Majid Saffar-Avval, Hassan Basirat Tabrizi and Faridudin Behzad*
- 15:20 Numerical Method for Wet-Steam Flows in Turbine Cascades  
*Michele Giordano and Paola Cinnella*
- 15:40 Fluid Dynamic – Thermal Coupled Model between Fluid and Solid Contours  
*Marcela B. Goldschmit and Damián E. Hryb*



## Tuesday Afternoon Sessions (14:00 - 16:00)

### Room: **CAS3.1**

#### MS154 Virtual Fracture Testing of Composite Materials and Structures III

##### Joint IACM – IUTAM Minisymposium

Organizers: Javier LLorca and Brian Cox

- 14:00 Numerical Simulation of Damage in Polymeric Matrix Composites  
*Javier Segurado, Luis Canal and Javier LLorca*
- 14:20 A New Approach to Model Non-Linear Shear Behaviour for Damage Analysis of Composite Laminates and Structures  
*Conor McCarthy and Ronan O'Higgins*
- 14:40 Simulation of Damage Evolution in Discontinuously Reinforced Composites: A Phase-Field Modeling Approach  
*Bulent Biner and Shen Yang Hu*
- 15:00 A Novel, Multiscale High Fidelity Progressive Damage and Failure Modeling Approach for Laminated Fiber Reinforced Composites  
*Evan J. Pineda, Anthony M. Waas, Brett Bednarzyk and Craig Collier*
- 15:20 An Elasto-Plasto-Damage Constitutive Ply Model for FEM-Analyses of Laminated Composite Structures  
*Thomas Flatscher, Clara Schuecker and Heinz Pettermann*
- 15:40 Virtual Testbed for Numerical Homogenization of Elastic Behaviour and Damage Initiation in Bidirectional Composites  
*Michael Okereke, Nik Petrinic, Jens Wiegand, Robert Gerlach and Clive Siviour*

### Room: **CAS3.2**

#### TS328 Computational Structural Mechanics V

- 14:00 A Computational Homogenization Technique Coupled with a Yielding Criteria for the Structural Response of Masonry Panels  
*Maria Laura De Bellis, Sergio Oller and Pablo Mata A*
- 14:20 Discrete Limit Analysis for Plate Bending Problems by using Hybrid-Type Penalty Method  
*Yasuyuki Tajiri, Anna V. Vardanyan and Norio Takeuchi*
- 14:40 Discrete Modelling Method for Post-Buckling of Shear Panels  
*Philip A. Williams, H. Alicia Kim and Richard Butler*
- 15:00 Dynamic Inertial Effects during Structural Progressive Collapse in RC Structures  
*Kfir Menchel, Thierry Massart and Philippe Bouillard*
- 15:20 Effect of Concrete/CFRP Interface Modelling on Failure Mechanism of RC Beams Strengthened with CFRP: A Cohesive Element Model  
*Suchart Limkatanyu, Kittisak Kuntiyawichai and Sdhabhon Bhokha*
- 15:40 Finite Element Formulation for the Nonlinear Analysis of Masonry Walls  
*Sandro Brasile, Raffaele Casciari, Giovanni Formica and Antonio Rosato*

### Room: **CAS3.3**

#### MS265 Advances in Multiscale and Multiphysics Methods: From Quantum to Continuum II

##### Joint IACM – IUTAM Minisymposium

Organizers: Dong Qian, Wing Kam Liu and Jacob Fish

- 14:00 Modeling Masonry Microstructure through Virtual Block Clusters  
*Luca Salvatori, Wing Kam Liu and Paolo Spinelli*
- 14:20 Velocity Interfacial Conditions for Two-Atom Chains  
*Shaoqiang Tang*
- 14:40 Enhanced Molecular Dynamics for Simulating Thermal and Charge Transport Phenomena  
*Reese E. Jones, Jeremy A. Templeton, Gregory J. Wagner, David Olmsted and Normand Modine*
- 15:00 An Extended Bridging Domain Method for Continuum-Atomistic Simulations of Discontinuities  
*Robert Gracie and Ted Belytschko*
- 15:20 Electronic Structures of Mechanically Deformed Silicon Nanowires  
*Ruiqin Zhang, A.J. Lu and S.T. Lee*
- 15:40 Computational Improvement of Time-History-Kernel Non-reflecting Boundary Condition and its Preliminary Application in Laser-Assisted Nanoimprinting  
*Di-Bao Wang, Fei-Bin Hsiao and Wing Kam Liu*

**Room: CAS3.4**

**MS177 Thermodynamics Aspects of Metal Behavior at Extreme Loading Rates I**

Joint IACM – IUTAM Minisymposium

Organizers: Aleksander Zubelewicz and Wojciech Nowacki

- 14:00 **Dynamic Compression of Solids: Mechanics Challenges and Opportunities (Keynote Lecture)**  
*Yogendra M. Gupta*
- 14:30 **Inelastic Deformation in Shock Loaded Energetic Molecular Crystals (Keynote Lecture)**  
*Thomas D. Sewell, Marc J. Cawkwell, Eugenio Jaramillo, Alejandro Strachan, Kyle J. Ramos and Daniel E. Hooks*
- 15:00 Non-Equilibrium Phenomena in Metals at High Strain Rates  
*Aleksander Zubelewicz*
- 15:20 Dynamics of the Onset of Damage in Copper under Shock Loading  
*Aaron Koskelo, Scott Greenfield and Dennis Paisley*
- 15:40 Geometric Reconstruction and Numerical Simulation of 3D Deformation of Unmarked Macroscopically Anisotropic, Homogeneous Materials subjected to Uniaxial Tension at Different Rates of Strain  
*Matthew Arthington, Nik Petrinic, Clive Siviour and Ben Elliott*

**Room: CAS3.5**

**TS309 Computational Dynamics I**

- 14:00 On the Least Action Principle  
*Giovanni Romano, Raffaele Barretta and Annalisa Barretta*
- 14:20 Reflection and Refraction of Quasi-Longitudinal Plane Waves at an Interface of Two Piezoelectric Media under Initial Stresses  
*Abo-el-nour Abd-Alla and Fatimah Al-Shiekh*
- 14:40 Response Spectrum of Wind Force  
*Željana Nikolić, Ante Mihanovic and Hrvoje Smoljanović*
- 15:00 Controllability Method for Time-harmonic Acousto-elastic Interaction  
*Sanna Mönkölä, Erkki Heikkola and Tuomo Rossi*
- 15:20 Dependence of Structure of Flow Simulation Results on Errors in Iteration Process  
*Itaru Hataue*
- 15:40 Vocal Tract Shape Design Problem based on Resonant Poles for the Helmholtz Equation  
*Takashi Kako*

**Room: CAS3.6**

**MS200 Numerical Modeling in Reinforced Concrete and Its Validation II**

Organizers: Rena C. Yu, Giulio Ventura, Gonzalo Ruiz and Jacinto R. Carmona

- 14:00 Numerical Modeling of the Debonding Mechanisms in FRP-RC Strengthened Beams  
*Agostino Monteleone and Stanislav Potapenko*
- 14:20 Cohesive Modeling of Corrosion-Induced Cracking in Concrete  
*Fabiano Tavares, Rena C. Yu, Carmen Andrade and Gonzalo Ruiz*
- 14:40 An Approach for the Modelling of the Uniaxial Behaviour of Textile Reinforced Concrete  
*Jens Häußler-Combe, Ulrich Hartig and Kai Schicktanz*
- 15:00 Virtual Laboratory for testing Anchors under Static and Cyclic Loads  
*Hocine Boussa, Michel Nakhlé, Jacques Duysens and Abdelghani Sichaib*
- 15:20 Plastification of R/C Frames under Monotonic Loading  
*Boris Trogrlic, Ante Mihanovic and Ivan Balic*
- 15:40 Surface and Volume Damages  
*E. Bonetti, F. Freddi and M. Frémond*

**Room: CAS3.7**

**MS237 Numerical Techniques for the Modelling of Material Failure in Solids V**

Organizers: Xavier Oliver and Francisco Armero

- 14:00 A Dissipation-Based Arc-Length Method for Robust Simulation of Failure  
*Clemens Verhoosel, Joris Remmers and Miguel Gutiérrez*
- 14:20 Crack Tip Plasticity and Asymptotic Strain Fields in Extended Finite Element Formulation  
*Ronaldo Borja and Fushen Liu*
- 14:40 Towards 3D-Modeling of Failure for Composites by the Extended Finite-Element Method and Level Sets  
*Ingrid Brass and Ekkehard Ramm*
- 15:00 Quasi-Static Crack Propagation in Concrete with Cohesive Elements under Mixed-Mode Conditions  
*Jerzy Bobinski and Jacek Tejchman*
- 15:20 Rate-Independent Energetic Approach to Stochastic Damada Mechanics of Discrete Lattices  
*Jan Zeman, Ron H.J. Peerlings and Marc Geers*
- 15:40 Extraction of a Crack Opening from a Continuous Approach using Regularized Damage Models  
*Frédéric Dufour, Gilles Pijaudier-cabot, Marta Choinska and Antonio Huerta*

**Room: CAS3.8**

**MS050 Numerical and Computational Aspects of Interface Problems III**

Organizers: Frederic Gibou and Christian Ratsch

- 14:00 Parallel Adaptive Phase Field Simulation for Solidification  
*Chin Yi Chee, Kevin Chu and Siu Sin Quek*
- 14:20 Numerically Repeated Support Splitting and Connecting Phenomena in the Flow Through an Absorbing Medium  
*Kenji Tomoeda*
- 14:40 Meshes using a 3D Anisotropic Metric  
*Cecile Dobrzynski, Vincent Ducrot and Pascal Frey*
- 15:00 Flux-free Finite Element Method for Immiscible Two-fluid Flows  
*Katsushi Ohmori and Norikazu Saito*
- 15:20 A Non Associated Elasto-Visco-Plastic Model suited to the Numerical Simulation of 2D Adhesively Bonded Assemblies with Interface Elements  
*Romain Creac'hcadec, Jean-Yves Cognard and Laurent Sohier*
- 15:40 Finite Element Analysis on the Mechanical Behaviour of Adhesive Lap Joints  
*Francesco Ascione and Geminiano Mancusi*

**Room: CAS3.9**

**MS036 Advanced Computational Methods for Wave Motion II**

Organizers: Dan Givoli and Geza Seriani

- 14:00 Some Contributions to Perfectly Matched Layers  
*Eliane Becache*
- 14:20 High-Order Absorbing and Open Boundaries: Extensions and Improvements  
*Dan Givoli, Assaf Mar-Or and Thomas Hagstrom*
- 14:40 An Unsplit Variational Perfectly Matched Layer Technique Optimized at Grazing Incidence: Application to the Spectral-Element Method  
*Roland Martin, Dimitri Komatitsch and Nicolas Legoff*
- 15:00 Effects of Topography on Rotational Ground Motions under Incident Elastic Waves using Boundary Methods  
*Alejandro Cadena-Isaza, Luis Godinho, Paulo Amado Mendes, Antonio Tadeu, Francisco Luzon and Francisco J. Sanchez-Sesma*
- 15:20 Analytical Study of the Performance of new Approximate Local DtN Boundary Conditions for Prolate Spheroidal Shaped-Boundaries  
*Hélène Barucq, Rabia Djellouli and Anne-Gaelle Saint-Guirons*
- 15:40 Integration Scheme for Wave Boundary Elements  
*Jon Trevelyan and Mick Honnor*

**Room: CAS3.10**

**MS114 Computational Procedures and Models for Quasi-brittle Materials II**

Organizers: Anthony Jefferson and Günter Hofstetter

- 14:00 **Nonlocal Damage Model combined with Displacement Discontinuity (Keynote Lecture)**  
*Milan Jirásek and Sonia Marfia*
- 14:30 **The Modeling of Axial Splitting and Related Issues (Keynote Lecture)**  
*Howard Schreyer*
- 15:00 Numerical Prediction of Crack Widths in Concrete Structures  
*Yvonne Theiner and Günter Hofstetter*
- 15:20 The Effects of Strain Smoothing on Finite Element Solutions of Strain Softening Solids  
*Anthony Jefferson and Paul Lyons*
- 15:40 Simulating Brittle Material Failure with High-Order Finite Elements  
*Holger Heidkamp, Casimir Katz, Alexander Düster and Ernst Rank*



**Room: CIN0.1**

**MS202 Computational Mechanics of Biological and Bio-Inspired Materials and Structures I**

Organizers: Christian Hellmich and Dinesh Katti

- 14:00 Mechanics at the Molecular Scale in Bone  
*Kalpana S. Katti and Dinesh R. Katti*
- 14:20 Comparison of Voxel-Based Micro Fe and Different Surface-Based Homogenized Fe Models of Human Vertebral Bodies  
*Dieter Pahr and Philippe Zysset*
- 14:40 Pressure Response Analysis in Head Injury  
*Philippe Young and Emma A.C. Johnson*
- 15:00 Multi-Scale Mechanics of Traumatic Brain Injury  
*Rudy Cloots, Hans van Dommelen and Marc Geers*
- 15:20 Towards an Advanced Poroviscoelastic Model at Large Strains for the Simulation of Collagen Induced Anisotropy of Articular Cartilage  
*Uwe-Jens Görke, Hubert Günther, Christoph Forkmann and Markus Wimmer*
- 15:40 Pulling Rate Dependence of the Nanomechanics of Single Tropocollagen Molecules  
*Alfonso Gautieri, Markus Buehler and Alberto Redaelli*

**Room: CIN0.2**

**MS193 Composite Materials and Multiscale Modeling and Design in Medicine and Engineering II**

Joint IACM – IUTAM Minisymposium

Organizers: Michel C. Delfour and Marc Thiriet

- 14:00 Steady State Carotid Flow Simulations  
*Marie-Isabelle Farinas, André Garon and Marc Thiriet*
- 14:20 Multiscale 1D-3D Models for Tissue Perfusion and Applications  
*Carlo D'Angelo*
- 14:40 Critical Aspects of Flow and Aerosol Simulations in the Airway Tract  
*Yves Bourgault and Marc Thiriet*
- 15:00 Mechanotransduction at the Endothelial Interface  
*Marc Thiriet, François Fages and Benoit Perthame*
- 15:20 Implementing Slip Boundary Conditions on Curved Boundaries  
*Jose M. Urquiza, André Garon and André Fortin*

**Room: CIN1.1**

**MS151 Advances in Multiphysics Simulation and Experimental Testing of MEMS and NEMS V**

Joint IACM – IUTAM Minisymposium

Organizers: Attilio Frangi, Narayan Aluru and Subrata Mukherjee

- 14:00 Dynamic Characterization of Microresonators by Stroboscopic Optical Microscopy  
*Fabien Parrain, Alain Bosseboeuf, Jean-Paul Gilles, Souhil Megherbi and Xavier Leroux*
- 14:20 Comparing Simulations and Measurements of Prestressed MEMS  
*Stephan Hannot, Véronique Rochus and Daniel J. Rixen*
- 14:40 ESD Effects in Capacitive RF MEMS Switches  
*Jinyu Ruan, Nicolas Nolhier, Georges Papaioannou and Robert Plana*
- 15:00 Theoretical and Experimental Considerations regarding Magnetic Separation in Microfluidic Device  
*Elena Barbarini, Marioara Avram, Andreea R. Sterian, Guolin Xu and Ciprian Iliescu*
- 15:20 Measurement of Adsorbate Properties with the Pull-In Method  
*Hamed Sadeghian, Hans Goosen, Andre Bossche and Fred van Keulen*
- 15:40 Dissipation in MEMS in the Near Vacuum Regime  
*Richard Rosing, Dongsheng Liu, Aldo Ghisi and Andrew Richardson*

## Tuesday Afternoon Sessions (14:00 - 16:00)

### Room: CIN2.1

#### MS016 Computational Bioimaging and Visualization II

Organizers: João Tavares, Renato Natal Jorge, Thomas J. R. Hughes and Chandrajit Bajaj

- 14:00 An Introduction to the Level Set Methods and its Applications  
*Ilda Marisa Sá Reis, João Tavares and Renato Natal Jorge*
- 14:20 An Efficient Approach for Automated Meshing of 3D Image Data  
*Rajab Said, Viet Bui Xuan and Terry Beresford-West*
- 14:40 Adaptive Mesh Refinement for Non-Rigid Registration of Brain MRI  
*Andriy Fedorov and Nikos Chrisochoides*
- 15:00 Automatic IMT Measurement for Carotid Ultrasound Images  
*Anton Vernet, Honorio Pallas and Blai Coll*
- 15:20 Particle Tracking and Robust Estimation of Azimuthal Averages from Confocal Laser Scanning Microscopy Data  
*Eric von Lieres, Christian Niehoff and Katharina Nöh*

### Room: PGL

#### MS029 Computational Geomechanics Minisymposium V

Organizers: Boris Jeremic, Claudio Tamagnini, Richard Regueiro, Ronaldo Borja, Fusao Oka and Stein Sture

- 14:00 Investigations of Dynamic Shear Localization in Granular Bodies using an Uncoupled Ale-Formulation  
*Michal Wojcik and Jacek Tejchman*
- 14:20 Length Scale Effects in I3 - Plasticity Model for Granular Materials  
*Aylin Ahadi and Matti Ristinmaa*
- 14:40 Mechanical Properties of Granular Materials: A Variational Approach to Grain-Scale Simulations  
*Ran Holtzman, Dmitry B. Silin and Tad W. Patzek*
- 15:00 On Probabilistic Yielding of (GEO-) Materials  
*Boris Jeremic and Kallol Sett*
- 15:20 Simulation of Long-Term Consolidation Behaviour of Soft Sensitive Clay  
*Md.Rezaul Karim, Fusao Oka, Kristian Krabbenhoft and Andrei Lyamin*
- 15:40 Strong Discontinuity in a Critical State Domain  
*Natasa Katic and Ole Hededal*

**Room: EXC1.1**

**MS155 Advances in Computational Mechanics in Honor of Professor Maier III**

Organizers: Eugenio Oñate, Claudia Comi and Giorgio Novati

- 14:00 Advances in the Particle Finite Element for Fluid-Soil-Structure Interaction  
*Eugenio Oñate, Sergio Idelsohn and Miguel A. Celigueta*
- 14:20 Numerical Modeling of the Human Cardiovascular System  
*Alfio Quarteroni*
- 14:40 Cohesive Crack Model Description of Mechanical Instabilities in Quasi-Brittle and Composite Materials  
*Alberto Carpinteri and Marco Paggi*
- 15:00 A Unified Potential-Based Approach for Mixed Mode Cohesive Fracture  
*Glaucio Paulino, Kyoungsoo Park and Jeffery R. Roesler*
- 15:20 Application of a Three-Field Natural Neighbour Method in Linear Fracture Mechanics  
*Li Xiang, Serge Cescotto and Laurent Duchene*
- 15:40 Green's Functions and Finite Elements or why Stresses are Rarely Accurate  
*Friedel Hartmann*

**Room: EXC1.2**

**MS169 Multiscale Model-Based Simulation with Applications to Nano and Bio Systems II**

Organizers: Zhen Chen, Er Ping Chen, H. Eliot Fang, Hongwu Zhang and Zhuo Zhuang

- 14:00 Coarse-Grained Modeling and Simulation of Actin Filament Dynamics: Polymerization, Depolymerization and Severing  
*Taiji Adachi, Yoshitaka Shimada, Yasuhiro Inoue and Masaki Hojo*
- 14:20 Recent Advances in Developing a Unified Multiscale Simulation Procedure for Single Crystal Materials  
*Zhen Chen, Luming Shen and Yong Gan*
- 14:40 Geometrical Effects in Cell-Particle Interactions at the Mesoscale  
*Paolo Decuzzi and Mauro Ferrari*
- 15:00 Deformation and Stability of Copper Nanowires under Bending  
*Yonggang Zheng, Hongwu Zhang and Zhen Chen*
- 15:20 A Multi-Scale Computational Model of Crystal Plasticity  
*Zhanli Liu, Xiaochuan You and Zhuo Zhuang*
- 15:40 Heat Wave Simulation in Micro-Bars with the Finite Element Method  
*Sotirios Filopoulos, Theodosios Papathanassiou and George Tsamasphyros*

**Room: EXC1.3**

**MS124 Multiscale Modelling of Material Behaviour I**

Joint IACM – IUTAM Minisymposium

Organizers: Chris Pearce and Eduardo de Souza Neto

- 14:00 On Multi-scale/Multi-grid FE Analysis of Heterogeneous Quasi-brittle Materials  
*Lukasz Kaczmarczyk, Chris Pearce and Nenad Bicanic*
- 14:20 Topological Derivative in Multi-Scale Linear Elasticity Models  
*Sebastián Giusti, Antonio André Novotny, Eduardo Alberto de Souza Neto and Raul Feijoo*
- 14:40 Topological Derivative in Multi-Scale Heat Conduction Models  
*Sebastián Giusti, Antonio André Novotny, Eduardo Alberto de Souza Neto and Raul Feijoo*
- 15:00 The Influence of Mesoscopic Irregularities on the Macroscopic Behavior of Metal Foam  
*Daniel Schwarzer and Carsten Proppe*
- 15:20 Sensitivity of Mechanical Masonry Characteristics to the Textures: FE Micro-Modelling and Homogenization Procedures  
*Luisa Berto, Antonella Cecchi and Anna Saetta*
- 15:40 A Meso-Scale approach to the Thermo-Mechanical Modelling of Concrete  
*Peter Grassl and Chris Pearce*



## Tuesday Afternoon Sessions (14:00 - 16:00)

### Room: **EXC2.1**

#### **STS03: Drag Reduction Technologies**

Organizer: David Sawyers

- 14:00 Opportunities for Reducing Turbulent Skin Friction Drag: Modeling the Canonical Turbulent Boundary Layer  
*Beverley J. McKeon*
- 14:20 Use of Laminar Flow Technologies for Supersonic Drag Reduction - Results of FP Project SUPERTRAC  
*Jean-Pierre Archambaud, Daniel Arnal, Stefan Hein, Joao Melo de Sousa, Ardashir Hanifi, Jean-Luc Godard, Johann Krier and Raffaele Donelli*
- 14:40 TELFONA Pathfinder Wing for Calibration of the ETW Wind Tunnel  
*Karl Heinz Horstmann, Juergen Quest and Geza Schrauf*
- 15:00 Problem of Viscous Drag Reduction: TsAGI Experience and Investigations  
*Sergey L. Chernyshev, Alexander I. Ivanov, Andrey Ph. Kiselev and Alexander P. Kuryachii*

### Room: **EXC2.2**

#### **MS055 Stabilized, Multiscale and Multiphysics Methods IV**

Organizers: Tayfun Tezduyar, Arif Masud and Thomas J. R. Hughes

- 14:00 Energy Budget in a Sub-Grid Scale Finite Element Model for Turbulent Incompressible Flows  
*Ramon Codina, Javier Principe and Oriol Guasch*
- 14:20 A Multi-Scale Finite Element Method with Discontinuity Capturing for Reaction Dominated Flow Regimes in Unsteady Turbomachinery Computations  
*Alessandro Corsini, Filippo Menichini, Franco Rispoli, Andrea Santoriello and Tayfun Tezduyar*
- 14:40 Advances in Variational Multiscale Shock Hydrodynamics  
*Guglielmo Scovazzi*
- 15:00 The Variational Multiscale-Multigrid Method (VM<sup>s</sup>) for Large Eddy Simulation of Turbulent Flows  
*Volker Gravemeier, Michael Gee, Martin Kronbichler, Peter Gannitzer and Wolfgang A. Wall*
- 15:20 Discontinuity-Capturing and the Variational Multiscale Method  
*John A. Evans, Thomas J.R. Hughes and Giancarlo Sangalli*
- 15:40 Adaptive Computation of Turbulent Compressible Flow using a General Galerkin Method  
*Johan Hoffman, Johan Jansson and Murtazo Nazarov*

**Room: CAS0.1**

**MS039 Contact Mechanics : Modelling, Analysis and Applications II**

Joint IACM – IUTAM Minisymposium

Organizers: Mircea Sofonea, José R. Fernandez and Georgios E. Stavroulakis

- 16:30 Contact Problems with Anisotropic Friction.  
*Radek Kucera, Jaroslav Haslinger and Zdenek Dostal*
- 16:50 Error Estimators for Coulomb Friction  
*Patrick Hild and Vanessa LLeras*
- 17:10 Elasticity Problems with Coulomb Friction Solution using Relaxation Algorithms  
*Leonid A. Rozin, Alexander D. Lovtsov and Mikhail S. Smirnov*
- 17:30 Numerical Solution of 3D Friction Contact Problem  
*Irina Goryacheva, Pekka Neittaanmäki and Alexander Kravchuk*
- 17:50 Parallel Solution Methods for Dynamic Contact Problems  
*Rolf Krause, Christina Mohr and Mirjam Walloth*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics VI**

Joint IACM – IUTAM Minisymposium

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 16:30 Model Uncertainties and Structural Reliability of Tall Buildings subjected to Win Loads  
*Emil Simiu, Rene Gabbai and William Fritz*
- 16:50 Uncertain Response of a Suspended Beam under a Moving Oscillator  
*J.D. Yau and L. Fryba*
- 17:10 Effective Probabilistic Methods for Uncertainties in Aeroelasticity  
*Fabrice Poirion*
- 17:30 An Energy-Based Method for Vibroacoustic Analysis of Complex Structures in the Low-and Medium-Frequency Ranges, a Computational Model with Uncertainties  
*Morad Kassem, Christian Soize and Laurent Gagliardini*
- 17:50 Adaptive Sparse Polynomial Chaos Expansions using a Sequential Experimental Design  
*Géraud Blatman and Bruno Sudret*

**Room: CAS1.2**

**MS168 Computational Contact Mechanics VI**

Organizers: Peter Wriggers, Tod A. Laursen and Giorgio Zavarise

- 16:30 Modeling of High Friction Contact Problems with or without Third Body  
*Zhi-Qiang Feng, Jean-Michel Cros and Christine Renaud*
- 16:50 Numerical Methods for 3D Coulomb's Friction based on Nonsmooth Newton's Method and Nonlinear Complementarity Formulations  
*Vincent Acary, Houari-Boumediene Khenous and Franck Perignon*
- 17:10 Multiscale Thermomechanical Modelling of High Speed Dry Friction in Hydrodynamics  
*Franck Dambakizi, Patrick Le Tallec and Jean-Philippe Perlat*
- 17:30 Schwarz Method for Slip Weakening Friction with Applications to Earthquake Source Dynamics  
*Lori Badea, Ioan R. Ionescu and Sylvie Wolf*
- 17:50 Extended Finite Element Modeling of Large Deformation Frictional Contact  
*Amir Khoei, Omid Reza Biabanaki, I. Yadegaran and Masoud Anahid*
- 18:10 Development of a Constitutive Model for the Masonry-FRP Interface Behaviour  
*Claudio Maruccio, Daniel Oliveira and Paulo Lourenço*

**Room: CAS1.3**

**MS176 Multiobjective Optimization in Industrial Applications II**

Organizers: Jussi Hakanen and Elina Madetoja

- 16:30 Comparative Study of Data Mining Methods for Aerodynamic Multiobjective Optimizations  
*Tomoaki Tatsukawa, Akira Oyama and Kozo Fujii*
- 16:50 A Multi-Fidelity Formulation for Multidisciplinary Design Optimization of Aircraft Configurations  
*Matteo Diez, Lorenzo Burghignoli, Cecilia Leotardi and Alessio Sargentini*
- 17:10 Aerodynamic Optimization of 2-D High-Lift Device under Kinematics Constraints  
*Keizo Takenaka and Kazuhiro Nakahashi*
- 17:30 Multiobjective Optimization Approach for Model Parameter Extraction in Gliding Motility Assays  
*Florin Fulga, Cristina Fulga and Dan V. Nicolau*

**Room: CAS1.4**

**MS198 Advances in Computational Modeling for Environmental Engineering III**

Organizers: Agustí Pérez-Foguet and Rafael Montenegro Armas

- 16:30 Numerical Modeling of Biochemical Transport Processes with Heterogeneous Source Terms. Dimensionless Analysis with the Activated Sludge Model ASM1  
*Jordi Pascual-Ferrer and Agustí Pérez-Foguet*
- 16:50 Computational Modelling of Reactive Multiphase Flows in Hydrometallurgical Processes  
*Chris Bennett, Diane McBride, Mark Cross and Jim Gebhardt*
- 17:10 Modeling the Transport of Chromium and Fine Sediments with a Meshless Method  
*Alfredo Emilio Trento and Ana María T. Alvarez*
- 17:30 A New Profile-Temperature Fully Coupled Model for ICE Sheets Simulations  
*Natividad Calvo, José Durany and Carlos Vázquez*

**Room: CAS1.5**

**MS171 Development of a Computational Testbed for Studying Near-Surface Phenomena I**

Organizers: Owen Eslinger

- 16:30 Overview of the Computational Testbed for Thermal Imaging  
*John Peters*
- 16:50 Soil Moisture and Heat Transport Modeling to support Simulation of Infrared Imaging  
*Stacy Howington*
- 17:10 Issues in Multi-Spectral Ray Tracing for the Computational Testbed  
*Raju Kala and John Peters*
- 17:30 CFD Simulation of Three-Dimensional Airflow over a Vegetated Soil Surface  
*Phu Luong, Robert Bernard and Stacy Howington*
- 17:50 Large-Scale Meshing and Data Management for the Computational Testbed  
*Owen Eslinger and Amanda Hines*
- 18:10 Computational Study of Gas-Solid Heat Transfer in Rotating Fluidized Beds in a Static Geometry  
*Juray De Wilde*

**Room: CAS1.6**

**MS076 New Trends for Evolutionary Optimization Methods Applied to Multidisciplinary Problems III**

Organizers: William Annicchiarico, George Dulikravich and Miguel Cerrolaza

- 16:30 Topology Optimization of Beam Structures using Genetic Programming.  
*Raymond Wildman and George Gazonas*
- 16:50 Topology Optimization with Algorithm based on Bacterial Chemotaxis  
*Maria Alejandra Guzman, Alberto Delgado and Jonas De Carvalho*
- 17:10 Topology Optimization for Force Sensor Structure Considering Accuracy of Force Detection  
*Akihiro Takezawa, Shinji Nishiwaki, Mitsuru Kitamura and Emilio C.N. Silva*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation VI**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 16:30 Analysis of the Intervertebral Discs using a Finite Element and Multibody Dynamics Approach  
*Nuno B. Monteiro, João Folgado, Miguel Silva and João L. Melancia*
- 16:50 Optimization of the Force Distribution at the Lower Limb/Orthosis Interface for Comfort Design  
*Paula Silva, Miguel Silva and Jorge Martins*
- 17:10 Modeling and Control of 3-D Pinching in Full Variables by Soft Fingers under Non-Holonomic Constraints  
*Morio Yoshida, Suguru Arimoto and Zhi-Wei Luo*
- 17:30 Comparison between two Multibody Codes for the Simulation of a Railway Vehicle Dynamics  
*Jury Auciello, Enrico Meli, Monica Malvezzi and Andrea Rindi*
- 17:50 Model Normalization for the Analysis of Inertial Parameters in Multibody Dynamics  
*Saeed Ebrahimi and Jozsef Kovacs*
- 18:10 Method of the Translation of FEM Models from the Inertial to the Floating Frame Formulation  
*Dmitry Vlasenko and Roland Kasper*

**Room: CAS1.8**

**MS054 Inverse Problems: Recent Advances in Methodology and Techniques I**

Organizers: Barbara Kaltenbacher and Roland Potthast

- 16:30 Regularized Total Least Squares: Computational Aspects and Error Bounds  
*Shuai Lu, Sergei Pereverzev and Ulrich Tautenhahn*
- 16:50 The Convex Source Support and its Application to Electric Impedance Tomography  
*Stefanie Reusswig*
- 17:10 Hierarchical and Adaptive Concept for the Identification of Material Laws by Boundary Observations  
*Peter Knabner and Michael Blume*
- 17:30 A Semismooth Newton Method for Inverse Problems with Sparsity Constraint  
*Dirk A. Lorenz and Roland Griesse*
- 17:50 Adaptive Meshing Approach to Locating Internal Metals with Electrical Resistance Tomography  
*Aku Seppänen, Kimmo Karhunen, Anssi Lehtikoinen, Paulo Monteiro and Jari Kaipio*
- 18:10 Optimal Configuration for Damage Identification in Piezoelectrics  
*Roberto Palma, Guillermo Rus, José Luis Pérez-Aparicio and Rafael Gallego*

## Tuesday Evening Sessions (16:30 - 18:30)

### Room: **CAS2.1**

#### MS094 **Soft Computing Methods IV**

Organizers: Tadeusz Burczyński, Jamshid Ghaboussi and Zenon Waszczyszyn

- 16:30 Neural Networks applied to Damage Evaluation in Experimental Tests  
*Piotr Nazarko and Leonard Ziemiński*
- 16:50 Identification of Damage in Beams based on Modal Parameters Changes using Neural Network  
*Artur Borowiec and Leonard Ziemiński*
- 17:10 Parametric Optimization using Genetic Algorithm and Neural Network  
*Krzysztof Szajek, Witold Kąkol, Tomasz Łodygowski and Marcin Wierszycki*
- 17:30 Performance Based Design of Masonry Infilled Frames using Feature Sensitive Neural Networks  
*Alok Madan and Arshad Hashmi*
- 17:50 The use of Genetic Algorithms in Straight forward Engineering Problems – The Influence of the Genetic Operators  
*Branca Sher, Rui Moreira and Antonio Andrade-Campos*

### Room: **CAS2.2**

#### MS116 **Minisymposium on “Mathematical Modeling and Numerical Simulation of Coupled Multiphysics Systems in Nano- and Biotechnologies” I**

Organizers: Roderick Melnik and Riccardo Sacco

- 16:30 **Modeling DNA Sequencing at the Nanoscale (Keynote Lecture)**  
*Massimiliano Di Ventra*
- 17:00 **Multiscale - Multiphysics Simulation of Nanostructured Devices: The TIBERCARD Project (Keynote Lecture)**  
*Aldo Di Carlo, M. Auf der Maur, M. Povolotskyi, F. Sacconi, Giovanni Romano, G. Penazzi and A. Pecchia*
- 17:30 Modeling of Semiconductor/Electrolyte Nanostructures with Nextnano<sup>3</sup>  
*Stefan Birner*
- 17:50 Three-Dimensional Strain Distributions due to Anisotropic Effects in InGaAs Semiconductor Quantum Dots  
*Daniele Baretton, Benny Lassen, M. Willatzen, R.V.N. Melnik and Lok Lew Yan Voon*

### Room: **CAS2.3**

#### MS186 **RANS/LES Coupling for the Simulation of Complex Flows II**

Organizers: Jochen Fröhlich and Ivan Mary

- 16:30 High-Order Upwind and WENOM Schemes for DNS of Compressible Turbulent Flow  
*Georges Gerolymos, Dorothee Sénéchal and Isabelle Vallet*
- 16:50 Assessment of Large-Eddy Simulation Models in Complex Flows using Unstructured Meshes  
*Oriol Lehmkuhl, Ricard Borrell, F.Xavier Trias and Carlos D. Perez-Segarra*
- 17:10 A Low-Dispersive Dynamic Finite Difference Scheme for Large Eddy Simulation  
*Dieter Fauconnier, Chris De Langhe and Erik Dick*
- 17:30 Numerical Viscosity, SGS Modeling and Grid Refinement in LES and in Variational Multiscale LES  
*Hilde Ouvrard, Simone Camarri, Bruno Koobus, Stephen Wornom, Alain Dervieux and Maria-Vittoria Salvetti*

**Room: CAS2.5**

**MS085 Numerical Methods for Gas-Liquid Two-Phase Flow I**

Organizers: Byeong Rog SHIN and Takeo Kajishima

- 16:30 **Direct Numerical Simulation of Cavitating Flow Noise (Keynote Lecture)**  
*Young Moon, Jung Hee Seo and Byeong Rog Shin*
- 17:00 **Extension of the Full Cavitation Model for Cryogenic Fluids (Keynote Lecture)**  
*H.Q. Yang and Ashok K. Singhal*
- 17:30 **Accurate Prediction of Transitional Flows among Gas, Liquid and Supercritical Fluids**  
*Takashi Furusawa and Satoru Yamamoto*
- 17:50 **Direct Numerical Simulation of Interaction between Cavitation and Turbulence Vortices**  
*Kie Okabayashi, Takashi Ohta and Takeo Kajishima*
- 18:10 **Numerical Study of a Patterning Process using Microdroplet Ejection**  
*Youngho Suh and Gihun Son*

**Room: CAS2.6**

**MS175 Immersed Boundary and Immersed Interface Methods I**  
**Joint IACM – IUTAM Minisymposium**

Organizers: Pietro De Palma, Michele Napolitano, Giuseppe Pascazio and Roberto Verzicco

- 16:30 **High-Fidelity Simulations of Turbulent Heat Transfer on Bluff Bodies (Keynote Lecture)**  
*Seongwon Kang, Gianluca Iaccarino, Frank Ham and Parviz Moin*
- 17:00 **A Monotone, Higher-Order Accurate, Fixed-Grid Finite-Volume Method for Convection Problems with Moving Boundaries (Keynote Lecture)**  
*Barry Koren and Yunus Hassen*
- 17:30 **An Embedded Boundary Method with Adaptive Mesh Refinements**  
*Marcos Vanella and Elías Balaras*
- 17:50 **Direct Numerical Simulation of the Physiological Flow through a Bileaflet Mechanical Heart Valve**  
*Marco D. de Tullio and Roberto Verzicco*
- 18:10 **Shape Representation by Signed Distance Function for Immersed Boundary Method**  
*Kohei Okita, Takehiro Tawara and Kenji Ono*

**Room: CAS3.1**

**MS154 Virtual Fracture Testing of Composite Materials and Structures IV**

Joint IACM – IUTAM Minisymposium

Organizers: Javier LLorca and Brian Cox

- 16:30 **Cohesive Zone Description and Fracture of Ceramics subjected to Environmentally Assisted Slow Crack Growth**  
*Marcos Romero de la Osa, Rafael Estevez, Christian Olagnon, Jerome Chevalier, Lionel Vignoud and Christophe Tallaron*
- 16:50 **Superposition of Softening Laws to Account for Multiple Toughening Mechanisms**  
*Carlos Dávila, Pedro Camanho and Albert Turon*
- 17:10 **Simulation until Failure of a Stiffened Panel with Progressive Damage and Delamination**  
*Albert Turon, Joan Andreu Mayugo Majó, Pere Mairim, Norbert Blanco, Pedro Ponces Camanho and Josep Costa*
- 17:30 **Growth of Surface Flaws on Glass Fibres during High Temperature Exposure**  
*Stefanie Feih, Zenka Mathys and Adrian Mouritz*
- 17:50 **In-Situ Characterization of Interface Delamination by a New Miniature Mixed-Mode Bending Setup**  
*Murthy Kolluri, M.H.L Thissen, Johan Hoefnagels, J.A.W. van Dommelen and M.G.D Geers*
- 18:10 **On the Evaluation of the Young's Modulus for a Laminated Periodic Composite Structure based on Auxetic Materials**  
*Stefania Donescu, Veturia Chiroiu and Ana Maria Mitu*

**Room: CAS3.2**

**TS328 Computational Structural Mechanics VI**

- 16:30 3D Beam-Beam Effects Simulation Algorithm  
*Marina Boronina, Valery Snytnikov and Vitaly Vshivkov*
- 16:50 Configuration-Dependent Interpolation in 3D Beam Elements of Arbitrary Order  
*Gordan Jelenic*
- 17:10 Nonlinear Membrane Locking-Free Curved-Beam Element for Arches  
*Yong-Lin Pi and Mark Andrew Bradford*
- 17:30 Numerical Implementation of the Force Method in the Elastoplastic Analysis of Frames  
*Konstantinos V. Spiliopoulos and Theodore N. Patsios*
- 17:50 Numerical Modelling of Tension Systems with Unilateral Constrains  
*Marek Stanuszek and Wieslaw Bereza*
- 18:10 Post-buckling Behaviour of a Compressed Slender Beam constrained to a Cylindrical Tube  
*Mircea Gheorghie Munteanu and André Barraco*

**Room: CAS3.3**

**MS265 Advances in Multiscale and Multiphysics Methods: From Quantum to Continuum III**

**Joint IACM – IUTAM Minisymposium**

Organizers: Dong Qian, Wing Kam Liu and Jacob Fish

- 16:30 Atomistic-continuum Coupling for Dynamic Crack Propagation  
*Pascal Aubertin, Rene de Borst and Julien Réthoré*
- 16:50 Modeling Hot Rolling: A Study on the Microstructural Changes during the Austenite-Ferrite Phase Transformation in Dual Phase Steels  
*Stefan Benke, Jenny Rudnizki and Ulrich Prah*
- 17:10 Hybrid Model for Simulation of Magneto-Optical Response of Layers of Triple Quantum Dot Molecules  
*Oleksandr Voskoboinikov*
- 17:30 Homogenized Model of Bone Poroelasticity and Deformation Induced Microflow  
*Eduard Rohan, Robert Cimrman, Salah Naili and Thibault Lemaire*
- 17:50 A New Timoshenko Beam Model based on a Modified Couple Stress Theory  
*Hemei Ma, Xin-Lin Gao and J. N. Reddy*

**Room: CAS3.4**

**MS177 Thermodynamics Aspects of Metal Behavior at Extreme Loading Rates II**

**Joint IACM – IUTAM Minisymposium**

Organizers: Aleksander Zubelewicz and Wojciech Nowacki

- 16:30 Thermodynamic Models and Simulations of Advanced Nuclear Fuels  
*Marius Stan*
- 16:50 Plastic Anisotropy of FCC Single Crystals in High-Rate Deformation  
*Zhiqiang Wang, Irene Beyerlein and Richard LeSar*
- 17:10 Optimization of Protection Effect of Multi-Phase Materials subjected to Impact Loading  
*Martin Herrenbrück and Roman Lackner*
- 17:30 An Efficient CSD/CFD Scheme for Weapon Fragmentation  
*Orlando Soto, Joseph Baum and Rainald Löhner*
- 17:50 Dynamic Property and Constitutive Model of the Perforated Casing Steel 32CrMo4 in the Perforation Charge  
*Wei-Guo Guo, Yulong Li and Bing Hou*

**Room: CAS3.5**

**TS309 Computational Dynamics II**

- 16:30 Computational Nonlinear Dynamic Frame Analysis Techniques  
*Ali Abolmaali and Dobrinka Radulova*
- 16:50 Dynamic Analysis of Overhead Crane Beams under Moving Loads  
*Ismail Gerdemeli, Derya Özer and Ismail Esen*
- 17:10 Dynamic Effect of High-Speed Train at the Bridges  
*József Györgyi and Gergely Szabó*
- 17:30 Vibrations of Variable Thickness Spherical Shells  
*Elia Efraim and Moshe Eisenberger*
- 17:50 Robust Vibration Control and System Analysis of Smart Antisymmetric Tubular Structures  
*Hamidreza Mirdamadi, Mohammadreza Ebrahimi and Navid Mozaffari*
- 18:10 Hamiltonian Mechanics Formulation & Finite Element Simulation of Adaptive Smart Axisymmetric Telescopic Structures  
*Hamid Reza Mirdamadi and Navid Mozaffari*

**Room: CAS3.6**

**MS143 A Background to Several Computational Difficulties: The Non-Smooth Evolution of Mechanical Systems Due to Discontinuities of the Velocities In Time or In Space I**

Organizers: Eric Dimnet and Frederico Tochetti

- 16:30 Non-Smooth Evolution of a Mechanical System using the A-CD<sup>2</sup> Method  
*Stefano Dal Pont and Eric Dimnet*
- 16:50 Evolution of a Fluid with Collisions and Unilateral Contact: The P-ALE Approach  
*Eric Dimnet and Raul Gormaz*
- 17:10 Discontinuous Galerkin Solution of the Euler Equations using an H-Multigrid Method  
*Francesco Bassi, Andrea Crivellini and Pietro Tesini*
- 17:30 Some Considerations on the Second Order Non Infinitesimal, Solid-Rigid Movements on Increased Mobility Singularities of Kinematical Chains  
*Igor Fernández de Bustos, Josu Agirrebeitia and Rafael Avilés*
- 17:50 New Event--Capturing Time--Stepping Schemes with Higher Resolution and order for Nonsmooth Multibody Systems  
*Vincent Acary*
- 18:10 Crack Propagation Analysis in the Media with Random Structure by Fine Mesh Window Technique  
*Jerzy Podgórski, Tomasz Sadowski and Tomasz Nowicki*

**Room: CAS3.7**

**MS237 Numerical Techniques for the Modelling of Material Failure in Solids VI**

Organizers: Xavier Oliver and Francisco Armero

- 16:30 Limit Analysis based Upscaling of Strength Properties and Investigation of Failure Modes of Two-Phase Materials  
*Josef Füssl and Roman Lackner*
- 16:50 Modeling of Dynamic Fracture using Finite Elements with Embedded Strong Discontinuities  
*Christian Linder and Francisco Armero*
- 17:10 Adaptive Dynamic Cohesive Fracture Simulation Using Edge-Swap and Node Perturbation Operators  
*Kyoungsoo Park, Glaucio H. Paulino and Waldemar Celes*
- 17:30 Moving Finite Element Analyses for Dynamic Nonlinear Fracture of Voided Materials  
*Takehiro Fujimoto and Toshihisa Nishioka*
- 17:50 A Numerical and Experimental Study of the Dynamic Propagation of Two Cracks in a Brittle Material  
*David Grégoire, Julien Réthoré, Hubert Maigre and Alain Combescure*
- 18:10 Elucidation of Various Dynamic Fracture Mechanisms using the Moving Finite Element based on Delaunay Automatic Triangulation  
*Toshihisa Nishioka*



## Tuesday Evening Sessions (16:30 - 18:30)

### Room: **CAS3.8**

#### MS064 Constitutive Stability and Fracture: Models and Applications I

Joint IACM – IUTAM Minisymposium

Organizers: Pedro Areias and José César de Sá

- 16:30 **Stability Analysis and Numerical Implementation of Non-Local Damage Models via a Global Variational Approach (Keynote Lecture)**  
*Hanan Amor, Jean-Jacques Marigo, Corrado Maurini and Ngoc Kim Hung Pham*
- 17:00 **Use of a Continuum Damage Model based on Energy Equivalence (Keynote Lecture)**  
*Paschalis Grammenoudis and Charalampos Tsakmakis*
- 17:30 Modelling of Strain Localization in Brittle and Ductile Materials Via a Two-Scale Formulation  
*Sebastián D'heres and Eduardo Dvorkin*
- 17:50 Nonlocal Damage Modelling of Ductile Materials  
*Jana Velde, Ursula Kowalsky, Tim Zümendorf and Dieter Dinkler*
- 18:10 Modelling Ductile Failure from Damage to Fracture  
*Jose César de Sá, F. M. A. Pires and Cai Zheng*

### Room: **CAS3.9**

#### MS036 Advanced Computational Methods for Wave Motion III

Organizers: Dan Givoli and Geza Seriani

- 16:30 Spectral Numerical Methods for Maxwell's on Non-Structured Mesh  
*Gary Cohen and Marc Duruflé*
- 16:50 Effect of Element Distortion on the Numerical Dispersion of Spectral Element Methods  
*Geza Seriani and Saulo P. Oliveira*
- 17:10 Spectral Element Methods for Acoustic Wave Models in Nonstandard Domains  
*Elena Zampieri, Luca Ghezzi and Luca Pavarino*
- 17:30 An Adaptive Computational "Wave" Approach  
*Pierre Ladevèze, Benjamin Sourcis, Hervé Riou and Béatrice Faverjon*
- 17:50 Discontinuous Galerkin Methods and Local Time-Stepping for Transient Wave Motion  
*Julien Diaz, Marcus J. Grote and Teodora Mitkova*
- 18:10 Coupling Discontinuous Galerkin Methods and Retarded Potentials for Time Dependent Wave Propagation Problems  
*Patrick Joly and Jerónimo Rodríguez*

### Room: **CAS3.10**

#### MS114 Computational Procedures and Models for Quasi-brittle Materials III

Organizers: Anthony Jefferson and Günter Hofstetter

- 16:30 Robust Anisotropic Visco-Damage Modeling for Impact Applications  
*Rodrigue Desmorat, Marion Chambart, Fabrice Gatuingt, Didier Combescure and Daniel Guilbaud*
- 16:50 Meso-Mechanically Motivated Nonlocal Models for Modelling of the Fracture Process Zone in Quasi-Brittle Materials  
*Peter Grassl and Milan Jirasek*
- 17:10 Simulation of Fresh Concrete Flow  
*Borek Patzak and Zdenek Bittnar*
- 17:30 Modeling of Fracture Process in Concrete Elements including Steel Fibres using a Novel Lattice Model  
*Jan Kozicki and Jacek Tejchman*
- 17:50 Modelling of Fracture of Concrete at High Loading Rates  
*Josko Ožbolt, Ivica Kozar and Vanja Travaš*
- 18:10 Lattice Modelling of Autonomic Healing Processes in Cementitious Materials  
*Christopher Joseph, Anthony Jefferson and Robert Lark*

**Room: CIN0.1**

**MS202 Computational Mechanics of Biological and Bio-Inspired Materials and Structures II**

Organizers: Christian Hellmich and Dinesh Katti

- 16:30 **Upscaling Anisotropic Stiffness and Strength Properties of Wood (Keynote Lecture)**  
*Karin Hofstetter, Christian Hellmich and Josef Eberhardsteiner*
- 17:00 **Multiscale Mechanics of NACRE: From Molecular to Macro (Keynote Lecture)**  
*Dinesh R. Katti and Kalpana S. Katti*
- 17:30 **Fracture of Structured Materials**  
*Ko Okumura*
- 17:50 **Mechanical Properties of Cellular Structures formed by the Voronoi-Partition of Randomly Disturbed Cubic Lattices.**  
*Rafael Schouwenaars, Humberto Cervantes, Elliot I. Bustillos, Víctor H. Jacobo and Armando Ortiz*
- 18:10 **Numerical Modeling of Stress Concentrations in Micro-Heterogeneous Bio-Tissue**  
*Jonathan F. Wenk, Panayiotis Papadopoulos and Tarek Zohdi*

**Room: CIN0.2**

**MS193 Composite Materials and Multiscale Modeling and Design in Medicine and Engineering III**

Joint IACM – IUTAM Minisymposium

Organizers: Michel C. Delfour and Marc Thiriet

- 16:30 **Numerical Investigation of Finite Element Discretizations for Hyperelastic Materials in Large Deformations**  
*Eric Chamberland, André Fortin, Abderrahman El Maliki and Nicolas Tardieu*
- 16:50 **An Anisotropic Inelastic Model for Preconditioning and Softening of Soft Biological Tissues**  
*Alexander Ehret and Mikhail Itskov*
- 17:10 **A Model to predict the Evolution with Time, of Orthodontic Tooth Movement**  
*Lidia Carvalho, Mildred Ballin Hecke, Gil Campos and José Simões*
- 17:30 **Understanding Mechanical Behavior of Protein Crystal using Coarse-Grained Model**  
*Gwonchan Yoon, Hyeongjin Park, Kilho Eom and Sungsoo Na*

**Room: CIN1.1**

**MS151 Advances in Multiphysics Simulation and Experimental Testing of MEMS and NEMS VI**

Joint IACM – IUTAM Minisymposium

Organizers: Attilio Frangi, Narayan Aluru and Subrata Mukherjee

- 16:30 **Mechanical Modeling of Electrostatically Actuated RF MEMS Ohmic Switch with Two Side Electrodes – Analysis of Various Loading Conditions**  
*Adam Koszewski and Frédéric Souchon*
- 16:50 **MEMS Modelling using Non-Conforming Elements**  
*Véronique Rochus, Daniel J. Rixen and Jean-Claude Golinval*
- 17:10 **A New Methodology for RF MEMS Contact Simulation**  
*David Peyrou, Fabienne Pennec, Hikmat Achkar, Patrick Pons, Robert Plana and Frédéric Courtade*
- 17:30 **Improvements in Accuracy of RF-MEMS Electromechanical Simulation within Cadence®**  
*Jacopo Iannacci, Benno Margesin, Flavio Giacomozzi, Eugenio Brusa, Mircea Gheorghie Munteanu and Antonio Gnudi*
- 17:50 **Topology Optimization of Reinforced Polysilicon Thin Plates for MEMS Based Microphones**  
*Carlos Calaza, Sabrina Colpo, Viviana Mulloni, Flavio Giacomozzi and Benno Margesin*
- 18:10 **Cohesive Modelling for Spontaneous Adhesion in Microelectromechanical Systems**  
*Raffaele Ardito, Alberto Corigliano, Biagio De Masi and Attilio Frangi*

## Tuesday Evening Sessions (16:30 - 18:30)

### Room: CIN2.1

#### MS016 Computational Bioimaging and Visualization III

Organizers: João Tavares, Renato Natal Jorge, Thomas J. R. Hughes and Chandrajit Bajaj

- 16:30 Efficient and Robust Restoration of High Resolution MRI  
*Alexandre Cunha and Jérôme Darbon*
- 16:50 Image Segmentation for Human Motion Analysis: Methods and Applications  
*Maria João M. Vasconcelos and João Manuel R. S. Tavares*
- 17:10 Excursion and Strain of the Brachial Plexus and Peripheral upper Limb Nerves following Reversed Arthroplasty of the Shoulder  
*Emmanuel Audenaert, Katharina D'Herde and Amaryllis Audenaert*
- 17:30 Determination of Objects Contours using Physical Principles  
*Patrícia C. T. Gonçalves, Joao Tavares and Renato Natal Jorge*
- 17:50 Segmentation of Structures in 2D Medical Images  
*Zhen Ma, João Tavares and Renato Natal Jorge*

### Room: PGL

#### MS029 Computational Geomechanics Minisymposium VI

Organizers: Boris Jeremic, Claudio Tamagnini, Richard Regueiro, Ronaldo Borja, Fusao Oka and Stein Sture

- 16:30 The Mechanics of Active Clays Circulated by Salts, Acids and Bases  
*Alessandro Gajo and Benjamin Loret*
- 16:50 The Stability Analysis of Numerical Schemes in Coupled Flow and Geomechanics: Poro-Elastic and Poro-ElastoPlastic Behavior  
*Jihoon Kim, Ruben Juanes and Hamdi Tchelepi*
- 17:10 Virtual Testing and Computational Homogenization of Geomaterials  
*Kristian Krabbenhoft, M.R. Karim, K.K. Altarawneh, O. Buzzi and Andrei Lyamin*
- 17:30 Seismic Stability of Landfills and Distress on the Geosynthetic Barrier  
*Yiannis Tsompanakis, Varvara Zania and Prodromos Psarropoulos*
- 17:50 Predictive Framework for Multiscale Computations in Granular Media  
*Jose Andrade*

**Room: EXC1.1**

**MS155 Advances in Computational Mechanics in Honor of Professor Maier IV**

Organizers: Eugenio Oñate, Claudia Comi and Giorgio Novati

- 16:30 Structural Optimization of Elastoplastic Structures under Shakedown Conditions  
*Erwin Stein and Karin Wiechmann*
- 16:50 Direct Methods derived from Linear Solution Methods with Spatial Variation of Moduli  
*Alan Ponter*
- 17:10 Application of the Lower Bound Shakedown Theorem for the Assessment and Design of Composites  
*Dieter Weichert, Abdelkader Hachemi, Min Chen and Said Mouhtamid*
- 17:30 Mathematical Programs with Equilibrium Constraints (Mpecs) in Engineering Mechanics  
*Francis Tin-Loi*
- 17:50 Control the Thermal Response of Thin-Walled Structures using the Robust Design Method  
*Lijia Fan, Zhihai Xiang, Mingde Xue and Zhangzhi Cen*

**Room: EXC1.2**

**MS073 Minisymposium in the Honor of Michel Bernadou's 65th Birthday I**

Organizers: John Cagnol and Roland Glowinski

- 16:30 Finite Element Characteristics Old and New  
*Federic Hecht and Olivier Pironneau*
- 16:50 Fundamental and Applicative Challenges in the Modeling and Computations of Shells: An Overview  
*Dominique Chapelle*
- 17:10 An Extended Variational Principle for Coupling Shell/Plate Models and 3D Solid Models  
*Pablo J. Blanco and Raul Feijoo*
- 17:30 Structural-Acoustic Vibrations with Dissipative Interface  
*Jean-François Deü, Walid Larbi and Roger Ohayon*

**Room: EXC1.3**

**MS124 Multiscale Modelling of Material Behaviour II**  
**Joint IACM – IUTAM Minisymposium**

Organizers: Chris Pearce and Eduardo de Souza Neto

- 16:30 A Composite Cell Model for BCC Structured Metals under Strain Path Changes  
*Tuncay Yalcinkaya, W.A.M. Brekelmans and M.G.D. Geers*
- 16:50 A Two-Scale Approach to Characterisation of Plastic Spin in Ti-6Al-4V at High Rates of Strain  
*Nik Petrinic, Helen Sarsfield, Matthew Arthington and Julian M. Reed*
- 17:10 A Study of a Fully Implicit Integration Algorithm for a Rate-Independent Single Crystal Plasticity with Dislocation Density  
*Ikumu Watanabe, Daigo Setoyama, Noritoshi Iwata and Koukichi Nakanishi*
- 17:30 Mean-Field Modelling of Dual-Phase Steel under Non-Monotonic Loading Conditions  
*Laurence Brassart, Laurent Delannay and Issam Doghri*
- 17:50 Numerical Homogenization of Elastic and Plastic Properties of Polycrystalline Microcomponents  
*Thomas Böhlke, Felix Fritzen and Katja Jöchen*
- 18:10 Fast Fourier Methods Applied to Perturbation-based Homogenization Relations  
*David Fullwood, Surya Kalidindi and Brent Adams*

**Room: EXC2.1**

**STS11: Models and Tools for the Design of a Supersonic Transport Aircraft with Reduced Impact on the Environment**

Organizers: Michel Mallet

- 16:30 Aerodynamic and Thermal Loads at High-Speed Flows  
*Johan Steelant*
- 16:50 Aerodynamic Design of Innovative Business Jet  
*Alain Bugeau, Zdenek Johan, Aurélien Merlet, Marc Stojanowski, Sébastien Vigneron and Michel Mallet*
- 17:10 Application of Automatic Shape Optimisation Methods to Design Efficient Supersonic Transport Aircraft  
*Vittorio Selmin, Nicola Ceresola and E. Pelizzari*
- 17:30 Sonic Boom Modeling: Aspects, Numerical Methods and Optimisation  
*Frédéric Alauzet, Alain Dervieux, Adrien Loseille and Youssef Mesri*

**Room: EXC2.2**

**MS055 Stabilized, Multiscale and Multiphysics Methods V**

Organizers: Tayfun Tezduyar, Arif Masud and Thomas J. R. Hughes

- 16:30 Stabilized Finite Element Method for Flood Flow Simulation in Urban Area  
*Kazuo Kashiwama, Nobuyoshi Kawai and Tayfun Tezduyar*
- 16:50 Stabilized Finite Element Methods for the Simulation of Bulk Precipitations  
*Volker John, Michael Roland and Ellen Schmeyer*
- 17:10 Interface Stabilised Finite Element Method for Free-Surface Geophysical Flows  
*Garth Wells and Robert Jan Labeur*
- 17:30 Accurate Continuous/Discontinuous Velocity Approximations for Transport in Porous Media  
*Maicon Correa and Abimael Loula*
- 17:50 Variational Multiscale High-Resolution Method for the Simulation of Miscible and Immiscible Flow in Heterogeneous Porous Media  
*Francois-Xavier Dub, Luis Cueto-Felgueroso and Ruben Juanes*
- 18:10 Heat and Fluid Flow in Concrete as a Composite Material  
*Valentina Salomoni, Carmelo Majorana, Gianluca Mazzucco and Giovanna Xotta*

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## Wednesday July 2<sup>nd</sup>.

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	9:20	10:00	10:30	12:30	14:00	16:00	16:30	18:30
CAS0.1				MS039		MS039		MS039
CAS1.1				MS021		MS021		MS021
CAS1.2				MS032		MS032		MS167
CAS1.3				MS045		MS045		
CAS1.4				MS198		TS310		TS310
CAS1.5				MS182		MS182		MS139
CAS1.6				MS047		MS047		MS047
CAS1.7		SP5		MS019		MS019		MS019
CAS1.8				MS054		MS054		MS054
CAS2.1				MS199		MS199		MS199
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CAS2.6				MS175		MS175		MS175
CAS3.1				MS119		MS119		MS119
CAS3.2				TS328		TS328		MS236
CAS3.3				MS125		MS125		MS125
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EXC2.1				STS12		STS01		STS02
EXC2.2				STS13		STS10		STS04

Wednesday

P = Plenary Lecture  
 SP = Semi-Plenary Lecture  
 MS = Minisymposium  
 TS = Thematic Session  
 STS = Special Technology Session

## Plenary Lectures (P)

- P5. Wednesday 08.20 – PGL: Robert Taylor**  
University of California at Berkeley, United States  
*My Fifty Years with Finite Elements!*
- P6. Wednesday 08.50 – PGL: Olivier Pironneau**  
Université Paris VI, France  
*Numerical Challenge for Option Pricing*

## Semi-Plenary Lectures (SP)

Wednesday 09.30

- SP5. CAS1.7: Zdenek Bazant**  
Northwestern University, United States  
*Computing Quasibrittle Failure Probability: from Nano to Macro*
- SP6. CAS3.7: Wolfgang Wall**  
Technical University of Munich, Germany  
*Computational modeling of the respiratory system*
- SP7. CIN1.1: Sergio Idelsohn**  
CIMNE, Spain  
Universidad Nacional del Litoral, Argentina  
*Fluid-Structure-Interaction Problems Including “Added-Mass Effects”*
- SP8. PGL: Wing Kam Liu**  
Northwestern University, United States  
*Multiresolution Mechanics: Linking Material Properties to Evolving Microstructure*

**Room: CAS0.1**

**MS039 Contact Mechanics : Modelling, Analysis and Applications III**

Joint IACM – IUTAM Minisymposium

Organizers: Mircea Sofonea, José R. Fernandez and Georgios E. Stavroulakis

- 10:30 Topology Optimization of Linear Elastic Structures with Contact Boundaries  
*Niclas Strömberg*
- 10:50 Proximal Methods and Elliptic Regularization for Variational Inequalities in Mathematical Physics  
*Alexander Kaplan and Rainer Tichatschke*
- 11:10 Multiple Point Constraints in Finite Element Analysis of Two-Dimensional Elastic Contacts  
*Chaohwa Liu and Ke-Huei Wei*
- 11:30 Accurate Stress Recovery in Contact Problems  
*Juan José Ródenas, Manuel Tur, Javier Fuenmayor and Ana Vercher*
- 11:50 Stress-Unilateral Models of a Human Spine  
*Peter Nédli, Mártha Kurutz and Georgios Stavroulakis*
- 12:10 A Contact Problem including Bone Remodeling: Numerical Analysis and Computational Experiments  
*José R. Fernández and Rebeca Martínez*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics VII**

Joint IACM – IUTAM Minisymposium

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 10:30 Statistical Volume Element Method for Predicting Probabilistic Material Constitutive Relations  
*Xiaolei Yin, Wei Chen and Wing Kam Liu*
- 10:50 A Homogenization Based Spectral Stochastic Computational Approach for the Analysis of Multi-phase Periodic Materials with Random Material  
*M. Tootkaboni, Lori Graham-Brady and Arghavan Louhghalam*
- 11:10 An Efficient Method to Reconstruct Random Heterogeneous Material Properties  
*Edoardo Patelli and Gerhart I. Schueller*
- 11:30 Identification of the Elasticity Tensor of an Uncertain Biomechanical Computational Model using Axial Transmission  
*Christophe Desceliers, Christian Soize, Quentin Grimal, Maryline Talmant and Samah Naili*
- 11:50 Stochastic Representation of a Random Field Based on Experimental Vibration Tests: A One-Dimensional Composite Application  
*Loujaine Mehrez, David Moens and Dirk Vandepitte*
- 12:10 Maximum Likelihood Estimation and Polynomial Chaos Expansions in Stochastic Inverse Problems  
*Bruno Sudret, Frédéric Perrin and Maurice Pendola*



**Room: CAS1.2**

**MS032 Numerical Modelling of High Speed or Innovative Metal Forming Processes I**

Organizers: Jean-Loup Chenot, Fabricio Micari and Katia Mocellin

- 10:30 A New Multiphysics Simulation Approach for Electromagnetic Forming  
*Iñigo Aranguren, Iñaki Pérez, Beatriz González and Iñaki Egua*
- 10:50 Computational Identification of Rate-Dependent Constitutive Models for Dual-Phase Steels based on Dynamic Bulge Experiments  
*Vincent Grolleau, Arnaud Penin, Dirk Mohr and Gérard Gary*
- 11:10 Cooling-Channels Design Optimization for Injection Molding, using Exact Gradients and Reduction Model in Instantaneous Case  
*Nicolas Pirc, Fabrice Schmidt, Marcel Mongeau and Florian Bugarin*
- 11:30 Effects of Specimen Geometry on Elastic-Bar Type High Strain-Rate Tensile Testing for Sheet Metals  
*Satoshi Hirose, Hiroshi Yoshida and Akihiro Uenishi*
- 11:50 Finite Element Modelling of Process Integrated Powder Coating  
*Jan Frischkorn and Stefanie Reese*
- 12:10 Modeling of Ductile Behavior of Metals with a Semi-Empirical Approach: Application to the Stamping and Uniaxial Tests  
*Christophe Husson, François Bilteyst, Joao Pedro Correia De Magalhaes and Said Ahzi*

**Room: CAS1.3**

**MS045 Metamodels for High Dimensionality Response Surfaces in Multiobjective Optimization I**

Organizers: George Dulikravich and Marcelo Colaco

- 10:30 A Comparison among Different Response Surface Methods  
*Marcelo Colaco, Wellington Silva, Ana Magalhaes and George Dulikravich*
- 10:50 Application of Metamodel-Based Robust Design Optimization to Industrial Problems  
*Stuart J. Bates, Royston D. Jones and Vassili V. Toropov*
- 11:10 Radial Basis Functions Performance on Large Scale Problems  
*Enrico Rigoni and Alberto Lovison*
- 11:30 Accelerating Aerodynamic Shape Design using Metamodel-Assisted Particle Swarm Optimization  
*Praveen Chandrashekarappa and Régis Duvigneau*
- 11:50 Assessment of Strategies for Design of Experiments and Data Fitting Techniques for Reservoir Engineering Problems  
*Silvana Maria Afonso, Bernardo Horowitz and Ramiro Willmersdorf*

**Room: CAS1.4**

**MS198 Advances in Computational Modeling for Environmental Engineering IV**

Organizers: Agustí Pérez-Foguet and Rafael Montenegro Armas

- 10:30 Recent Achievements on the use of Pure Hyperbolic Cattaneo-Type Convection-Diffusion Models in CFD  
*Fermin Navarrina, Hector Gomez, Ignasi Colominas and Manuel Casteleiro*
- 10:50 Modeling of Wetting-Drying Transitions in Free Surface Flows and Over Complex Topographies  
*Azzeddine Soulaïmani, Jean-Marie Zokagoa, T. Quach and G.W. Tchamen*
- 11:10 Numerical Study of Convergence of the Hybrid Wavelet-Finite Element Approximation in the Method of Arbitrary Lines for Convection-Diffusion Problems  
*Xiaoan Ren and Leonidas Xanthis*
- 11:30 Finite Element Hydropower Reservoir Flow Simulator  
*Norberto Mangiavacchi, Luiz Carvalho, Virginia Costa, Wagner Fortes, José Pontes and Cassio Soares*

**Room: CAS1.5**

**MS182 Mechanics of Tires and Pavements: Material and Computational Modeling I**

Joint IACM – IUTAM Minisymposium

Organizers: Michael Kaliske and Markus Oeser

- 10:30 **A Constitutive Model for Elasto-Viscoplastic Behaviour of Pavement Materials (Keynote Lecture)**  
*Mzichael Habte and Nasser Khalili*
- 11:00 **Concept for Computational Modelling of Tire Pavement Interaction Phenomena under Consideration of Flexible Pavement Structures (Keynote Lecture)**  
*Michael Kaliske and Markus Oeser*
- 11:30 Triaxial Cyclic Compression Tests for Parameter Identification of Advanced Rheological Models to predict Rutting Potential of Asphalt Mixes  
*Bernhard Hofko and Ronald Blab*
- 11:50 Modeling the Rheological Behaviour of Asphalt based on Fractional Time Derivatives and Neural Networks  
*Markus Oeser and Steffen Freitag*
- 12:10 Experimental and Numerical Simulation of Loading Impact on Modified Granular Pavements  
*Markus Oeser, Sabine Werkmeister, Alvaro Gonzalez and David Alabaster*

**Room: CAS1.6**

**MS047 Minisymposium on Performance-Based Structural Design Optimization I**

Organizers: Nikos Lagaros, Christopher Foley and Hongbing Fang

- 10:30 **Low Cost Adaptive Remeshing Strategies for the Solution of Structural Shape Optimization Problems using Hybrid (Evolutionary-Gradient) Methods (Keynote Lecture)**  
*Gabriel Bugeda, Juan José Ródenas, Francisco José Fuenmayor and Eugenio Oñate*
- 11:00 **Uncertainty Models in Engineering Analysis, Design, and Optimization (Keynote Lecture)**  
*Sambasiva R. Singiresu*
- 11:30 Shape Sensitivity Analysis and Optimization of Structures using Isogeometric Approach  
*Seonho Cho and Seung-Hyun Ha*
- 11:50 Dynamic Analysis of Sandwich Panels and Topological Design of Cores considering the Size Effect  
*Kepeng Qiu, Weihong Zhang and Pierre Duysinx*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation VII**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 10:30 Flexible Multibody Dynamics with Linear Deformations: Overviewing the Basics  
*Jorge Ambrosio and Maria Augusta Neto*
- 10:50 Discussion on the Modelling Fidelity Levels in Flexible System Dynamics  
*Michael Bruyneel, Didier Granville, Philippe Pasquet and Eros Gabellini*
- 11:10 Shear Correction of a Thin Plate Element in Absolute Nodal Coordinates  
*Oleg Dmitrochenko and Aki Mikkola*
- 11:30 Multibody Modelling of Pantographs for Pantograph-Catenary Interaction  
*Frederico Rauter, Jorge Ambrosio, João Pombo and Manuel Seabra Pereira*
- 11:50 Design of Mechanism Components using Topology Optimization and Flexible Multibody Simulation  
*Olivier Brûls, Etienne Lemaire, Peter Eberhard and Pierre Duysinx*
- 12:10 Flexible Multibody Modeling of Valve Spring in the Valve Train of Diesel Engine  
*Won-Gul Hwang, Wonsuk Sung, Hyeonkyu Kim, Myungwook Choi, Kyungsu Kim and Kiwon Ahn*

**Room: CAS1.8**

**MS054 Inverse Problems: Recent Advances in Methodology and Techniques II**

Organizers: Barbara Kaltenbacher and Roland Potthast

- 10:30 A Method for Identifying a Spacewise Dependent Heat Source under Stochastic Noise Interference  
*B. Thomas Johansson and Mihaela Pricop*
- 10:50 Convergence Results for the Bayesian Inversion Theory  
*Andreas Neubauer and Hanna Katriina Pikkarainen*
- 11:10 Analyzing Quasi-Optimality -- Choosing the Regularization Parameter without Knowing the Noise Level  
*Frank Bauer, Stefan Kindermann and Markus Reiss*
- 11:30 Correlation Length Controllable Priors in Statistical Inversion  
*Lassi Roininen*
- 11:50 Adaptive Discretization of Parameter Identification Problems in PDE's  
*Barbara Kaltenbacher, Anke Griebbaum and Boris Vexler*
- 12:10 Damage Identification for Bridges based on Multi-type Sensors  
*Yiqian Li, Masheng Zhou, Zhihai Xiang and Zhangzhi Cen*

**Room: CAS2.1**

**MS199 High-performance Computing in Computational Mechanics I**

Organizers: Shahrouz Aliabadi, Omar Ghattas, Robert Haber, Guillaume Houzeaux, Abani Patra and Mariano Vázquez

- 10:30 **A 21 Billion Degrees of Freedom, 2.5 Terabyte Simulation of Seismic Wave Propagation in the Inner Core of the Earth on Marenostrum (Keynote Lecture)**  
*Dimitri Komatitsch, Jesús Labarta and David Michéa*
- 11:00 **Toward Scalable Adaptive Mantle Convection Simulation on Petascale Supercomputers (Keynote Lecture)**  
*George Biros, Carsten Burstedde, Omar Ghattas, Michael Gurnis, Georg Stadler, Eh Tan, Tiankai Tu, Lucas Wilcox and Shijie Zhong*
- 11:30 Harnessing the Power of Multi-Core Architectures in CFD by Coupling Multi-Threading Programming, Cache Misses Reduction Techniques with Multi-Scale Adaptivity  
*Adrien Loseille, Frédéric Alauzet, Paul-Louis George, Loic Maréchal and Eric Salte*
- 11:50 Scalable Techniques for Parallel Implementation of Adaptive Spacetime Discontinuous Galerkin Methods  
*Aaron K. Becker, Robert Haber and Laxmkant V. Kale*
- 12:10 Efficient Parallelisation of an Unstructured Delaunay Triangulation  
*M. El Hachemi, Oubay Hassan, N. P. Weatherill and Kenneth Morgan*

**Room: CAS2.2**

**MS116 Minisymposium on "Mathematical Modeling and Numerical Simulation of Coupled Multiphysics Systems in Nano- and Biotechnologies" II**

Organizers: Roderick Melnik and Riccardo Sacco

- 10:30 Multi-Scale Simulations of DNA and Colloidal Systems with a Combined Lattice Boltzmann/ Molecular Dynamics Approach  
*Simona Melchionna, Maria Fyta, Efthimios Kaxiras, Massimo Bernaschi and Sauro Succi*
- 10:50 Simple Models for Extracting Compressive Rigidity of Molecules from Atomic Force Microscopy Data  
*Igor Sokolov and Ravi Gaikwad*
- 11:10 Size Selective Capturing of Biomolecules and Nanoparticles by Combined Dielectrophoresis and Surface Tension  
*Yaling Liu, Jae-Hyun Chung and Kyong-Hoon Lee*
- 11:30 Thermodynamic and Mechanical Properties of Simple RNA Nanostructures  
*Maxim Paliy and Roderick Melnik*
- 11:50 Tissue Engineering through Simulation and Experiments  
*Manuela Teresa Raimondi, Federica Boschetti, Margherita Cioffi, Fabio Galbusera, Katia Lagana, Matteo Moretti and Gabriele Dubini*

**Room: CAS2.3**

**MS186 RANS/LES Coupling for the Simulation of Complex Flows III**

Organizers: Jochen Fröhlich and Ivan Mary

- 10:30 RANS/LES Simulation of Separated Flow in a 3D Curved Duct  
*Ivan Mary*
- 10:50 Suitability of Different RANS Models in the description of Turbulent Plane and Round Impinging Jets  
*Julian Jaramillo, Carlos D. Perez-Segarra and Assensi Oliva*
- 11:10 Crosswind Effects around a Simplified Car by Detached Eddy Simulation  
*Emmanuel Guilmineau, Oussama Chikhaoui, Ganbo Deng and Michel Visonneau*
- 11:30 A Hybrid LES-RANS Technique using an Explicit Algebraic Reynolds Stress Model  
*Michael Breuer, Benoit Jaffrézic and Orhan Aybay*
- 11:50 On the Use of Hybrid RANS/LES Methods in Applied Aerodynamics  
*Sébastien Deck*

**Room: CAS2.4**

**MS071 Minisymposium on PDE Constrained Optimization I**

Organizers: Michael Hintermueller and Ronald H W Hoppe

- 10:30 **Error Estimates for Elliptic Control Problems with Finitely Many Constraints (Keynote Lecture)**  
*Pedro Merino, Fredi Tröltzsch and Boris Vexler*
- 11:00 Computable Error Bounds for Elliptic Optimal Control Problems  
*Daniel Wachsmuth*
- 11:20 Control-in-the-coefficients subject to Variational Inequalities  
*Michael Hintermueller and Hicham Tber*
- 11:40 Multigrid and Stochastic Sparse-Grid Techniques for Time-Dependent Control Problems with Random Inputs  
*Alfio Borzi and Greg von Winkel*
- 12:00 Computational Methods for SPDE Control Problems  
*Max Gunzburger, Catalin Trenchea and Clayton Webster*

**Room: CAS2.5**

**MS085 Numerical Methods for Gas-Liquid Two-Phase Flow II**

Organizers: Byeong Rog SHIN and Takeo Kajishima

- 10:30 A Numerical Analysis on the Binary Droplet Collision by using a Level Set Method  
*Sang Hyuk Lee and Nahmkeon Hur*
- 10:50 Two-Phase Flow Analysis on the Occurrence of the Liquid Jet into a Bubble in a Convergent Divergent Channel  
*Kazuya Shimizu, Kazuhiro Hashiguchi, Rie Tachibana, Shintaro Takeuchi, Shu Takagi and Yoichiro Matsumoto*
- 11:10 Homogeneous Gas-Liquid Two-Phase Flow Model and Shock-Cavitation Bubble Interaction Problems  
*Byeong-Rog Shin and Young-Jun Ahn*
- 11:30 A Preconditioned Second-Order Linearized Implicit Formulation for Barotropic Cavitating Flows  
*Marco Bilanceri, Edoardo Sinibaldi, François Beux and Maria-Vittoria Salvetti*
- 11:50 CFD Simulation of a Stratified Gas-Liquid Flow with and without the Effect of Gravity  
*Kamel Sidi-Ali and Renée Gatignol*
- 12:10 Heat Transfer Analysis of Circular Source for OLED Vapor Deposition  
*Youngcheol Joo, Choong Hwan Han, Tai Joon Um, Sang-Wook Lee and Kye-Si Kwon*

**Room: CAS2.6**

**MS175 Immersed Boundary and Immersed Interface Methods II**

**Joint IACM – IUTAM Minisymposium**

Organizers: Pietro De Palma, Michele Napolitano, Giuseppe Pascazio and Roberto Verzicco

- 10:30 An Embedded/Immersed Boundary Method for Compressible Navier-Stokes/LES Equations  
*Marco Kupiainen and Pierre Sagaut*
- 10:50 An Immersed Boundary Method for the RANS Equations using Adaptive Wall Functions  
*Marco D. de Tullio, Pietro De Palma, Giuseppe Pascazio, Maurizio Sciancalepore and Michele Napolitano*
- 11:10 Application of an Immersed Boundary Method to Turbulent Flows along Porous Beds  
*Wim-Paul Breugem*
- 11:30 A Closer Look at the Numerical Errors of the Immersed Boundary Method  
*Mathieu Pourquie*
- 11:50 RANS Simulations of Flows around Complex Geometries using Locally Refined Cartesian Grids  
*Francesco Capizzano and Pietro Catalano*
- 12:10 Convergence Acceleration Method for Computational Fluid Dynamics using Immersed Boundary Cartesian Grid Method  
*Takahiro Fukushige, Toshihiro Kamatsuchi, Toshiyuki Arima and Seiji Fujino*

**Room: CAS3.1**

**MS119 Computational Methods in Composite Materials and Structures I**

Organizers: Anastasia Muliana, Rami Haj-Ali and Marcin Kaminski

- 10:30 **Fast Calculation of Elastic Fields around Inclusions and Cracks in Composite Materials (Keynote Lecture)**  
*Sergey Kanaun*
- 11:00 **Homogenization of the Fiber-Reinforced Composites under Stochastic Ageing Process (Keynote Lecture)**  
*Marcin Kaminski*
- 11:30 Strain Dependent Continuum Damage Theory for Description of Polymer Matrix Composites  
*Tomasz Sadowski and Katarzyna Osina*
- 11:50 Effective Thermal Conductivity of Imperfect Carbon-Carbon Textile Composites using the Mori-Tanaka Method  
*Jan Vorel, Michal Sejnoha and Jan Zeman*
- 12:10 A Global-Local Model for the Analysis of Laminated Composite Plates  
*Lavinia Alves Borges, Julio Cesar Ferreira and Antonio Jose Pinto Marques*

**Room: CAS3.2**

**TS328 Computational Structural Mechanics VII**

- 10:30 Computational Strategy for Taking Geometrical Uncertainties into Account in Structural Assemblies  
*Laurent Champaney*
- 10:50 Fluid-Structure Interaction using the Coupled FE-SPH Method  
*James Campbell, Rade Vignjevic and Nenad Djordjevic*
- 11:10 Advantages of the CEG Rotation Free Shell Element in Analysis and Design of Thin Shell Structures  
*Johannes Linhard and Kai-Uwe Bletzinger*
- 11:30 Structural Damage Analysis of a Frame Structure Model by Variable Parametric Projection Filter  
*Nobuyoshi Tosaka and Ryuji Endo*
- 11:50 The Update of Probabilistic Floor Response Spectra for Seismic Probabilistic Safety Assessment of Loviisa Plant  
*Pentti Varpasuo*
- 12:10 Uncertainty estimating the Vibration Reduction Index from Direct Measurements in Buildings  
*Jesus Alba, Vicente Estruch, Pepe Pastor, Romina del Rey and Eva Escuder*

**Room: CAS3.3**

**MS125 Advances in Computational Stochastic Mechanics I**

Organizers: Vissarion Papadopoulos, Dimos Charmpis and Manolis Papadrakakis

- 10:30 **An Adaptive Response Surface Approach for Reliability Analyses of High-Dimensional Problems (Keynote Lecture)**  
*Thomas Most*
- 11:00 **Robust Design of Shells with Stochastic Properties (Keynote Lecture)**  
*Vissarion Papadopoulos and Nikos Lagaros*
- 11:30 Uncertainty Quantification in Complex Systems using Approximate Solvers  
*Phaedon-Stelios Koutsourelakis and Wilkins Aquino*
- 11:50 Stochastic Modeling and Simulation for Large-Size Computational Mechanics Problems  
*Dan M. Ghiocel*
- 12:10 Reliability Analysis with Stochastic Finite Elements and Wavelet Approximations  
*Carsten Proppe*

**Room: CAS3.4**

**MS082 Multiscale Mechanics in Durability of Materials**

Joint IACM – IUTAM Minisymposium

Organizers: Roman Lackner and Josef Eberhardsteiner

- 10:30 Computational Homogenization of Microstructural Damage in Metals  
*Erica Coenen, Varvara Kouznetsova and Marc Geers*
- 10:50 Some Issues in Viscoelastic Homogenisation with respect to the Compatibility of Microscopic Spectra  
*Fekri Meftah and Quoc-Viet Le*
- 11:10 A General Framework for Critical Plane Methods based on the Micromechanisms of High Cycle Fatigue  
*Juergen Froeschl, Hans-Peter Gaenser and Wojciech Razny*
- 11:30 Probing the Chemo-mechanical Performance of Cementitious Materials  
*Georgios Constantinides, Krystyn van Vliet, James Smith and Franz-Josef Ulm*
- 11:50 Effective Properties of Nano-Filled Polymers  
*Stefan Diebels, Holger Steeb and Michael Jöhrlitz*
- 12:10 Identification of Viscoelastic Model Parameters by Means of Cyclic Nanoindentation Testing  
*Andreas Jäger and Roman Lackner*

**Room: CAS3.5**

**MS087 Numerical Methods for Fluid-structure Interactions I**

Organizers: Hester Bijl and Jan Vierendeels

- 10:30 The Challenge of Three Dimensional Dynamic Fluid Structure Interaction  
*Avril Stone and Mark Cross*
- 10:50 Influence of the Time Step on the Stability of the Coupling Iterations in a Partitioned Fluid-Structure Interaction Simulation  
*Joris Degroote, Peter Bruggeman, Robby Haelterman, Karen Willcox and Jan Vierendeels*
- 11:10 FLECS: A Flexible Coupling Shell  
*Aukje de Boer, Margreet Nool, Erik Jan Lingem and Hester Bijl*
- 11:30 Computational Aeroelasticity based on Bifurcation Theory  
*Sebastian Timme and Kenneth Badcock*
- 11:50 Aeroelastic Analysis using Unstructured CFD Method for Realistic Aircraft Design  
*Takayasu Kumano, Hiroyuki Morino, Shinkyu Jeong and Shigeru Obayashi*

**Room: CAS3.6**

**MS026 Advanced Computational Descriptions of Macromolecular Materials: from the Atom to the Flow I**

Organizers: Francisco Chinesta, Elias Cueto, Martin Kroger and Tim Phillips

- 10:30 **Molecular Dynamics Prediction of Elastic and Plastic Deformation of Semi-Crystalline Polyethylene (Keynote Lecture)**  
*Bernard Monasse, Séverine Queyroy and Olivier Lhost*
- 11:00 **Consistent Scaling of Thermal Fluctuations in DPD/SPH (Keynote Lecture)**  
*Marco Ellero, Adolfo Vazquez and Pep Espanol*
- 11:30 Computational Cluster-modeling Approach to Self-organization Effects in Covalent-bonded Glassy Networks  
*Oleh Shpotyuk, Malgorzata Hyla and Vitaliy Boyko*
- 11:50 Molecular Dynamics Simulation on cis-1,4 Polybutadiene under Cyclic Deformation: Chain Entanglements and Hysteresis  
*Kisaragi Yashiro, Yutaka Koga, Masato Naito, Yasuhisa Minagawa and Yoshihiro Tomita*
- 12:10 Meshless Stochastic Simulation of Micro-Macro Models arising from Kinetic Theory  
*Elias Cueto, Manuel Laso and Francisco Chinesta*

**Room: CAS3.7**

**MS237 Numerical Techniques for the Modelling of Material Failure in Solids VII**

Organizers: Xavier Oliver and Francisco Armero

- 10:30 Damage Evolution in Composites with a Homogenization Based Continuum Damage Mechanics Model  
*Somnath Ghosh and Jayesh Jain*
- 10:50 A Multiscale Failure Framework for Thin Heterogeneous Structures  
*Caglar Oskay*
- 11:10 Failure Detection in Masonry Shells Homogenisation and its Incorporation in Coupled Two-scale Computations  
*Benoit Mercatoris and Thierry Massart*
- 11:30 Development and Verification of FE Model for Fatigue Crack Growth Simulation under Mixed Mode Conditions  
*Miroslav Španiel, Josef Jurenka and Jiří Kuželka*
- 11:50 Low-Cycle Fatigue Analysis using the Direct Cyclic Approach  
*Zhen-zhong Du, Lin Xia, Michael Snyman and Chris Wohlever*
- 12:10 Fatigue Crack Growth Simulation using S-version FEM  
*Masanori Kikuchi, Yoshitaka Wada and Hitomi Suyama*

**Room: CAS3.8**

**MS064 Constitutive Stability and Fracture: Models and Applications II**

Joint IACM – IUTAM Minisymposium

Organizers: Pedro Areias and José César de Sá

- 10:30 Precise Simulation of 3D Fatigue Crack Propagation  
*Wilhelm Weber, Paul Steinmann and Günther Kuhn*
- 10:50 An Implicit Energetic Approach of 3D Crack growth under Fatigue Loading and Residual Stresses  
*Vincent Chiaruttini, Gwenaél Edeline, Frédéric Feyel and Marc Bonnet*
- 11:10 Aspects of the Mean-Field Relaxation and Numerical Solution of the Free-Discontinuity Formulation of Brittle Fracture  
*Slav Dimitrov and Thomas Boehlke*
- 11:30 On Numerical Modelling of Creep Behaviour of Medium Density Polyethylene  
*Ivica Skozrit and Zdenko Tonkovic*
- 11:50 Computational Investigation of Fatigue Crack Propagation under Mixed-Mode Loading Conditions using Extended Finite Element Methods  
*Yangjian Xu and Huang Yuan*
- 12:10 Dynamic Crack Propagation on Prestressed Plates and Pressurized Vessels  
*Jesús Mediavilla, Jaap Weerheijm, C. Wentzel, F. Soetens, B. van den Berg and J. van Deursen*

**Room: CAS3.9**

**MS036 Advanced Computational Methods for Wave Motion IV**

Organizers: Dan Givoli and Geza Seriani

- 10:30 A Multi-Level Fast Multipole Multi-Region Method for 3D Seismic Response of Alluvial Basins  
*Stephanie Chaillat, Marc Bonnet and Jean-Francois Semblat*
- 10:50 A New Fast, Accurate and Non-Oscillatory Numerical Approach for Wave Propagation Problems in Solids  
*Alexander Idesman*
- 11:10 Quasi Optimal Petrov-Galerkin Methods for Helmholtz Problem  
*Abimael Loula and Daniel Thomes Fernandes*
- 11:30 Evaluation and Application of Large-Scale Ultrasound Propagation Simulation in Heterogeneous Media  
*Yoshiaki Tamura, Yusuke Nakajima, Junko Uebayashi and Yoichiro Matsumoto*
- 11:50 Investigation of Nonlinear Waves Dynamic in Protoplanet Disk by Alternative Numerical Methods  
*Olga Stoyanovskaya and Elvira Kuksheva*

**Room: CAS3.10**

**TS313 Fracture Mechanics I**

- 10:30 A Micromechanical Model for Failure Analysis of Rubber-Like Materials  
*Hüsnü Dal and Michael Kaliske*
- 10:50 Anisotropy Induced by Evolution of Microstructure in Ductile Material  
*Adam Glema, Tomasz Lodygowski and Wojciech Sumelka*
- 11:10 Computational Estimation of Micro-Crack Behaviour in Polypropylene Copolymer  
*Pavel Hutar, Zdenek Majer, Zdenek Knesl, Lubos Nahlik, Lucie Sestakova and Gaetan Prod'homme*
- 11:30 Fractal Dimension as a Characteristic of Fracture  
*Marina Davydova*
- 11:50 Ductile Fracture Criteria in Cutting Process Simulation  
*Jindrich Petruska and Jan Borkovec*





**Room: CIN0.1**

**MS202 Computational Mechanics of Biological and Bio-Inspired Materials and Structures III**

Organizers: Christian Hellmich and Dinesh Katti

- 10:30 A Numerical Stability Analysis of Chemo-mechanical Formulations of Biological Growth  
*Harish Narayanan and Krishna Garikipati*
- 10:50 A Finite Element Model for Wound Healing  
*Fred Vermolen and Etelvina Javierre*
- 11:10 A Computational Model for Studying Coupled Processes in Wound Healing for Arbitrary Geometries  
*Etelvina Javierre, Fred Vermolen, Kees Vuik and Sybrand van der Zwaag*
- 11:30 Computer Modelling of Biosensor with Product Inhibition  
*Evelina Gaidamauskaitė and Romas Baronas*
- 11:50 Numerical Modeling of Resin Flow through a Demineralized Dentin Collagen Network  
*Elsa Vennat, Denis Aubry, Jean-Marie Fleureau and Michel Degrange*
- 12:10 Numerical Simulation of Mechanotransduction in Drosophila Embryos including Mesoderm Large Strain  
*Rachele Allena, Denis Aubry and Anne-Sophie Mouronval*

**Room: CIN0.2**

**MS127 Computational Methods in Virtual and Computer Planned Surgery I**

Organizers: Suvranu De and Anna Pandolfi

- 10:30 Modeling and Numerical Simulation of Kidney Damaging Side Effects in Shock Wave Lithotripsy  
*Kerstin Weinberg*
- 10:50 Digital Surgery using a Meshfree Method  
*Suvranu De*
- 11:10 A Microstructure-Based Anisotropic, Nonlinear Viscoelastic Model for Fibrous Tissues: Applications to the Cornea  
*Thao Nguyen*
- 11:30 Computational Simulation of Lasik Surgery  
*Alejandro Arciniegas, Fernando Ramirez, Luis E. Amaya and Andres Guzman*
- 11:50 Numerical Evaluation of the Mechanical Response to Laser Refractive Corneal Surgery  
*Anna Pandolfi, Giorgio Fotia and Federico Manganiello*
- 12:10 Utilization of Cochlea Function Principle for Decomposition of Non-Stationary Signals  
*Daniel Dusek*

**Room: CIN1.1**

**MS170 Numerical Modeling and Simulation on Micro and Nanoscale Materials and Devices I**

Organizers: Marisol Koslowski and Richard Lesar

- 10:30 Mesoscopic Modelling and Size Effect for the Mechanics of Multi-Walled Carbon Nanotubes  
*Irene Arias and Marino Arroyo*
- 10:50 Monte Carlo Simulation of Nanocrystalline Grain Growth  
*Dana Zöllner and Peter Streitenberger*
- 11:10 Numerical Modeling of Nanostructures  
*Azeddine Benabbou, Houman Borouchaki, Patrick Laug and Jian Lu*
- 11:30 Atomistic Simulations of Incipient Plasticity in Stepped Surfaces  
*Oscar Rodriguez de la Fuente*
- 11:50 Competition between Leading, Trailing, and Twinning Partial Dislocation Nucleation in FCC Metals  
*Derek Warner and William Curtin*
- 12:10 Towards Understanding Defect Formation Evolution During Cryogenic Milling of Crystalline Organics  
*M. Teresa Carvajal, Tao Feng and Simon Bates*

## Wednesday Morning Sessions (10:30 - 12:30)

### Room: **CIN2.1**

#### MS016 Computational Bioimaging and Visualization IV

Organizers: João Tavares, Renato Natal Jorge, Thomas J. R. Hughes and Chandrajit Bajaj

- 10:30 **Photo-Consistent Object 3D Reconstruction from Images using a Volumetric Method (Keynote Lecture)**  
*Teresa Azevedo, João Tavares and Mário Vaz*
- 11:00 Image-Based Shape Modeling of the Human Body via Free-Form Deformation and Numerical Optimization  
*Kenji Shimada, Murat Gunay and Mun-bo Shim*
- 11:20 Quantitative Image Analysis in Mammary Gland Morphologies  
*Yan Nei Law, Sherlynn P.L. Ang, Victor Racine, Jacqueline M. Veltmaat and Hwee Kuan Lee*
- 11:40 Using Weighted Saliency Map in Visual Attention for Object Recognition  
*Hamed Bahmani, Ali Motie Nasrabadi and Mohammad Reza Hashemi Gholpayeghani*
- 12:00 Virtual Stent Deployment with Simplex Meshes  
*Ignacio Larrabide and Alejandro Frangi*

### Room: **PGL**

#### MS208 Computational Modelling of Locomotor Systems I

Organizers: Markus Böl, Stefanie Reese and Bob Svendsen

- 10:30 The effect of Walking Speed on Muscle Function  
*Richard Neptune, Kotaro Sasaki and Steven Kautz*
- 10:50 Muscle Contraction on the Half-Sarcomere Level: A New Model Approach  
*Ivo A. Telley, Urs Stöcker and Jachen Denoth*
- 11:10 A Three-Dimensional Finite Element Framework For Investigating Functional Electrical Stimulation Protocols  
*Oliver Röhrle, Juliana Kim, John Davidson and Andrew Pullan*
- 11:30 Skiing Turns  
*Peter Kaps, Werner Nachbauer, Dieter Heinrich, Martin Mössner and Ulrich Filippi-Oberegger*
- 11:50 Predicting Quadriceps Fatigue during Electrically Stimulated Non-Isometric Contractions  
*Susan Marion, Maury Hull and Anthony Wexler*
- 12:10 A Model for Muscle based on a Molecular Mechanical System  
*Sam Walcott*

**Room: EXC1.1**

**MS053 Minisymposium in Honor of Prof. O.C. Zienkiewicz I**

Organizers: Robert Taylor and Perumal Nithiarasu

- 10:30 Minisymposium in Honor of Prof. O.C. Zienkiewicz - Introduction  
*Robert L. Taylor and Perumal Nithiarasu*
- 10:50 Advances in the Extended Finite Element Method (XFEM)  
*Ted Belytschko, Jeong-Hoon Song, Robert Gracie and Jay Oswald*
- 11:10 Accurate upper Bound of the Discretization Error in XFEM through a Recovery-Based Technique and Error Estimation of the Recovered Solution  
*Juan José Ródenas, Pedro Díez, Octavio Andrés González Estrada and Javier Fuenmayor*
- 11:30 Combining Linear Tetrahedral Elements to Solve Problems with Incompressible Behaviour through an Iterative Force Based Method  
*Bijan Boroomand, Kazem Kamran and Eugenio Oñate*
- 11:50 Computation of Ice Loads on Structures in the Arctic  
*Pål G. Bergan and Gus Cammaert*
- 12:10 Multiscale Approach for Nonlinear Inelastic Behavior of Heterogeneous Materials  
*Anđan Ibrahimbegovic, Delphine Brancherie, Sergiy Melnyk and Damijan Markovic*

**Room: EXC1.2**

**MS073 Minisymposium in the Honor of Michel Bernadou's 65th Birthday II**

Organizers: John Cagnol and Roland Glowinski

- 10:30 Retrospective of Intrinsic Methods in the Theory of Thin and Asymptotic Shells  
*Michel Delfour*
- 10:50 Shape Sensitivity Analysis of Elastic Thin Shells  
*Edgardo Taroco and Raul Feijoo*
- 11:10 Nash-Strategies and Evolutionary Algorithms for Solving Single and Multidisciplinary Design Problems  
*Jacques Pèriaux, D.S. Lee, Felipe Gonzalez and Karhenahalli Srinivas*
- 11:30 Nitsches Method for General Boundary Conditions  
*Mika Juntunen and Rolf Stenberg*
- 11:50 Numerical Analysis of a Bone Remodeling Problem  
*José R. Fernández, Rebeca Martínez and Juan M. Viaño*

**Room: EXC1.3**

**MS037 Extended / Generalized Finite Element Method I**

Organizers: Ted Belytschko, Elisa Budyn, John Dolbow, Nicolas Moës and Giulio Ventura

- 10:30 X-Ray Microtomography, X-3D-Digital Image Correlation and X-FEM Multigrid, a General Tool for 3D Crack Growth Law Identification - PROPAVANFIS Collaboration  
*Marie-Christine Baietto-Dubourg, J.Y. Buffière, Alain Combescure, Anthony Gravouil, François Hild, N. Limodin, W. Ludwig, Julien Réthoré, Stéphane Roux and J.-P. Tinnes*
- 10:50 An Extended Finite Element Method for Modelling Micro and Nano Inclusions with Imperfect Interfaces  
*Julien Yvonnet, Charles Toulemonde and Qi-Chang He*
- 11:10 A Multiscale Extended Finite Element Method for Crack Propagation with Frictional Contact  
*Pierre-Alain Guidault and Laurent Champaney*
- 11:30 Multiscale Simulation of Atomistic Systems based on Extended Space/Time Finite Element Method  
*Dong Qian and Shardoool Chirputkar*
- 11:50 An X-Fem Statistical Approach to Assess Fracture Strength of Human Cortical Bone Microstructures  
*Elisa Budyn, Thierry Hoc and Julien Jonvaux*
- 12:10 3D-XFEM Modeling of Composite Materials based on Octree Subdivision  
*Amine Ouaar, Jean-François Remacle and Nicolas Moës*

**Room: EXC2.1**

**STS12: High Reynolds Number Aerodynamics**

Organizer: Winfried Kühn

- 10:30 Advanced Measurement Techniques for Cryogenic Testing  
*Uwe Fey, Yasuhiro Egami, Robert Konrath, Lars Koop, Christian Klein and Jürgen Kompenhans*
- 10:50 Optimisation of Supports for High Reynolds Number Testing  
*Thorsten Lutz, Benedikt König, Martin Pätzold and Ewald Krämer*
- 11:10 ETW – Industrial Testing at High Reynolds Numbers  
*Juergen Quest*
- 11:30 Flight Reynolds Number Testing - The European Project FLIRET  
*Winfried Kühn*
- 11:50 Application of Advanced CFD tools for Cryogenic Testing  
*Stefan Melber-Wilkending, Alexander Heidebrecht, Oskar Szulc, Martin Pätzold and Georg Wichmann*

**Room: EXC2.2**

**STS13: Advanced Methods for Aerospace Structures**

Organizer: Peter Horst

- 10:30 Key Enabling Technologies for Virtual Testing of Aircraft Structures - Airbus Vision  
*Jocelyn Gaudin and Michel Mahe*
- 10:50 General Modeling of the Behaviour of Carbon-Nanotubes  
*Maria Morandi Cecchi and M. Venturin*
- 11:10 Optimization of Processes to manufacture Composite Aircraft Components with Regard to Components Quality and Cost  
*Spiros Pantelakis, George N. Labeas and Christos V. Katsiropoulos*
- 11:30 Analysis of the Crack Propagation in Modern, Integrally Stiffened Aluminium Structures  
*Peter Horst and Sascha Häusler*

**Room: CAS0.1**

**MS039 Contact Mechanics : Modelling, Analysis and Applications IV  
Joint IACM – IUTAM Minisymposium**

Organizers: Mircea Sofonea, José R. Fernandez and Georgios E. Stavroulakis

- 14:00 Asymptotic Behavior of a Thin Inclusion in an Elastic Body: The Case of Comparable Rigidity  
*Frédéric Lebon and Raffaella Rizzoni*
- 14:20 The Analyses of a New Three Body Friction Model with Multi-Scale and Adhesive Effects in the Micro-Contact Situation  
*Jeng-Haur Horng, Chin-Chung Wei and B.C. Shiu*
- 14:40 Local Adhesive Contact Law: Finite Element Implementation and Consequences of Large Deformation  
*Harish Radhakrishnan and Sinisa Mesarovic*
- 15:00 Smooth-Joint Contact Model  
*Diego Mas Ivars, David Potyondy, Mathew Pierce and Peter Cundall*
- 15:20 Separation at a Precompressed Frictionless Interface due to Asymmetric Localized Loads  
*Hans Bernard Schmidt, Patrick Selvadurai and Kai Willner*
- 15:40 Rod Cluster Drop Time Simulation using a Continuous Contact Formulation Extended to Beams  
*Marc Kham, Mohamed Torkhani, Patrick Massin and Hachmi Bendhia*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics VIII**

**Joint IACM – IUTAM Minisymposium**

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 14:00 Equations for the Response Probability Density of a Dynamic System under N-Component Non-Poisson Impulse Process Excitation  
*Radoslaw Iwankiewicz*
- 14:20 Dynamics Analysis of Non Linear Uncertain Systems by a Joined Galerkin/RBF Approach  
*Michele Betti, Paolo Biagini and Luca Facchini*
- 14:40 Uncertainty of Design Parameters and their influence on Dynamic Properties of MEMS Microresonators  
*Adam Martowicz, Irina Codreanu and Tadeusz Uhl*
- 15:00 Sand Transport in Surface Waters: An Uncertainty Analysis  
*André Fortunato, Lígia Pinto, Paula Freire, Xavier Bertin and Anabela Oliveira*

**Room: CAS1.2**

**MS032 Numerical Modelling of High Speed or Innovative Metal Forming Processes II**

Organizers: Jean-Loup Chenot, Fabricio Micari and Katia Mocellin

- 14:00 Micromechanically Motivated Macroscopic Modeling of Induced Flow Anisotropy in Sheet Metals  
*Yuliana Stepanova, Vladislav Levkovitch and Bob Svendsen*
- 14:20 Simulation and Experimental Validation of Steel Sheet Laser Forming Processes  
*Diego Celentano, Francisco Rojas, Jorge Ramos-Grez and Carlos Vásquez*
- 14:40 Simulation Concepts for Roughness Transfer in Temper and Skin-Pass Rolling  
*Christian Edelbauer, Alexander Kainz, Dieter Paesold and Klaus Zeman*
- 15:00 Simulation of Ultrasonic Welding of Fibre Elements in Metal Matrices  
*A. Siddiq and Elaheh Ghassemieh*
- 15:20 Thermo-Mechanical Modeling of Multi-Pass Welding and Metal Deposition Processes  
*Miguel Cervera, Michele Chiumenti and Carlos Azelet de Saracibar*

**Room: CAS1.3**

**MS045 Metamodels for High Dimensionality Response Surfaces in Multiobjective Optimization II**

Organizers: George Dulikravich and Marcelo Colaco

- 14:00 Low-Boom and Low-Drag Design Exploration for Twin Engine Supersonic Business Jet  
*Shinkyu Jeong, Koma Sato, Takayasu Kumano and Shigeru Obayashi*
- 14:20 Automatic Surrogate Model Building for Computer Based Design  
*Dirk Gorissen, Tom Dhaene and Piet Demeester*
- 14:40 Large Scale Optimization based on Adaptive Metamodelling  
*Andrey A. Polynkin and Vassili V. Toropov*
- 15:00 Simulation and Loading Path Optimization of a Hydroform Part using Response Surface Method  
*Khalil Khalili, Seyd Yousef Ahmadi Borghuni and Ehsan Eftekhari Shahri*

**Room: CAS1.4**

**TS310 Environment I**

- 14:00 A New Control System for Saltwater Intrusion into Coastal Aquifers  
*Rippe Makino, Eri Hirasawa and Morito Kusabuka*
- 14:20 Bathymetry Alteration in the Venice Lagoon during the Last Century and Mathematical Modelling of the Possible Complex Causes  
*Stefano Bellati, Carl Amos, Mario-Cesar Suarez Arriaga and Marco Firpo*
- 14:40 Discontinuous Galerkin Methods for Morphodynamic Modelling  
*Pablo Tassi, Sander Rhebergen, Carlos Vionnet and Onno Bokhove*
- 15:00 Reasoning the Survival Condition from Manicure Ghost Crab's Housing Behavior using CFD analyses  
*Sun-Hye Kim, Jae-Boong Choi, Tae-Won Kim and Jae-Chun Choe*
- 15:20 Stabilized P1P0 Finite Element Approximations of Coupled Free Surface to Porous Media Subsurface Flow Problems  
*Flávio Pietrobon-Costa, Augusto Galeão and Luiz Bevilacqua*

**Room: CAS1.5**

**MS182 Mechanics of Tires and Pavements: Material and Computational Modeling II**

**Joint IACM – IUTAM Minisymposium**

Organizers: Michael Kaliske and Markus Oeser

- 14:00 Continuum Micromechanics based Upscaling of Viscoelastic Properties of Bituminous Mixtures  
*Elisabeth Aigner, Roman Lackner and Michael Wistuba*
- 14:20 FE Modeling of Rubber Friction on Rough Roads  
*René van der Steen, Ines Lopez Arteaga, Bart de Bruijn, Antoine Schmeitz and Henk Nijmeijer*
- 14:40 A Multi-Scale Approach on the Transient Dynamics of Rolling Tires  
*Maik Brinkmeier, Udo Nackenhorst, Anuwat Suwannachit and Matthias Ziefle*
- 15:00 A Computational Model to Investigate the Sound Radiation from Rolling Tires  
*Jan Biermann and Otto von Estorff*
- 15:20 A Meshfree Procedure for the Microscopic Simulation and Design of Rubber Compounds and its Application to Multi-Scale Simulation of Tires  
*C. T. Wu, Masataka Koishi, Gregg Skinner and Hiroki Shimamoto*
- 15:40 A Hyperelastic-Visco-Elasto-Plastic-Damage Model for Rubber-Like Solids  
*Junji Yoshida, Masaki Fujikawa and Takaya Kobayashi*

**Room: CAS1.6**

**MS047 Minisymposium on Performance-Based Structural Design Optimization II**

Organizers: Nikos Lagaros , Christopher Foley and Hongbing Fang

- 14:00 Aerodynamic Global Optimal Shape's Design with Weak Interaction with Structure  
*Adriana Nastase*
- 14:20 Aeroelastic Analysis and Optimal Design of Axial Multistage Fans and Compressors  
*Michele Ferlauto*
- 14:40 Eigenvalue-Based Topology Optimization for Aseismic Design of Structures and Devices  
*Matteo Bruggi and Carlo Cini*
- 15:00 Performance-Based Optimization of a Welded Open Cross Section Runway Beam According to EC3 and EC1  
*Demetrios T. Venetsanos and Christopher G. Provatidis*
- 15:20 Performance-Based Optimization of the Welded Box of a Single Girder Overhead Travelling Crane According to EC3 and EC1  
*Demetrios T. Venetsanos, Efrossini-Aikaterini T. Magoula and Christopher G. Provatidis*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation VIII**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 14:00 **Optimally Blended Lobatto Methods for Constrained Dynamical Systems (Keynote Lecture)**  
*Gregory M. Hulbert*
- 14:30 **New and Innovative Advances and State-of-the Art Concepts in Time Integration: A Consistent Design Methodology for Structure Preserving/Conserving versus Numerical Dissipative Integrators for Computational Flexible/Rigid Dynamics (Keynote Lecture)**  
*Kumar Tamma, Xiangmin Zhou, Siti Masuri and Andrew Hoi*
- 15:00 Who's Afraid of High Index DAES? Scaled and Augmented Lagrangian Formulations in Multibody Dynamics  
*Olivier A. Bauchau, Alexander Epple and Carlo Luigi Bottasso*
- 15:20 On the Application of Reliability and Sensitivity Methods on Vehicle Systems under Stochastic Wind Excitation  
*Christian Wetzel and Carsten Proppe*
- 15:40 Numerical Simulation of Elastic Airplane Landing Dynamics  
*Zdravko Terze, Milan Vrdoljak, Dubravko Matijasević and Tomislav Mesinovic*

**Room: CAS1.8**

**MS054 Inverse Problems: Recent Advances in Methodology and Techniques III**

Organizers: Barbara Kaltenbacher and Roland Potthast

- 14:00 Nonlinear Integral Equations for a 3D Inverse Acoustic Scattering Problem  
*Olha Ivanyshyn and Martin Pieper*
- 14:20 How to make Obstacles Appear More (or Less) Visible by Exterior Measurements  
*Mourad Sini*
- 14:40 Identification of the Discontinuity in the Medium by Thermal Imaging  
*Victor Isakov, Kyoungsun Kim and Gen Nakamura*
- 15:00 The Linear Sampling Method and Eigenfunctions of the Far Field Operator  
*Tilo Arens, Armin Lechleiter and Russell Luke*
- 15:20 Inverse Scattering of an Arbitrarily Shaped Buried Scatterer with Conductive Boundary Condition  
*Fatih Yaman*
- 15:40 Body Shape Reconstruction by its Scattered Patterns  
*Oleg Kusiya and Nikolai Voitovich*



**Room: CAS2.1**

**MS199 High-performance Computing in Computational Mechanics II**

Organizers: Shahrouz Aliabadi, Omar Ghattas, Robert Haber, Guillaume Houzeaux, Abani Patra and Mariano Vázquez

- 14:00 Multi-Moment Euler Scheme for Computational Fluid Dynamics  
*Takayuki Aoki*
- 14:20 A Hybrid Finite Volume/Element Method for Low and High Reynolds Number Incompressible Flow  
*Shuangzhang Tu and Shahrouz Aliabadi*
- 14:40 Massively Parallel Vortex Particle Simulations of Aircraft Wakes  
*Philippe Chatelain, Alessandro Curioni, Michael Bergdorf, Diego Rossinelli, Wanda Andreoni and Petros Koumoutsakos*
- 15:00 HPC-LES for Unsteady Aerodynamics of Road Vehicles  
*Makoto Tsubokura, Takuji Nakashima, Huilai Zhang, Kotaro Hori, Nobuyuki Oshima and Toshio Kobayashi*
- 15:20 STAR-CD Computational Fluid Dynamics on IBM Blue Gene/P  
*Stephen Behling and Boris Kaludercic*
- 15:40 DNS of an Air-Filled Differentially Heated Cavity of Aspect Ratio 4 At Ra-Numbers 6.4x10, 2x10, 1x10, 3x10 and 10  
*F.Xavier Trias, Manel Soria, Andrey Gorobets and Assensi Oliva*

**Room: CAS2.2**

**MS116 Minisymposium on “Mathematical Modeling and Numerical Simulation of Coupled Multiphysics Systems in Nano- and Biotechnologies” III**

Organizers: Roderick Melnik and Riccardo Sacco

- 14:00 A Three-Dimensional Model of Cellular Electrical Activity  
*Yoichiro Mori, Charles S. Peskin and Joseph W. Jerome*
- 14:20 Mathematical Models of Axon Guidance: Towards the Understanding of a Key Process in Development  
*Giacomo Aletti, Paola Causin and Giovanni Naldi*
- 14:40 Multiscale/Multiphysics Computational Models for Lab-On-Chip Technology Applications  
*Bice Chini, Joseph W. Jerome, Massimo Longaretti and Riccardo Sacco*

**Room: CAS2.3**

**MS192 Transition Modelling I**

**Joint IACM – IUTAM Minisymposium**

Organizers: Erik Dick, Mark Savill, Witold Elsner and Franco Magagnato

- 14:00 **Direct Numerical Simulations of Flow in a Low-Pressure Compressor Cascade with Incoming Wakes (Keynote Lecture)**  
*Jan G. Wissink, Tamer A. Zaki, Wolfgang Rodi and Paul A. Durbin*
- 14:30 **New Developments and Applications of the Gamma-Re-Theta Transition Model (Keynote Lecture)**  
*Florian Menter*
- 15:00 Prediction of the Transitional Flow of Turbine Blades with DDES and LES  
*Franco Magagnato and Martin Gabi*
- 15:20 Prediction of Wake-Induced Transition on Turbine Blade with Intermittency Transport Model  
*Władysław Piotrowski and Witold Elsner*
- 15:40 Implementing and Testing a Natural Transition Model in a Multi-Block Finite-Volume Time-Resolved RANS Scheme  
*Aldo Rona, Davide Di Pasquale and J. Paul Gostelow*

**Room: CAS2.4**

**MS071 Minisymposium on PDE Constrained Optimization II**

Organizers: Michael Hintermueller and Ronald H W Hoppe

- 14:00 Scalable Solution Methods for Advection Dominated PDEs Using an Optimal Control Reformulation  
*Denis Ridzal and Pavel Bochev*
- 14:20 Hierarchical Modelling and Optimal Control for Gas Networks  
*Pia Bales, Oliver Kolb and Jens Lang*
- 14:40 Toward Modular Multigrid Design Optimisation  
*Armen Jaworski and Jens-Dominik Müller*
- 15:00 Topology Optimization for Nano-Scale Heat Transfe  
*Anton Evgrafov, Kurt Maute, Ronggui Yang and Martin Dunn*
- 15:20 A New Optimization Strategy for Flows in the Presence of Shocks: Application to the Optimal Design of a Duct  
*Antonio Baeza, Carlos Castro, Francisco Palacios and Enrique Zuazua*
- 15:40 Total FETI Method for Parallel Solution of Contact Shape Optimization Problems  
*Vit Vondrak, Zdenek Dostal, David Horak and Oldrich Vlach*

**Room: CAS2.5**

**MS097 Delamination Including Internal Contact I**

Joint IACM – IUTAM Minisymposium

Organizers: Mieczyslaw Kuczma and Bernd Zastrau

- 14:00 **Towards Exact and Scalable Computational Multiscale Strategies for Delamination Analysis (Keynote Lecture)**  
*Olivier Allix, Pierre Kerfriden and Pierre Gosselet*
- 14:30 **Failure Analysis in Postbuckled Laminated Composite Shell Structures (Keynote Lecture)**  
*Werner Wagner and Claudio Balzani*
- 15:00 An Assessment of Techniques for predicting Delamination: A Comparison among Stress based Criteria, Fracture Mechanics and Interface Models  
*Ugo Icardi and Laura Ferrero*
- 15:20 Effect of Delamination on Folding Characteristics of Multilayered Paperboard – A Numerical Modeling Study  
*Sergiy Lavrykov, Bandaru Ramarao and Doeung Choi*
- 15:40 Composite Delamination Approaches at MSC Software  
*Per Nordlund and Adrie Bout*

**Room: CAS2.6**

**MS175 Immersed Boundary and Immersed Interface Methods III**  
Joint IACM – IUTAM Minisymposium

Organizers: Pietro De Palma, Michele Napolitano, Giuseppe Pascazio and Roberto Verzicco

- 14:00 The LS-STAG Method : A new Immersed Boundary / Level-Set Method for the Computation of Incompressible Viscous Flows  
*Yoann Cheny and Olivier Botella*
- 14:20 The Finite Element Immersed Boundary Method: Model, Stability, and Applications  
*Daniele Boffi, Lucia Gastaldi and Luca Heltai*
- 14:40 A Parallel RANS Solver based upon the Immersed Boundary and Domain Decomposition Methods  
*Marco D. de Tullio, Gianluca Rossiello, Pietro De Palma, Giuseppe Pascazio and Michele Napolitano*
- 15:00 Immersed Pressure Loss Boundary Condition on Cartesian Grid  
*Kei Akasaka and Kenji Ono*
- 15:20 Domain Free Discretization Method for Incompressible Navier-Stokes Equations and its Application to Simulate Vortex Shedding from an Oscillating Circular Cylinder  
*Chun-Hua Zhou and Ke-Ming Cheng*
- 15:40 A Numerical Scheme to Moving Boundaries of Porous Medium Flow in Oil Reservoir  
*Tatsuyuki Nakaki*

**Room: CAS3.1**

**MS119 Computational Methods in Composite Materials and Structures II**

Organizers: Anastasia Muliana, Rami Haj-Ali and Marcin Kaminski

- 14:00 A Combined Experimental and Computational Study on Shear Strength Distributions for Bonded Polymers and Composites  
*Arun Krishnan and Luoyu Xu*
- 14:20 Tailoring of a Pressurized Fuselage Panel with a Cutout using Tow-Placed Steered Fibers  
*Ahmad Alhajahmad, Mostafa Abdalla and Zafer Gürdal*
- 14:40 A Numerical Study of Mechanical Behaviour of Multilayer Composites under Depth-Sensing Indentation  
*Nataliya Sakharova, José Valdemar Fernandes, Jorge Antunes and Marta Cristina Oliveira*
- 15:00 A Multi-Scale Study for Thermo-Viscoelastic Analysis of Fiber Metal Laminates  
*Sourabh Sawant, Anastasia Muliana and Rami Haj-Ali*
- 15:20 Crack-Centered Enrichment for Debonding in Two-Phase Composite applied to Textile-Reinforced Concrete  
*Jakub Jerabek, Rostislav Chudoba, Frank Peiffer and Joseph Hegger*

**Room: CAS3.2**

**TS328 Computational Structural Mechanics VIII**

- 14:00 Higher-Order Linked Interpolation for 3D Beam Elements  
*Gordan Jelenic and Edita Papa*
- 14:20 Mathematical Modeling of the Local Buckling of Continuous Composite Beams with Partial Connection  
*Mohamed Bensoula, M. Tehami and Belkacem Achour*
- 14:40 The Analysis of Shell Structures using T-spline Finite Element Method  
*Tae-Kyoung Uhm and Sung-Kie Youn*
- 15:00 Sensitivity Analysis of Multiparameter Model Systems in Civil Engineering  
*Cengiz Erdönmez and C. Erdem Imrak*

**Room: CAS3.3**

**MS125 Advances in Computational Stochastic Mechanics II**

Organizers: Vissarion Papadopoulos, Dimos Charmpis and Manolis Papadrakakis

- 14:00 Sensitivity Analysis of Multiparameter Model Systems in Civil Engineering  
*Zdenek Kala and Libor Puklicky*
- 14:20 The Investigation of the Stability of Systems subjected to Stochastic Parametric Forces in the form of Markov Processes  
*Vadim Potapov*
- 14:40 A Probabilistic Approach for Modelling of Fracture in Die-Castings  
*Cato Dørum, Odd Sture Hopperstad, Torodd Berstad and Hans Ivar Laukli*
- 15:00 Stochastic Stability Analysis of Shells with Non-Gaussian Geometric, Material and Thickness Imperfections  
*Vissarion Papadopoulos, George Stefanou and Manolis Papadrakakis*

**Room: CAS3.4**

**TS323 Multiple-Scale Physics and Computation I**

- 14:00 Twoscale Simulation of Damage Evolution in Composite Structures  
*Anton Matzenmiller and Benjamin Köster*
- 14:20 Multiscale Numerical Modeling of Regular Open-Cell Cellular Structures with Elastic Filler Material  
*Lovre Krstulovic-Opara, Stefan Loehnert, Matej Vesenjak, Dana Mueller-Hoeppe, Peter Wriggers and Petar Marendic*
- 14:40 Partial Interface Modes in Component Mode Synthesis  
*Duc-Minh Tran*
- 15:00 Finite Element Method in Solution of Elastic Waves Problems on Domains with Multi-Scale Feature  
*Bijan Boroomand and Farshid Mossaiby*

**Room: CAS3.5**

**MS087 Numerical Methods for Fluid-structure Interactions II**

Organizers: Hester Bijl and Jan Vierendeels

- 14:00 A 2D Patient-Specific FSI Assessment of the Impact of Left Atrium Boundary Conditions on Left Ventricle Vorticity and Mitral Valve Movement  
*Sigrid K. Dahl, Paul Leinan, Leif Hellevik and Bjørn Skallerud*
- 14:20 Numerical Simulation of Fluid-Structure Interaction in Human Phonation  
*Martin Larsson and Bernhard Müller*
- 14:40 Fluid-Structure Interaction applied to Ovoiding Oscillations of a Silo  
*David Dooms, Guido De Roeck and Geert Degrande*
- 15:00 Computations of Turbulent Flows around Oscillating Bodies Using Multi-Block Deforming Meshes and Eddy Resolving Techniques  
*Dmitri Zaitsev, Evgueni Smirnov and Nikolai Schur*
- 15:20 Multigrid Fictitious Boundary Method for Vortex-Induced Motion of Cylinders on Moving Grids  
*Decheng Wan*

**Room: CAS3.6**

**MS026 Advanced Computational Descriptions of Macromolecular Materials: from the Atom to the Flow II**

Organizers: Francisco Chinesta, Elias Cueto, Martin Kroger and Tim Phillips

- 14:00 Stochastic Hard-Sphere Dynamics Algorithm for Hydrodynamics of Polymers in Flow  
*Aleksandar Donev, Alejandro Garcia and Berni Alder*
- 14:20 Statistical Mechanics of the Fluctuating Lattice Boltzmann Equation  
*Burkhard Duenweg, Ulf Schiller and Tony Ladd*
- 14:40 On the Deterministic Solution of Kinetic Theory Models of Complex Fluids within the Fokker-Planck Formalism  
*Francisco Chinesta, Amine Ammar and A. Giner*
- 15:00 On the Solution of the Fokker-Planck Equation using Reduced Spectral Basis Function Method  
*Ganna Leonenko and Tim Phillips*
- 15:20 The Mechanical Behaviors of Polymer-Carbon-Nanotube Composites suffering from Compressing or Tensile Loading  
*X.Q. He and Y. Kuang*
- 15:40 Computational Modelling of Scratch Test on Solid Polymers  
*Nicolas Aleksy, Guillaume Kermouche, Alain Vautrin and Jean Michel Bergheau*

**Room: CAS3.7**

**MS210 Image-Based Computational Modelling of Materials I**

Organizers: M.A. Siddiq Qidwai and Andrew B. Geltmacher

- 14:00 **Three Dimensional (3D) Microstructure-Based Modeling of Interfacial Decohesion in Particle Reinforced Metal Matrix Composites (MMCs) (Keynote Lecture)**  
*Jason Williams, Javier Segurado, Nik Chawla and Javier LLorca*
- 14:30 **Image-Based Computational Homogenization of Random Materials using Level Sets and X-FEM (Keynote Lecture)**  
*Patrice Cartraud, Irina Ionescu, Gregory Legrain and Nicolas Moës*
- 15:00 3D Image-Based Modelling of a Carbon/Carbon Composite  
*Vendel Szeremi, Francisco Calvo-Plaza, Lee Margetts and Paul Mummery*
- 15:20 Microstructure-Property-Processing Linkages using Discrete Fourier Transforms  
*Surya Kalidindi, Stephen Niezgodá, Max Binci and Marko Knezevic*
- 15:40 Rubber Filled with Carbon Black from the Nanoscopic Structure to the Macroscopic Behaviour  
*Aurélie Jean, Dominique Jeulin, Sabine Cantournet, Samuel Forest and Franck N'Guyen*

**Room: CAS3.8**

**MS109 Computational Fracture Mechanics of Heterogeneous Materials and Structures I**

Organizers: Noriyuki Miyazaki and Toru Ikeda

- 14:00 **Stress Intensity Factors Analyses of a Three-Dimensional Interfacial Corner Between Dissimilar Anisotropic Materials under Thermal Stress (Keynote Lecture)**  
*Toru Ikeda, Yoshiyuki Nomura and Noriyuki Miyazaki*
- 14:30 **On the Transformation Toughening of a Crack along an Interface between a Shape Memory Alloy and an Isotropic Medium (Keynote Lecture)**  
*Yuval Freed and Leslie Banks-Sills*
- 15:00 Characteristics of Stress Singularity Field of Residual Thermal Stresses in Three-Dimensional Bonded Joints  
*Hideo Koguchi and Akira Taniguchi*
- 15:20 3D Problem for an Interface Crack under Harmonic Loading  
*Oleksandr Menshykov and Igor Guz*
- 15:40 The Effect of Residual Stresses on Elastic and Elastic-plastic Bimaterials with Initial Crack Perpendicular to the Interface  
*Bojan Medjo, Marko Rakin, Otmar Kolednik, Narendra Simha and Franz Dieter Fischer*

**Room: CAS3.9**

**TS303 Computational Fluid Dynamics I**

- 14:00 Comparison between Epsilon and Kappa based Transport-Equation Subgrid Modelling  
*Chris De Langhe and Erik Dick*
- 14:20 DNS of Acoustic Sound Generated by Collision of Vortex Rings  
*Yoshitaka Nakashima and Osamu Inoue*
- 14:40 Integrated Simulation of Wake Turbulence using Lidar Measurement  
*Takashi Misaka, Takeshi Ogasawara, Shigeru Obayashi, Izumi Yamada and Yoshinori Okuno*
- 15:00 Mathematical Model of Turbulent Shear Layers with Harmonic Perturbations  
*Yuli Lifshitz and David Degani*
- 15:20 Quasi-Hydrodynamic Model and Small Scale Turbulence  
*Ilya Ivahnenko, Serge Polyakov and Boris Chetverushkin*
- 15:40 Numerical Simulation of the Decelerating Parachute-Like Body with Consideration of Virtual Mass  
*Hiroyuki Houzu, Norio Arai and Yoko Takakura*

**Room: CAS3.10**

**TS313 Fracture Mechanics II**

- 14:00 Continuous Damage Deactivation in Modelling of Low Cycle Fatigue of Metallic and Concrete Materials  
*Artur Ganczarski and Marcin Cegielski*
- 14:20 Modeling of Crankshaft Roller Burnishing for their High-Cycle Fatigue Design  
*Louis Augustins*
- 14:40 Multiaxial High-Cycle Fatigue Analysis of Rolling Contact Phenomenon  
*Paweł Romanowicz and Andrzej Zieliński*
- 15:00 An Implicit Level Set Algorithm for Hydraulic Fractures  
*Anthony Peirce and Emmanuel Detournay*
- 15:20 3D-Modelling of Cutting Process on the Base of the Multiscale Thermo Softening Damage Model  
*Vladimir Kukudzhinov and Alexander Levitin*

Room: **CIN0.1**

**MS080 Biofluids and Coupled Problems in Biomechanics I**

Joint IACM – IUTAM Minisymposium

Organizers: Wolfgang Wall, Marek Behr, Matteo Pasquali and Alberto Figueroa

- 14:00 Fluid-Structure Interaction in a Stented Abdominal Aortic Aneurysm: Effects of Endoleaks  
*Ramon Berguer and Khalil Khanafer*
- 14:20 Explicit Time-Stepping of Fluid-Structure Problems arising in Blood Flows  
*Erik Burman and Miguel Ángel Fernández*
- 14:40 Kinematically Coupled Algorithms for Fluid-Structure Interaction in Blood Flow Simulations  
*Giovanna Guidoboni, Roland Glowinski, Suncica Canic, Tsorn-Whay Pan and Sergey Lapin*
- 15:00 Three-Dimensional Finite Element Modeling of Blood Flow in the Coronary Arteries  
*Hyun Jin Kim, Jessica Shih, Irene E. Vignon-Clementel, Carlos A. Figueroa, Kenneth E. Jansen and Charles A. Taylor*
- 15:20 Fluid Structure Interaction Modeling of Pulsations in the Fetal Umbilical Cord  
*Paul Leinan, Torvid Kiserud, Jan Vierendeels, Patrick Segers and Leif Hellevik*
- 15:40 Multi-scale Modeling of Blood Vessels using a Fluid-Solid Growth Framework  
*Carlos Alberto Figueroa, Seungik Baek, Charles A. Taylor and Jay D. Humphrey*

Room: **CIN0.2**

**MS127 Computational Methods in Virtual and Computer Planned Surgery II**

Organizers: Suvranu De and Anna Pandolfi

- 14:00 **Computational Strategies for Pre-Treatment Planning and Real-Time Control of Image-Guided Laser Surgery of Prostate Cancer (Keynote Lecture)**  
*Yusheng Feng*
- 14:30 **Application of the Multiscale Approach to investigate Fluidynamics in Surgical Procedures for the Treatment of Congenital Heart Diseases (Keynote Lecture)**  
*Gabriele Dubini, Francesco Migliavacca, Giancarlo Pennati, Rossella Balossino, Katia Laganà, Edward L. Bove, Tain-Yen Hsia and Marc R. de Leval*
- 15:00 Optimisation of Lower Limb Bypass Surgery Hemodynamics with a Patient Specific 1D-0D Model  
*Marie Willemet, Emilie Marchandise and Valérie Lacroix*
- 15:20 Numerical Simulation in Biomechanics - A Flexible Multiscale Approach  
*Stefanie Berenber, Christian Gross and Rolf Krause*
- 15:40 Simplified contact analysis of temporomandibular joint by using RBSM  
*Norio Takeuchi, Kouichi Ueki and Kiyomasa Nakagawa*

Room: **CIN1.1**

**MS170 Numerical Modeling and Simulation on Micro and Nanoscale Materials and Devices II**

Organizers: Marisol Koslowski and Richard Lesar

- 14:00 3D-Continuum Theory of Dislocations: Numerical Implementation and Application  
*Stefan Sandfeld, Thomas Hoehrainger and Michael Zaiser*
- 14:20 Phase Field Theory of Dislocations obtained by Coarse Graining  
*Istvan Groma and Peter Ispanovics*
- 14:40 Plasticity in Ultra Fine Polycrystalline Materials  
*Abigail Hunter and Marisol Koslowski*
- 15:00 Simulating the Dynamics of Partial Dislocations and their Associated Stacking Faults using the Level Set Method  
*Siu Sin Quek, Yong-Wei Zhang, Kevin Chu, Yang Xiang and David Srolovitz*
- 15:20 Size Effect in a Cellular Automata Model for Systems of Interacting Dislocations  
*Valentina Beato and Stefano Zapperi*
- 15:40 Thermodynamic Coarse-graining of Dislocation Mechanics and the Size-dependent Continuum Plasticity  
*Sinisa Mesarovic, Raghuraman Baskaran, Sreekanth Akaraou and Hussein M. Zbib*

**Room: CIN2.1**

**MS043 Advances in Boundary Element Methods I**

Organizers: Yijun Liu, Martin Schanz, Naoshi Nishimura, Zhenhan Yao, Marc Bonnet, Ernie Pan, Attilio Frangi and Mitch Denda

- 14:00 **An Iterative Solver for Boundary Element Analysis (Keynote Lecture)**  
*John O. Watson*
- 14:30 **A Black-Box Fast Multipole Method (Keynote Lecture)**  
*Eric Darve and William Fong*
- 15:00 Integral Equation Approaches for Estimating Gas-Damping in MEMS in the Free-Molecule Regime  
*Attilio Frangi*
- 15:20 Dynamic BETI/FETI-Method with Nonconforming Interfaces  
*Thomas Rueberg, Martin Schanz and Gernot Beer*
- 15:40 Efficient (Error Controlled) Calculation of Non-Linear Problems by the Boundary Element Method  
*Klaus Thoeni and Gernot Beer*

**Room: PGL**

**MS208 Computational Modelling of Locomotor Systems II**

Organizers: Markus Böl, Stefanie Reese and Bob Svendsen

- 14:00 Non-Equilibrium Mechanics of Motor-Activated Gels and Living Cells  
*Fred MacKintosh*
- 14:20 Effect of Muscle Properties on Postural Stability of Simple Musculoskeletal System  
*Christian Rode, Tobias Siebert, Olaf Till and Reinhard Blickhan*
- 14:40 An Optimisation Method to simulate Whole-Body walking using Asymmetric Lower Limbs to search a Stable Gait  
*Weijie Wang and Rami Abboud*
- 15:00 Visible Biomechanics: 4D-Visualization of Human Ankle Joint Flexion based on Dynamic Radiology (MRI)  
*Cornelia Kobe, Joerg Rieger, Robert Sader and Martin Mack*
- 15:20 Simulation of Stretch-Shortening Cycles with Two Common Hill-Type Muscle Models  
*Tobias Siebert, Christian Rode, Olaf Till and Reinhard Blickhan*
- 15:40 Three-dimensional Muscle Modelling  
*Markus Böl and Stefanie Reese*

**Room: EXC1.1**

**MS053 Minisymposium in Honor of Prof. O.C. Zienkiewicz II**

Organizers: Robert Taylor and Perumal Nithiarasu

- 14:00 New Generation of Rotation-Free Triangles for Analysis of Thin and Thick Plates and Shells  
*Eugenio Oñate*
- 14:20 Vibrations of Structures Containing Liquids - Hydroelastic/Sloshing Interactions and Compressibility Effects  
*Roger Ohayon and Jean-Sebastien Schotte*
- 14:40 Three Level Finite Element Method  
*George Mejak*
- 15:00 Numerical Abacuses Method based on the Equivalence between the Closest Point Projection and a Geometrical Bounded Problem  
*Siegfried Maiolino*
- 15:20 3d Numerical Modelling of Dynamic Saturated Soil and Pore Fluid Interaction  
*Jianhua Ou and Andrew Chan*
- 15:40 The Role of Finite Elements in the Design of Particle Accelerators & Medical Science  
*Bill Trowbridge*

**Room: EXC1.2**

**MS073 Minisymposium in the Honor of Michel Bernadou's 65th Birthday III**

Organizers: John Cagnol and Roland Glowinski

- 14:00 Homogenisation and Domain Decomposition with Applications to Shells Made of Microstructured Materials  
*Patrick Le Tallec*
- 14:20 Mesh Adaptation and the Future of Shell Computation  
*Michel Fortin and André Fortin*
- 14:40 Numerical Simulation of a Thermomechanical Model arising in Steel Hardening  
*José Manuel Díaz Moreno, Concepción García Vázquez, María Teresa González Montesinos and Francisco Ortegón Gallego*
- 15:00 Recent Advances in the Numerical Simulation of Hysteresis Curve  
*Song He, Sophie Depeyre and Philip Meiland*
- 15:20 A Numerical Algorithm for Mixed Nonlinear Complementarity Problems and Applications to Contact Stress Analysis  
*Jose Herskovits, Sandro Mazorche, Alfredo Canelas and Gabriel Guerra*

**Room: EXC1.3**

**MS037 Extended / Generalized Finite Element Method II**

Organizers: Ted Belytschko, Elisa Budyn, John Dolbow, Nicolas Moës and Giulio Ventura

- 14:00 Comparison between Simulation and Experiments on Fractured Samples using X-Fem Kinematics  
*Julien Réthoré, Stéphane Roux and François Hild*
- 14:20 Time Integration in the Extended Finite Element Method (XFEM)  
*Thomas-Peter Fries and Andreas Zilian*
- 14:40 Model of Crack Propagation with the Extended Finite Element Method  
*Nicolas Chevaugeon and Nicolas Moës*
- 15:00 Explicit Dynamics for the eXtended Finite Element Method  
*Thomas Menouillard, Alain Combescure and Ted Belytschko*
- 15:20 An X-FEM Approach for Modeling Closed Discontinuities under Large Sliding Contact  
*Ionel Nistor, Martin Guiton, Patrick Massin and Nicolas Moës*



**Room: EXC2.1**

**STS01: Flow Simulation and Validation in Aeronautics**

Organizers: Dietrich Knoerzer

- 14:00 On the use of Software Analyses for the Substantiation of Falcon 7X upper Cockpit concerning Birdstrike  
*Christian Cornuault, Denis Bourge, Alexandre Sellouma and Michel Sgarbozza*
- 14:20 Prediction and Experimental Validation of Buffeting Phenomena  
*Catalin Nae and Florin Munteanu*
- 14:40 Particle Image Velocimetry as Validation Tool in Aeronautics  
*Andreas Schröder, Dieter Pallek, Reinhard Geisler and Heiko von Geyr*
- 15:00 Vortex Cell Shape Optimisation for Separation Control  
*Sergei Chernyshenko, Ian Castro, Tilman Hetsch, Angelo Iollo, Edmondo Minisci and Ralph Savelsberg*
- 15:20 The Design, Numerical Modelling and Validation of Microfabricated Pulsed Airjet Actuators for Flow Separation Control  
*Clyde Warsop, Andrew Press and Paul Dawson*

**Room: EXC2.2**

**STS10: Computational Aero-acoustics**

Organizer: Roland Ewert

- 14:00 Fast CAA Broadband Noise Prediction for Aeroacoustic Design  
*Roland Ewert*
- 14:20 A Linearized Euler Solver for Computation of Tonal Noise Radiation from Lined Turbofan Nozzles  
*Yusuf Ozyoruk*
- 14:40 CAA Based Study of Spectral Broadening of Turbine Tones  
*Oliver Kornow and Roland Ewert*
- 15:00 Numerical Simulation of Coaxial Jet Noise  
*Wolfgang Schroeder, E. Gröschel, M. Meinke and P. Renze*

**Room: CAS0.1**

**MS039 Contact Mechanics : Modelling, Analysis and Applications V**

Joint IACM – IUTAM Minisymposium

Organizers: Mircea Sofonea, José R. Fernandez and Georgios E. Stavroulakis

- 16:30 Design Method for Wear in Transmission Systems  
*Damien Herisson, Benoit Delattre, Geoffrey Jamart, Thi Mac Lan Nguyen, Rachel Marie Pradeilles-Duval, Habibou Maitournam and Siegfried Fouvry*
- 16:50 Stiffness of Prestressed Bolt Plate Contact  
*Niels L. Pedersen*
- 17:10 Validation of Simulation Platform for Modeling of RF MEMS Contacts  
*Fabienne Pennec, David Peyrou, Hikmat Achkar, Patrick Pons, Robert Plana and Frédéric Courtade*
- 17:30 Condition of Retraction of Sheet Material with Rolling Pair  
*Dilshod Bahadirov, Gayrat Bahadirov and Kudrathon Bahadirov*

**Room: CAS1.1**

**MS021 Uncertainty Modeling and Quantification in Computational Mechanics IX**

Joint IACM – IUTAM Minisymposium

Organizers: Roger Ghanem, Christian Soize and Gerhart Schueller

- 16:30 Response Surface Approximation for Uncertain Structural Analysis  
*Wolfgang Graf, Stephan Pannier and Jan-Uwe Sickert*
- 16:50 Reliability Analysis of the Buckling of Imperfect Shells based on the Karhunen-Loève Expansion  
*Claudine Noirfalise, Jean-Marc Bourinet, Michel Fogli and Bruno Cochelin*
- 17:10 Research on Safety Evaluation Method of Concrete High Arch Dam based on Uncertainty and Stochastic Analysis  
*Chen Zaitie*

**Room: CAS1.2**

**MS167 Inverse Problems for Parameter Identification I**

Organizers: George Dulikravich, Giulio Maier and Helcio Orlando

- 16:30 **Non-direct Determination of Adhesive Properties of Elastic Materials by Depth-Sensing Indentation (Keynote Lecture)**  
*Feodor M. Borodich and Boris A. Galanov*
- 17:00 **POD-RBF Network Approximation for Identification of Material Coefficients of Human Pelvic Bone Tissues (Keynote Lecture)**  
*Ziemowit Ostrowski, Ryszard Bialecki, Antoni John, Piotr Orantek and Wacław Kus*
- 17:30 Nanoindentation Applied to the Estimation of Elastic Anisotropy in Human Cortical Secondary Osteons  
*Giampaolo Franzoso, Roberto Contro and Philippe Zysset*
- 17:50 On Structural Material Diagnosis by Instrumented Indentation and Neural Networks  
*Vladimir Buljak, Enzo Josef Chiarullo and Giulio Maier*
- 18:10 Optimization of Input Material Parameters for Nanoindentation Model  
*Matej Leps and Zuzana Vittingerova*

**Room: CAS1.4**

**TS310 Environment II**

- 16:30 Experimental and Numerical Study of the Exhaust Gas Dispersion of Public Light Bus under Idle Condition  
*Hong-di He and Wei-zhen Lu*
- 16:50 Study of Cascade Impacter Pollen Sampling Device  
*Hideki Aoi, Kunio Funami, Hiroyuki Miyamoto, Yue Zhao and Yorito Ishikawa*
- 17:10 Validation of an Experimental Model of the Air Flow over a Conveyor Belt. Implications on Dust Emission  
*Javier Toraño, Isidro Diego, Susana Torno and Judith Velasco*

**Room: CAS1.5**

**MS139 Time- and Spatial Decomposition Methods for Multi-physical and Multi-field Problems I**

Organizers: Jürgen Geiser and Qin Sheng

- 16:30 General Stabilisation Theory of Iterative Operator Splitting Methods and Applications  
*Jürgen Geiser and Christos Kravvaritis*
- 16:50 A Numerical Adaptive Algorithm combining Domain Decomposition  
*Manuela Simões and Luis Ferragut*
- 17:10 An Adaptive, Process-Preserving Modified Newton's Method to solve Reactive Multicomponent Transport Problems Efficiently  
*Alexander Prechtel, Stephan Ossmann and Peter Knabner*
- 17:30 Conservative Treatment of 3D Multi-Block Unstructured Mesh Interfaces for Finite Volumes Computations of Fluid Flows with Moving Boundaries  
*Didier Vigneron and Jean-André Essers*

**Room: CAS1.6**

**MS047 Minisymposium on Performance-Based Structural Design Optimization III**

Organizers: Nikos Lagaros , Christopher Foley and Hongbing Fang

- 16:30 Compliant Mechanism Topological Optimum Design based on Truss-Like Continuum  
*Kemin Zhou and Dan Zhao*
- 16:50 Softcomputing Methods Based Identification of Nonlinear Mechanical Model Parameters  
*Anna Kucerova and Matej Leps*
- 17:10 Metamodeling Techniques for all Steel Sandwich Panel Optimization  
*Janis Auzins, Kaspars Kalnins and Janis Janushevskis*
- 17:30 An Extended Level Set Method in Structural Optimization  
*Andrzej Myśliński*
- 17:50 Mathematical Modeling of Structural Transformation of Suspension into Anisotropic Composite with Optimal Structure  
*Evgeny Taran and Vera Gryaznova*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation IX**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 16:30 Dynamic Interaction Analysis of a Shinkansen Train and Railway Structure after Derailment during an Earthquake  
*Makoto Tanabe, Hajime Wakui, Nobuyuki Matsumoto, Masamichi Sogabe and Yasuko Tanabe*
- 16:50 Trajectory Modeling of a Parallel Structure in the Presence of Obstacles  
*Sezimaria F P Saramago, Aline R Assis and Marco Ceccarelli*
- 17:10 Simulation Dynamics Processes of Rotating System  
*Marijonas Bogdevicius and Jolanta Januteniene*

**Room: CAS1.8**

**MS054 Inverse Problems: Recent Advances in Methodology and Techniques IV**

Organizers: Barbara Kaltenbacher and Roland Potthast

- 16:30 Multi-point Source Localization Methodology for the Advection-diffusion Equation  
*Aleksey Penenko*
- 16:50 Identification of Parameters under Uncertainties of Interval Type  
*Yuri Menshikov*
- 17:10 Identification of Thermal Stressed State in Inhomogeneous Thermal Sensitive Cylindrical Bodies using the Surface Displacements  
*Roman Kushnir, Anatoliy Yasinskyy and Bohdan Kalynyak*
- 17:30 Multiple Signal Classification Algorithm for Inverse Imaging of Two-Dimensional Scatterers having Special Characteristics  
*Krishna Agarwal and Xudong Chen*
- 17:50 Fingerprint Encryption using Fractional Fourier Transform  
*Juan M. Vilardy, Cesar O. Torres and Lorenzo Mattos*
- 18:10 Simultaneous Estimation of Set Model Parameters with Intensive Measurement Noise  
*Mikhail Romanovski*

**Room: CAS2.1**

**MS199 High-performance Computing in Computational Mechanics III**

Organizers: Shahrouz Aliabadi, Omar Ghattas, Robert Haber, Guillaume Houzeaux, Abani Patra and Mariano Vázquez

- 16:30 A High Performance Computational Electrophysiology Model  
*Mariano Vázquez, Ruth Aris, Adrian Rosolen and Guillaume Houzeaux*
- 16:50 Extreme Scalability Challenges in Analyses of Human Bone Structures  
*Peter Arbenz, Cyril Flaig, Harry van Lenthe, Ralph Mueller, Andreas Wirth, Costas Bekas and Alessandro Curioni*
- 17:10 High Performance Computing Virtual Fly-Out Simulations with Special Emphasis on Initial Conditions  
*Jubaraj Sahu and Sukumar Chakravarthy*
- 17:30 Parallel Strategies of High-Speed Contact/Impact Simulation Code  
*JiJoong Moon, Seung Jo Kim and M. Lee*
- 17:50 Towards Petascale Computing with Computational Fluid Dynamics codes on IBM Blue Gene/P  
*Ananthanarayanan Sugavanam, Pascal Vezolle and Stephen Behling*

**Room: CAS2.2**

**MS203 Computations of Fluid Flows at the Solid-Fluid Interfaces I**

Organizers: Dimitrios Papavassiliou and Lloyd Lee

- 16:30 DNS of Turbulent Channel Flow Past Ultrahydrophobic Surfaces with Periodic Microfeatures  
*Michael B. Martell Jr., Blair Perot and Jonathan P. Rothstein*
- 16:50 Numerical Simulation on Nanotube  
*Mathieu Colin, Thierry Colin and Kevin Santugini*
- 17:10 Numerical Modeling of Fluid-Biofilm Interaction  
*Ashkan Safari, Alojz Ivankovic and Zeljko Tukovic*
- 17:30 Numerical Simulation of Flow Past a Rotationally Oscillating Cylinder  
*Nima Ghiasi Tabari, Ghasem Heidarinejad and Mohammad Heidarinejad*
- 17:50 An Iterative Process for the Implicit Evaluation of Forces in the Immersed Boundary Method, using the Virtual Physical Method  
*João Marcelo Vedovoto, Felipe Pamplona Mariano and Aristeu Silveira-Neto*

**Room: CAS2.3**

**MS192 Transition Modelling II**

Organizers: Erik Dick, Mark Savill, Witold Elsner and Franco Magagnato

- 16:30 3D Transition Prediction in Navier-Stokes Computations using Linear Stability Theory  
*Normann Krimmelbein and Rolf Radespiel*
- 16:50 A Transport Intermittency Model for Supersonic/Hypersonic Boundary Layer Transition  
*Song Fu and Liang Wang*
- 17:10 Direct Numerical Simulation of Reverse Transition from Turbulence in Plane Poiseuille Flow  
*Yoshito Tanaka, Masato Yoshino, Masaharu Matsubara and Noritaka Aota*
- 17:30 Investigation of the Negative and Positive Jets in the Induced by Wakes Transition  
*Zygmunt Wiercinski and Jacek Zabski*
- 17:50 Turbulent Spots during Boundary Layer By-Pass Transition  
*Pavel Jonas, Witold Elsner, Oton Mazur, Vaclav Uruba and Marian Wysocki*
- 18:10 Validation of a Dynamic Intermittency Model for Wake-Induced Transition on Turbine Blades  
*Koen Lodefier, Slawomir Kubacki, Robert Zarzycki, Witold Elsner and Erik Dick*

**Room: CAS2.4**

**MS060 Recent Advances in Numerical Methods for Hyperbolic Problems I**

Organizers: Sergey Karabasov, Vassily Goloviznin, Tatyana Kozubskaya, Yoko Takakura, Ralf Deiterding and Maria Lukacova

- 16:30 **Fluid-Structure Interaction Simulation of Shock Wave Impact on Solid Structures (Keynote Lecture)**  
*Ralf Deiterding*
- 17:00 **A Way of Higher Accuracy Aeroacoustics Simulations on Unstructured Grids (Keynote Lecture)**  
*Tatiana Kozubskaya, Ilya Abalakin and Alexey Duben*
- 17:30 A High Order Accurate Finite Difference Method for Adaptive Grids  
*Ken Mattsson, Mark H.M. Carpenter and Jan Nordström*
- 17:50 A Third-Order Computational Method for Numerical Flux to guarantee Positive Difference Coefficients for Advection-Diffusion Equations  
*Katsuhiko Sakai, Yasufumi Kato and Takayuki Nakamura*
- 18:10 A Space-Time hp-Adaptive Scheme for Evolution Equations  
*Andreas Dedner*

**Room: CAS2.5**

**MS097 Delamination Including Internal Contact II  
Joint IACM – IUTAM Minisymposium**

Organizers: Mieczyslaw Kuczma and Bernd Zastrau

- 16:30 Numerical Simulation of Composite's Interface Failure - Delamination  
*Bernd Zastrau, Rainer Schlebusch, Krzysztof Kula and Jan Matheas*
- 16:50 Computational Approach to Delamination Problems for Elastic Laminates using Interfacial Fracture Mechanics  
*Lukasz Figiel*
- 17:10 A Cohesive Finite Element Method for Quasi-continua  
*Shaofan Li*
- 17:30 A FEM Sub-Laminates Approach for Progressive Failure Analysis of Multilayered Beams  
*Carlo Di Giacomo, Marco Gherlone and Marco Di Sciuva*
- 17:50 A Nonlinear Model for Composite Beams with Longitudinal and Transverse Partial Interaction  
*Mieczyslaw Kuczma and Bozena Kuczma*

**Room: CAS2.6**

**MS175 Immersed Boundary and Immersed Interface Methods IV  
Joint IACM – IUTAM Minisymposium**

Organizers: Pietro De Palma, Michele Napolitano, Giuseppe Pascazio and Roberto Verzicco

- 16:30 Immersed Finite Element Method with Sharp Interfaces  
*Lucy Zhang*
- 16:50 Numerical Simulation of Tube Bundles by using Immersed Finite Element Method  
*Tae-Rin Lee, Yoon-Suk Chang, Jae-Boon Choi and Young-Jin Kim*
- 17:10 Numerical Simulation of Immersed Collisions of Tethered Spheres  
*Ching-Biao Liao and Cheng-Hsin Chen*
- 17:30 Immersed Boundary Method applied to Simplified Drilling Problems  
*Elie Luis Padilla, André Martins and Aristeu Silveira-Neto*
- 17:50 A Variational Approach for Fluid-Solid Interaction Problems using Immersed Domains  
*Pablo J. Blanco, Enzo A. Dari and Raul Feijoo*
- 18:10 Directly Coupled Immersed Finite Element Method for Rigid Body-Flow Interaction Problems  
*Do Wan Kim and Wing Kam Liu*

**Room: CAS3.1**

**MS119 Computational Methods in Composite Materials and Structures III**

Organizers: Anastasia Muliana, Rami Haj-Ali and Marcin Kaminski

- 16:30 Analyses of the Effect of Grain Boundaries in Multifunctionality of Sic-Si3n4 Nanocomposites  
*Vikas Tomar and Vikas Samvedi*
- 16:50 Towards Structure-Property Relationships for Polymeric Foams  
*Johannes van Dommelen, J.G.F. Wismans, L.E. Govaert, Bert van Rietbergen and H.E.H. Meijer*
- 17:10 Morphological Instability of a Film Surface under High Temperature  
*Sergey Kostyrko and Mikhail A. Grekov*
- 17:30 Modelling of Structure Evolution of Filled Elastomers under Uniaxial Elongation  
*Bernd Lauke and Ilya Morozov*
- 17:50 Influence of the Foam Fill of Basic Composite Structures on the Failure Energy  
*Tadeusz Niezgodna and Wieslaw Barnat*
- 18:10 Modeling of Concrete Microstructure for the Assessment of the Percolation Threshold of Interfacial Transition Zone  
*Daniel Rypl and Tomas Bym*

**Room: CAS3.2**

**MS236 Adaptive Modeling in Computational Mechanics I**

Organizers: J. Tinsley Oden and Serge Prudhomme

- 16:30 **On Modeling and Discretization Errors in Multiscale Problems: A Two-Scale Adaptive Fe-Discretization of a Heterogeneous Structure (Keynote Lecture)**  
*Fredrik Larsson and Kenneth Runesson*
- 17:00 **An A Posteriori Error Estimator for a Hierarchical Model Dimension Reduction (Keynote Lecture)**  
*Alexandre Ern, Simona Perotto and Alessandro Veneziani*
- 17:30 Modeling Error Estimates for Plate Bending Models based on Local Neumann Problem  
*Uros Bohinc, Adnan Ibrahimbegovic and Bostjan Brank*
- 17:50 Model Adaptivity for Elasticity on Thin Domains  
*David Heintz and Peter Hansbo*
- 18:10 Combined Expansive Model and Fe-Discretization Adaptivity of Thin-Walled Structures with Coarse-To-Fine-Scale Prolongations for Model Error Estimates  
*Erwin Stein and Stephan Ohnimus*

**Room: CAS3.3**

**MS125 Advances in Computational Stochastic Mechanics III**

Organizers: Vissarion Papadopoulos, Dimos Charmpis and Manolis Papadrakakis

- 16:30 Adaptive Wavelet Method for solving Stochastic Convection-Diffusion Equation  
*Wenquan Wu and Xiaoan Ren*
- 16:50 Macroscopic Probabilistic Modelling of Cracking Processes in Concrete Structures  
*Jean-Louis Tailhan, Pierre Rossi and Stefano Dal Pont*
- 17:10 Stochastic PDE's as a Tool for solving Joint Velocity- Scalar PDF Equation in Turbulent Reacting Flows: Numerical Aspects and Validation  
*Olivier Soulard and Vladimir Sabelnikov*
- 17:30 Bayesian Damage Classification by AR-ARX Array Expression Data  
*Tzu Kang Lin and Anne Kiremidjian*
- 17:50 Automation of Stochastic Finite Element Method by Symbolic-Numeric Approach  
*Joze Korelc and Teja Melink*

**Room: CAS3.4**

**TS323 Multiple-Scale Physics and Computation II**

- 16:30 Model Order Reduction of Large-Scale Systems in Finite Element Method  
*Marko Jokic, Branislav Orcic and Mirko Butkovic*
- 16:50 Multiscale Mortar Mixed Methods for Elliptic and Parabolic Problems arising from Darcy Flows  
*Eun-Jae Park and Mary Wheeler*
- 17:10 Multiscale Computations of Fluid-Flows using an Adaptive Wavelet Method  
*Damrongsak Wirasaet, Samuel Paolucci and Joseph M. Powers*
- 17:30 Magnetic-Structural Coupled Analysis by Hierarchical Domain Decomposition Method  
*Shin-ichiro Sugimoto, Shinobu Yoshimura and Hiroshi Kanayama*

**Room: CAS3.5**

**MS087 Numerical Methods for Fluid-structure Interactions III**

Organizers: Hester Bijl and Jan Vierendeels

- 16:30 Dynamic Analysis of Inflatable Membranes Coupled with Enclosed Fluids  
*Amphon Jarasjarungkiat, Roland Wüchner and Kai-Uwe Bletzinger*
- 16:50 Influence of the Drilling Fluid Flow on the Dynamics of a Drill-String  
*Thiago Ritto, Rubens Sampaio and Christian Soize*
- 17:10 Coupled Analysis of High-Speed Flow and Large-Deformable Structure using Partitioned Solution Method with Level Set Function.  
*Gaku Hashimoto, Kenji Ono and Hirohisa Noguchi*

**Room: CAS3.6**

**MS187 Mechanical Modeling of Wood and Wood Based Materials I**  
Joint IACM – IUTAM Minisymposium

Organizers: Josef Eberhardsteiner, Michael Kaliske and Karin Hofstetter

- 16:30 **A 3D Coupled Moisture-Stress Numerical Analysis for Timber Structures (Keynote Lecture)**  
*Stefania Fortino, Antti Hanhijärvi, Florian Mirianon and Tomi Toratti*
- 17:00 **Numerical Modeling of Moisture Transport in Wood (Keynote Lecture)**  
*Staffan Svensson and Henrik L. Frandsen*
- 17:30 Modelling of Cross-Laminated Solid Wood Panels  
*Thomas Gereke, Per Johan Gustafsson, Kent Persson and Peter Niemz*
- 17:50 Hygromechanical Behaviour of Painted Wooden Panels from the Cultural Heritage  
*Joseph Gril and Patrick Perré*

**Room: CAS3.7**

**MS210 Image-Based Computational Modelling of Materials II**

Organizers: M.A. Siddiq Qidwai and Andrew B. Geltmacher

- 16:30 Image-Based Numerical Investigation of Mechanical Properties in WC/CO Composite under Compression  
*Tomasz Sadowski, Tomasz Nowicki and Józef Jonak*
- 16:50 An Analysis of Damage Accumulation in Composite Materials using Computational Micromechanics  
*Essam Totry, Carlos Gonzalez and Javier LLorca*
- 17:10 Image-Based Modelling of Irregular Masonry  
*Alessandra Brabanera, Federico Ciuni and Vittorio Gusella*
- 17:30 Microstructural Analysis of Materials with Complex Architectures  
*Francisco Calvo, Johar Farooqi, Lee Margetts and Paul Mummery*
- 17:50 Image Based Simulation of the Densification of Open Celled Foams  
*Bruno Notarberardino, Philippe Young and Brian Walker*
- 18:10 Experimental and Numerical Modeling of Solid Propellants using Microtomography  
*Karel Matous, Filippo Maggi, Brett Collins, Hyunsun Lee and Thomas Jackson*

**Room: CAS3.8**

**MS109 Computational Fracture Mechanics of Heterogeneous Materials and Structures II**

Organizers: Noriyuki Miyazaki and Toru Ikeda

- 16:30 Application of an Atom Continuum Model in Process of Damage Simulation on Multiple Length Scales  
*Alexander Luther and Carsten Könke*
- 16:50 Different Characteristics of Unstable Atoms in Monatomic Amorphous Ni and Al: Local Lattice Instability Analysis  
*Masaomi Nishimura, Kisaragi Yashiro and Yoshihiro Tomita*
- 17:10 A Multi-Scale and Multi-Physics Model for Stress Corrosion Cracking  
*Julian Rimoli and Michael Ortiz*
- 17:30 Modelling of Damage and Fracture in the Microstructure of Multiphase Steels  
*Vitoon Uthaisangsuk, Bart Binsbergen, Ulrich Prahl and Wolfgang Bleck*
- 17:50 Energy Absorption and Damage Propagation in 2D Triaxially Braided Carbon Fiber Composites: Effects of Polymer Matrix  
*Amit G. Salvi, Anthony M. Waas and Ari Caliskan*
- 18:10 Elasto-Plastic Finite Element Studies of Fatigue Crack Shielding in Multi-Layered Systems  
*Allan Burke-Veliz, Philippa Reed and Stavros Syngellakis*



**Room: CAS3.9**

**TS303 Computational Fluid Dynamics II**

- 16:30 Accurate Incorporation of Non-Point-to-Point Matched Computational Blocks into Full Navier-Stokes Computations on Structured Grids  
*Boris Epstein and Sergey Peigin*
- 16:50 Anisotropic Adaptation for Complex Geometries  
*Jerzy Majewski and Vit Dolejsi*
- 17:10 Blanking Techniques for Chimera Method  
*Gaëlle Jeanfaivre, Christophe Benoit and Stéphanie Péron*
- 17:30 Body-Fitted Cartesian Grid Method for Complex High Reynolds Number Flows  
*Keiichiro Fujimoto, Kozo Fujii and Z. J. Wang*
- 17:50 OpenFOAM Mesh Motion using Radial Basis Function Interpolation  
*Frank Bos, Dubravko Matijasevic, Zdravko Terze, Bas van Oudheusden and Hester Bijl*
- 18:10 An Implicit Immersed Boundary Method for Three-Dimensional Membrane-Fluid Flow Interactions  
*Duc Vinh Le, Jacob White, Jaime Peraire, Kian-Meng Lim and Boo Cheong Khoo*

**Room: CAS3.10**

**TS313 Fracture Mechanics III**

- 16:30 Modelling Complex Gas Flow-Fractured Solid Interaction by a Finite/Discrete Element Method  
*Soheil Mohammadi*
- 16:50 Evaluation of Interference with Hole and Surface Crack using the VNA-FEM Alternating Method  
*Toshihisa Nishioka, Yusuke Hirooka, Youngjun Won, Guangqin Zhou and Takehiro Fujimoto*
- 17:10 Reflection Response of SH Transient Wave from a Finite Length Crack in Elastic Half-Space  
*Kimihisa Miura*

Room: **CIN0.1**

MS080 Biofluids and Coupled Problems in Biomechanics II

Joint IACM – IUTAM Minisymposium

Organizers: Wolfgang Wall, Marek Behr, Matteo Pasquali and Alberto Figueroa

- 16:30 The Interaction of Blood Flow and Drug Release for Cardiovascular Drug Eluting Stents  
*Carlo D'Angelo and Paolo Zunino*
- 16:50 Wall Shear-stress Computation on Heart Valves  
*Jens-Dominik Mueller*
- 17:10 Influence of Blood Microstructure on Computational Analysis and Design of Blood Pumps  
*Marek Behr, Mehdi Behbahani, Mike Nicolai and Markus Probst*

Room: **CIN0.2**

TS314 Computational Geomechanics I

- 16:30 Discrete Limit Analysis for GRW by using HPM with Penalty Density Function  
*Hirohisa Ohki, Norio Takeuchi and Akinori Hazama*
- 16:50 Numerical Computations in the Problems of the Limit Equilibrium of Materials with Different Strengths  
*Vladimir Sadovskii*
- 17:10 Wave Acoustic Propagation for Geophysics Imaging, Finite Difference vs Finite Element Methods Comparison and Boundary Condition Treatment  
*Anne-Cécile Lesage, Mauricio Araya Polo and Guillaume Houzeaux*
- 17:30 A Hybrid Method for Transient Wave Propagation in a Multilayered Solid  
*Xianyue Su and Jiayong Tian*
- 17:50 Absorbing Boundary Conditions and the Perfectly Matched Layer Model in Elastic Wave Propagation Analysis  
*Josif Josifovski, Vasil Vitanov and Otto von Estorff*
- 18:10 A Numerical Model for Structural Settlements due to Deformation Accumulation in Granular Soils under Repeated Small Amplitude Dynamic Loading  
*Stijn François, Christian Karg, Geert Degrande and Wim Haegeman*

Room: **CIN1.1**

MS170 Numerical Modeling and Simulation on Micro and Nanoscale Materials and Devices III

Organizers: Marisol Koslowski and Richard Lesar

- 16:30 **Discrete Dislocation Modeling of Polycrystal Plasticity (Keynote Lecture)**  
*Alan Needleman and Erik Van der Giessen*
- 17:00 **Grain-Scale Surface Roughness in Ductile Polycrystals (Keynote Lecture)**  
*Zizu Zhao, M. Ramesh, Raul Radovitzky, Dierk Raabe and Alberto Cuitiño*
- 17:30 A Microscale Model of Martensitic Transformation with Incorporation of Interaction Between Plasticity and Transformation  
*Alexei Balmachnov, Varvara Kouznetsova and Marc Geers*
- 17:50 A Three-dimensional eXtended Finite Element Method for Dislocation Dynamics  
*Jay Oswald, Robert Gracie and Ted Belytschko*
- 18:10 Continuum Model of Ultrafine Polycrystals with Embedded Growth Nano-twins  
*Antoine Jerusalem, Ming Dao, Subra Suresh and Raul Radovitzky*

**Room: CIN2.1**

**MS043 Advances in Boundary Element Methods II**

Organizers: Yijun Liu, Martin Schanz, Naoshi Nishimura, Zhenhan Yao, Marc Bonnet, Ernie Pan, Attilio Frangi and Mitch Denda

- 16:30 Accelerating an Elastodynamic Boundary Element Formulation by using Adaptive Cross Approximation  
*Matthias Messner and Martin Schanz*
- 16:50 Dynamic Response Analysis of Interfacial Cracks in 2D Anisotropic Bi-Materials using a Time-Domain BEM  
*Jun Lei, Felipe García-Sánchez and Chuanzeng Zhang*
- 17:10 A 3-D Elastodynamic Symmetric Galerkin Boundary Element Formulation for Semi-Infinite Domains  
*Lars Kielhorn and Martin Schanz*
- 17:30 Analysis of Rock Bolts and Inhomogeneities in Tunneling with the BEM  
*Katharina Riederer, Christian Duenser and Gernot Beer*
- 17:50 The Boundary Element Collocation Method for Fractional Diffusion Equations  
*Jukka Kemppainen and Keijo Ruotsalainen*
- 18:10 An Alternative Boundary Element Multi-Region Formulation applied to 3D Infinite Domain Problems  
*Dimas Ribeiro and João Paiva*

**Room: PGL**

**MS208 Computational Modelling of Locomotor Systems III**

Organizers: Markus Böl, Stefanie Reese and Bob Svendsen

- 16:30 The 3D Architecture of Muscle Fascicles in Selected Muscles and its Relevance to Force Production  
*Heiko Stark, M.S. Fischer and N. Schilling*
- 16:50 Three-Dimensional Modelling of Whole-Body Human Walking: An Investigation into the Fundamental Problem of Inverse Dynamics  
*Lei Ren and David Howard*
- 17:10 Optimization-Based and EMG-Assisted Estimation of Muscle Forces and Joint Moments under Isometric and Dynamic Contractions  
*David Amarantini*
- 17:30 Prediction of Human Walking based on Simple Gait Descriptors  
*Lei Ren, Richard Jones and David Howard*
- 17:50 A Model to explain Human Trunk Mechanics in Walking  
*Emanuel Andrada and Hartmut Witte*
- 18:10 Computational Mechanics of Human Gluteal Soft Tissue and Body Support Interaction  
*Gerhard Silber and Christophe Then*

**Room: EXC1.1**

**MS053 Minisymposium in Honor of Prof. O.C. Zienkiewicz III**

Organizers: Robert Taylor and Perumal Nithiarasu

- 16:30 The P-Version of the Finite Element Method  
*Ernst Rank and Alexander Düster*
- 16:50 Staggered Procedures Revisited – Initial Fondest Hopes, Ensuing Applications, and Future Prospects  
*K. C. Park and Carlos A. Felippa*
- 17:10 3D Nurbs-Enhanced Finite Element Method (NEFEM)  
*Antonio Huerta, Rubén Sevilla and Sonia Fernández-Méndez*
- 17:30 An Ale Based CBS Algorithm for Non-isothermal Non-newtonian Flow with Adaptive Coupled Finite Element and Meshfree Method  
*Xikui Li, Qinglin Duan, Xianhong Han and Xuanping Wang*
- 17:50 An Artificial Compressibility Algorithm for Modelling Natural Convection in Saturated Packed Pebble Beds: A Heterogeneous Approach  
*Arnaud G. Malan, Coert Visser and J.P. Meyer*

**Room: EXC1.2**

**MS073 Minisymposium in the Honor of Michel Bernadou's 65th Birthday IV**

Organizers: John Cagnol and Roland Glowinski

- 16:30 Numerical Simulation of Smart Cells with a Frontal Microperforated Wall devised as Sound Absorbers  
*Alfredo Bermudez, Pablo Gamallo, Luis Hervella-Nieto and Andres Prieto*
- 16:50 Dynamic Simulation of Fabric and Clothes  
*Rony Goldenthal, David Harmon, Bernhard Thomaszewski, Raanan Fattal, Eitan Grinspun and Michel Bercovier*
- 17:10 Shell Based Robust Numerical Procedures for the Solution of Real-Life Problems  
*Marina Vidrascu*
- 17:30 On the solution of Navier-Stokes Equations by the PSI Method as a Non-linear Petrov-Galerkin Method  
*Marta Benítez Garcia, Tomas Chacon Rebollo, Macarena Gomez Marmol and Gladys Narbona Reina*

**Room: EXC1.3**

**MS037 Extended / Generalized Finite Element Method III**

Organizers: Ted Belytschko, Elisa Budyn, John Dolbow, Nicolas Moës and Giulio Ventura

- 16:30 Improved SIF Extraction using different Domain Integrals in FEM and X-FEM  
*Eugenio Giner, Francisco Javier Fuenmayor, Ana Vercher and José Enrique Tarancón*
- 16:50 Non-Conformal XFEM Approach and Spider XFEM: Error Estimates and Numerical Experiments  
*Elie Chahine, Patrick Laborde and Yves Renard*
- 17:10 A Technique for Recovery of Equilibrium on Star Patches via a Partition of Unity  
*Jose Almeida and Edward Maunder*
- 17:30 Discontinuous Fields Integration in a Structured Mesh using the Level Set Method  
*Gaetan Briceux, Gaetan Remacle, Amine Ouair and Marc Dufloy*
- 17:50 High Order Extended Finite Element Method : Influence of the Geometrical Representation  
*Kristell Dréau, Nicolas Chevaugnon and Nicolas Moës*
- 18:10 A More Reliable Finite Element Procedure Via controlling the Condition Number of the System  
*Sina Mohajeri, Pouyan Broumand, Amir Khoei, Mostafa Zeinali and Leila Farrokhpour*

**Room: EXC2.1**

**STS02: Large Eddy Simulation: Research and Industrial Applications**

Organizer: Charles Hirsch

- 16:30 Simulation of Separation from Continuous Surfaces: Some Lessons on Capabilities and Limitations  
*Michael A. Leschziner*
- 16:50 Large-Eddy Simulation of Shock-Induced Separation of a Turbulent Bondary Layer  
*Neil D. Sandham and Emile Touber*
- 17:10 LES-Like Simulations in Aerospace Engineering: From Validation to Physical Analysis  
*Pierre Sagaut*
- 17:30 Towards LES Application for Shock-Boundary Layer Interactions  
*George Barakos, J.C. Huang and E. Benard*

**Room: EXC2.2**

**STS04: Introduction to Optimisation Methods and Tools for Multidisciplinary Design in Aeronautics and Turbo-Machinery (VKI Course Summary Session)**

Organizer: Herman Deconinck

- 16:30 Optimal Shape Design, Theory and Algorithm  
*Olivier Pironneau*
- 16:50 Summary Report: VKI Lecture MOO Methods for Multidisciplinary Design and UCAV Systems Applications  
*Felipe Gonzalez, Jacques Pèriaux, Dong Seop Lee and Karkenahalli Srinivas*
- 17:10 Multi-disciplinary Optimization of HP Turbine Blades taking into account Heat Transfer and Stresses  
*Rene Van den Braembussche, Tom Verstraete, Sergio Amaral and Tony Arts*
- 17:30 MDO Systems for Aeronautical Applications  
*Vittorio Selmin*
- 17:50 Robust design, Self Organizing Maps and Applications in Aeronautics/Turbomachinery  
*Valentino Pediroda and Carlo Poloni*

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Thursday

P = Plenary Lecture  
 SP = Semi-Plenary Lecture  
 MS = Minisymposium  
 TS = Thematic Session  
 STS = Special Technology Session

## Plenary Lectures (P)

- P7. Thursday 08.20 – PGL:** **Ted Belytschko**  
Northwestern University, United States  
*Multiscale Computational Methods for Failure*
- P8. Thursday 08.50 – PGL:** **Pierre Ladevèze**  
LMT-Cachan, Paris 6 University, France  
*The Latin Method: A Paradigm for Multiscale and Multiphysics Computational Methods*

## Semi-Plenary Lectures (SP)

Thursday 09.30

- SP9. CAS1.7:** **Nicolas Moës**  
Ecole Centrale de Nantes, France  
The eXtended Finite Element Method: State of the Art and Challenges Ahead
- SP10. CAS3.7:** **Javier Bonet**  
University of Wales Swansea, United Kingdom  
Two Step Taylor-Galerkin Solution of Lagrangian Explicit Dynamic Solid Mechanics
- SP11. CIN1.1:** **Worsak Kanok-Nukulchai**  
Asian Institute Of Technology, Thailand  
Advances in Kriging-Based Finite Element Method
- SP12. PGL:** **Tom Hughes**  
The University of Texas at Austin, United States  
*Isogeometric Analysis: Progress and Challenges*

**Room: CAS0.1**

**MS158 Sparse Linear System Solvers for Large-Scale Finite Element Applications I**

Organizers: Alberto Bertoldo and Mauro Bianco

- 10:30 Coupled Analysis of Reactor Vessel by Domain Decomposition Methods  
*Jaroslav Kruis*
- 10:50 Direct Versus Iterative Solvers for Sparse Linear Systems within Time-Adaptive Finite-Element Analysis of Inelastic Structures  
*Karsten J. Quint, Stefan Hartmann, Juerjen Duintjer Tebbens and Meister Andreas*
- 11:10 Reduced Basis and Iterative Algorithms for Non-Linear Elastic Thin Shells  
*Jean-Marc Cadou and Michel Potier-Ferry*
- 11:30 Multi-Step Preconditioner for Saddle-Point Problems  
*Aleksandar Jemcov and Joseph Maruszewski*
- 11:50 Projected Krylov Methods for the Solution of Unsymmetric Augmented Systems  
*Dominique Orban*
- 12:10 Efficient Finite Element Solvers for P-Laplacian Equation  
*Erasmus Senger and Abimael Loula*

**Room: CAS1.1**

**MS122 Adaptive Methods for Material Processing I**

Organizers: Thierry Coupez, Jean-François Hetu and José César de Sa

- 10:30 A New Reduced Integrated Solid-Shell Element for Sheet Metal Forming Applications  
*Rui Cardoso, Jeong Yoon, Made Mahardika and Sanjay Choudhry*
- 10:50 Application of Adaptive Method in Thermomechanical Modeling and Simulation of Extrusion of Aluminum Alloys  
*Farhad Parvizián, Tobias Kayser and Bob Svendsen*
- 11:10 Constitutive Modeling and Simulation of Cold Forming of Ceramic Powders  
*Andrea Piccolroaz, Davide Bigoni, Alessandro Cocchio, Luca Deseri, Alessandro Gajo and Laura Galuppi*
- 11:30 Integration of a Projection Technique for the Adaptive Remeshing of Thin Sheets  
*Laurence Giraud-Moreau, Houman Borouchaki and Abdelhakim Cherouat*
- 11:50 Efficient Simulation of Contact Problems: Multi-Body Case and Large Deformations  
*Thomas Dickopf, Rolf Krause and Christina Mohr*

**Room: CAS1.2**

**MS167 Inverse Problems for Parameter Identification II**

Organizers: George Dulikravich, Giulio Maier and Helcio Orlande

- 10:30 A Procedure for the Identification of Concentrated Damages on Beams by Static Tests  
*Salvatore Caddemi, Ivo Caliò and Sandro Liseni*
- 10:50 Inverse Finite Element Method for Real-Time Structural Health Monitoring: Application to Fiber-Optic Strain Measurements  
*Alexander Tessler and Massimiliano Mattone*
- 11:10 Crack Identification in Concrete with Electrical Resistance Tomography  
*Kimmo Karhunen, Aku Seppänen, Anssi Lehtikainen, Paulo Monteiro and Jari Kaipio*
- 11:30 GPS Based Structural Identification: a Feasibility Study  
*Fabio Casciati and Clemente Fuggini*
- 11:50 Comparison of Kalman Filter Approaches in the Field of Geomechanics  
*Anneke Hommels, Akira Murakami and Shin-Ichi Nishimura*
- 12:10 Optimization Techniques for Inverse Identification of Geomechanical Parameters  
*Igor Grešovnik, Nedim Radončić, Karl Grossauer and Tomaž Rodič*



**Room: CAS1.3**

**TS325 Optimization and Control I**

- 10:30 An Optimization Strategy for the Blank Holder Force in Deep Drawing  
*Raghupathy Padmanabhan, Marta Oliveira, José Luis Alves and Luis Menezes*
- 10:50 Design of the Resistance Welding Tool using Optimization Techniques  
*Michael Bogomolny, Martin P. Bendsøe and Jesper Hattel*
- 11:10 Numerical Solutions for Optimal Control of the Bidomain Equations  
*Chamakuri Nagaiah, Karl Kunisch and Gernot Plank*
- 11:30 Stress-constrained Topology Optimization by Truly-mixed Finite Elements  
*Matteo Bruggi and Paolo Venini*
- 11:50 Topology Optimization with Fatigue Constraints of Nozzle Connections of Pressure Vessels  
*Mirosław Mrzyglod and Andrzej Zieliński*

**Room: CAS1.4**

**MS148 Numerical Modeling of Coupled Problems in Geo- and Durability Mechanics I**

Organizers: Günther Meschke and Xikui Li

- 10:30 **Modeling of Calcium Leaching from Cemented Composites Coupled with Micro-Pore Structural Reform (Keynote Lecture)**  
*Koichi Maekawa, Kenichiro Nakarai and Tetsuya Ishida*
- 11:00 **Numerical Model of Calcium Leaching in Cementitious Materials, considering the Process Kinetics and Advective Calcium Transport (Keynote Lecture)**  
*Dariusz Gawin, Francesco Pesavento and Bernhard A. Schrefler*
- 11:30 Modelling of Chemo-Mechanical coupling in Porous Cement Paste  
*Jianfu Shao, A. Mohamad-Hussein, Y. Zhang, S.Y. Xie, N. Burlion and J. Saint-Marc*
- 11:50 Modelling the Mechanical Behaviour of Leached Interface  
*Cedric Lambert, Olivier Buzzi and Anna Giacomini*
- 12:10 Modelling and Numerical Simulation of the Degradation of Concrete at High Temperature  
*Dieter Dinkler and Lars Ostermann*

**Room: CAS1.5**

**MS139 Time- and Spatial Decomposition Methods for Multi-physical and Multi-field Problems II**

Organizers: Jürgen Geiser and Qin Sheng

- 10:30 A Reaction Kinetic Model for the Ethylene Polymerization using a Homogeneous Chromium Catalysts  
*Ali Lara, Ali Papa, Carmen Albano and Arquimedes Karam*
- 10:50 Development of Parallel Computational Framework for Multi-Physics Flow Simulations  
*René Steijl and George Barakos*
- 11:10 Modelling the VAR Process  
*Georgi Djambazov, Koulis Pericleous and Valdis Bojarevics*
- 11:30 Two-Phase Flow Simulation using Parallel Computers with Distributed Memory  
*Rogério Silva, Paulo Lyra, Darlan Carvalho and Ramiro Willmersdorf*

**Room: CAS1.6**

**MS142 Dynamics of Nonlinear Structures with Contact Interfaces I**

Joint IACM – IUTAM Minisymposium

Organizers: Evgeny Petrov and Kai Willner

- 10:30 **Controlled Friction Damping by Semi-Active Joints (Keynote Lecture)**  
*Lothar Gaul*
- 11:00 **Resonance Peak Vibrations of Nonlinear Structures with Friction Interfaces: Sensitivity Analysis and Optimization (Keynote Lecture)**  
*Evgeny Petrov*
- 11:30 Multi-Scale Dynamic Method for Structures with Contact Interfaces  
*Pierre-Alain Boucard, David Odièvre and Fabrice Gatuings*
- 11:50 Friction Damping  
*Walter Sestro*
- 12:10 Mathematical Modelling of Self Contact in Hyperelastic Rods  
*Saloua Mani Aouadi, Mourad Chamekh and Maher Moakher*

**Room: CAS1.7**

**MS019 Computational Methods in Multibody Dynamics Simulation X**

Organizers: Dan Negrut, Carlo Bottasso and Rudranarayan M. Mukherjee

- 10:30 Belt Fit Simulation for a Safety Belt System Design  
*Dong-Hun Kim, Hyun-Dai Kang, Soo-Won Chae, Jae-Nyung Han and Dong-Seok Kim*
- 10:50 Multibody Dynamics Methodologies for Road Accidents  
*Ricardo J.F. Portal and João M.P. Dias*
- 11:10 Modelling of Coupled Rotating Systems with Gears  
*Michal Hajžman and Vladimír Zeman*
- 11:30 Slider-Crank Mechanism  
*Homero Jiménez, Isaias Hilerio, Mario Gómez, Benjamín Vázquez, Gilberto D. Álvarez and Giancarlo Rosas*

**Room: CAS1.8**

**MS030 Accomplishments and Challenges in Verification & Validation I**

Organizers: Luís Eça, Len Schwer, Martin Hoekstra and Bill Oberkampf

- 10:30 Verification Test of Mixed High-Order Numerical Codes for Laminar-Turbulent Transition Simulation  
*Homero Ghioti da Silva and Marcello Augusto Faraco de Medeiros*
- 10:50 Impact of Coding Mistakes on Numerical Error and Uncertainty in Solutions to PDEs  
*Patrick Knupp, Curtis Ober and Ryan Bond*
- 11:10 Tolerance and UQ4SIM: Nimble Uncertainty Documentation and Analysis Software  
*Bil Kleb*
- 11:30 The Evaluation of Different Validation Techniques for Software Development Process  
*Gray F. Moita and Bruno Ferreira*
- 11:50 Error Dynamics: A New paradigm in Scientific Computing  
*Tapan Kumar Sengupta, Valliappan Lakhsmanan, Anurag Dipankar and Pierre Sagaut*
- 12:10 Bayesian Modelling Error Approach for Uncertainties in the Model Parameters—Experimental Results in Electrical Impedance Tomography  
*Antti Nissinen, Lasse Heikkinen and Jari Kaipio*

**Room: CAS2.1**

**MS199 High-performance Computing in Computational**

*Mechanics IV*

Organizers: Shahrouz Aliabadi, Omar Ghattas, Robert Haber, Guillaume Houzeaux, Abani Patra and Mariano Vázquez

- 10:30 High Performance Computing for Current and Future NASA Applications  
*Rupak Biswas*
- 10:50 Enhancing Data Locality and Interface Communication in Edge-Based Computations  
*Marcos Martins, Renato Elias, Jose Camata and Alvaro Coutinho*
- 11:10 Scalable Domain Decomposition Algorithms for Coupled Multiphysics Problems  
*Xiao-Chuan Cai*
- 11:30 Mesh Domain Decomposition supervised by Control Space  
*Tomasz Jurczyk and Barbara Glut*
- 11:50 Evolution of a CFD Code's Tool Chain towards HPC Applications  
*Yvan Fournier, Jérôme Bonelle and Sofiane Benhamadouche*

**Room: CAS.2.2**

**MS203 Computations of Fluid Flows at the Solid-Fluid Interfaces II**

Organizers: Dimitrios Papavassiliou and Lloyd Lee

- 10:30 A Quadrature Based Moment Approach for Multi-Component Fluid Mixtures using Boltzmann Equations  
*Prakash Vedula*
- 10:50 Large-Scale DES around Complex Geometries using an Unstructured Compressible Flow Solver  
*Laurent Georges, Koen Hillewaert, Raphaël Capart and Philippe Geuzaine*
- 11:10 Convective Heat Transfer Predictions in an Axisymmetric Jet Impinging onto a Flat Plate  
*Sławomir Kubacki and Erik Dick*
- 11:30 Unsteady Computational Analysis of Supersonic Underexpanded Jet Impinging on an Inclined Flat Plate  
*Yoshinori Goto, Kansai McIlroy and Kozo Fujii*

**Room: CAS2.3**

**MS130 Theory and Applications of Discontinuous**

*Galerkin Methods I*

Organizers: Slimane Adjerid, Clint Dawson, Adrian Lew, Beatrice Riviere and Chi-Wang Shu

- 10:30 A Discontinuous Galerkin Method for solving Partial Differential Equations in Complicated Domains  
*Peter Bastian, Christian Engwer and Sreejith Kuttannikkad*
- 10:50 Smoothness-Increasing Accuracy-Conserving Filtering of Discontinuous Galerkin Solutions  
*Jennifer Ryan*
- 11:10 Discontinuous Galerkin Methods for the Chemotaxis Model and Closely Related Biomedical Problems  
*Yekaterina Epshteyn and Alexander Kurganov*
- 11:30 Bubble Stabilization of Discontinuous Galerkin Methods  
*L. DOñatella Marini*
- 11:50 A Subgrid Discontinuous Galerkin Method for Advection-Diffusion-Reaction Problems  
*Regina Almeida, Eduardo Dutra do Carmo and Natalia Arruda*
- 12:10 CFL Conditions for Runge-Kutta and Multi-Step Discontinuous Galerkin Methods  
*Ethan J. Kubatko, Clint Dawson and Joannes J. Westerink*

**Room: CAS2.4**

**MS060 Recent Advances in Numerical Methods for Hyperbolic Problems II**

Organizers: Sergey Karabasov, Vassily Goloviznin, Tatyana Kozubskaya, Yoko Takakura, Ralf Deiterding and Maria Lukacova

- 10:30 Very High-Order Godunov-Type Methods on Unstructured Hexahedral Meshes in Three Space Dimensions  
*Panagiotis Tsoutsanis, Vladimir Titarev and Dimitris Drikakis*
- 10:50 Benchmark of ADER Schemes in Multi-Dimensional Phenomena  
*Yoko Takakura*
- 11:10 Quasi-Gasdynamical Numerical Algorithm for Unsteady Flow Simulations  
*Tatiana Elizarova*
- 11:30 Transparent Boundary Conditions for Anisotropic Elastodynamics  
*Ivan L. Sofronov and Nikolai A. Zaitsev*
- 11:50 Boundary Conditions for Combined Compact Difference Schemes with High Resolution  
*Kazuya Matsuoka and Katsuya Ishii*
- 12:10 Free Boundary Conditions for High-Accuracy Aeroacoustic Algorithms  
*Ludwig Dorodnicyn*

**Room: CAS2.5**

**MS052 Iterative Solvers for the Incompressible Navier Stokes Equations I**

Organizers: Michele Benzi and Kees Vuik

- 10:30 **Black-Box Multigrid Preconditioning for Unsteady Incompressible Flows (Keynote Lecture)**  
*David Silvester and David Kay*
- 11:00 **Time-Adaptive Splitting Schemes for the Incompressible Navier-Stokes Equations (Keynote Lecture)**  
*Alessandro Veneziani*
- 11:30 Modified Augmented Lagrangian Methods for the Navier-Stokes Equations  
*Michele Benzi*
- 11:50 A Projection Method and Solvers for Incompressible Viscous Flow with Coriolis Force  
*Maxim Olshanskii, Andriy Sokolov and Stefan Turek*
- 12:10 A 3D Unsteady Incompressible Flow Solver and its Application in Fluid Structure Interaction Problems  
*Ubay Hassan, Clare Wood, Z. Zhang, Antonio J. Gil and Kenneth Morgan*

**Room: CAS2.6**

**MS120 Modern Approaches for Fluid-structure Interaction Problems on Lightweight Structures I**

Joint IACM – IUTAM Minisymposium

Organizers: Roland Wüchner and Riccardo Rossi

- 10:30 **Stability Issues of Implicit Coupling Methods for Partitioned Solvers in Biomechanical Applications (Keynote Lecture)**  
*Jan Vierendeels, Joris Degroote, Robby Haelterman and Peter Bruggeman*
- 11:00 **Algebraic Multigrid in Fluid Structure Interaction Biomechanics (Keynote Lecture)**  
*Michael Gee and Wolfgang A. Wall*
- 11:30 Design of Efficient Structures considering Flow-Induced Effects  
*Roland Wüchner, Alexander Kupzok, Thomas Gallinger and Kai-Uwe Bletzinger*
- 11:50 Low-Speed Aeroelasticity of Rotor Blades and Slender Wings with Adaptive Airfoils  
*Carlos E.S. Cesnik, Smith Thepvongs and Rafael Palacios*
- 12:10 The Robin-Robin/GMRES Algorithm for Fluid-Structure Interaction: Large Added-Mass Effect and Balloon-Type Problems  
*Santiago Badia, Fabio Nobile and Christian Vergara*

**Room: CAS3.1**

**MS119 Computational Methods in Composite Materials and Structures IV**

Organizers: Anastasia Muliana, Rami Haj-Ali and Marcin Kaminski

- 10:30 A Study on the Development of Numerical Fatigue Damage Analysis Method for Welded Structures  
*Chi-Seung Lee, Young-Hwan Kim, Myung-Hyun Kim and Jae-Myung Lee*
- 10:50 Progressive Failure Analysis with MD Nastran and Genoa  
*Per Nordlund, Shiva Padmanaban, Claudio Bruzzo and Marco Calcagni*
- 11:10 An Experimental Study on the Bearing Strength of Composite Laminates  
*Francesco Ascione and Luciano Feo*
- 11:30 Mixed Finite Element Solution on the-out-of Plane Natural Frequencies of Composite Circular Beams  
*Bahar Ayhan and Fethi Kadioglu*
- 11:50 Finite Element Large Deformation Analysis of Cord-Reinforced Membranes  
*Suresh Shrivastava and John Nemr Saliba*
- 12:10 Effect of Support Conditions on the Behavior of the Laminated Glass Arch  
*Mehmet Zulfu Asik and Ebru Dural*

**Room: CAS3.2**

**MS236 Adaptive Modeling in Computational Mechanics II**

Organizers: J. Tinsley Oden and Serge Prudhomme

- 10:30 Hybrid Solvers for Heterogeneous Multiscale Methods  
*Assyr Abdulle*
- 10:50 An Adaptive Multiscale Resolution Strategy for the Analysis of Microheterogeneous Structures  
*Ilker Temizer and Peter Wriggers*
- 11:10 Adaptive Models for Electronic Structure Computations of Solids and Defects  
*Denis Aubry and Ann-Lenaig Hamon*
- 11:30 Application-Specific Error Control in Inverse Identification  
*Hakan Johansson, Fredrik Larsson and Kenneth Runesson*
- 11:50 Estimation of Modeling Errors for a Coupling Method  
*Serge Prudhomme, J. Tinsley Oden, Paul T. Bauman, Ludovic Chamoin and Hachmi Ben Dhia*
- 12:10 Modeling Error Estimates in the Simulation of the Electrical Activity of the Heart  
*Lucia Mirabella, Fabio Nobile, Mauro Prego and Alessandro Veneziani*

**Room: CAS3.3**

**TS319 Computational Mathematics and Numerical Methods I**

- 10:30 A Finite Difference Scheme for the Biharmonic Equation in Planar Irregular Domains  
*Matania Ben-Artzi, Ittai Chorev, Jean-Pierre Croisille and Dalia Fishelov*
- 10:50 A Finite Difference Method for Helmholtz Equation for Unstructured Meshes  
*Daniel Thomes Fernandes and Abimael Loula*
- 11:10 Numerical Solution of a 1-D Time-Dependent Phase Change Problem  
*Mohamad Muhieddine, Édouard Canot and Ramiro March*
- 11:30 DIAMANT: An Efficient Automatic Differentiation Tool for the Solution of Non Linear Problems  
*Isabelle Charpentier, Arnaud Lejeune and Michel Potier-Ferry*
- 11:50 A New Mixed Finite Element Method on Hexahedra, its Equivalent Finite Difference Method and Convergence of Multipoint Flux Approximation in 3D  
*Sebastien Matringe, Ruben Juanes and Hamdi Tchelepi*
- 12:10 An Algebraic Multilevel Method for Nonsymmetric Discontinuous Galerkin Methods  
*Klaus Johannsen*

**Room: CAS3.4**

**MS086 Coupled Multifield Problems and Smart Structures I**

Joint IACM – IUTAM Minisymposium

Organizers: Thomas Wallmersperger, Bernd Kröplin and Erasmo Carrera

- 10:30 **A Thermomechanical Refined Sinus Finite Element including Transverse Normal Stress Effects in Multilayered Beams (Keynote Lecture)**  
*Philippe Vidal and Olivier Polit*
- 11:00 **Electroactive Polymers - Basics, Modeling and Applications (Keynote Lecture)**  
*Thomas Wallmersperger*
- 11:30 Analysis of Localized Effect in Vicinity of Piezoelectric Patches  
*Erasmo Carrera and Pietro Nali*
- 11:50 The Significance of Nilpotent Sensors for Monitoring in Multifield Problems  
*Michael Krommer and Markus Zellhofer*
- 12:10 Smart Structure Design for Micro-Vibration Environment Control - Thales Alenia Space Experience  
*Pietro Carlo Marucchi-Chierro*

**Room: CAS3.6**

**MS187 Mechanical Modeling of Wood and Wood Based Materials II**  
**Joint IACM – IUTAM Minisymposium**

Organizers: Josef Eberhardsteiner, Michael Kaliske and Karin Hofstetter

- 10:30 Multiscale Approach for the Modelling of Timber Structures under Earthquake Loading  
*Luc Davenne, Motoi Yasumura and Nicolas Richard*
- 10:50 Modeling Anisotropic Elasticity of Multi-Layer Engineered Wood Products  
*Reinhard Stürzenbecher, Karin Hofstetter, Gerhard Schickhofer and Josef Eberhardsteiner*
- 11:10 Prediction of Effective Stiffness Properties of Wooden Lightweight Panels by Means of Numerical Simulations  
*Christoph Hackspiel, Karin Hofstetter and Ulrich Müller*
- 11:30 A Multi-Scale Analysis of Wood Physical Properties by the Reinforced-Matrix Principle: Formulation by Mori-Tanaka Theory  
*Hiroyuki Yamamoto, Joseph Gril and Tancrede Almeras*
- 11:50 Tensile Properties of Native Wood Fibres  
*Michaela Eder, Stefanie Tschegg and Ingo Burgert*

**Room: CAS3.7**

**MS210 Image-Based Computational Modelling of Materials III**

Organizers: M.A. Siddiq Qidwai and Andrew B. Geltmacher

- 10:30 Image-Based Computational Modeling of Titanium Alloys  
*M.A. Siddiq Qidwai, Andrew Geltmacher, Alexis Lewis, David Rowenhorst and George Spanos*
- 10:50 Image Based Crystal Plasticity Models for Dwell Fatigue Initiation in Polycrystalline Alloys  
*Somnath Ghosh, K. Kirane, D. Joseph and P. Chakraborty*
- 11:10 An Automated Framework for Incorporation of Realistic Microstructures in Computational Models  
*Michael Groeber, Somnath Ghosh, Michael Uchic and Dennis Dimiduk*
- 11:30 Femtosecond Laser Serial Sectioning: A New Tomographic Technique  
*Mclean Echlin and Tresa Pollock*
- 11:50 Experimental and Theoretical Investigation of the Microstructure of Aluminum Alloys during Extrusion  
*Tobias Kayser, Farhad Parvzian and Bob Svendsen*
- 12:10 Thermomechanical Modeling and Characterization of the Semi-Solid State of A356 Alloys during Solidification  
*Gottfried Laschet, Stefan Benke, Ismail Caylak, Lars Pape, Sebastian Dziallach, Rolf Mahnken, Michael Modigell, Ulrich Prah and Wolfgang Bleck*

**Room: CAS3.8**

**MS109 Computational Fracture Mechanics of Heterogeneous Materials and Structures III**

Organizers: Noriyuki Miyazaki and Toru Ikeda

- 10:30 Dynamic Study of Adhesive Joints under Different Loading Rates  
*Oussama Essersi, Mostapha Tarfaoui, Stephen Boyd, R.Ajit Sheno and Fodil Meraghni*
- 10:50 Deformation Analysis of Gun Bullet's Collision  
*Hidetoshi Sakamoto, Tetsuya Hiwatashi and Toshihiko Yamaguchi*
- 11:10 Crack Driving Force in Geometrically Nonlinear Orthotropic Functionally Graded Materials  
*Ralf Denzer*
- 11:30 Brittle Crack Growth driven by Material Forces  
*Rolf Mahnken*
- 11:50 Stochastic Elasto-plastic Fracture Analysis of Aluminum Foam using Cohesive Zone Model  
*Sun Shi-yong, Chen Hao-ran and Hu Xiao-zhi*
- 12:10 Structural Dependence of Plastic Rotation Capacity in RC Beams  
*André Luís Gamino, José Luiz Sousa and Túlio Nogueira Bittencourt*

**Room: CAS3.9**

**TS303 Computational Fluid Dynamics III**

- 10:30 An Updated Lagrangian Approach for Fluid-Structure Problems based on Natural Elements and the Method of Characteristics  
*Andrés Galavís, David González, Elías Cueto and Francisco Chinesta*
- 10:50 Fast and Accurate Computational Nonlinear Aeroelasticity for Wing Optimization  
*Simon-Nicolas Roth and Azzeddine Soulaïmani*
- 11:10 Passive Control of Transonic Cavity Flow  
*Stephen J. Lawson and George Barakos*
- 11:30 Numerical Simulations of Natural Convection Flow in a Rectangular Cavity under Transient Boundary Conditions  
*Deniz Kizildag, Carlos D. Perez-Segarra, Assensi Oliva and Ivette Rodríguez*
- 11:50 Numerical Study of Flow and Heat Transfer for Incompressible Flows Past Open Cavity  
*Youssef Stiriba, Xavier F. Grau, Josep A. Ferré and Anton Vernet*
- 12:10 Vortex Shedding in a Confined Laminar Flow Past a Square Cylinder  
*Anna Mueller, Jerome Anthoine and Patrick Rambaud*

**Room: CAS3.10**

**MS103 Damage and Interfacial Delamination Modelling in Composite Materials I**

Joint IACM – IUTAM Minisymposium

Organizers: Domenico Bruno, Frédéric Lebon and Elio Sacco

- 10:30 Delamination Study of Z-Pinned Composite Laminates  
*Tiziana Turetta, Alessia Cottone and Giuseppe Giambanco*
- 10:50 Ductile Failure of Heterogeneous Materials: A Cohesive-Volumetric Approach Coupling Analytical and Numerical Homogenization Models  
*Yann Monerie, Frédéric Perales and Pierre-Guy Vincent*
- 11:10 Computational Estimation of Macroscopic Constitutive Behavior in Composite Materials  
*Domenico Bruno, Fabrizio Greco, Paolo Lonetti and Paolo Nevone Blasi*
- 11:30 Justification of the Periodic Distribution of Transverse Cracks in a Composite by Energy Minimization  
*Blaise Bourdin and Jean-Jacques Marigo*
- 11:50 Modelling of the Bond Behaviour of CFRP Laminates Glued on Clay Bricks  
*Ernesto Grande, Maura Imbimbo and Elio Sacco*
- 12:10 Numerical Homogenization of Periodic Composites by Prescribing the Average Stress  
*Andrea Caporale and Raimondo Luciano*

**Room: CIN0.1**

**MS080 Biofluids and Coupled Problems in Biomechanics III**

Joint IACM – IUTAM Minisymposium

Organizers: Wolfgang Wall, Marek Behr, Matteo Pasquali and Alberto Figueroa

- 10:30 Multiscale Elasticity of Tissue Engineering Scaffolds with Tissue-Engineered Bone: A Continuum Micromechanics Approach  
*Emmanuel Bertrand and Christian Hellmich*
- 10:50 A Sample-Specific Computational Model of Articular Cartilage based on MRI, Histology, Computer Vision and Mechanical Testing  
*David Pierce, Werner Trobin, Horst Bischof, Siegfried Trattning and Gerhard A. Holzapfel*
- 11:10 Multi-Scale Analysis of Coupled Lung Tissue Dynamics  
*Lena Wiechert and Wolfgang A. Wall*
- 11:30 Modeling on Dynamic Behavior of Lung Surfactant using Smoothed Particle Hydrodynamics  
*Inga Mahle, Xiangyu Hu and Nikolaus Adams*
- 11:50 Cross Flow Phenomenon in Nasal Septal Perforations  
*Heow Pueh Lee, D.Y. Wang, V.F.H. Chong, C.S. Chong and H.J. Poh*
- 12:10 LES and DES Study of Fluid-Particle Dynamics in Human upper Respiratory Pathway  
*Santhosh Jayaraju, Mark Brouns, Sylvia Verbanck and Chris Lacor*

**Room: CIN0.2**

**MS066 Propagation of Electron, Elastic, and Electromagnetic Waves in Nonhomogeneous Waveguides and Nanostructures**

Joint IACM – IUTAM Minisymposium

Organizers: Lev Baskin, Pekka Neittaanmäki and Boris Plamenevskiy

- 10:30 Asymptotics of Resonant Tunneling in Quantum Waveguides of Variable Cross-Section  
*Lev Baskin, Pekka Neittaanmäki, Boris Plamenevskiy and Oleg Sarafanov*
- 10:50 The Modeling of Low Threshold Field Emission from Nanostructures  
*Lev Baskin, Pekka Neittaanmäki and Boris Plamenevskiy*
- 11:10 On Electron Transport in Locally Periodical Waveguides  
*Alexey Pozharsky*
- 11:30 On Electron and Phonon Transport in Nanostructures  
*Lev Baskin, Pekka Neittaanmäki, Boris Plamenevskiy and Alexey Pozharsky*
- 11:50 Numerical Solution of Nanomechanics Problems. Development of the Hybrid Method  
*Irina Goryacheva, Pekka Neittaanmäki and Alexander Kravchuk*
- 12:10 Resonance Frequency and Young's Modulus of Composite Porous Silicon/Silicon Cantilever Beams  
*Somashekara Bhat, Renny Edwin Fernandez, Sara Stolyarova and Enakshi Bhattacharya*

**Room: CIN1.1**

**MS170 Numerical Modeling and Simulation on Micro and Nanoscale Materials and Devices IV**

Organizers: Marisol Koslowski and Richard Lesar

- 10:30 Athermal Mechanisms of Size-Dependent Crystal Flow Gleaned from Three-Dimensional Discrete Dislocation Simulations  
*Satish Rao, Dennis Dimiduk, Triplicane Parthasarathy, Michael Uchic, Meijie Tang and Christopher Woodward*
- 10:50 Computer Simulations of Dislocation Motion in Crystals  
*Jerzy P. Nowacki, Vladimir I. Alshits, Romuald Kotowski and Piotr Tronczyk*
- 11:10 Discrete Transformation - Dislocation Model  
*Jingyi Shi, Sergio Turteltaub and Erik Van der Giessen*
- 11:30 Improving 3D Mechanisms used in Mechanism-Based Discrete Dislocation Plasticity by considering Periodic Boundary Conditions  
*Siamak Soleymani Shishvan, Soheil Mohammadi and Mohammad Rahimian*
- 11:50 Multi-Scale Modelling of Cluster Formation  
*Karine Gouriet and Tatiana E. Itina*
- 12:10 Quasicontinuum Method: Novel Theories and Implementation  
*Chuin-Shan Chen, Shu-Wei Chang and Chien-Kai Wang*



**Room: CIN2.1**

**MS043 Advances in Boundary Element Methods III**

Organizers: Yijun Liu, Martin Schanz, Naoshi Nishimura, Zhenhan Yao, Marc Bonnet, Ernie Pan, Attilio Frangi and Mitch Denda

- 10:30 Simulation of CNT Composite using Fast Multipole Boundary Element Method  
*Zhenhan Yao, Jundong Xu and Haitao Wang*
- 10:50 Comparison of Two FFT-BIE Methods for Poisson-Type Equation  
*Xuefei He, Kian-Meng Lim and Siak-Piang Lim*
- 11:10 Fast Multipole Compression for Non-Homogenous Parts of Poisson Type Problems  
*Jure Ravnik, Leopold Skerget and Matjaz Hribersek*
- 11:30 Integrated Imaging and Fast Boundary Element Computation for Complex Freeform Objects  
*Xiaolin Chen, Hui Zhang and Yijun Liu*
- 11:50 Scalable Total BETI Algorithm for 3D Contact Problems  
*Jiri Bouchala, Zdenek Dostal and Marie Sadowska*
- 12:10 Simple a Posteriori Error Estimators for the h-Version of the Boundary Element Method  
*Samuel Ferraz-Leite and Dirk Praetorius*

**Room: PGL**

**MS208 Computational Modelling of Locomotor Systems IV**

Organizers: Markus Böl, Stefanie Reese and Bob Svendsen

- 10:30 Biomechanics of a Crouched Gait caused by Spastic Cerebral Palsy in Children  
*Zubayer Karim, Andreas Kranzl, Margit Gfoehler and Marcus G. Pandy*
- 10:50 Motion Dynamics and Optimization of Humans and a Biologically Inspired Biped Robot  
*Maximilian Steitzer and Oskar von Stryk*
- 11:10 In Vivo Mechanical Characterisation of Human Buttock Fat and Muscle using Inverse FEM  
*Christophe Then and Gerhard Silber*
- 11:30 Mammalian Muscle Contraction and Performance Examined by Temperature Perturbation  
*K.W. Ranatunga*
- 11:50 Optimisation of Dynamic Human Movement  
*Mark King, Maurice Yeadon and Pui Kong*
- 12:10 CT-Based Reconstruction and Modelling of Muscle and Nerve Tissue  
*Amaryllis Audenaert and Emmanuel Audenaert*

**Room: EXC1.1**

**MS053 Minisymposium in Honor of Prof. O.C. Zienkiewicz IV**

Organizers: Robert Taylor and Perumal Nithiarasu

- 10:30 Fluid Structure Interaction with High Order Discontinuous Galerkin Methods  
*Jaime Peraire, Per-Olof Persson and David Willis*
- 10:50 The Characteristic / Inertial Galerkin Method applied to Shallow Water Flows  
*Ramon Codina*
- 11:10 An Iterated Upwind Method for Incompressible and Compressible Fluids  
*Joanna Szmelter and Piotr Smolarkiewicz*
- 11:30 CBS Methodology for Environmental Hydraulics. A Continuous FEM Competitive Choice  
*Pablo Ortiz*
- 11:50 Very Low Mach Number Problems and the CBS Scheme: Non-Hydrostatic Atmospheric Modelling for Numerical Weather Prediction  
*Mariano Vázquez and Guillaume Houzeaux*
- 12:10 Artificial Compressibility CBS Scheme for the Generalized Porous Medium Model  
*Fausto Arpino, Nicola Massarotti, Alessandro Mauro and Perumal Nithiarasu*

**Room: EXC1.2**

**MS107 Meshfree and Generalized/Extended Finite Element Methods I**

Organizers: J. S. Chen, Ivo Babuska, Ted Belytschko, C. Armando Duarte, Vítor Leitão, Wing Kam Liu, Hirohisa Noguchi and Angelo Simone

- 10:30 **On Finite Element Methods with Embedded Discontinuities for Evolving Interface Problems (Keynote Lecture)**  
*John Dolbow, Isaac Harari, Jessica Sanders and Tod Laursen*
- 11:00 **A Fluid Shell SPH Method for Simulation of Fluid Leakage in case of Severe Impact (Keynote Lecture)**  
*Alain Combescure, Bertrand Maurel and Serguei Potapov*
- 11:30 T-spline Finite Element Analysis of the Trimmed Surface  
*Hyun-Jung Kim, Yu-Deok Seo, Tae-Kyoung Uhm and Sung-Kie Youn*
- 11:50 A Discontinuous SPH Formulation and Application for 2D and 3D Problems  
*Fei Xu, Yan Zhao and Li Yulong*
- 12:10 The Meshless Local Petrov-Galerkin Method for the Stefan Problem in Systems with complex Geometry  
*Ruben Avila, Muhammad Ashraf and Jaime Cervantes*

**Room: EXC1.3**

**MS037 Extended / Generalized Finite Element Method IV**

Organizers: Ted Belytschko, Elisa Budyn, John Dolbow, Nicolas Moës and Giulio Ventura

- 10:30 3D Shape Optimization with X-FEM and Level Set Description  
*Laurent Van Miegroet and Pierre Duysinx*
- 10:50 Sensitivity Analysis of Interfaces using XFEM  
*Franz-Joseph Barthold and Monika Rotthaus*
- 11:10 Extended Finite Element Methods for Thin Plates  
*Jérémie Lasry, Yves Renard and Michel Salaün*
- 11:30 A 3D XFEM/Lagrange Multiplier Based Approach for Fluid-Structure Interaction  
*Axel Gerstenberger, Ursula M. Mayer and Wolfgang A. Wall*
- 11:50 Application of the Level Set X-FEM to Sloshing Problems of a Liquid Storage Container  
*Toshio Nagashima*

**Room: EXC2.1**

**STS08: New Technologies in Aero-Engines**

Organizer: Remy Denos

- 10:30 Numerical Analysis of the Unsteady Strong Shock Interaction in a Transonic Turbine  
*Lionel Castillon, Guillermo Paniagua and Tolga Yasa*
- 10:50 Selected Aerothermal CFD Analyses of High-Pressure Turbine Topics within the AITEB-2 Project  
*Erik Janke, Howard Hodson, B. Facchini, I. Popovic, K. Lehmann, C. Georgakis, L. Pons, E. Lutum, F. Wallin, Bill Dawes, F. Favaretto and L. Toni*
- 11:10 Appropriate Transition Modelling for the Design of Low Pressure Turbines  
*Dirk Nuernberger and Matthias Franke*
- 11:30 Aggressive Intermediate Ducts Aerodynamics for Competitive & Environmentally Friendly Jet Engines (AIDA)  
*Howard Hodson and Peter B.V. Johansson*

**Room: EXC2.2**

**STS07.1: MDO Tools for High Quality Design in Aeronautics**

Organizer: Jacques Pèriaux

- 10:30 CAD Centric Use of Geometry for Tightly Coupled Analysis and Design  
*Robert Haimes*
- 10:50 Industrial applications of Turbomachinery Blade Design Optimization  
*Charles Hirsch and Alban Ligout*
- 11:10 A Collaborative Environment for High Performance Multi-physics Simulations  
*Tiago Quintino and Herman Deconinck*
- 11:30 Uncertainty based Multidisciplinary Aero-Structural Design Optimisation of MM-UAV using HAPMOEA  
*Luis Felipe González, DongSeop Lee, Karkenahalli Srinivas and Jacques Pèriaux*
- 11:50 A Hybrid Mesh/Meshless CFD Solver Coupled with Genetic Algorithms for Solving Inverse Design Problems in Aerodynamics.  
*Zhihua Ma, Hongquan Chen and Jacques Pèriaux*

**Room: CAS0.1**

**MS065 Topology Optimization in Civil and Structural Engineering I**

Organizers: Matthew Gilbert and Tomasz Lewinski

- 14:00 **Topology Optimization of Structures - An Overview (Keynote Lecture)**  
*George I.N. Rozvany*
- 14:30 A New Parametrization Scheme for Shape Optimization in Plane Elastostatics  
*Shmuel Vigdergauz*
- 14:50 Numerical Simulation of Damage Evolution by the Level Set Method  
*Grégoire Allaire, François Jouve and Nicolas Van Goethem*
- 15:10 Shape Optimization for Elliptic PDEs: Optimality Conditions, Convergence and Stability  
*Karsten Eppler and Helmut Harbrecht*
- 15:30 Optimal Design of Shallow Shells by the Translation Method  
*Grzegorz Dzierzanowski*

**Room: CAS1.1**

**MS122 Adaptive Methods for Material Processing II**

Organizers: Thierry Coupez, Jean-François Hetu and José César de Sa

- 14:00 **Adaptive Finite Elements with Large Aspect Ratio: Theory and Practice (Keynote Lecture)**  
*Marco Picasso, Jacek Narski, Yves Bourgault, Frédéric Alauzet and Adrien Loseille*
- 14:30 **Solution of Free Surface Flows using Enriched Pressure Shape Functions (Keynote Lecture)**  
*Florin Ilinca and Jean-Francois Hetu*
- 15:00 Retriangulation Techniques for 3D Mesh Adaptation  
*Barbara Glut and Tomasz Jurczyk*
- 15:20 Mesh Adaptation applied to Unsteady Simulation of Bi-Fluid Flow with Level Set  
*Damien Guegan, Frédéric Alauzet, Olivier Allain and Alain Dervieux*
- 15:40 Interface Capturing and Application to the Simulation of the Water Assisted Injection Molding Process  
*Walid Zerguine, Luisa Silva, Thierry Coupez and Hugues Dignonnet*

**Room: CAS1.2**

**MS167 Inverse Problems for Parameter Identification III**

Organizers: George Dulikravich, Giulio Maier and Helcio Orlando

- 14:00 Structural Damage Identification from Noisy Modal Data using a Variable-Weight Optimization Method  
*Guo Sun, Hongwu Zhang and Xinglin Guo*
- 14:20 High Amplitude Forced Oscillations of a Modern Bell tower in Rome  
*Marco Lepidi, Vincenzo Gattulli and Dora Foti*
- 14:40 Inverse Dynamical Problems and Damage Identification in Steel-Concrete Composite Beams  
*Antonino Morassi*
- 15:00 Analysis of Damaged Vibrating Beams by Means of Distributions: Direct and Inverse Problems  
*Salvatore Caddemi, Ivo Caliò and Sandro Liseni*
- 15:20 A User-Friendly Program for the Determination of the Parameters of a Complex Plasticity Model  
*Jean-Baptiste Leblond and Gerard Mottet*
- 15:40 Estimation of Sensitivities in Parabolic Boundary Value Problems by Statistical Simulation of Diffusion Processes  
*Sergey Gusev*

**Room: CAS1.3**

**TS325 Optimization and Control II**

- 14:00 A Novel Implementation of Arora's Algorithm for the Euclidean TSP  
*Barbara Martina Rodeker, Maria Virginia Cifuentes and Liliana Favre*
- 14:20 An Application of Traveling-Salesman Models to Shot Sequence Generation for Scan Lithography  
*Yuji Shinano, Nobuo Inui, Youzou Fukagawa and Noburu Takakura*
- 14:40 Electromagnetic Modeling and Optimization using Neural Networks  
*Q.J. Zhang*
- 15:00 Global Optimisation of Non-Linear Inverse Scattering Problems  
*Thierry Scotti and Armand Wirgin*
- 15:20 Shape Finding of Taut Structures by the Natural Force Density Method  
*Ruy Marcelo Pauletti and Paulo Pimenta*

**Room: CAS1.4**

**MS148 Numerical Modeling of Coupled Problems in Geo- and Durability Mechanics II**

Organizers: Günther Meschke and Xikui Li

- 14:00 An Interface Method for the Coupling of Dissimilar Finite Element Meshe for the Simulation of Partially Saturated Soils  
*Felix Nagel and Günther Meschke*
- 14:20 Stabilized Finite Element Formulation for Saturated Soils under Cyclic Loading  
*Maosong Huang and Weidong Wang*
- 14:40 Application of Operator-Split ALE Methods to Large Deformation Problems in Granular Soil  
*Daniel Aubram, Stavros A. Savidis and Frank Rackwitz*
- 15:00 Computing Method of Thermoelastoelastic Analysis of Asphalt Pavement under condition of Cyclic Temperature Changing  
*Jianlong Zheng and Guoping Qian*
- 15:20 Theory Model and Computing Method for Dynamic Mechanical Responses of Asphalt Pavement under Complex Vehicle Loads  
*Guoping Qian and Jianlong Zheng*
- 15:40 Numerical Investigation on Surface Roughness Effect of Sand Erosion Phenomena in 90 Degree Bend  
*Masaya Suzuki and Makoto Yamamoto*

**Room: CAS1.5**

**TS321 Computer Simulation in Vehicle Design and Transport I**

- 14:00 Advanced Simulation Technology for Closed Loop Limit Vehicle Handling Performance  
*Diego Minen and Davide Bacchet*
- 14:20 Finite Element Analysis of Automotive Riveted Clutch Disc  
*Samir Sfarni, Emmanuel Bellenger, Jérôme Fortin and Matthieu Malley*
- 14:40 Gear Shocks: Non Linear Dynamic Model and Parametric Identification  
*Jean-Luc Dion, Gael Chevallier and Sylvie Lemoyne*
- 15:00 Virtual Prototyping of a Car Direction Indicator Switch using Haptic Feedback  
*Hunor Etele Erdelyi, Doru Talaba and Csaba Antonya*
- 15:20 Congested Traffic Simulation based on a 2D Hydrodynamical Model.  
*Boris Chetverushkin, Natalia Churbanova, Alina Sukhinova and Marina Trapeznikova*

**Room: CAS1.6**

**MS142 Dynamics of Nonlinear Structures with Contact Interfaces II**

Joint IACM – IUTAM Minisymposium

Organizers: Evgeny Petrov and Kai Willner

- 14:00 Frictional Characteristics of Randomly Rough Hertzian Contacts in Partial Slip  
*Daniele Dini, David Nowell and David A. Hills*
- 14:20 Measured and Simulated Contact Stiffness of Dry, Metallic Joints  
*Daniel Goerke and Kai Willner*
- 14:40 A Unified Approach for Surface Contact and Lubrication Problems  
*Dong Zhu and Q. Jane Wang*
- 15:00 Experimental and Analytical Investigation on Rubber Contacts with Adhesion  
*Matthias Kröger*
- 15:20 Investigations on Joint Interfaces using zero Thickness Finite Elements  
*Johannes Geisler and Kai Willner*
- 15:40 Crack Detection by Means of Static and Dynamic Simulations with a Crack Contact Model  
*Fernando Buezas, Marta Rosales and Carlos Fjilpich*

**Room: CAS1.7**

**MS178 Application of Computational Mechanics to Geoscience**

**Problems: Computational Geosciences I**

Organizers: Chongbin Zhao, A. Murakami and K. T. Chau

- 14:00 **Advances in Computational Geosciences (Keynote Lecture)**  
*Chongbin Zhao and B. E. Hobbs*
- 14:30 **Numerical Modeling of Deformation-Associated Fluid Flow in the Genesis of Indium Deposits in the Dachang Ore District, China (Keynote Lecture)**  
*Minghui Ju, Jianwen Yang and Tegen Dai*
- 15:00 Mass Conservative Approximation of Flow in Porous Media with Applications to Environmental Studies  
*Markus Bause*
- 15:20 A Numerical Method for Strength Evaluation of Discontinuous Rock Mass based on Multiscale Primal-Dual Rigid-Plastic Analysis  
*Hiroaki Kobayakawa, Masaki Nakamura and Takashi Kyoya*
- 15:40 Stress Analysis for the Direct Shear of Rock Masses Adopting a Triangular Finite Element with an Embedded Interface  
*Tatsuro Nishiyama and Takashi Hasegawa*

**Room: CAS1.8**

**MS030 Accomplishments and Challenges in Verification & Validation II**

Organizers: Luís Eça, Len Schwer, Martin Hoekstra and Bill Oberkamp

- 14:00 Adaptivity, Sensitivity and Uncertainty in Verification and Validation  
*Dominique Pelletier, Alexander Hay and Stephane Etienne*
- 14:20 An Optimized Extrapolation Solution Framework for Parabolic PDEs  
*Christophe Picard and Marc Garbey*
- 14:40 RANS Solutions and the Asymptotic Range  
*Luís Eça and Martin Hoekstra*
- 15:00 Recovery by Compatibility in Patches in Finite Element Elastoplastic Analysis  
*Federica Daghia, Stefano de Miranda, Stefano Ferri and Francesco Ubertini*
- 15:20 Verification of a Lagrangian Hydro-Dynamics Code with the Dynamic Sphere Test Problem  
*Francois Hemez, Jerry Brock and James Kamm*

**Room: CAS2.1**

**MS199 High-performance Computing in Computational Mechanics V**

Organizers: Shahrouz Aliabadi, Omar Ghattas, Robert Haber, Guillaume Houzeaux, Abani Patra and Mariano Vázquez

- 14:00 Parallel Schur-Fourier Decomposition for the Efficient Solution of Poisson Equation on Massive Extruded Unstructured Meshes  
*Ricard Borrell, Oriol Lehmkuhl, Manel Soria and Guillem Colomer*
- 14:20 Parallel Implementation of a Predictor-Corrector Scheme for the Solution of the Navier-Stokes Equations  
*Guillaume Houzeaux and Mariano Vázquez*
- 14:40 Hybrid Programming of Krylov Type Iterative Solvers on SMP Clusters  
*George Pashos, Antony Spyropoulos, Nikos Anastopoulos, Georgios Goumas, Nectarios Koziris and Andreas Boudouvis*
- 15:00 Performance Enhancement of Eigenvalue Problem based on Block Lanczos Iteration in Parallel Computing Environment  
*Wanil Byun, Sung Hwan Cho, Seung Jo Kim and Si Hyong Park*
- 15:20 Strong Linear Scaling for Spectral Simulations of Time Dependent Semilinear Partial Differential Equations on Marenostrom  
*Raul de la Cruz, Benson Muite and Harald Servat*

**Room: CAS2.3**

**MS130 Theory and Applications of Discontinuous Galerkin Methods II**

Organizers: Slimane Adjerid, Clint Dawson, Adrian Lew, Beatrice Riviere and Chi-Wang Shu

- 14:00 An a Posteriori Error Estimator for a Quadratic  $C^0$  Interior Penalty Method for the Biharmonic Problem  
*Susanne C. Brenner, Thirupathi Gudi and Li-yeng Sung*
- 14:20 Superconvergence and Time Evolution of Discontinuous Galerkin Finite Element Solutions  
*Yingda Cheng and Chi-Wang Shu*
- 14:40 Energy Norm A-Posteriori Error Estimation for HP-Adaptive DG Methods for Convection-Diffusion Equations  
*Dominik Schotzau*
- 15:00 Superconvergence and Error Estimation for DG Methods on Unstructured Grids  
*Slimane Adjerid, Mahboub Baccouch and Thomas Weinhart*
- 15:20 A Posteriori Error Estimates for Discontinuous Galerkin Methods based on Weighted Interior Penalties  
*Paolo Zunino*
- 15:40 An hp-adaptive Spacetime Discontinuous Galerkin Method with Discontinuity Tracking  
*Scott Miller and Robert Haber*

**Room: CAS2.4**

**MS060 Recent Advances in Numerical Methods for Hyperbolic Problems III**

Organizers: Sergey Karabasov, Vassily Goloviznin, Tatyana Kozubskaya, Yoko Takakura, Ralf Deiterding and Maria Lukacova

- 14:00 Contrasting High-Resolution Schemes for Gas Dynamics Test Problems  
*Sergey Karabasov and Vassily M. Goloviznin*
- 14:20 Unstructured Cell Centered and Vertex Solution of the Eikonal Equation  
*Hao Xia and Paul G. Tucker*
- 14:40 Metric-Based Mesh Adaptation in ALE Simulation  
*Yuri Vassilevskij and Kostantin Lipnikov*
- 15:00 A Second Order Cell-Centered Lagrangian Scheme for Two-Dimensional Compressible Flow Problems  
*Pierre-Henri Maire and Jérôme Breil*
- 15:20 A Second Order Method for the Resolution of the Shallow Water Equations with Turbulent Term  
*Jaime Fe, Luis Cueto-Felgueroso and Fermín Navarrina*
- 15:40 Numerical Modeling of Filtering Medium Freezing  
*Sergey Mordovskoy and Vladimir Leveryev*

**Room: CAS2.5**

**MS052 Iterative Solvers for the Incompressible Navier Stokes Equations II**

Organizers: Michele Benzi and Kees Vuik

- 14:00 A Comparison of Preconditioners for Industrial Incompressible Flows  
*Kees Vuik, Mehfooz ur Rehman and Guus Segal*
- 14:20 Schur-Complement Preconditioning in Two-Phase Incompressible Flow with Extended Finite Elements  
*Jörg Grande*
- 14:40 Extension of Navier-Stokes Preconditioners for Large-Displacement Fluid-Structure Interaction (FSI) Problems  
*Jonathan Boyle, Richard Muddle, Andrew Hazel and Matthias Heil*
- 15:00 Shape Sensitivity Analysis for Incompressible Fluid using SPH Projection Method  
*Yoondo Ha and Seonho Cho*
- 15:20 High Order P3 Hermite Triangular Finite Element for Transport and Incompressible Flow Problems  
*Thomas Cordaro and Gérard Degrez*
- 15:40 Natural Convection/Isothermal Viscous Incompressible Flows by the Velocity-Pressure-Vorticity Formulation  
*Elsa Báez, Alfredo Nicolás and Blanca Bermúdez*

**Room: CAS2.6**

**MS120 Modern Approaches for Fluid-structure Interaction Problems on Lightweight Structures II**

Joint IACM – IUTAM Minisymposium

Organizers: Roland Wüchner and Riccardo Rossi

- 14:00 Strong Coupling, Partitioned Methods in FSI  
*Riccardo Rossi, Pooyan Davdand, Sergio Iselsohn and Eugenio Oñate*
- 14:20 Modular vs Non-Modular Preconditioners for Fluid-Structure Systems with Large Added-Mass Effect  
*Annalisa Quaini, Santiago Badia and Alfio Quarteroni*
- 14:40 An Adaptive ALE Formulation to Solve Fluid-Structure Interaction with Large Deformations and Added Mass Effects  
*Facundo Del Pin*
- 15:00 Analysis of Block Gauss-Seidel Methods with Reference to Fluid-Structure Interaction in Biomedical Applications  
*Wulf G. Dettmer, D. Peric and M. M. Joosten*
- 15:20 Fluid Structure Interaction of Hairy Surfaces  
*Julien Favier, Antoine Dauplain and Alessandro Bottaro*
- 15:40 Structure-Borne Sound Propagation Calculation with Maxwell Element  
*Göran Sandberg, Delphine Bard and Kent Persson*

**Room: CAS3.1**

**MS209 Advanced Materials: Computational Analysis of Properties and Performance I**

Organizers: Vadim Silberschmidt and Valery Matveenko

- 14:00 **Thermomechanics of Polymers under Conditions of Relaxation and Phase Transitions (Keynote Lecture)**  
*Valery P. Matveyenko, O.Y. Smetannikov, N.A. Trufanov and I.N. Shardakov*
- 14:30 **Standard and Impact Fatigue of Bonded Joints: Modelling Transient Strains and Progressive Damage (Keynote Lecture)**  
*Ian Ashcroft, Juan Pablo Casas-Rodriguez and Vadim Silberschmidt*
- 15:00 Micromechanics Based Structural Analyses of MMC Components under Finite Strains  
*Heinz Pettermann, Sergio Nogales, Christopher Huber, Mathias Luxner and Helmut Böhm*
- 15:20 Constitutive Equations for Dissipative Materials operating under Finite Deformations  
*Alexander Svistkov, Bernd Lauke and Gerd Heinrich*
- 15:40 V&V Concepts in Developing a Class of Finite Deformation Pressure Dependent Plasticity Models validated by Experimental Observations  
*Szanto Mordechai, Z. Yosibash, M. Dariel, N. Frage, W. Bier, Stefan Hartmann, Alexander Düster, U. Heisserer, Ernst Rank and Stefan Holzer*



**Room: CAS3.2**

**MS236 Adaptive Modeling in Computational Mechanics III**

Organizers: J. Tinsley Oden and Serge Prudhomme

- 14:00 Adaptive Modelling of Turbulent Flow based on Weak Euler Solutions  
*Johan Hoffman, Johan Jansson and Murtazo Nazarov*
- 14:20 Adaptive Finite Element Methods for Multiphysics Problems  
*Mats G. Larson, Fredrik Bengzon and Robert Soderlund*
- 14:40 Goal-Oriented Error Estimation and Adaptivity for Fluid-Structure Interaction  
*Kristoffer van der Zee, Harald van Brummelen, Ido Akkerman and Rene de Borst*
- 15:00 Strict Error Bounds for Linear and Nonlinear Solid Mechanics Problems using the Subdomain-Based Flux-Free Method  
*Régis Cottreau, Pedro Díez and Antonio Huerta*
- 15:20 On R-Adaptive Mesh Optimization for Local Quantities of Interest based on the Material Residual  
*Daniel Materna and Franz-Joseph Barthold*
- 15:40 Transient Mesh Adaptivity applied to Domains Undergoing Large Deformations  
*Gaëtan Compère, Jean-François Remacle and Koen Hillewaert*

**Room: CAS3.3**

**TS319 Computational Mathematics and Numerical Methods II**

- 14:00 An Isogeometric Stream Function Formulation for Incompressible Plane Elastic Problems  
*Ferdinando Auricchio, Lourenco Beirão da Veiga, Annalisa Buffa, Carlo Lovadina, Alessandro Reali and Giancarlo Sangalli*
- 14:20 Surface Modeling with Sparsity Constraints  
*Stefan Schiffler, Peter Maass and Dirk A. Lorenz*
- 14:40 On the Convergence of the p-Method in the Poisson Problem with Concentrated Load  
*Harri Hakula and Antti Niemi*
- 15:00 Numerical Analysis of Energy Balances in Thermal Convection Problems  
*Daisuke Tagami*
- 15:20 Improvement of Point Inversion Algorithm for NURBS Curves and Surfaces  
*Marta R. Hidalgo*
- 15:40 Iterative Algorithms for Multi-Valued Inclusions and Complementarity Problems with Z Mappings  
*Elisabetta Allevi, Adriana Gnudi and Igor V. Konnov*

**Room: CAS3.4**

**MS086 Coupled Multifield Problems and Smart Structures II**

Joint IACM – IUTAM Minisymposium

Organizers: Thomas Wallmersperger, Bernd Kröplin and Erasmo Carrera

- 14:00 Hierarchic 2D Models for Piezoelectric Sandwich Shells  
*Michele D'Ottavio, Salvatore Brischetto and Olivier Polit*
- 14:20 Adaptive Piezoelectric Structural-Acoustic Coupled Systems with Damping Interface  
*Jean-François Deü, Walid Larbi and Roger Ohayon*
- 14:40 Analysis of Piezoelectric Solids with an Efficient Node-based Smoothing Element  
*Hieu Nguyen-Van, Nam Mai-Duy and Thanh Tran-Cong*
- 15:00 Optimal Location of Piezoelectric Sensors by a Genetic Algorithm  
*Isabelle Bruant, Laurent Gallimard and Shahram Nikoukar*
- 15:20 Fracture Criterion for Piezoelectric Ceramics using the Exact Boundary Conditions applied to the Crack Surfaces  
*Murtazo Motola and Leslie Banks-Sills*

**Room: CAS3.6**

**MS187 Mechanical Modeling of Wood and Wood Based Materials III**

**Joint IACM – IUTAM Minisymposium**

Organizers: Josef Eberhardsteiner, Michael Kaliske and Karin Hofstetter

- 14:00 Microfracture and Damage in Wood: A Lattice Simulation and Acoustic Emission Measurement  
*Edwin Nagy, William Davids and Eric Landis*
- 14:20 Thermal Damage and Cooling Effects on Modelled Bond Strength Mappings in Bio-Composite Materials during their Consolidation  
*Phillip Humphrey and Heiko Thoemen*
- 14:40 3-Dimensional Lattice Model for Predicting Failure in Structural Composite Lumber Products  
*Monica A. Snow, Ian Smith and Andi Asiz*
- 15:00 Modelling and Numerical Analysis of Wooden Structures  
*Jörg Schmidt, Eckart Resch and Michael Kaliske*
- 15:20 Modelling of Growth Stress Generation and Timber Distortions related to Log Sawing and Forced Drying  
*Sigurdur Ormarsson and Ola Dahlblom*
- 15:40 Morphological Characterization of Wood/Polymer Interphase in Wood-Plastic Composites using Advanced Imaging Tools  
*Lech Muszynski and Yi Wang*

**Room: CAS3.7**

**MS149 Multiscale Damage and Failure Mechanics of Engineering Materials I**

**Joint IACM – IUTAM Minisymposium**

Organizers: J. Woody Ju, Lizhi Sun, Pierre Ladevèze and Olivier Allix

- 14:00 **A Multiscale Damage Model for Analysis of Laminated Composites at the Micro Scale (Keynote Lecture)**  
*Michaël Trovalet, Pierre Ladevèze and Gilles Lubineau*
- 14:30 **Elastoplastic Micromechanical Damage Mechanics for Composites with Progressive Partial Fiber Debonding and Thermal Stress (Keynote Lecture)**  
*J. Woody Ju and Keiji Yanase*
- 15:00 3D Damage Analysis of Sheet Metal  
*Cem Tasan, Johan Hoefnagels, Mickael Pradelle and Marc Geers*
- 15:20 A Meso-Scale Approach for the Nonlinear Analysis of Angle-Ply Laminates with Damage  
*Fernand Ellyin, Yunfa Zhang and Zihui Xia*
- 15:40 A Multi-Level Damage Model for Particle Reinforced Composites considering Conditional Probability  
*Bong Rae Kim and Haeng-Ki Lee*

**Room: CAS3.8**

**TS318 Computational Materials Mechanics I**

- 14:00 Anisotropic Hyper-Elastic Material Model for the Mechanical Behaviour of Cloth using Polyconvex Strain Energy Function  
*Masato Tanaka and Hirohisa Noguchi*
- 14:20 Anisotropic Elasticity Tensors at Reference State-Approximations with Polyconvex Energies  
*Vera Ebbing, Joerg Schroeder and Patrizio Neff*
- 14:40 Study of the Influence of Ratio of Young's Moduli on Critical Stresses applied to Bimaterial Notches  
*Jan Klusak and Zdenek Knesl*
- 15:00 Yield Surface for Elastoplastic Beam 2D Element considering Damage Material  
*Edwin Chica Arrieta, Jose Maria Garcia Teran and Antolin Lorenzana Iban*
- 15:20 Remarks on the Solution of the Initial Value Problem for Anisotropic Finite Elastoplasticity Considering Various Formulations of the Material Model  
*Reiner Kreißig, Anke Bucher and Uwe-Jens Goerke*
- 15:40 A new Efficient Explicit Numerical Scheme for Integration of DAE: Application to Constitutive Equations in Solid Mechanics  
*Marko Vrh, Miroslav Halilović and Boris Štok*

**Room: CAS3.9**

**TS303 Computational Fluid Dynamics IV**

- 14:00 Numerical Simulation of Two-Phase Flow with an Oscillating Circular Cylinder based on a Viscous Incompressible Two-Fluid Model  
*Serpil Kocabiyik, Larisa A. Mironova and Oleg I. Gubanov*
- 14:20 Stabilized Finite Element Method for Compressible-Incompressible Interface Flows  
*Marie Billaud, Gérard Gallice and Boniface Nkonga*
- 14:40 The Rayleigh-Benard Problem in Parallelepiped Enclosures with Soret Effect  
*Daniel Soler and Ainhoa Iturraspe*
- 15:00 Two Phase Flow Simulation in the Structured Packed Distillation Columns using Computational Fluid Dynamics  
*Masoud Haghshenas Fard and Farzaneh Banitabae Jeshvaghani*
- 15:20 Aeroheating Prediction of Hypersonic vehicles using Inviscid Properties Calculated on Unstructured Grids  
*Hamid Parhizkar and Mohammad Hossein Karimian*
- 15:40 Finite Element Method applied to Aerostatic Bearings for Investigation of the Discharge Coefficient Effects on the Operating Parameters  
*Marcos Theiss Neves, Vilmar Arthur Schwarz and Genesisio Jose Menon*

**Room: CAS3.10**

**MS103 Damage and Interfacial Delamination Modelling in Composite Materials II**

**Joint IACM – IUTAM Minisymposium**

Organizers: Domenico Bruno, Frédéric Lebon and Elio Sacco

- 14:00 Analysis of Dynamic Interfacial Crack Growth in Fiber-Reinforced Composite Structures  
*Domenico Bruno, Fabrizio Greco, Paolo Lonetti and Paolo Nevone Blasi*
- 14:20 Interlaminar Decohesion and Inner-layer Damage in Composite Structures  
*Guido Borino, Boris Failla and Francesco Parrinello*
- 14:40 Static and Dynamic Interaction Effects of Multiple Damage Mechanisms in Multilayered Structures  
*Roberta Massabò*
- 15:00 Competition between Penetration and Debonding at an Interface in Brittle Matrix Composites  
*Eric Martin, Benoit Poitou and Dominique Leguillon*
- 15:20 Progressive Interfacial Failure of Adhesive Joints based on a 1D Model of Decohesion  
*Ilaria Monetto*

**Room: CIN0.1**

**MS080 Biofluids and Coupled Problems in Biomechanics IV**

Joint IACM – IUTAM Minisymposium

Organizers: Wolfgang Wall, Marek Behr, Matteo Pasquali and Alberto Figueroa

- 14:00 **Mathematical Modelling and Numerical Simulation of Blood Flow in Compliant Vessels**  
*Maria Lukacova and Anna Zauskova*
- 14:20 **Centreline Analysis of the Role of Geometry on Flow in Curved Blood Vessels**  
*Jordi Alastruey Arimon and Spencer J. Sherwin*
- 14:40 **Biomechanical Determinants of Abdominal Aortic Aneurysms- Fusiform versus Pseudo(Sacccular) Formations**  
*Jacopo Biasetti, Martin Auer, T. Christian Gasser, Ulf Hedin and Jesper Swedenberg*
- 15:00 **Patient-Specific FEM Analysis of the Atherosclerotic Carotid Bifurcation**  
*Joseph R. Leach, Vitaliy Rayz, Mohammad R.K. Mofrad, Max Wintermark and David Saloner*
- 15:20 **Free-boundary Flows of Complex Fluids by Monolithic Methods**  
*Matteo Pasquali, Oscar Coronado and Xueying Xie*
- 15:40 **Numerical Simulation of Cerebrospinal Fluid Flow by Fictitious Domain Method**  
*Hiroshi Suito and Takuya Ueda*

**Room: CIN0.2**

**MS117 Mathematical Foundations of Computational Mechanics I**

Organizers: Susanne C. Brenner and Carsten Carstensen

- 14:00 **Geometric Decompositions and bases For Spaces of Piecewise Polynomial Differential Forms (Keynote Lecture)**  
*Douglas Arnold, Richard Falk and Ragnar Winther*
- 14:30 **Convergence Analysis of an Adaptive Interior Penalty Discontinuous Galerkin Method (Keynote Lecture)**  
*Ronald H. W. Hoppe*
- 15:00 **Finite Element Discretizations of the Elasticity Complex**  
*Douglas Arnold, Snorre H. Christiansen, Richard Falk and Ragnar Winther*
- 15:20 **A Weakly Over-Penalized Symmetric Interior Penalty Method**  
*Susanne C. Brenner, Thirupathi Gudi, Luke Owens and Li-yeng Sung*
- 15:20 **Discontinuous Galerkin Methods for Miscible Displacement Problems**  
*Max Jensen, Sören Bartels and Rüdiger Müller*

**Room: CIN1.1**

**MS099 Computational Modeling in Cardiovascular Mechanics I**

Organizers: Gerhard A. Holzapfel, Jay D. Humphrey, Charles A. Taylor and David A. Vorp

- 14:00 **Fibroblast-Controlled Aneurysm growth in a Human Cerebral Artery (Keynote Lecture)**  
*Martin Kroon and Gerhard Holzapfel*
- 14:30 **Lagrangian Analysis of Rest and Exercise Hemodynamics in Patient-Specific Abdominal Aortic Aneurysm Models (Keynote Lecture)**  
*Shawn Shadden, Andrea Les and Charles A. Taylor*
- 15:00 **Numerical Simulation of Cerebral Aneurysm Flow: Prediction of Thrombus-Prone Regions**  
*Vitaliy Rayz, Loic Boussel and David Saloner*
- 15:20 **Vortex Dynamics in Cerebral Aneurysm Flow**  
*Gwen Mulder, Peter Rongen, Arjen Bogaerds and Frans van de Vosse*
- 15:40 **On Modeling Multi-Layered Soft Collagenous Tissues**  
*Gerhard A. Holzapfel, Dimitrios Kiousis and Martin Kroon*

**Room: CIN2.1**

**MS043 Advances in Boundary Element Methods IV**

Organizers: Yijun Liu, Martin Schanz, Naoshi Nishimura, Zhenhan Yao, Marc Bonnet, Ernie Pan, Attilio Frangi and Mitch Denda

- 14:00 A New Semi-Analytical Method for the Construction of Auxiliary Fields in the Interaction Integrals of 3-D LEFM  
*Gwenaél Edeline, Marc Bonnet and Vincent Chiaruttini*
- 14:20 Three-Dimensional Spectral Boundary Integral Equation Analysis of Plasmon Polaritons Enhanced Optical Nanoantenna  
*Lyudmyla N. Illyashenko-Raguin, Christian Hafner and Ralf Hiptmair*
- 14:40 Dynamic Analysis of Cracked Plates repaired with Adhesively Bonded Anisotropic Patches  
*Martim Mauler, Paulo Sollero and Eder Albuquerque*
- 15:00 Determination of Depth of Surface Crack with Time Domain BIEM in Laser-ultrasonic NDE  
*Hitoshi Yoshikawa, Tomokazu Kawada and Naoshi Nishimura*
- 15:20 Crack Interaction in Plane Magnetoelastoelectroelastic Solids under Dynamic Loading  
*Andrés Saez, Ramón Rojas-Díaz and Felipe García-Sánchez*
- 15:40 A Multilevel Galerkin Boundary Element Method  
*Jinyou Xiao, Lihua Wen and Johannes Tausch*

**Room: PGL**

**MS208 Computational Modelling of Locomotor Systems V**

Organizers: Markus Böl, Stefanie Reese and Bob Svendsen

- 14:00 Identification of Neuromechanical Muscle Properties  
*Sigrid Thaller, Markus Tilp and Martin Sust*
- 14:20 SubjectSpecific Human Motion Dynamic Simulation on the Basis of 3D Bones and Soft Tissue Measured Morphology  
*Victor Sholukha, Fedor Moiseev, Olivier Snoeck, Patrick Salvia, Andrej Morozov, Fulvia Taddei, Marcel Rooze and Serge Van Sint Jan*
- 14:40 Model-Based Approaches in Biomechanical Movements: From the Assessment to the Interpretation in Clinical Use  
*Guenther Rau, Thomas Schmitz-Rode and Catherine Disselhorst-Klug*

**Room: EXC1.1**

**MS185 Special Symposium in Honour of 75th Birthday of Professor S. Valliappan I**

Organizers: Nasser Khalili and Scott Sloan

- 14:00 Extending the Philosophy of Science to the Philosophy of Computational Engineering. The Falsification Role of Convergence Analysis  
*Eduardo Oliveira*
- 14:20 A Priori Identification of the Mode of Conversion from an Imperfection-Sensitive into an Imperfection-Insensitive Elastic Structure  
*Gerhard Höfner, Xin Jia and Herbert Mang*
- 14:40 Advances in Solution of Classical Generalized Eigenvalue Problem  
*Ming Wu Yuan, Pu Chen, Shuli Sun, Qiancheng Zhao, Yucai Gong and Yongqiang Chen*
- 15:00 Process Optimization using a Single Computational Simulation Environment  
*Grant Steven*
- 15:20 Review on FEM, BEM, XFEM, Scaled Boundary Finite Elements and Fractal Finite Elements in Linear Fracture Mechanics  
*Andrew Y.T. Leung and Hao Yang*
- 15:40 Enriched Free Mesh Method with Superconvergent Patch Recovery Scheme  
*Hitoshi Matsubara and Genki Yagawa*

**Room: EXC1.2**

**MS107 Meshfree and Generalized/Extended Finite Element Methods II**

Organizers: J. S. Chen, Ivo Babuska, Ted Belytschko, C. Armando Duarte, Vitor Leitão, Wing Kam Liu, Hirohisa Noguchi and Angelo Simone

- 14:00 Space-Time Meshfree Collocation Method by Interpolating Moving Least Squares  
*Hennadiy Netuzhylov and Andreas Zilian*
- 14:20 A Forward Model for Optical Diffuse Tomography based on a Cardinal Splines  
*Jean-Charles Baritoux, S. Chandra Sekhar and Michael Unser*
- 14:40 Smoothed Point Interpolation Methods for 2D and 3D Elasticity Problems with Certified Solutions  
*Guiyong Zhang and Guirong Liu*
- 15:00 Hermite Reproducing Kernel Meshfree Analysis of Thin Beams and Plates  
*Dongdong Wang and Jiun-Shyan Chen*
- 15:20 A Local Meshfree Updated Lagrangian (UI) Approach for Geometrically Nonlinear Analysis  
*Y.T. Gu and Prasad K.D.V. Yarlagadda*
- 15:40 Local Radial Basis Partition of Unity Collocation Method  
*Hsin-Yun Hu, Jiun-Shyan Chen and Wei Hu*

**Room: EXC1.3**

**MS098 Meshless and Related Methods I**

Organizers: Janusz Orkisz, Sergio Idelsohn and Suvranu De

- 14:00 **Radial Basis Partition of Unity Galerkin Method for Quantum Mechanics (Keynote Lecture)**  
*Jiun-Shyan Chen and Wei Hu*
- 14:30 **On Classification of the Meshless Methods (Keynote Lecture)**  
*Janusz Orkisz and Józef Krok*
- 15:00 MPS-Based Unified Algorithm for Compressible and Incompressible Flows  
*Jun Arai and Seiichi Koshizuka*
- 15:20 Incompressible Gas-Liquid Two Phase Flow Analysis using a Particle Method for Fuel Cells  
*Masahiro Kondo, Seiichi Koshizuka and Masato Takimoto*
- 15:40 A Meshless RBF Collocation Method for Potential Problems in Nonconvex Domains  
*Jiahn Horng Chen*

**Room: EXC2.1**

**STS09: Simulation and Validation of the Combustion of Advanced Aero-Engines**

Organizer: Ralf von der Bank

- 14:00 Simulation and Validation of Advanced Combustion Technology for Aero-Engines  
*Ralf von der Bank*
- 14:20 Design Methodologies and CFD Methods for the Development of Low Emission Combustion Systems in Aero-engines  
*Nima Pegemanyfar, Ralf von der Bank, Marco Zedda, Michael Pfitzner and Nicolas Savary*
- 14:40 Assessment of Advanced Numerical Diagnosis on the Base of Non-Intrusive Measurements in Lean Combustion. Application on Understanding and Design of Lean Combustion Technologies  
*Thomas Noel, Leif Rackwitz and Pasquale Di Martino*
- 15:00 Massively Parallel LES for the Design of Modern Combustors  
*Pierre Wolf, Gabriel Staffebach, Laurent Gicquel, Thierry Poinsot and Claude Berat*
- 15:20 Low Emissions Combustors Development for New Aero-Engines Core Applications  
*Salvatore Colantuoni, Sebastian Bake and Jean-Pierre Badet*

**Room: EXC2.2**

**STS07.2: MDO Tools for High Quality Design in Aeronautics**

Organizer: Jacques Pèriaux

- 14:00 Hierarchical Optimization: Multi-Level Algorithms, Multi-Disciplinary Optimization, Robust Design and Software Environments  
*Jean-Antoine Desideri, Régis Duvigneau and Toan Nguyen*
- 14:20 An Efficient Robust Optimization Framework for Real-World Engineering Design  
*Koji Shimoyama, Shinkyu Jeong and Shigeru Obayashi*
- 14:40 FreeFem++: A Versatile Tool to Solve Optimization Problem in Finite Element Methods  
*Frederic Hecht and Olivier Pironneau*
- 15:00 Optimization of 3-D Multi Element High Lift Device Configuration  
*Jochen Wild and Joel Brezillon*
- 15:20 Application of Active Flow Control in Aeroengine Compressors  
*Kyriacos Papailiou*

**Room: CAS0.1**

**MS065 Topology Optimization in Civil and Structural Engineering II**

Organizers: Matthew Gilbert and Tomasz Lewinski

- 16:30 Form:a Practical Layout Optimization Tool for Civil and Structural Engineers  
*Wael Darwich, Matthew Gilbert and Andy Tyas*
- 16:50 Advances on Parallel Computing in Structural Topology Optimization  
*Jose Paris, Ignasi Colominas, Fermín Navarrina and Manuel Casteleiro*
- 17:10 ForcePAD and Optimization - An Improved Tool for Conceptual Design  
*Jonas Lindemann and Lars Damkilde*
- 17:30 Global Topology Optimization of Truss Systems using Modified Genetic Algorithm  
*Rimantas Belevicius and Dmitrij Sesok*
- 17:50 Shaping of Modular Tensegrity Structures  
*Zbigniew Bieniek*
- 18:10 Morphogenesis Design Support System of the Building Roof  
*Kazutoshi Tsutsumi and Jynya Owashi*

**Room: CAS1.1**

**MS122 Adaptive Methods for Material Processing III**

Organizers: Thierry Coupez, Jean-François Hetu and José César de Sa

- 16:30 Assessment of adaptative meshing in CPFEM simulation of the anisotropy of polycrystalline aggregates  
*Maxime Melchior, Jean-François Remacle and Laurent Delannay*
- 16:50 Numerical Modelling of Plastic Deformation and Subsequent Primary Recrystallization in a Polycrystalline Volume Element, Based on a Level Set Framework  
*Heba Resk, M. Bernacki, Yvan Chastel, Thierry Coupez and Roland Logé*
- 17:10 Adaptive Remeshing Issues in the Presence of Softening Constitutive Models Associated with Ductile Damage Prediction  
*Jose César de Sá, Francisco Pires and Cai Zheng*
- 17:30 Computer-Aided Modeling of High-Pressure/High-Temperature Processing of Materials  
*Oleksandr Lyeshchuk*
- 17:50 Qualitative Behavior of Solutions in the Vicinity of Tool Surface in Plasticity Theory for Porous and Powder Materials  
*Olga Chesnikova, Sergei Alexandrov and Alexander Pirumov*

**Room: CAS1.2**

**MS167 Inverse Problems for Parameter Identification IV**

Organizers: George Dulikravich, Giulio Maier and Helcio Orlando

- 16:30 The Optimal Design of Space Structures considering the Criterion of Thermal Flutter  
*Lijia Fan, Zhihai Xiang, Mingde Xue and Zhangzhi Cen*
- 16:50 An Intergrated Experimental-Numerical Method applied to Thermo-Mechanical Characterisation of Steel at High Strain Rates  
*Ben Elliott, Stefan Schwindt, Clive Siviour and Nik Petrinic*
- 17:10 Estimation of Thermal Parameters describing Surfacing by Welding Process  
*Ireneusz Szczygieł, Adam Fic and Andrzej Sachajdak*
- 17:30 Identification of Diffusivity Coefficients in Time Fractional Diffusion Equations  
*Diego Murio*
- 17:50 Identification of Tribological Properties of Soft-Wet Materials  
*Ilinca Stanculescu, Bin Shen and John Dolbow*
- 18:10 Mathematical Modeling of a Thermal Condition of Aircraft Compartments  
*Vladimir Nikolaev and Sergey Gusev*



**Room: CAS1.3**

**TS325 Optimization and Control III**

Organizers: Paolo Venini

- 16:30 Global Optimization of Laminates  
*Paolo Vannucci, Mohamed Reza Ahmadian and Angela Vincenti*
- 16:50 Optimal Orthotropic Material Orientation by the use of Polar Representation  
*Angela Vincenti and Boris Desmorat*
- 17:10 Optimization Formulations for Composite Structures subjected to Compression Loads  
*Esben Lindgaard Olesen, Erik Lund and Lars Chr. T. Overgaard*
- 17:30 Parallel Hierarchical Optimization of Geometrically Nonlinear Laminated Composite Structures  
*Leon Johansen and Erik Lund*
- 17:50 Puck Failure Criterion as Constraint in the Optimization of Laminated Composites  
*Rafael H. Lopez, Marco Luersen and Eduardo Cursi*
- 18:10 Topology Optimization of a Composite Heat-Sink involving a Phase-Change Material  
*Varanasi Srinivas and G.K. Ananthasuresh*

**Room: CAS1.4**

**MS148 Numerical Modeling of Coupled Problems in Geo- and Durability Mechanics III**

Organizers: Günther Meschke and Xikui Li

- 16:30 A LCP-Based Numerical Procedure using Mesh-Free Method for Gradient Elasto-Plasticity Continuum  
*Xikui Li and Junbo Zhang*
- 16:50 The Experimental and Numerical Research of Soil and Root Composites  
*Yang Pu, Xiang Zhihai, Hu Xiasong, Li Guorong, Zhu Haili, Mao Xiaoqing and Cen Zhangzhi*
- 17:10 PVP Based Voronoi Cell Finite Element Method for Mechanical Analysis of Heterogeneous Materials  
*Hongwu Zhang, Hui Wang, Biaosong Chen and Zhaoqian Xie*

**Room: CAS1.5**

**TS321 Computer Simulation in Vehicle Design and Transport II**

- 16:30 A Numerical Method to take into Account the Damping Induced by Viscoelastic Materials in Brake Squeal  
*Gael Chevallier, Sylvain Thouviot, Jean-luc Dion and Franck Renaud*
- 16:50 Numerical Methods in the Simulation of Friction Stir Welding  
*Zhao Zhang, Yali Liu and Hongwu Zhang*
- 17:10 Simulation of a Mechanical Assembly using Model Reduction  
*Bastien Lefevre, Frédéric Druesne, Jean-Luc Dulong and Pierre Villon*
- 17:30 A Moving Body under Variable Friction on a Toboggan  
*Medardo Fonseca, Victor E. Ruiz R. and Pablo A. Acosta S.*
- 17:50 Finite Element Applied to the Analysis and Simulation of a Car Tank Double Cone  
*Cesar Arturo Barron Ortega, Gerardo Atanacio Jimenez and Jorge Sanchez Macias*

**Room: CAS1.6**

**MS142 Dynamics of Nonlinear Structures with Contact Interfaces III**

Joint IACM – IUTAM Minisymposium

Organizers: Evgeny Petrov and Kai Willner

- 16:30 Application of a Modal Identification Procedure to study the Influence of Operating Parameters on Friction-Induced Vibrations  
*Pierre Grange, David Clair and Michel Fogli*
- 16:50 Linear and Non-Linear Time Series Analysis of Vibration in Friction Brakes  
*Boris A. Wernitz and Norbert P. Hoffmann*
- 17:10 Dynamic Analysis of 3D Landing Gear Model with Possible Flaw  
*Jerzy Malachowski and Wieslaw Krason*
- 17:30 Simulated Repetitive Impact in Orthogonal Continuous Structures  
*Elizabeth K. Ervin*
- 17:50 Elastic, Viscous and Friction Phenomena Based Computational Model of Engine Mount Dynamics  
*Hoda Yarmohamadi, Viktor Berbyuk, Peter Nilsson, Erik Wikenhed and Fredrik Ojjer*
- 18:10 Behaviour Analysis of Bolted Connected Z Cold Formed Steel Beams  
*Ruth Gutiérrez, Alfonso Loureiro, Alicia Moreno, Jose M. Reinosa and Ricardo Bellón*

**Room: CAS1.7**

**MS178 Application of Computational Mechanics to Geoscience Problems: Computational Geosciences II**

Organizers: Chongbin Zhao, A. Murakami and K. T. Chau

- 16:30 Mechanical Control on Location of Skarn Ore Bodies in Tongling-Anqing Cu District, China: Evidences from Computational Simulation  
*Liang-Ming Liu, Chang-Lin Wan, Ai-Liang Cai and Yi-Lai Zhao*
- 16:50 A Study on Optimal Strength Distribution of Rigid-Plastic Body  
*Jun Saito, Toshihiro Asakura, Takeshi Tamura and Shun-ichi Kobayashi*
- 17:10 Fundamental Study on Shape Optimization of a Rigid-Plastic Structure  
*Shun-ichi Kobayashi, Kana Yanagimoto and Takeshi Tamura*
- 17:30 Global Method for Coupling Reactive Transport  
*Caroline de Dieuleveult and Jocelyne Erhel*
- 17:50 Effects of Frictional Slip between Crack Interfaces to Crack Propagation in Quasi-Brittle Rocks  
*Tateki Ishii, Takashi Kyoya and Kenjiro Terada*
- 18:10 Numerical Simulation Analysis of the main reason of Powder-Binder Separation in Component during PIM Process  
*Zhoushun Zheng and Xuanhui Qu*

**Room: CAS1.8**

**MS030 Accomplishments and Challenges in Verification & Validation III**

Organizers: Luís Eça, Len Schwer, Martin Hoekstra and Bill Oberkamp

- 16:30 **An Overview of ASME V&V 20: Standard for Verification and Validation in Computational Fluid Dynamics and Heat Transfer (Keynote Lecture)**  
*Hugh Coleman and Glenn Steele*
- 17:00 Comparison of Validation Metrics using Repeated Full-Scale Automobile Crash Tests  
*Malcolm Ray, Ali Atahan and Mario Mongiardini*
- 17:20 Overview of ASME PTC-60 End-to-End Verification and Validation Example.  
*Leonard Schwer*
- 17:40 Verification and Validation of CFD Results for Turbomachinery Applications  
*John Chew, Nick Hills and Konstantin Volkov*
- 18:00 On Verification & Validation of Turbulent Flow Simulation Models  
*Fernando Grinstein*

**Room: CAS2.1**

**MS199 High-performance Computing in Computational Mechanics VI**

Organizers: Shahrouz Aliabadi, Omar Ghattas, Robert Haber, Guillaume Houzeaux, Abani Patra and Mariano Vázquez

- 16:30 Scaling the Science using Adaptivity and Uncertainty Quantification -- Case Study of Volcanic Hazard Analysis using HPC  
*Abani Patra, Keith Dalbey, Matthew Jones, E. Bruce Pitman and Michael Sheridan*
- 16:50 Toward Higher Performance FEM Implementations using Lazy Evaluation and Symbolic Programming  
*Hugo Leclerc*
- 17:10 Scalability, Mobility and Interactivity in Computational Mechanics  
*Lee Margetts, Rupert Ford, Francisco Calvo and Vendel Szeremi*
- 17:30 An Architecture for the Automatic Development of High Performance Multi-physics Simulators  
*Felix Santos, Eduardo Brito Jr. and José Maria Silva*
- 17:50 Design of Parallel, Dynamic Load Balancing Framework in OOFEM  
*Borek Patzak and Zdenek Bittnar*
- 18:10 Flow Simulations on Massively Parallel Computers Including Multi-Core Processors  
*Onkar Sahni, Kenneth Jansen and Mark Shephard*

**Room: CAS2.3**

**MS130 Theory and Applications of Discontinuous Galerkin Methods III**

Organizers: Slimane Adjerid, Clint Dawson, Adrian Lew, Beatrice Riviere and Chi-Wang Shu

- 16:30 Implicit and Semi-Implicit Discontinuous Galerkin Schemes for Unsteady Incompressible Flows  
*Francesco Bassi, Andrea Crivellini, Nicoletta Franchina and Stefano Rebay*
- 16:50 A New Discontinuous Galerkin Method for the Navier-Stokes Equations  
*Michel Borrel and Juliet Ryan*
- 17:10 A Stable Mixed Discontinuous/Continuous Finite Element Pair suited to Large Scale Ocean Simulations  
*David Ham, Colin Cotter, Christopher Pain and Sebastian Reich*
- 17:30 Remarks on the Links between Low Order DG Methods and some Finite Difference Schemes for the Stokes Problem  
*Peter Minev*
- 17:50 Preconditioning of Newton-GMRES Solvers for Discontinuous Galerkin Problems  
*Per-Olof Persson and Jaime Peraire*
- 18:10 Discontinuous Galerkin Finite Element Methods for Hyperbolic Nonconservative Partial Differential Equations  
*Onno Bokhove, Sander Rhebergen and Jaap van der Vegt*

**Room: CAS2.4**

**MS057 Adaptive Higher Order Variational Methods for Aerospace Applications I**

Organizers: Norbert Kroll, Jaap van der Vegt and Remi Abgrall

- 16:30 **Very High-Order Accurate P-Multigrid Discontinuous Finite Element Solution of the Euler and Navier-Stokes Equations (Keynote Lecture)**  
*Francesco Bassi, Antonio Ghidoni, Nicoletta Franchina and Stefano Rebay*
- 17:00 **Third-Order Residual-Based Scheme for Computing Inviscid and Viscous Flows on Unstructured Grids (Keynote Lecture)**  
*Xi Du, Christophe Corre and Alain Lerat*
- 17:30 Discontinuous Galerkin Method on Unstructured Hexahedral Grids for 3D Euler and Navier-Stokes Equations  
*Charles Hirsch, Andrey Wolkov and Benoit Leonard*
- 17:50 A 3D DGFEM solver for the (Reynolds-Averaged) Navier-Stokes equations  
*Koen Hillewaert, Gaëtan Compère, Jean-François Remacle and Philippe Geuzaine*
- 18:10 An Explicit Space-Time Discontinuous Galerkin Scheme with Local Time-Stepping for Unsteady Flows  
*Christoph Altmann, Gregor Gassner, Frieder Lörcher, Arne Taube and Claus-Dieter Munz*

**Room: CAS2.5**

**MS212 Advances in CFD Simulation of In-Flight Icing I**

Organizers: Wagdi Habashi and Mark Potapczuk

- 16:30 Numerical Simulation of Icing Roughness Growth  
*Giulio Croce, Erika De Candido, Wagdi Habashi and Martin Aube*
- 16:50 Three-Dimensional Ice Modelling with Electro-Thermal Ice Protection Systems  
*Andrew Press*
- 17:10 Advances in the Development of a 3D Morphogenetic Model for In-Flight Icing  
*Krzysztof Szilder*
- 17:30 Advances in FENSAP-Ice for Simulation of Aircraft, Rotorcraft, UAVs and Jet Engines In-Flight Icing  
*Wagdi Habashi, Martin Aubé, Guido Baruzzi and Cristhian Aliaga*
- 17:50 A Convergent Explicit Scheme for Simulating Convection-Diffusion Phenomena  
*Vitoriano Ruas, Antonio Brasil Jr. and Paulo Trales*
- 18:10 Boundary Conditions For Interactive Fluid Flow Simulation  
*Michael Pfaffinger, Christoph van Treeck, Petra Wenisch and Ernst Rank*

**Room: CAS2.6**

**MS062 Numerical Modelling of Hydrodynamic Geophysical Flows I**

Organizers: Tomas Chacon Rebollo and Edie Miglio

- 16:30 Design and Preliminary Validation of a Three-dimensional, Baroclinic, Unstructured-mesh, Finite-element Ocean Model  
*Sébastien Blaise, Richard Comblen, Jonathan Lambrechts, Vincent Legat, Eric Deleersnijder and Jean-François Remacle*
- 16:50 Stabilized Discontinuous Galerkin Formulations for Ocean Modelling  
*Vincent Legat, Richard Comblen, Jonathan Lambrechts, Jean-François Remacle and Eric Deleersnijder*
- 17:10 A Predictor-Corrector Numerical Schemes for Ocean Primitive Equations with Large Time Steps  
*Pedro Galan del Sastre, Elisa Dorado and Rodolfo Bermejo*
- 17:30 A Stabilized Scheme for the Primitive Equations of the Ocean based upon Orthogonal Subscales  
*Tomas Chacon Rebollo, Macarena Gomez Marmol and Isabel Sanchez Muñoz*
- 17:50 A 3D Numerical Model for Stratified Free Surface Flows  
*M. Augusto Maidana, Jordi Blasco, Manuel Espino and Arnel German*
- 18:10 Numerical Modelling of Geophysical Fluid Dynamics with Adapting Unstructured Meshes  
*Matthew Piggott*

**Room: CAS3.1**

**MS209 Advanced Materials: Computational Analysis of Properties and Performance II**

Organizers: Vadim Silberschmidt and Valery Matveenko

- 16:30 Simulations of Damage in Cross-Ply Laminates under Tensile Fatigue: Effect of Microstructural Randomness  
*Zahid R. Khokhar, Ian Ashcroft and Vadim Silberschmidt*
- 16:50 Micromechanical Modeling of Random Composites with Irregularly Shaped Inhomogeneities  
*Igor Tsukrov, Romana Piat and Oleg Eroshkin*
- 17:10 Micromechanical Material Modeling of Interpenetrated Metal-Ceramic Composites  
*Romana Piat, Mickael Guichard and Thomas Böhlke*
- 17:30 Multiscale and Multyphysics Modeling of Filled Composites, Design Validation of the Models and Uncertainty in the Modelling  
*Sergey Lurie, Dmitrii Volkov-Bogorodskii, Natalia Tuchkova and Vladimir Zubov*
- 17:50 Thermomechanical Energetic Models for Multi-phase Materials  
*Tom-Alexander Langhoff, Thomas Boehlke and Eckart Schnack*
- 18:10 Modelling Damage and Failure of Mineral Polycrystalline Matrices in Fibrous Composites  
*Vyacheslav Shavshukov and Anatoly Tashkinov*

**Room: CAS3.2**

**MS236 Adaptive Modeling in Computational Mechanics IV**

Organizers: J. Tinsley Oden and Serge Prudhomme

- 16:30 Adaptive Time-Stepping Algorithm for Strain-Softening Materials  
*Rostislav Chudoba and Miroslav Vořechovský*
- 16:50 Automatic Unstructured and Non-Conforming Remeshing with Boundary Control for Metal Cutting Simulation  
*Xin Gu, Christian Hortig and Bob Svendsen*
- 17:10 An Adaptive Gradient Smoothing Method (GSM) for Fluid Dynamics Problems  
*George Xu and G.R. Liu*
- 17:30 An Automatic Mesh Coarsening Technique for Three Dimensional Anisotropic Meshes  
*Youssef Mesri and Hervé Guillard*
- 17:50 3D MLS-Based Variable-Node Elements for Easy Meshing  
*Young-Sam Cho and Min Gyu Choi*
- 18:10 Three-Dimensional Mesh Generation using the Crossed Circles Method  
*Yoshitaka Ezawa, Hayato Suzuki and Yukihiro Shinkawa*

**Room: CAS3.3**

**TS319 Computational Mathematics and Numerical Methods III**

- 16:30 RMS Defuzzification Algorithms applied to FMEA  
*Selva Rivera and Jorge Núñez McLeod*
- 16:50 Well Log Interpretation through the use of Support Vector Machines  
*Vicente Ciccola, Guillermo Montilla, Pablo Guillen and Geralf Pineda*
- 17:10 High Performance Methods for Intense Laser-Matter Interactions  
*Emmanuel Lorin, Stéphane Chelkowski and André Bandrauk*
- 17:30 Numerical Solution of Non-Stationary Axisymmetric Hele-Shaw Problems for Electrochemical Machining  
*Olga Zinnatullina and Vladimir Zhitnikov*
- 17:50 A Method of Manufactured Solutions for PDE's with Stochastic Parameters  
*Paul G. Constantine, Patrick Knupp and Gianluca Iaccarino*
- 18:10 On the singular limit for normal flux boundary conditions  
*Tomas Chacon Rebollo, Macarena Gomez Marmol and Isabel Sanchez Muñoz*

**Room: CAS3.4**

**MS086 Coupled Multifield Problems and Smart Structures III**

**Joint IACM – IUTAM Minisymposium**

Organizers: Thomas Wallmersperger, Bernd Kröplin and Erasmo Carrera

- 16:30 Phase Field Simulation of Ferroelectric Materials with Different Electrical and Mechanical Boundary Conditions  
*Jie Wang and Marc Kamlah*
- 16:50 Numerical Procedure for Polycrystalline Ferroelectrics using Landau's Potential and Vector-Nodal Finite Element  
*Gakuji Nagai and Takamasa Hayashi*
- 17:10 Multi-domain Simulations for Increasing the Efficiency of Energy Harvesting  
*Matthias Kurch, Heiko Atzrodt, Christoph Klein and Dirk Mayer*

**Room: CAS3.6**

**MS187 Mechanical Modeling of Wood and Wood Based Materials IV**

**Joint IACM – IUTAM Minisymposium**

Organizers: Josef Eberhardsteiner, Michael Kaliske and Karin Hofstetter

- 16:30 Full Field Image Correlation at Micro-Scale to Investigate Transverse Meso-Scale Heterogeneity of Mechanical Behaviour of Softwood  
*Pierre Simon, Hubert Maigre, Jean-François Jullien, Dominique Eyheramendy, Gilbert Thollet and Sylvie Descartes*
- 16:50 Investigation of the Mechanism of Failure Behaviour of Wood Based Materials using Acoustic Emission Analysis and Image Processing  
*Peter Niemz, Andreas Brunner and Olivier Walter*
- 17:10 Optical Measurement of Local Strains Development in Finger-Jointed Wood Subjected to Static and Sustained Loads  
*Lech Muszynski, Boris Clouet and Regis Pommier*
- 17:30 Three-Dimensional Elasticity of Yew (*Taxus Baccata* L.) and Spruce (*Picea Abies* [L.] Karst.)  
*Daniel Keunecke, Stefan Hering and Peter Niemz*

**Room: CAS3.7**

**MS149 Multiscale Damage and Failure Mechanics of Engineering Materials II**

Joint IACM – IUTAM Minisymposium

Organizers: J. Woody Ju, Lizhi Sun, Pierre Ladevèze and Olivier Allix

- 16:30 Beyond Scale Separation - Damage Propagation and Evolving Discontinuities in a Multi-Scale Concept  
*Ekkehard Ramm, Ingrid Bruss, Andrea Erhart and Thomas Hettich*
- 16:50 Theory and Simulation of a Brittle Damage Model in Thermoelastodynamics  
*Jonathan Pitt and Francesco Costanzo*
- 17:10 A Multiscale Approach for the Modelling of Propagating Discontinuities  
*Julia Mergheim*
- 17:30 A Non Local Anisotropic Damage Model for Brittle Materials  
*Enrico Papa, Gaetano Napoli, Alberto Taliervo and Paolo Taranto*
- 17:50 Advanced Mean-Field Homogenization Models incorporating Debonding in Inclusion-Reinforced Composites  
*Yamen Othmani, Laurence Brassart, Laurent Delannay, Issam Doghri and Philippe Geubelle*
- 18:10 Spacetime Method for Tracking Elastodynamic Fracture with a Damage-Based Cohesive Model  
*Reza Abedi, Shuo-Heng Chung and Robert Haber*

**Room: CAS3.8**

**TS318 Computational Materials Mechanics II**

- 16:30 A Numerical Comparison of Two Thermo-viscoelastic Constitutive Equations based on their Temperability Capturing Capability  
*Nando Troyani, Y. Ulacio, Pedro Baiz and Carlos Gomes*
- 16:50 Viscoelasticity of Multi-layer Material Systems used in Soccer Balls  
*Daniel Price, Roy Jones, Andy Harland and Vadim Silberschmidt*
- 17:10 Non Linear Viscoelasticity in a Plastic Damageable Aggregate Material sensitive to Hydrostatic Pressure  
*Arnaud Duchosal, Viet-Dung Le, Michel Gratton, Mickael Caliez and Didier Picart*
- 17:30 Modelling of Dynamic Behaviour of Aluminium Alloys  
*Rade Vignjevic, Kevin Hughes and James Campbell*
- 17:50 Asymptotic Representation of the Equivalent Strain Rate in the Vicinity of Maximum Friction Surfaces in Viscoplasticity  
*Sergei Alexandrov and Gennady Mishuris*
- 18:10 Development and Applications of the Inverse Operators in Continuum Mechanics  
*Sami Holopainen*

**Room: CAS3.9**

**TS303 Computational Fluid Dynamics V**

- 16:30 A New Petrov-Galerkin Finite Element Method for Stabilizing Reaction-Diffusion Equations  
*Florin Ilinca and Jean-François Hetu*
- 16:50 CFD Methods derived from Simplified Variational Principles  
*Asher Yahalom, Gad Pinhasi, I. Shtainbach and A. Ullmann*
- 17:10 Implementation and Evaluation of Different Preconditioning Methods in the Compressible CFD Solver Edge  
*Karl Pettersson and Arthur Rizzi*
- 17:30 Implicit Harmonic Balance Solver for Forced Motion Transonic Flow  
*Mark Woodgate and Kenneth Badcock*
- 17:50 Interpolation Alternatives for the Cell Face Velocity and their effect on the solution  
*Antonio Pascau*
- 18:10 Low-Order Models based on 2D and 3D Navier-Stokes Simulations of Compressible Unsteady Flows  
*Rémi Bourguet, Marianna Braza and Alain Dervieux*

**Room: CAS3.10**

**MS103 Damage and Interfacial Delamination Modelling in Composite Materials III**

Joint IACM – IUTAM Minisymposium

Organizers: Domenico Bruno, Frédéric Lebon and Elio Sacco

- 16:30 Biomodular Thin-Walled Beams: A Variational Model Based on a Dual Constrained Approach  
*Franco Maceri and Giuseppe Vairo*
- 16:50 Models of Slightly Curved Defects in Layered Materials  
*Mikhail A. Grekov*
- 17:10 Premature Debonding Failures of Plate Bonded Reinforced Concrete Beams: A Limit Analysis Approach  
*Vincenzo Colotti*
- 17:30 A Generalized Differential Quadrature Solution for Laminated Composite Shells of Revolution  
*Francesco Tornabene and Erasmo Viola*
- 17:50 Finite Element Implementation of Inter-Elements Discontinuities with Zero Elastic Opening and Plastic-Damaging Response  
*Massimo Cuomo*
- 18:10 A Crack-Length Control Scheme for the Analysis of Snap-Back Instability in the Delamination of Strengthened Beams  
*Alberto Carpinteri and Marco Paggi*

**Room: CIN0.1**

**MS080 Biofluids and Coupled Problems in Biomechanics V**

Joint IACM – IUTAM Minisymposium

Organizers: Wolfgang Wall, Marek Behr, Matteo Pasquali and Alberto Figueroa

- 16:30 **Coupling of the Navier-Stokes and Porous Media Equations to Model Blood Flow in the Coronary Arteries (Keynote Lecture)**  
*Irene E. Vignon-Clementel, Giuliana Rossi and Jean-Frédéric Gerbeau*
- 17:00 Platelet Aggregation Modeling using DPD Method and Probabilistic Binding  
*Nenad Filipovic, Milos Kojic and Akira Tsuda*
- 17:20 Transport-Reaction Model of Mural Thrombogenesis  
*Sandra Rugonyi*
- 17:40 Fluid-Structure Modeling of Epithelial Cell Deformation during Microbubble Flows  
*Hannah Dailey and Samir Ghadiali*

**Room: CIN0.2**

**MS117 Mathematical Foundations of Computational Mechanics II**

Organizers: Susanne C. Brenner and Carsten Carstensen

- 16:30 Rehabilitation of the Lowest-Order Raviart-Thomas Element on Quadrilateral Grids  
*Pavel Bochev and Denis Ridzal*
- 16:50 Solid with an Immersed Thin Beam  
*Fehmi Cirak, Bernd Flemisch, Jingzhi Li and Barbara Wohlmuth*
- 17:10 A Posteriori Error Estimates for Fully Discrete Approximations of Time-Dependent Problems  
*Eberhard Baensch, Fotini Karakatsani and Charalambos Makridakis*
- 17:30 Finite Elements for Elliptic Eigenvalue Problems in the Preasymptotic Regime  
*Stefan Sauter, Lehel Banjai and Steffen Börm*
- 17:50 Implicit A Posteriori Error Estimators for the Maxwell Equations  
*Jacobus van der Vegt and Ferenc Izsák*
- 18:10 A Posteriori Error Analysis for Nonstandard FEM  
*Carsten Carstensen*

**Room: CIN1.1**

**MS099 Computational Modeling in Cardiovascular Mechanics II**

Organizers: Gerhard A. Holzapfel, Jay D. Humphrey, Charles A. Taylor and David A. Vorp

- 16:30 Effects of Tissue Components on the Vulnerability of Atherosclerotic Plaques: A Computational Study  
*Dimitrios Kioussis and Gerhard A. Holzapfel*
- 16:50 Modeling of Damage Hysteresis in Overstretched Soft Biological Tissues  
*Daniel Balzani, Sarah Brinkhues, Gerhard Sommer and Gerhard A. Holzapfel*
- 17:10 A Comparative Study of Different Material Models for the Simulation of Arterial Walls  
*Dominik Brands, Axel Klawonn, Oliver Rheinbach and Jörg Schröder*
- 17:30 FE Simulation of the Deployment of a Niti Stent into the Arteria Femoralis  
*Daniel Christ and Stefanie Reese*
- 17:50 Biaxial Mechanical Properties of Intact and Layer-Dissected Human Carotid Arteries at Physiological and Supra-Physiological Loadings  
*Gerhard Sommer, Peter Regitnig, Lukas Koeltringer and Gerhard A. Holzapfel*



## Thursday Evening Sessions (16:30 - 18:30)

### Room: CIN2.1

#### MS043 Advances in Boundary Element Methods V

Organizers: Yijun Liu, Martin Schanz, Naoshi Nishimura, Zhenhan Yao, Marc Bonnet, Ernie Pan, Attilio Frangi and Mitch Denda

- 16:30 Recent Development of the Fast Multipole Boundary Element Method for Solving Large-Scale Acoustic Wave Problems  
*Yijun Liu, Liang Shen and Milind Bapat*
- 16:50 An FMM for Periodic Scattering Problems in Electromagnetics  
*Yoshihiro Otani and Naoshi Nishimura*
- 17:10 A New Technique of High-Speed Boundary Element Methods using Multipole Expansion for Target Region  
*Hiroshi Yamagishi and Kenji Amaya*
- 17:30 Fast Algebraic Boundary Integral Solver for Far Field Acoustic Unbounded Problem using Adaptive Cross Approximation Matrix  
*Xavier Juvigny*
- 17:50 Numerical Modelling of Ground-Borne Vibration and Re-Radiated Noise in Buildings due to Underground Railways  
*Shashank Gupta, Peter Fiala, Geert Degrande and Fulop Augustinovicz*
- 18:10 Stationary Dynamic Analysis of 3D Viscoelastic Domains by an Indirect Version of the Boundary Element Method based on a Non-Singular Auxiliary State  
*Josue Labaki Silva, Euclides Mesquita, Marco Adolph and Persio L. A. Barros*

### Room: PGL

#### MS079 Multiphysics Modelling of Porous Media: Geomaterials, Biomaterials and Others I

Joint IACM – IUTAM Minisymposium

Organizers: Younane N. Abovsliman, Stefan Diebels and Lorenzo Sanavia

- 16:30 **Poromechanics Solutions in Single and Dual Porosity Anisotropic Media for Laboratory Testing (Keynote Lecture)**  
*Younane Abovsliman, Vinh X. Nguyen, Son K. Hoang and Minh H. Tran*
- 17:00 **Swelling Phenomena in Active Soil (Keynote Lecture)**  
*Wolfgang Ehlers, Nils Karajan and Ayhan Acartürk*
- 17:30 A Model for Electrokinetic Transport in Contaminated Clay  
*Cristina Jommi, Guido Musso and Claudio Tamagnini*
- 17:50 Numerical Modelling of Chemical Reactions in Cementitious Materials  
*Detlef Kuhl and Sandra Krimpmann*
- 18:10 Multi-Scale Homogenization of Thin Foam Layers using Shell Theory  
*Mats Landervik and Ragnar Larsson*

**Room: EXC1.1**

**MS185 Special Symposium in Honour of 75th Birthday of Professor S. Valliappan II**

Organizers: Nasser Khalili and Scott Sloan

- 16:30 Parallel Computing of a Reproducing Kernel Particle Method with Closed Form Shape Functions  
*Yao Zheng and Jifa Zhang*
- 16:50 Level-Set Based Topological Optimization for Steady-State Navier-Stokes Flow  
*Shiwei Zhou and Qing Li*
- 17:10 Space-Time FSI Modeling in Arterial Fluid Mechanics  
*Tayfun Tezduyar*

**Room: EXC1.2**

**MS107 Meshfree and Generalized/Extended Finite Element Methods III**

Organizers: J. S. Chen, Ivo Babuska, Ted Belytschko, C. Armando Duarte, Vitor Leitão, Wing Kam Liu, Hirohisa Noguchi and Angelo Simone

- 16:30 A Hybrid Pufem-Meshfree Approach for the Solution of Plane Stress Problems  
*Michele Betti, Paolo Biagini and Luca Facchini*
- 16:50 Free-Vibration Analysis of Thin Plates using the Generalized Moving-Least Squares Approximation  
*Carlos Tiago and Vitor Leitao*
- 17:10 Mixed Time-Stepping for Coupled Meshfree and Finite Element Simulations  
*Arun Prakash, William Elmer and Ertugrul Taciroglu*
- 17:30 RBF as MFS Approximations in Higher Dimension  
*Carlos Alves*
- 17:50 Arlequin Method – Application to Welded Structure Calculations  
*Thi Thuy Trang Lê, Louis Augustins and Habibou Maitournam*
- 18:10 On Fracture Mechanics Analysis using B-spline Wavelet Galerkin Method  
*Satoyuki Tanaka, Hiroshi Okada, Shigenobu Okazawa and Masahiko Fujikubo*

**Room: EXC1.3**

**MS098 Meshless and Related Methods II**

Organizers: Janusz Orkisz, Sergio Idelsohn and Suvranu De

- 16:30 Analytical Integrations in Meshless Implementations of Local Integral Equations  
*Vladimir Sladek, Jan Sladek and Chuanzeng Zhang*
- 16:50 A Mixed Meshless Formulation for Analysis of Shell-Like Structures  
*Tomislav Jarak, Jurica Soric and Josip Hoster*
- 17:10 Higher Order Approximation in the Meshless Finite Difference Method – State of the Art  
*Janusz Orkisz and Slawomir Milewski*
- 17:30 Multipoint Meshless Finite Difference Method – Recent Development  
*Irena Jaworska and Janusz Orkisz*
- 17:50 A High Accuracy Approximated Scheme based on Indirect Radial Basis Neural Networks  
*Haitao Sun*
- 18:10 An Application of Meshless Method in Shake-Down Analysis  
*Michal Pazdanowski*

**Room: EXC2.1**

**STS06: Wake Vortex Research in Europe**

Organizer: Thilo Schönfeld

- 16:30 WSVBS - An Advisory System for Aircraft Wake Vortices  
*Thomas Gerz and Frank Holzäpfel*
- 16:50 CFD simulations of wake flows in the FAR-Wake project  
*Anton de Bruin, Laurent Nybelen, Thilo Schönfeld, Gregoire Winckelmans, André Giovannini, Laurent Georges and Stefan Melber-Wilkending*
- 17:10 Spatial Simulation of a Co-Rotating Vortex Merging Process in Unstable Conditions  
*Laurent Nybelen and Hughes Deniau*
- 17:30 Status of ONERA Research on Wake Vortex Evolution and Alleviation in the Framework of National Activities and European Collaboration  
*Eric Coustols, Odile Labbe, Frédéric Moens, Pascal Molton and Laurent Jacquin*

**Room: EXC2.2**

**STS07.3: MDO Tools for High Quality Design in Aeronautics**

Organizer: Jacques Pèriaux

- 16:30 Dive: A New Approach for Multidisciplinary Optimization  
*Mohamed Masmoudi and yogesh Parte*
- 16:50 Mode Frontier Framework and its Uncertainty Capabilities in Aeronautics  
*Carlo Poloni*
- 17:10 Processes & Methodologies for Multidisciplinary Design in Aeronautics  
*Vittorio Selmin*
- 17:30 Multi-Element Airfoil Lift Maximization Problems with Uncertainties using Evolutionary Optimization and Unstructured Meshes  
*Eugenio Oñate, Gabriel Bugeda, Zhili Tang and Jacques Pèriaux*

# INDEX OF SESSIONS

## Friday July 4<sup>th</sup>.

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	9:20	10:00	10:30	12:30	14:00	16:00	16:30	18:30
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CAS1.1				MS122		MS136		MS136
CAS1.2				MS167		MS167		MS167
CAS1.3								
CAS1.4				MS070		MS070		MS070
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CAS2.4				MS057		MS048		MS048
CAS2.5				MS044		MS044		
CAS2.6				MS062		MS062		MS062
CAS3.1				MS209		MS209		
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EXC1.1			MS185	MS023	MS023			
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EXC1.3			MS098	MS098	MS098			
EXC2.1			MS084	MS084	MS084			
EXC2.2			MS083	MS083	MS083			

P = Plenary Lecture  
 SP = Semi-Plenary Lecture  
 MS = Minisymposium  
 TS = Thematic Session  
 STS = Special Technology Session

## Plenary Lectures (P)

- P9. Friday 08.20 – PGL: Barbara Wohlmuth**  
University of Stuttgart, Germany  
*Stable Hybridization Techniques in Computational Mechanics*
- P10. Friday 08.50 – PGL: Roger Owen**  
University of Wales Swansea, United Kingdom  
*Multi-Field Coupling Strategies for Large Scale Problems Involving Multi-Fracturing Rock and Particulate Media*

## Semi-Plenary Lectures (SP)

Friday 09.30

- SP13. CAS1.7: Rainald Löhner**  
George Mason University, United States  
*Combination of Body-Fitted and Embedded/Immersed Methods for Complex CFD Applications*
- SP14. CAS3.7: Ferdinando Auricchio**  
Università di Pavia, Italy  
*On the Stability of Finite Element Schemes for Finite Strain Incompressible Elasticity*
- SP15. CIN1.1: Gengdong Cheng**  
Dalian University of Technology, China  
*Multi-Scale Design Optimization*
- SP16. PGL: Charbel Farhat**  
Stanford University, United States  
*Reduced-Order Modeling, Differential Geometry and Physics-Based Near-Real-Time Predictions*

**Room: CAS0.1**

**MS065 Topology Optimization in Civil and Structural Engineering III**

Organizers: Matthew Gilbert and Tomasz Lewinski

- 10:30 On the Analogy between Structural Layout Optimization and Plastic Limit Analysis Formulations  
*Matthew Gilbert and Colin Smith*
- 10:50 A Novel Numerical Topology Optimization Method  
*David Taggart and Peter Dewhurst*
- 11:10 Optimal Topologies with Loading Uncertainties  
*Janos Logo, Mohsen Ghaemi and Majid Mohavedi Rad*
- 11:30 Topology Optimization of Three Dimensional Structures with Contact Conditions  
*João Folgado, Paulo Fernandes and Helder Rodrigues*
- 11:50 Topology Design Optimization of Switched Reluctance Motors for the Desired Torque Profile  
*Jaewook Lee, Jeong Hun Seo and Noboru Kikuchi*
- 12:10 Multimaterial Topology Optimization as a Graded Material Design  
*Ryszard Kutylowski*

**Room: CAS1.1**

**MS122 Adaptive Methods for Material Processing IV**

Organizers: Thierry Coupez, Jean-François Hetu and José César de Sa

- 10:30 An Adaptive Remeshing Strategy for Viscoelastic Fluid Flow Simulations  
*André Fortin, Robert Guénette, Abdoulaye Kane and Jean-François Hetu*
- 10:50 Start-Up of Flow through a 4:1:4 Constriction in a Tube using the Rouse-CCR Tube Model for Linear Entangled Polymers with Finite Extensibility  
*Kalonji Kabanemi, Jean-Francois Hetu and Martin Audet*
- 11:10 Numerical Simulation and Sensitivity Analysis of Thermally Induced Flow Instabilities  
*Jean-Serge Giguere, Florin Ilinca, Stephane Etienne and Dominique Pelletier*
- 11:30 Finite Element Analysis using Time-Adaptive Rosenbrock-Type Methods for Finite Strain Viscoelasticity  
*Ahmad-Wahadj Hamkar and Stefan Hartmann*
- 11:50 Relaxation of Residual Stresses during Multi-Pass Machining: Simulation with the Level-Set Method and Process Optimization  
*Olivier Pierard, Josue Barboza, Marc Duflot and Laurent D'Alvise*

**Room: CAS1.2**

**MS167 Inverse Problems for Parameter Identification V**

Organizers: George Dulikravich, Giulio Maier and Helcio Orlando

- 10:30 Identification of Global and Local Parametrization of Material Laws in Fluid Flow and Reactive Transport through Porous Media by Hierarchical and Adaptive Output Least Squares Minimization  
*Michael Blume and Peter Knabner*
- 10:50 Identification and Model of Civil Structure in Dynamics  
*Peter Rosko*
- 11:10 Shape Identification of Forced Heat-Convection Fields  
*Eiji Katamine, Yoshiyuki Kawase and Hideyuki Azegami*
- 11:30 A Bayesian Framework for Orthotropic Elastic Constants Identification Accounting for both Error and Variability  
*Christian Gogu, Raphael T. Haftka, Rodolphe Le Riche, Jerome Molimard and Alain Vautrin*
- 11:50 Bayesian Approach for Parameter Estimation in Heat Transfer  
*Carolina Naveira, Henrique Fonseca, Marina Paez and Helcio Orlando*
- 12:10 Estimating the Uncertainty Range on the Elasto-Plastic Material Parameters determined through Mixed Numerical-Experimental Techniques  
*Steven Cooreman, David Lecompte, Hugo Sol, Sam Coppieters, Dimitri Debruyne and John Vantomme*

**Room: CAS1.4**

**MS070 Patient Specific Computational Modelling I**

Organizers: Perumal Nithiarasu and Rainald Lohner

- 10:30 A Computational Framework for Patient-Specific Modeling of the Cardiovascular System  
*Pablo J. Blanco and Raul Feijoo*
- 10:50 Dynamics of Nano Particles in Patient Specific Blood Vessels  
*Victor Calo, Thomas J. R. Hughes, Mauro Ferrari and Paolo Decuzzi*
- 11:10 Patient-Sensitive Anatomic and Functional 3D Model of the Left Ventricle  
*Deborá Gil, Jaume García-Barnes, Mariano Vázquez, Ruth Aris and Guillaume Houzeaux*
- 11:30 Peripheral Bypass Graft Atherogenesis Study using Near-Wall Convective Transport Normal to the Wall, given by a Series Expansion of Lagrangian Dynamics  
*Alberto Gambaruto, Denis Doorly and Peter Franke*
- 11:50 A Comparison between Patient Specific Blood Flow and One Dimensional Wave Forms  
*Jonathan Mynard and Perumal Nithiarasu*
- 12:10 Patient-Specific Modelling of Haemodynamics in an Aneurismal Thoracic Aorta  
*Igor Sazonov, Prihambado Saksono, Perumal Nithiarasu, Heyman Luckraz and Raoul van Loon*

**Room: CAS1.5**

**MS025 Finite Element Technology and Meshfree Approaches: Innovative Formulation Applied to Metal Forming I**

Organizers: Renato Natal Jorge, Robertt Valente, Stefanie Reese and Elías Cueto

- 10:30 **F-Bar Projection Method for Incompressible Finite Deformation Elasticity and Plasticity using NURBS Based Isogeometric Analysis (Keynote Lecture)**  
*Thomas Elguedj, Yuri Bazilevs, Victor Calo and Thomas J.R. Hughes*
- 11:00 **A Unified Discretization Approach for Shear-Rigid and Shear-Deformable Shells (Keynote Lecture)**  
*Quan Long and Fehmi Cirak*
- 11:30 A Brick Element for Finite Deformations with Inhomogeneous Mode Enhancement  
*Dana Mueller-Hoeppe, Stefan Loehnert and Peter Wriggers*
- 11:50 A Generalized Cosserat Point Element (CPE) for Isotropic Nonlinear Elastic Materials including Irregular 3-D Brick and Thin Structures  
*Mahmood Jabareen and Miles B. Rubin*
- 12:10 New Aspects in Material Modelling and Finite Element Technology for Forming Simulations  
*Stefanie Reese, Marco Schwarze and Iyaylo N. Vladimirov*

**Room: CAS1.6**

**TS316 Industrial Applications I**

- 10:30 A New Unstructured Mesh FE Method for the Analysis of Ship Hydrodynamics  
*Julio García-Espinosa and Eugenio Oñate*
- 10:50 Computational Modelling of a Tidal Stream Turbine  
*Nick Croft, Alison Williams and Mark Cross*
- 11:10 Numerical Study of the Aspect Ratio Effects on the Stratification in Water Storage Tanks  
*Hanan Aloui and Chiheb Bouden*
- 11:30 A Reduced Integration Method for the Coupled Analysis of Offshore Systems  
*Fabrcio Corrêa and Breno Jacob*
- 11:50 Numerical Modelling of Cooldown and Spill Conditions in an All-Concrete LNG Tank  
*Dorel Iosif*
- 12:10 A Fluid-Structure Coupling Analysis of Large-Scale Hyperbolic Cooling Tower subjected to Wind Loads  
*Gang Li, Wenbin Cao and Yaochu Fang*

**Room: CAS1.7**

**MS178 Application of Computational Mechanics to Geoscience**

**Problems: Computational Geosciences III**

Organizers: Chongbin Zhao, A. Murakami and K. T. Chau

- 10:30 An Infinite Element Description of Volterra Dislocations in an Elastic Halfspace and its Application in Earthquake Inversions  
*Gertjan van Zwieten, R.F. Hanssen and Miguel Gutiérrez*
- 10:50 Preliminary Studies on the Role played by Upward Conductive Heat Flux and Throughflow in the Thinning Process of North China Craton  
*Ge Lin, Chongbin Zhao, Lu Zhang, Zian Li, Shilin Llu and Deshun Zhang*
- 11:10 Two Dimensional Electroseismic Modeling  
*Patricia M. Gauzellino, Juan E. Santos and Fabio I. Zyserman*
- 11:30 An Element-Based Finite Volume Method for the Simulation of the Coupled Fluid Flow/Compaction Problem in Sedimentary Basin  
*Clovis R. Maliska, Ewaldo Schubert, Jr. and Fernando S.V. Hurtado*
- 11:50 Particle Finite Element Method and Level Set Method for the Simulation of the Failure of Rockfill Dams due to Overtopping Phenomena  
*Antonia Larese de Tetto, Riccardo Rossi, Eugenio Oñate and Sergio Idelsohn*
- 12:10 Micromechanics of Particulate Solids and its Application to Faulting Process  
*Xi Zhang, Ai-Liang Cai and Chongbin Zhao*

**Room: CAS1.8**

**MS106 Optimization and Inverse Engineering for Industrial Applications I**

Organizers: Michele Chiumenti and Valentino Pediroda

- 10:30 **Evolutionary-Based Aero-Structural Optimization of a Joined Wing UAV using Advanced Potential Methods (Keynote Lecture)**  
*Emiliano Iuliano, Domenico Quagliarella, Pier Luigi Vitagliano, Giovanni Andreutti, Paolo Caccavale and Carlo de Nicola*
- 11:00 Aerodynamic Optimization of Aircraft Configurations with Multidisciplinary Aspects  
*Luca Nardin, Stephan Hitzel, Kaare Sorensen and Herbert Rieger*
- 11:20 Aerodynamic Design of Supersonic Biplane Wing with Complicated Interference using Inverse Problem Method  
*Daigo Maruyama, Kisa Matsushima, Kazuhiro Kusunose and Kazuhiro Nakahashi*
- 11:40 Application of PARSEC Geometry Representation to High-fidelity Aircraft Design by CFD  
*Kisa Matsushima, Takumi Matsuzawa and Kazuhiro Nakahashi*
- 12:00 Multi-Level Parametric Shape Optimization for Reflector Antennas Design  
*Benoît Chaigne, Claude Dedebean and Jean-Antoine Désidéri*

**Room: CAS2.1**

**TS315 Advances in Finite Element Method I**

- 10:30 Localized Artificial Viscosity and Diffusivity Scheme for Capturing Discontinuities on Curvilinear and Anisotropic Meshes  
*Soshi Kawai and Sanjiva K. Lele*
- 10:50 An Energy-Preserving Discrete Element Method for Linear Elasticity In Large Deformation  
*Christian Mariotti and Laurent Monasse*
- 11:10 A Finite Element Formulation for Wrinkling at Finite Strains based on Energy Minimization  
*Joern Mosler*
- 11:30 Finite Element Patterns to satisfy the Consistency Condition  
*Wojciech Gilewski*
- 11:50 Comparison of Mixed and Nodal Based Formulations for Linear Tetrahedral Elements in Elasticity and Plasticity  
*Ismael Caylak, Gottfried Laschet and Rolf Mahnken*
- 12:10 Rheology of Granular Materials with a Discrete Element Method  
*Serge Dumont, Jérôme Fortin and Youssef Ouafik*



**Room: CAS2.3**

**MS130 Theory and Applications of Discontinuous Galerkin Methods IV**

Organizers: Slimane Adjerid, Clint Dawson, Adrian Lew, Beatrice Riviere and Chi-Wang Shu

- 10:30 Mixed Discontinuous Galerkin Methods for Elasticity  
*Saurabh Srivastava and Abani Patra*
- 10:50 Adaptive Stabilization for a Discontinuous Galerkin Method for Nonlinear Elasticity  
*Adrian Lew, Alex Ten Eyck and Fatih Celiker*
- 11:10 Residual Based Formulations of Space-Time Discontinuous Galerkin Methods for Elasto-Dynamic Problems  
*Luca Heltai and Francesco Costanzo*
- 11:30 A discontinuous Galerkin based immersed boundary method for simulation of elastic solids  
*Rangarajan Ramsharan, Adrian J. Lew and Gustavo C. Buscaglia*
- 11:50 Automated Code Generation for Discontinuous Galerkin Methods in Strain-Gradient Plasticity  
*Kristian Oelgaard, Jakob Ostien, Garth Wells and Krishna Garikipati*
- 12:10 A Discontinuous Galerkin Formulation of Kirchhoff-Love Shells: From Linear Elasticity to Finite Deformations  
*Ludovic Noels and Raul Radovitzky*

**Room: CAS2.4**

**MS057 Adaptive Higher Order Variational Methods for Aerospace Applications II**

Organizers: Norbert Kroll, Jaap van der Vegt and Remi Abgrall

- 10:30 h-Multigrid for Higher Order Space-Time Discontinuous Galerkin Discretizations of the Compressible Navier-Stokes Equations  
*Daniel Koster, Jaap van der Vegt, Harmen van der Ven and Christiaan Klaij*
- 10:50 Construction of very High Order Residual Distribution Schemes for Compressible Flow Problems  
*Rémi Abgrall, Adam Larat and Mario Ricchiuto*
- 11:10 A Spectral Volume Navier-Stokes Solver on Unstructured Tetrahedral Grids  
*Kris Van den Abeele, Matteo Parsani, Chris Lacor and Tiago Quintino*
- 11:30 Error Estimation and Adjoint-Based Refinement for Multiple Force Coefficients in Aerodynamic Flow Simulations  
*Ralf Hartmann*
- 11:50 High-Order/hp-Adaptive Discontinuous Galerkin Finite Element Methods for Compressible Fluid Flows  
*Stefano Giani and Paul Houston*
- 12:10 Enhancing Accuracy and Convergence Order of High Order Methods with Adaptive Techniques  
*Frédéric Alauzet*

**Room: CAS2.5**

**MS044 Advancement in Numerical and Physical Modeling of Free-Surface Flows I**

Organizers: Lian Shen and Feng Xiao

- 10:30 **Computations for a US Navy Frigate advancing in Head Waves in Fixed and Free Conditions (Keynote Lecture)**  
*Michel Visonneau, Patrick Queutey, Ganbo Deng, Alban Leroyer and Emmanuel Guilmineau*
- 11:00 **Compressible Two-Phase Flow in Sloshing Tanks (Keynote Lecture)**  
*Roel Luppens, Rik Wemmenhove, Arthur E.P. Veldman and Tim Bunnik*
- 11:30 Large Scale Simulations of Air/Water Free Interface  
*Feng Xiao, Susumu Yamashita, Chungang Chen and Keiko Takahashi*
- 11:50 A New Shallow Water Model with Explicit Polynomial Dependence on Depth  
*Jose M. Rodríguez and Raquel Taboada-Vázquez*
- 12:10 DNS of Turbulence-Wave Interaction and Physical Insights to SGS Modeling for LES  
*Yi Liu, Di Yang, Xin Guo and Lian Shen*

**Room: CAS2.6**

**MS062 Numerical Modelling of Hydrodynamic Geophysical Flows II**

Organizers: Tomas Chacon Rebollo and Edie Miglio

- 10:30 Coupling 1D-2D Shallow Water Models for Simulating Floods due to Overtopping and Breaching of Levees  
*Mustafa S. Altinakar, Edie Miglio and Weiming Wu*
- 10:50 A MUSTA Strategy to discretize the Coulomb Friction Term in Avalanches Models  
*Manuel J. Castro, Enrique D. Fernández-Nieto and Jose M. González-Vida*
- 11:10 Asymptotic Derivation of Section Averaged Models for River Hydraulics: A Second Order Approximation with Generalized Friction Term  
*Astrid Decoene, Luca Bonaventura, Edie Miglio and Fausto Saleri*
- 11:30 Representation of Linear Terrain Features in 2D Free Surface Models using Ghost Fluid Method  
*Edie Miglio, Mustafa Altinakar and Ewa Fijolek*
- 11:50 A quasi-3D Estuarine River Flow Modeling  
*Mohamed Amara, Daniela Capatina-Papaghiuc and Agnès Pétrau*

**Room: CAS3.1**

**MS209 Advanced Materials: Computational Analysis of Properties and Performance III**

Organizers: Vadim Silberschmidt and Valery Matveenko

- 10:30 Conventional and Ultrasonically Assisted Bone Cutting: Finite Element Study  
*Khurshid Alam, Alexander Mitrofanov, Martin Bäker and Vadim Silberschmidt*
- 10:50 Local Toughness in Human Cortical Bone Microstructures by an X-FEM Imaging Technique  
*Thierry Hoc, Elisa Budyn and Sebastien Uzel*
- 11:10 Finite Element Analysis of Thermally Bonded Nonwoven Material  
*Xiaonan Hou, Memiş Acar and Vadim V. Silberschmidt*
- 11:30 Numerical Modelling of Thermally Bonded Bi-Component Fibre Nonwovens  
*Emrah Demirci, Memiş Acar, Behnam Pourdeyhimi and Vadim Silberschmidt*
- 11:50 Modelling Specimens Testing for 3D Fiber Composites Tensile Strength Characterization  
*Aleksandr Anoshkin, Anatoly Tashkinov, Vyacheslav Shavshukov and Ilya Straumit*
- 12:10 Development of a Three Dimensional Grain Structure Submodel for Numerical Modelling of Ti-6Al-4V at Elevated Strain Rates  
*Helen Sarsfield and Nik Petrinic*

**Room: CAS3.2**

**MS024 Scale Bridging in Science and Engineering I**

**Joint IACM – IUTAM Minisymposium**

Organizers: Jacob Fish and Kenjiro Terada

- 10:30 Optimization of Crystal Microstructure in Piezoelectric Materials by Multiscale Finite Element Analysis  
*Yasutomo Uetsuji*
- 10:50 Strain Localization Analysis of Hexagonal Metal based on Homogenization Method  
*Yuichi Tadano*
- 11:10 Transition between Models in Multiscale Simulations: Continuum and Granular Models  
*Jagan Padbidri and Sinisa Mesarovic*
- 11:30 Extension, Compression and Bending Simulation of Nanowire with Nosé-Poincaré Molecular dynamics  
*Byeongyong Lee, Sanghaun Kim and Maenghyo Cho*
- 11:50 Multi-scale Analysis of Nano-size Thin Film and Thin Film/Substrate Systems  
*Jinbok Choi, Maenghyo Cho and Wonbae Kim*
- 12:10 Conservation Properties of the Bridging Domain Method for Coupled Molecular/Continuum Dynamics  
*Mei Xu and Ted Belytschko*

**Room: CAS3.4**

**MS096 Efficient Computational Methods for Coupled Problems I**

Organizers: Harald van Brummelen and Tayfun Tezduyar

- 10:30 **A Level-Set Method for Efficient Monolithic Modeling of Electromechanical Coupling (Keynote Lecture)**  
*Andriy Andreykiv and Daniel J. Rixen*
- 11:00 **Fluid-Structure Interaction and Multi-Body Contact. Application to Aortic Valves (Keynote Lecture)**  
*Matteo Astorino, Jean-Frédéric Gerbeau, Olivier Pantz and Karim Frédéric Traoré*
- 11:30 **A Thermoelctromechanical Model for the Analysis of Smart Structures**  
*Sven Lentzen and Ruediger Schmidt*
- 11:50 **Strong Coupling Solution Methods applied to Fluid-Structure Interaction Problems**  
*Ulrich Küttler and Wolfgang A. Wall*
- 12:10 **Efficiency Issues of Partitioned Solution in Fluid-Structure Interaction**  
*Malte von Scheven, Ekkehard Ramm and Manfred Bischoff*

**Room: CAS3.6**

**MS033 Multiscale Methods in Computer Materials Science I**

Organizers: Maciej Pietrzyk, Peter Hodgson and Tadeusz Burczyński

- 10:30 **An Atomistic-to-Continuum Coupling Method for Non-Equilibrium Heat Transfer in Solids (Keynote Lecture)**  
*Gregory J. Wagner, Reese E. Jones and Jeremy A. Templeton*
- 11:00 **Atomistic and FE Modelling of Crystal Lattice Defects Examined by HRTEM (Keynote Lecture)**  
*Paweł Dłużewski, Amina Belkadi, George Dimitrakopoulos and Philomela Komninou*
- 11:30 **Modelling of Diamond-Like Carbon Film by Double Beam Ion Beam Assisted Deposition**  
*Jacek Ronda and Wojciech Rajchel*
- 11:50 **Tool for Modelling of Deformation Mechanisms based on Digital Representation of Microstructure**  
*Lukasz Rauch, Lukasz Madej and Wojciech Wajda*
- 12:10 **Database-accelerated Local Quasicontinuum Method Based on First-principles Density-functional Theory**  
*Naohiro Toda, Hajime Kimizuka and Shigenobu Ogata*

**Room: CAS3.7**

**MS149 Multiscale Damage and Failure Mechanics of Engineering Materials III**

Joint IACM – IUTAM Minisymposium

Organizers: J. Woody Ju, Lizhi Sun, Pierre Ladevèze and Olivier Allix

- 10:30 **A Multiscale Projection Method for Fracturing Solids**  
*Stefan Loehner, Dana Mueller-Hoeppe and Peter Wriggers*
- 10:50 **Chirality-Sensitive Elastic Behaviour of Small-Radius Singlewalled Carbon Nanotubes**  
*C. Q. Ru*
- 11:10 **Dislocation Dynamics Simulation of Dislocation-Void Interaction**  
*Akiyuki Takahashi, Shotaro Hayashi and Masanori Kikuchi*
- 11:30 **Dislocation Dynamics Modeling of Interaction between Super Dislocation and  $\gamma$ -Precipitates in Nicle-Based Superalloys**  
*Akiyuki Takahashi, Mitsuru Kawanabe and Masanori Kikuchi*
- 11:50 **Effect of Micro Defects on Structure Failure: A Two Scale Approach**  
*Delphine Brancherie, Marc Dambrine, Gregory Vial and Pierre Villon*
- 12:10 **Modelling Damage Progression in Stiffened Composite Panels under Impact**  
*Alastair F. Johnson, Nathalie Toso-Pentecôte and Mickael Guichard*

**Room: CAS3.8**

**TS318 Computational Materials Mechanics III**

- 10:30 A Consistent Eulerian Rate Model for Finite Pseudoelasticity  
*Patrick Luig and Otto Bruhns*
- 10:50 A Geometrically Nonlinear Finite Shell Element for the Analysis of Piezoelectric Smart Structures  
*Katrin Schulz, Sven Klinkel and Werner Wagner*
- 11:10 Aspects of Mesh Distortion and Locking Phenomena in FE Modeling of Thin-Walled Piezoelectric Active Structures  
*Dragan Marinkovic and Manfred Zehn*
- 11:30 Computer Simulations of Magnetoplasticity in Nonmagnetic Materials  
*Romuald Kotowski, Vladimir I. Alshits, Aldona Drabik and Piotr Tronczyk*
- 11:50 Design of a Cylindrical Tube with Negative Poisson's Ratio via Finite Element Analysis  
*Moon Kyu Lee, Sang Hyuk Lee, Nahmkeon Hur, Tae Soo Lee and Jae Bong Choi*
- 12:10 Constitutive Modeling of Unbonded Flexible Riser under Tension  
*Ali Bahtui, Hamid Bahai and Giulio Alfano*

**Room: CAS3.9**

**TS303 Computational Fluid Dynamics VI**

- 10:30 Application of an Efficient Low-Mach Algorithm to Basic Variable Density Flows  
*Pieter Rauwoens, Jan Vierendeels and Bart Merci*
- 10:50 Development and Comparison of different Spatial Numerical Schemes for the Radiative Transfer Equation Resolution using Three-Dimensional Unstructured Meshes  
*Roser Capdevila, Carlos D. Perez-Segarra, Assensi Oliva and Guillem Colomer*
- 11:10 Development of a Light Preprocessor for Interactive CFD Simulations  
*Manuel Julio Garcia Ruiz, Juan Fernando Duque Lombana and Pierre Boulanger*
- 11:30 Heat Transfer Enhancement by using Vortex Generators  
*Markus Rütten and Lars Krenkel*
- 11:50 On Intrusion in a Linearly-Stratified Ambient: The Asymmetric Steady-State Model  
*Tamar Zemach and Marius Ungarish*
- 12:10 Permeability Prediction: Pore Level Simulation of Fluid Flow in Reconstructed Porous Media  
*Aydin Nabovati and A.C.M. Sousa*

**Room: CAS3.10**

**MS100 Concrete Subject to High Temperature and Fire I**

**Joint IACM – IUTAM Minisymposium**

Organizers: Carmelo Majorana and Gabriel Khoury

- 10:30 A Coupled Assessment Tool for the Prediction of the Spalling History of Heated Concrete  
*Matthias Zeiml and Roman Lackner*
- 10:50 Pore Pressure and Spalling in Concrete at High Temperature  
*Long Phan*
- 11:10 Simulating Concrete Behaviour subjected to High Speed Heating Reaching Elevated Temperatures  
*Charbel Melhem, Hocine Boussa and H el ene Dumontet*
- 11:30 Numerical Analysis of Spalling of Concrete Cover at High Temperature  
*Josko Ozbolt, Goran Periskic and Hans-Wolf Reinhardt*
- 11:50 Assessment of the Thermal Spalling Risk of Concrete Structures during Fire by Means of a Finite Element Model  
*Francesco Pesavento, Dariusz Gawin and Bernhard A. Schrefler*
- 12:10 A Symmetric Formulation for Nonlocal Elastic Finite Element Analysis  
*Francesco Marotti de Sciarra*



## Friday Morning Sessions (10:30 - 12:30)

### Room: **CIN0.1**

#### MS017 Computational Methods in Impact Engineering I

Organizers: Ashkan Vaziri, Zhenyu Xue, Dirk Mohr and Horacio Espinosa

- 10:30 A Multi-Scale Approach for Modeling Anisotropic Dynamic Response of Textured Polycrystals  
*Oana Cazacu and Brian Plunkett*
- 10:50 Analysis of Plastic Pipes Subjected to Impact Ruptures  
*Marco Domaneschi and Fabio Scannavino*
- 11:10 Computational Treatment of Dynamic Penetration Accompanied with Adiabatic Shear Banding  
*Patrice Longère, André Dragon and Xavier Deprince*
- 11:30 Developing Pc-Based Designing Technique for Blasting Demolition  
*Koji Uenishi, Hiroshi Yamachi and Shunsuke Sakurai*
- 11:50 Dynamic Response of Honeycomb Sandwich Panels under Impact Loading  
*Pu Xue, N. Zhao and Y.L. Li*
- 12:10 Issues in Constitutive Modeling and Failure for Ductile Materials  
*Zhenyu Xue and Ken Nahshon*

### Room: **CIN0.2**

#### MS131 Multiscale Problems in the Life Sciences I

Organizers: Vincenzo Capasso and Willi Jaeger

- 10:30 Modelling Flow, Chemical Reactions and Mechanical Processes in Tissue  
*Willi Jaeger*
- 10:50 A Multiscale Approach to Ion Transport through Channels  
*Maria Neuss-Radu*
- 11:10 Numerical Analysis of Heat and Mass Transfer Processes Within an Infant Placed Under a Radiant Warmer  
*Anna Fic, Maciej Ginalski, Derek Igham, Andrzej Nowak and Luiz Wrobel*
- 11:30 Conservative upwind finite-element method for the Keller-Segel system of chemotaxis  
*Norikazu Saito*
- 11:50 Multiscale Modelling of Random Geometric Processes, for Multi-Physics Problems occurring in Biomedicine  
*Vincenzo Capasso*
- 12:10 Modeling Blast-Related Traumatic Brain Injury  
*Michelle Nyein, Antoine Jerusalem and Raul Radovitzky*

### Room: **CIN1.1**

#### MS099 Computational Modeling in Cardiovascular Mechanics III

Organizers: Gerhard A. Holzapfel, Jay D. Humphrey, Charles A. Taylor and David A. Vorp

- 10:30 Aneurysm Enlargement utilizing a Fiber-based Growth Model  
*Fred Nugen, Yuri Bazilevs and Thomas J.R. Hughes*
- 10:50 Automatic 3D Geometry Reconstruction and FE-Mesh Generation of Abdominal Aortic Aneurysm Rupture  
*Martin Auer and T. Christian Gasser*
- 11:10 The Role of the Intra-luminal Thrombus in Abdominal Aortic Aneurysm Rupture  
*T. Christian Gasser, Martin Auer, Fausto Labruto, Roy Joy and Jesper Swedenberg*
- 11:30 The Role of Material Anisotropy in Abdominal Aortic Aneurysm Wall Mechanics  
*José F. Rodríguez, Giampaolo Martufi, Manuel Doblaré and Ender A. Finol*
- 11:50 Finite Volume Fluid/Structure Interaction applied to Patient-Specific Arterial Flow  
*Gavin Tabor, Philippe Young and Hrvoje Jasak*
- 12:10 Mitral Valve Finite Element Analysis using Human Uniaxial Tensile Data  
*Victorien Prot, Bjørn Skallerud and Gerhard A. Holzapfel*

**Room: CIN2.1**

**MS043 Advances in Boundary Element Methods VI**

Organizers: Yijun Liu, Martin Schanz, Naoshi Nishimura, Zhenhan Yao, Marc Bonnet, Ernie Pan, Attilio Frangi and Mitch Denda

- 10:30 Adaptive Coupling of Finite and Boundary Element Methods in Three-Dimensional Elasto-Plasticity  
*Wael Elleithy and Ulrich Langer*
- 10:50 A Complex Variable Symmetric Boundary Element Model for Polygonal Kirchhoff Plates  
*Mirko Mazza and Maurizio Aristodemo*
- 11:10 BIEM/BEM Simulation of Dynamic Interaction between a Sub-Interface Crack and an Interface in 3-D Elastic Bimaterial  
*Viktor Mykhas'kiv, Ihor Zhabdynskiy and Chuanzeng Zhang*

**Room: PGL**

**MS079 Multiphysics Modelling of Porous Media: Geomaterials, Biomaterials and Others II**

Joint IACM – IUTAM Minisymposium

Organizers: Younane N. Abousleiman, Stefan Diebels and Lorenzo Sanavia

- 10:30 Computational Modeling of Three-Phase Porous Media  
*Kanhasamy Muraleetharan and Nadarajah Ravichandran*
- 10:50 Wave Propagation in Partially-Saturated Rocks: Theoretical and Numerical Investigation  
*Holger Steeb and Stefan Schmalholz*
- 11:10 Seismic Initiation Mechanisms of Fast Granular Flows  
*Pablo Mira, Jose Antonio Fernández-Merodo, Manuel Pastor and Laura Tonni*
- 11:30 Modeling of Internal Erosion in Water-Saturated Materials subjected to Dynamic Loading  
*Bernd Lenhof, Per Kettil, Fredrik Larsson and Kenneth Runesson*
- 11:50 An Efficient Solution Strategy for Coupled Multi-Field Problems using Adaptive Integration and Time-Stepping  
*Peter Moonen, Jan Carmeliet and Bert Sluys*
- 12:10 A Preliminary Comparative Study between Two Edge-Based Finite Volume Formulations for the Solution of Elliptic Problems in Heterogeneous and Anisotropic Media  
*Darlan Carvalho, Rogerio Silva, Ramiro Willmersdorf and Paulo Lyra*

**Room: EXC1.1**

**MS185 Special Symposium in Honour of 75th Birthday of Professor S. Valliappan III**

Organizers: Nasser Khalili and Scott Sloan

- 10:30 A Geometric Approach for Generalization of Constitutive Models for Geomaterials from 2D to 3D  
*Nasser Khalili and Martin Liu*
- 10:50 Modelling Geo-Environmental Engineering Problems by Means of Porous Media Mechanics  
*Lorenzo Sanavia and Bernhard A. Schrefler*
- 11:10 Numerical Implementation of a New Class of Variational Plasticity Models For Geomaterials  
*Kristian Krabbenhoft*
- 11:30 Finite/Infinite Element Approach for Ground Vibrations Due to Underground Trains  
*Y. B. Yang and H.H. Hung*
- 11:50 Modelling the Interface Conditions in Limit Analysis Applications  
*Andrei Lyamin, Kristian Krabbenhoft and Scott W. Sloan*

**Room: EXC1.2**

**MS107 Meshfree and Generalized/Extended Finite Element Methods IV**

Organizers: J. S. Chen, Ivo Babuska, Ted Belytschko, C. Armando Duarte, Vítor Leitão, Wing Kam Liu, Hirohisa Noguchi and Angelo Simone

- 10:30 Second Order Maximum-Entropy Approximation Schemes  
*Christian Cyron, Marino Arroyo, Michael Ortiz and Wolfgang A. Wall*
- 10:50 Hermite-Type Meshfree Method with Discontinuous/Discontinuous-Derivative Basis Functions for solving Hyperbolic-Type Equation by using Pseudo-Particle Method  
*Zhiqian Zhang and Hirohisa Noguchi*
- 11:10 An Optimal Fictitious Domain Method inspired by the Extended Finite Element Method  
*Jaroslav Haslinger and Yves Renard*
- 11:30 Accurate Solution of Global Field Interpolations for Particle Simulations  
*L. A. Barba and Louis F. Rossi*
- 11:50 Variational Adaptivity for Finite-Deformation Elasticity with Local Maximum-Entropy Approximants: Locality and Node Location Adaption  
*Adrian Rosolen, Daniel Millán and Marino Arroyo*

**Room: EXC1.3**

**MS098 Meshless and Related Methods III**

Organizers: Janusz Orkisz, Sergio Idelsohn and Suvranu De

- 10:30 Blended Hermite MLS Approximation for Discretizing Biharmonic Partial Differential Equations  
*Pierre Joyot, Francisco Chinesta, Pierre Villon and Balal Khoshnoudirad*
- 10:50 A Kriging-Based Finite Element Method for Analyses of Shell Structures  
*Foek Tjong Wong and Worsak Kanok-Nukulchai*
- 11:10 On the Nonlinear Analysis of Thin Shells by the Generalized Moving-Least Squares Approximation  
*Carlos Tiago and Paulo Pimenta*
- 11:30 On Combinations of Adaptive FE and Meshless FDM  
*Józef Krok*
- 11:50 An IRBFN Cartesian Grid Method based on Displacement-Stress Formulation for 2D Elasticity Problems  
*Phong Le, Nam Mai-Duy, Thanh Tran-Cong and Graham Baker*
- 12:10 Analysis of an MLPG Solution for 3D Potential Problems  
*Annamaria Mazzia, Giorgio Pini and Flavio Sartoretto*



**Room: EXC2.1**

**MS084 Advances in Time-Integration I**

Organizers: Adrian Lew, Eric Darve and Isaac Harari

- 10:30 **Heterogeneous Multiscale Methods for Oscillatory Dynamical Systems (Keynote Lecture)**  
*Bjorn Engquist*
- 11:00 **Energy-Momentum Algorithms for Nonlinear Coupled Thermo-Elastodynamics (Keynote Lecture)**  
*Francisco Armero*
- 11:30 Mori-Zwanzig Normal Mode Dynamics  
*Jesus A. Izaguirre, Chris R. Sweet and Eric Darve*
- 11:50 A Multiscale Method for Weakly Coupled Oscillators  
*Gil Ariel, Bjorn Engquist and Richard Tsai*
- 12:10 On Energy Decay of Time Discontinuous Galerkin Methods for Non-Linear Elastodynamics  
*Stefano de Miranda, M. Mancuso and Francesco Ubertini*

**Room: EXC2.2**

**MS083 Structural Stability I**

Organizers: Herbert Mang and Zsolt Gaspar

- 10:30 **Application of the Splitting Lemma in the Stability Analysis (Keynote Lecture)**  
*Zsolt Gaspar and Laszlo Oroszvary*
- 11:00 **Postbuckling Behaviors of Steel Trusses under Mechanical and Thermal Loads (Keynote Lecture)**  
*Y. B. Yang and T. J. Lin*
- 11:30 Buckling of a Spindle Shaped Tensairity Column under Compression: A Numerical-Experimental Study  
*Theofanis Plagianakos, Rolf Luchsinger and Rene Cretton*
- 11:50 Generalized Eigenvalue Problem for Nonlinear Stability Analysis  
*Tomasz Sokol*
- 12:10 Mechanics of Highly-Deformed Elastic Shells: Probing Localized and Extended Deformations using Computational Mechanics  
*Ashkan Vaziri*

**Room: CAS0.1**

**MS065 Topology Optimization in Civil and Structural Engineering IV**

Organizers: Matthew Gilbert and Tomasz Lewinski

- 14:00 Optimal Shape Design subject to Variational Inequalities  
*Michael Hintermüller and Antoine Laurain*
- 14:20 The Stiffest Plates and Shells of the Uniformly Distributed Kelvin Moduli  
*Tomasz Lewinski*
- 14:40 On the Combination of the Topological Derivative Method with Free Material Optimization  
*Stefanie Gaile, Günter Leugering and Jan Sokolowski*
- 15:00 Optimization of Periodic Microstructures using Shape and Topology Derivatives  
*Anca-Maria Toader*
- 15:20 Topology Optimization of Optical Band Gap Effects in Slab Structures modulated by Periodic Rayleigh Waves  
*Allan Roulund Gersborg and Ole Sigmund*

**Room: CAS1.1**

**MS136 Minisymposium on Computational Methods for Seismic Analysis and Design I**

Organizers: Manolis Papadrakakis, Dimos Charmpis and Nikos Lagaros

- 14:00 Development of a Beam-Column Finite Element for Nonlinear Analysis of Reinforced Concrete Frame Structures considering Flexure-Shear Coupling  
*João Pacheco Almeida, António Araújo Correia and Rui Pinho*
- 14:20 High-Order Discontinuous Galerkin Methods for the Reverse Time Migration  
*Caroline Baldassari, H el ene Barucq, Henri Calandra, Bertrand Denel and Julien Diaz*
- 14:40 Developing of a Shaking Table Control Algorithm  
*Boris Blototsky, Grigory Agranovich and Yuri Ribakov*
- 15:00 Development of a Fibre Flexure-Shear Model for Seismic Analysis of RC Framed Structures  
*Paola Ceresa, Lorenza Petrini, Rui Pinho and Ferdinando Auricchio*
- 15:20 Force-Based Versus Displacement-Based Formulations in the Cyclic Nonlinear Analysis of Reinforced Concrete Frames  
*Ant onio Ara ujo Correia, Jo ao Pacheco Almeida and Rui Pinho*

**Room: CAS1.2**

**MS167 Inverse Problems for Parameter Identification VI**

Organizers: George Dulikravich, Giulio Maier and Helcio Orlando

- 14:00 Calibration of Third Order Elastic Moduli by the Echo Pulse Method  
*Alena Kruisova and Jiri Plesek*
- 14:20 Comparison between Multiobjective and Classical Algorithms for Identifying Damage Law Parameters using an Inverse Methodology  
*Eric Gildemyn, Camille Rertob, Philippe Dal Santo, Alain Potiron and Delphine Saïdane*
- 14:40 A Sparsity approach to Electric Impedance Tomography  
*Peter Maass and Taufiqur Khan*
- 15:00 Local Method for Identification of Parameters in Mathematical Model of Vestibular Afferent Neuron  
*Alexander Grebennikov, Vladimir Alexandrov and Gregorio Castillo Quir oz*
- 15:20 Pointwise Identification of Elastic Properties in Nonlinear Hyperelastic Membranes  
*Jia Lu and Xuefeng Zhao*
- 15:40 Semianalytical Versus Numerical Sensitivity Analysis: A Case Study for the Calibration of Material Models based on Mixed Formulations at Large Strains  
*Anke Bucher, Uwe-Jens G rke, Reiner Kreissig and Arnd Meyer*

**Room: CAS1.4**

**MS070 Patient Specific Computational Modelling II**

Organizers: Perumal Nithiarasu and Rainald Lohner

- 14:00 Coupled 3D Impedance Model of the Human Lungs  
*Andrew Comerford, Claudius Stahl, Josef Guttmann and Wolfgang A. Wall*
- 14:20 An Automated Reconstruction of the Lungs for CFD simulations  
*Julien Pennecot and Lars Krenkel*
- 14:40 CFD Mesh of the Human Nose and Flow Simulation  
*Julien Pennecot, Markus Ruetten, Roland Kessler and Claus Wagner*
- 15:00 Image-Based Pulmonary Airflow Simulation using Cartesian Adaptive Mesh Refinement Method  
*Takahito Miki, Yohsuke Imai, Masanori Nakamura, Chihiro Iwamura, Takuji Ishikawa, Shigeo Wada and Takami Yamaguchi*

**Room: CAS1.5**

**MS025 Finite Element Technology and Meshfree Approaches: Innovative Formulation Applied to Metal Forming II**

Organizers: Renato Natal Jorge, Robertt Valente, Stefanie Reese and Elías Cueto

- 14:00 A 3d Arbitrary Lagrangian Eulerian Formulation for the Numerical Simulation of Cold Roll Forming Processes  
*Jean-Philippe Ponthot, Romain Boman and Luc Papeleux*
- 14:20 Meshless Methods in Aluminium Extrusion  
*Wouter Quak, A.H. van den Boogaard and Jan Huétink*
- 14:40 A New Rotation-Free Triangular plate Element with Shear Deformation Effects  
*Francisco Zárate and Eugenio Oñate*
- 15:00 Characteristic Galerkin Finite Element Method with Marker Particle Integration for Metal Forming  
*Takahiro Yamada and Kazumi Matsui*
- 15:20 Hyper Reduction of Finite Strain Elasto-Plastic Models  
*David Ryckelynck*

**Room: CAS1.6**

**TS316 Industrial Applications II**

- 14:00 Analysis of Wing-Tail Interference  
*Zhong Lei, Dong-Youn Kwak and Mitsuhiro Murayama*
- 14:20 Numerical Simulation of a Full High Pressure Compressor  
*Nicolas Gourdain, Jen-Francois Boussuge and Michael Stoll*
- 14:40 Flow Simulations for Airports –Analyzing Flow Interaction of Taxiing Aircrafts with Buildings and Blast Fences  
*Markus Trenker, Gorka Ibanez and Philipp Muigg*
- 15:00 Simulating the Bistable Flow of Recirculation Loop in a BWR NPP  
*Carlos Julián Gavilán Moreno*
- 15:20 3-D Numerical Study of Internal Free Convection of a High Voltage Measuring Transformer  
*Ahmad Falahatpisheh, Omid Abouali and Arash Rajabi*
- 15:40 Three Dimensional Tomography for Fluid Flow Modelling in Dendritic Structures of Directionally Solidified Nickel-Base Superalloy  
*Jonathan Madison, Jonathan Spowart, David Rowenhorst, Katsuyo Thornton and Tresa Pollock*

**Room: CAS1.7**

**MS059 Modelling and Optimisation for Coupled Multi-Physics Processes I**

Organizers: Francois Bay and Mark Cross

- 14:00 **A Mixed Eulerian-Lagrangian Formulation for the Computational Modelling of Extrusion Processes (Keynote Lecture)**  
*Alison Williams, Nick Croft, Avril Slone and Mark Cross*
- 14:30 Three-Dimensional Simulation for the Injection  
*Zhiliang Fan, Clinton Kietzmann, Shishir R. Ray, Franco S. Costa and Peter K. Kennedy*
- 14:50 Three-Dimensional Finite Volume Computation of TIC Combustion Synthesis  
*Asdin Aoufi and Gilles Damamme*
- 15:10 Phase-Field-Based Modeling and Simulation of Solidification and Deformation Behavior of Technological Alloys  
*Svyatoslav Gladkov, Marcus Stiemer and Bob Svendsen*
- 15:30 A Multiphase Continuum Approach for Biological Conversion Processes in Landfills  
*Tim Ricken, Markus Robeck and Renatus Widmann*

**Room: CAS1.8**

**MS106 Optimization and Inverse Engineering for Industrial Applications II**

Organizers: Michele Chiumenti and Valentino Pediroda

- 14:00 Topology Optimization of Fluid Dynamics Devices  
*Marzio Lettich*
- 14:20 Manufacturing Constraints in Topology Optimization of Functionally Graded Materials and Structures  
*Silvia R.M. Almeida, Glaucio Paulino and Emilio C.N. Silva*
- 14:40 Topology Optimization of Plates and Shells using Hybrid Genetic Algorithm  
*Nidur Singh, C. V. Ramakrishnan and D. K. Sehgal*
- 15:00 Artificial Neural Networks for the Solution of Optimal Shape Design Problems  
*Roberto Lopez, Xavier Diego, Roberto Flores, Michele Chiumenti and Eugenio Oñate*
- 15:20 Notch Designs with Low Stress Concentration  
*Pauli Pedersen and Niels L. Pedersen*
- 15:40 Mathematical Modelling and Optimal Control of the Solidification Process  
*Vladimir Zubov and Alla Albu*

**Room: CAS2.1**

**TS315 Advances in Finite Element Method II**

- 14:00 Multigrid Methods for Inhomogeneous Problems in Solid Mechanics  
*Johann Bitzenbauer and Karl Schweizerhof*
- 14:20 Hierarchical Grid Adaptation for Hybrid Meshes  
*Matthias Möller*
- 14:40 Edge-Based Implementation for the NSGS Method  
*Isaac Santos, Lucia Catabriga and Regina Almeida*
- 15:00 Unstructured Hybrid Meshing Features in PADRAM  
*Caleb Dhanasekaran, Daisuke Sasaki, Bill Dawes and Shahrokh Shahpar*
- 15:20 Some Remarks on the Sensitivity of Finite Elements to Mesh Distortions  
*Manfred Bischoff, Benjamin Schneider, Nagesh Chilakunda and Deepak Ganapayya*
- 15:40 CUR Model Reduction of Mechanical Structures  
*Fabio Marcuzzi*

**Room: CAS2.3**

**MS130 Theory and Applications of Discontinuous Galerkin Methods V**

Organizers: Slimane Adjerid, Clint Dawson, Adrian Lew, Beatrice Riviere and Chi-Wang Shu

- 14:00 A Stabilized Discontinuous Galerkin Formulation for Helmholtz Problems  
*Mohamed Amara, Rabia Djellouli and Magdalena Grigoroscuta*
- 14:20 A High-Order Runge-Kutta Discontinuous Galerkin Method for solving Time-Domain Maxwell's Equations  
*Min-Hung Chen*
- 14:40 Comparison of Two Full-Wave Models for a Loudspeaker  
*Timo Lähivaara, Tomi Huttunen and Simo-Pekka Simonaho*
- 15:00 Application of Discontinuous Galerkin Method to Interface Fracture Phenomena  
*Felicia Stan*
- 15:20 Mortar Couplings of Discontinuous Galerkin and Mixed Finite Element Methods  
*Ivan Yotov*
- 15:40 Coupling Discontinuous Galerkin Discretizations using Mortar Finite Elements for Advection-Diffusion-Reaction Problems  
*Mi-Young Kim and Mary Wheeler*

**Room: CAS2.4**

**MS048 Second Level Preconditioners for Krylov Subspace Methods I**

Organizers: Reinhard Nabben and Kees Vuik

- 14:00 **Multilevel Krylov Methods (Keynote Lecture)**  
*Yogi Erlangga and Reinhard Nabben*
- 14:30 **Fast Algorithms for Nonlinear Systems of Equations and Optimization (Keynote Lecture)**  
*Eric de Sturler*
- 15:00 Acceleration Strategies based on the Reuse of Krylov Subspaces in Multiresolution Problems with Varying Matrices  
*Pierre Gosselet, Julien Pebrel and Christian Rey*
- 15:20 Performance of Various Algebraic Multigrid Based Preconditioners for the Drift-Diffusion Equations for Semiconductor Devices  
*Paul Lin, John Shadid and Robert Hoekstra*
- 15:40 On the Approximation of the Subgrid Scale for Systems of Equations  
*Javier Principe and Ramon Codina*

**Room: CAS2.5**

**MS044 Advancement in Numerical and Physical Modeling of Free-Surface Flows II**

Organizers: Lian Shen and Feng Xiao

- 14:00 Space-Time Variational (Dis)Continuous Galerkin Method for Free Surface Waves  
*Vijaya Raghav Ambati, O. Bokhove and J.J.W. van der Vegt*
- 14:20 A Discontinuous Galerkin Method for Free Surface Flows with Topography and Dry Lands  
*Pablo Tassi, Alexandre Ern and Serge Piperno*
- 14:40 Sloshing Problem: Simulation and Experimental Validation  
*Marcela Cruchaga, Alex Raventós, Diego Celentano and José Luis Almazán*
- 15:00 Hydraulic Performance of Spillways - Three Predictions using CFD  
*David Ho, Karen Riddette and Michael Hogg*
- 15:20 A Numerical Study on the Stability of the Steady Displacement of a Liquid Plug along a Small Conduit  
*Diego Campana, Sebastian Ubal, Maria Giavedoni and Fernando Saita*
- 15:40 Accuracy Evaluation of Volume Tracking Methods for Free Surface Flows  
*Jesús Castro and Carles Olliet*

**Room: CAS2.6**

**MS062 Numerical Modelling of Hydrodynamic Geophysical Flows III**

Organizers: Tomas Chacon Rebollo and Edie Miglio

- 14:00 **High Order Schemes on Unstructured Meshes for Two-Phase Free-Surface Flow with Stiff Friction (Keynote Lecture)**  
*Eleuterio Toro, Michael Dumbser, Arturo Hidalgo and Carlos Pares*
- 14:30 High Order Well Balanced Schemes for Systems of Balance Laws  
*Giovanni Russo and Alexander Khe*
- 14:50 Well-Balanced High Order Methods for Balance Laws based on Reconstruction of States  
*Carlos Pares, Manuel J. Castro, Jose M. Gallardo and J.A. López-García*
- 15:10 Well-Balanced High-Order Finite Volume Schemes for Shallow Water Equations with Topography and Dry Areas  
*Jose M. Gallardo, Manuel J. Castro and Carlos Pares*
- 15:30 On the Convergence of Path-Conservative Schemes for Nonconservative Problems  
*María Luz Muñoz-Ruiz and Carlos Pares*

**Room: CAS3.1**

**MS209 Advanced Materials: Computational Analysis of Properties and Performance IV**

Organizers: Vadim Silberschmidt and Valery Matveenko

- 14:00 Analytical and Numerical Models for Bloch Waves and Localised Defect Modes in Perforated Plates  
*Alexander Movchan, Natasha Movchan and Ross McPhedran*
- 14:20 Effective Properties of Magneto-electroelastic Materials with Aligned Ellipsoidal Voids (New)  
*Baolin Wang*
- 14:40 Nucleation and Growth of Voids in Solder Joints of MEMS  
*Kerstin Weinberg and Wolfgang Müller*
- 15:00 A Model for Eutectoid Steel subjected to Heat Treatment and its Finite Element Simulation  
*Mauro Fabrizio, Mirko Maraldi, Luisa Molari, Pier Gabriele Molari and Francesco Ubertini*
- 15:20 Efficient Methods for High Cycle Fatigue Assessment of Components Containing Defects  
*Hans-Peter Gaenser and Juergen Froeschl*
- 15:40 Solution to Optimization Problems of Dynamic Properties of Electroviscoelastic Systems with Electric Resonant Filters  
*Evgeny P. Kligman, Natalya A. Yurlova and Nikita F. Putin*

**Room: CAS3.2**

**MS024 Scale Bridging in Science and Engineering II**

**Joint IACM – IUTAM Minisymposium**

Organizers: Jacob Fish and Kenjiro Terada

- 14:00 **A Comparative Study of General Finite Element Techniques in Atomistic-to-Continuum Coupling (Keynote Lecture)**  
*Michael Macri and Peter Chung*
- 14:30 **Multiple Scale Reduced Order Homogenization (Keynote Lecture)**  
*Jacob Fish and Zheng Yuan*
- 15:00 Parallel Multi-Scale Finite Element Procedure for Piezoelectric Material  
*Hiroyuki Kuramae, Hisanao Nishioka, Yasutomo Uetsuji and Eiji Nakamachi*
- 15:20 On the Multiscale Simulations by Mixed Finite Element Method in Thermoelasticity  
*Dubravka Mijuca*
- 15:40 Multiscale Methods for Naval Ship Structures  
*Roshdy George S. Barsoum*

**Room: CAS3.4**

**MS096 Efficient Computational Methods for Coupled Problems II**

Organizers: Harald van Brummelen and Tayfun Tezduyar

- 14:00 Multiphysics Simulation of Welding Process  
*Nicolas Poletz, Koen Hillewaert and Arnaud Francois*
- 14:20 Numerical Treatment of Coupled Electro- Thermo-Mechanical Effects in Contact Problems  
*Christian Weißenfels and Peter Wriggers*
- 14:40 A Second Order Coupling Algorithm for Thermal Fluid-Structure Interaction  
*Plamen Pironkov, Michael Schäfer and Dörte Stempel*
- 15:00 Heterogeneous Coupling in Computational Aeroacoustics  
*Sabine Roller, Harald Klimach and Claus-Dieter Munz*
- 15:20 Time-Accurate, High-Order Schemes for the Numerical Simulation of Multiphase Flow in Porous Media  
*Luis Cueto-Felgueroso and Ruben Juanes*
- 15:40 New Displacement-Based Superelement for Poroelastic Materials. Derivation and Convergence Study  
*Cedric Batifol, Mohamed Ichchou and Mohamed Galland*

**Room: CAS3.6**

**MS033 Multiscale Methods in Computer Materials Science II**

Organizers: Maciej Pietrzyk, Peter Hodgson and Tadeusz Burczyński

- 14:00 Micro-Scale Simulation of Recrystallization through Cellular Automata  
*Nima Yazdipour, Chris Davies and Peter Hodgson*
- 14:20 Simulation of Plastic Behaviour of FCC Metals accounting for Lattice Orientation  
*Lechosław Trębacz, Lukasz Madej, Wojciech Wajda and Henryk Paul*
- 14:40 Multiscale Modelling using Finite and Boundary Elements Methods Coupled with Discrete Atomic Model  
*Tadeusz Burczyński, Waclaw Kus and Adam Mrozek*
- 15:00 Internal Variable and Cellular Automata – Finite Element Models of Heat Treatment  
*Piotr Macioł, Jerzy Gawąd, Roman Kuziak and Maciej Pietrzyk*
- 15:20 Generalized Micro/Macro Model of Crystallization and its Numerical Realization  
*Bohdan Mochnicki and Romuald Szopa*
- 15:40 The Multi-Scale Approach to Numerical Modelling of Solidification  
*Mariusz Ciesielski*

**Room: CAS3.7**

**MS149 Multiscale Damage and Failure Mechanics of Engineering Materials IV**

Joint IACM – IUTAM Minisymposium

Organizers: J. Woody Ju, Lizhi Sun, Pierre Ladevèze and Olivier Allix

- 14:00 Multiscale Equivalent Aggregating Discontinuities: Circumventing Loss of Ellipticity  
*Jeong-Hoon Song, Stefan Loehnert and Ted Belytschko*
- 14:20 Interfacial Debonding and Mechanical Behavior of Particle-Reinforced Composites  
*H.T. Liu, Lizhi Sun and J. Woody Ju*
- 14:40 Multi-Scale Construction and Large-Scale Simulation of Dynamically Loaded Structural Fabric  
*David Powell, Tarek Zohdi and Charbel Farhat*
- 15:00 Multiscale Constitutive Relation for Periodic Masonry  
*Elio Sacco*
- 15:20 Two-Scale Modeling of Thermal Shock Failure in Heterogeneous Solids  
*Izzet Ozdemir, Marcel Brekelmans and Marc Geers*
- 15:40 Proposal and use of a Void Model for the Evaluation of Ductile Fracture in Sheet Metal Forming  
*Kazutake Komori*

**Room: CAS3.8**

**TS318 Computational Materials Mechanics IV**

- 14:00 Experimental Characterization and Numerical Modelling of the Non-Linear Mechanical Behaviour of Nomex Honeycomb Cores  
*Steven Marguet, Laurent Gornet and Patrick Rozycki*
- 14:20 Description of a Composite with Weak Filling Material by Model with Voids  
*Eligiusz Postek and Tomasz Sadowski*
- 14:40 Meso-Scale Modelling of Plasticity in Two Phase Composite Materials  
*Katherine Acton and Lori Graham-Brady*
- 15:00 Effect of Neighbour Heterogeneity on Local Stresses in Two Phase Stochastic Composite  
*Hay Azulay and Eli Altus*
- 15:20 Special Hybrid Multilayer Finite Elements for 3-D Stress Analyses Around Holes in Laminated Composites  
*Qingping P. Yang, Z.S. Tian and X.Q. Zhang*
- 15:40 Simulation of Composite Manufacturing with MSC Products  
*Sanjay Choudhry, Shiva Padmanaban, Sheng Ping Wang, Per Nordlund, Claudio Bruzzo and Marco Calcagni*

**Room: CAS3.9**

**TS303 Computational Fluid Dynamics VII**

- 14:00 Application of NS Equations for 3D Viscous Turbulent Flow on Bladeless Fluid Machines  
*Jaroslav Pelant, Karel Adamek and Martin Kyncl*
- 14:20 Assessment of Surrogate Models for the Global Optimization of Turbomachinery Flows  
*Jacques Peter and Meryem Marcelet*
- 14:40 Heat Transfer Modeling Inside Industrial Furnaces  
*Elie Hachem, Hugues Dignonnet, Elisabeth Massoni and Thierry Coupez*
- 15:00 Large and Heterogeneous Data Handling for Helicopter CFD  
*Marc Poinot and Michel Costes*
- 15:20 Path Optimization of Thrust Producing Flapping Airfoils using Response Surface Methodology  
*Mustafa Kaya and Ismail Hakki Tuncer*

**Room: CAS3.10**

**MS100 Concrete Subject to High Temperature and Fire II**

**Joint IACM – IUTAM Minisymposium**

Organizers: Carmelo Majorana and Gabriel Khoury

- 14:00 Microstructural Analysis of High Performance Concrete under Fire. Improving Resistance through the use of Fibres  
*M. Cruz Alonso and Carmen Andrade*
- 14:20 Structural Alterations of Ultra High Performance at High Temperatures  
*Ulrich Diederichs*
- 14:40 Stress-Strain Modelling of Heated Concrete  
*Valentina Salomoni, Carmelo Majorana and Gabriel Khoury*
- 15:00 Numerical Simulation of Concrete Tunnels subjected to Fire  
*Jan Cervenka, Jiri Surovec and Petr Kabele*
- 15:20 Load Carrying Capacity of Underground Box Structure with Fire Spalling  
*GyeHee Lee, SunHoon Kim and IkChang Choi*
- 15:40 Polypropylene Fibres and Explosive Spalling in Tunnel Constructions  
*Gabriel Khoury, Carmelo Majorana and Valentina Salomoni*





**Room: CIN0.1**

**MS017 Computational Methods in Impact Engineering II**

Organizers: Ashkan Vaziri, Zhenyu Xue, Dirk Mohr and Horacio Espinosa

- 14:00 Ignition of High Explosive induced by Dynamic Shear Banding: Computational Impact Engineering and Experimental Validation  
*Cyril Gruau, Didier Picart, Franck Delmaire-Sizes, Hervé Trumel and Jocelyn Sabatier*
- 14:20 Impact Problems by TFETI Based Domain Decomposition Method  
*Jiri Dobias, Svatopluk Ptak, Zdenek Dostal and Vit Vondrak*
- 14:40 Material Modelling for Concrete Plate subjected to Blast Load  
*Krzysztof Cichocki*
- 15:00 Numerical Simulation of the Tumbling Effect of Small Caliber Projectiles into Ballistic Soap  
*Nestor Nsiampa, Gunther Dyckmans and André Chabotier*
- 15:20 Shock Absorption Optimization of Composite Granular Protectors  
*Fernando Fraternali and Chiara Daraio*
- 15:40 Simulation of the Response of Composite Structures to Intense Dynamic Loading  
*Alireza Forghani and Reza Vaziri*

**Room: CIN0.2**

**TS300 Boundary Element Method I**

- 14:00 Crack Propagation Simulations by a Combined FE/BE Approach with an Automatic BE Domain Extension  
*Bastian Helldörfer, Paul Steinmann and Günther Kuhn*
- 14:20 Boundary Element Formulation for Fractured Reinforced Bodies  
*Edson Denner Leonel, Osvaldo Manzoli and Wilson Sergio Venturini*
- 14:40 A Boundary Elements Formulation for General 3D Wear Simulations  
*Luis Rodríguez-Tembleque, Ramón Abascal and Mohammad Aliabadi*
- 15:00 Effect of Axial Restraint in Composite Bars under Nonlinear Inelastic Uniform Torsion by BEM  
*Evangelos Sapountzakis and Vasileios Tsiptiras*
- 15:20 A Boundary Element Formulation for Boundary only Analysis of Thin Shallow Shells  
*Eder Albuquerque and Ferri Aliabadi*
- 15:40 Boundary Element Method Solution in the Case of Concentrated Forces and Moments  
*Efstathios E. Theotokoglou and George Tsamasphyros*

**Room: CIN1.1**

**MS099 Computational Modeling in Cardiovascular Mechanics IV**

Organizers: Gerhard A. Holzapfel, Jay D. Humphrey, Charles A. Taylor and David A. Vorp

- 14:00 A Non-Linear Transformation for Accurate Integration of Anisotropic Microsphere-Based Material Models with Application to Blood Vessels Modeling  
*Victor Alastrue, Miguel Ángel Martínez, Manuel Doblare, Andreas Menzel and Andreas Menzel*
- 14:20 A Mechanochemical Model for Smooth Muscle Cells and Its Finite Element Implementation  
*Sae-Il Murtada, Martin Kroon and Gerhard A. Holzapfel*
- 14:40 Computational Remodeling of the Crimped Collagen Fibril Architecture in Corneal and Scleral Tissue  
*Rafael Grytz and Günther Meschke*
- 15:00 Numerical Modelling of Fibre Reorientation in Soft Tissue  
*Igor Karsaj, Carlo Sansour and Jurica Soric*
- 15:20 The Microstructure of the Adventitia Explains its Macroscopic Mechanical Behavior  
*Fernando Cacho-Nerin, Fabian Schmid, Gerhard A. Holzapfel, Peter Laggner and Heinz Amenitsch*

**Room: CIN2.1**

**MS075 Minisymposium on Advances in Mesh-Reduction  
Techniques: BEM and Meshless Methods I**

Organizers: Eduardo Divo, Alain Kassab, Bozidar Sarler and Ryszard Bialecki

- 14:00 Localized Collocation Meshless Method (LCMM) for Convectively Dominated Flows  
*Alain Kassab and Eduardo Divo*
- 14:20 A Point-Collocation Method based on Integrated Chebyshev Polynomials for Elliptic  
Differential Equations in Irregular Domains  
*Nam Mai-Duy and Thanh Tran-Cong*
- 14:40 A Multidomain Integrated RBF Collocation Method for Elliptic Differential Equations  
*Nam Mai-Duy and Thanh Tran-Cong*
- 15:00 RBF Based Mesh-Free Method for Navier Stokes Equations  
*Husain J. Al-Gahtani and Faisal A. Fairag*

**Room: PGL**

**MS079 Multiphysics Modelling of Porous Media: Geomaterials,  
Biomaterials and Others III**

Joint IACM – IUTAM Minisymposium

Organizers: Younane N. Abousleiman, Stefan Diebels and Lorenzo Sanavia

- 14:00 Modeling of Porous Functionally Graded Bio-Degradable Implants for Bone Replacement  
*Tim Ricken, Joachim Bluhm, Matthias Epple, Thomas Annen, Michael Wehmöller, Harald  
Eufinger and Moritz Blossfeld*
- 14:20 Failure of the Intervertebral Disc  
*Famke Kraaijeveld, Jacques Huyghe, Joris Remmers, Rene de Borst and Frank Baaijens*
- 14:40 Influence of Imperfections on Shear Band Formation and Evolution for Gradient-enhanced  
Cam-clay Model  
*Jerzy Pamin and Anna Stankiewicz*
- 15:00 Stress-integration Algorithms for Geomechanics Problems involving Large Deformations  
*Majidreza Nazem and John Carter*
- 15:20 Coupled Discrete/Finite Element Modelling of Geotechnical Problems  
*Jerzy Rojek and Eugenio Oñate*
- 15:40 A Coupled Model for Transport Processes and Deformations in Landfills  
*Volker Krase, Sonja Bente, Ursula Kowalsky and Dieter Dinkler*

**Room: EXC1.1**

**MS023 Large Scale Eigenvalue Problems I**

Organizers: Heinrich Voss, Peter Arbenz, Zhaojun Bai, Ren-Cang Li, Yvan Notay, Richard Lehoucq, Michiel Hochstenbach, Qiang Ye, Chao Yang and Andrew Knyazev

- 14:00 **Numerical Algorithms for Solving Nonlinear Eigenvalue Problems in Quantum Mechanical Calculations (Keynote Lecture)**  
*Chao Yang and Juan Meza*
- 14:30 **The Role of Preconditioning in Eigenvalue Computation (Keynote Lecture)**  
*Yvan Notay*
- 15:00 Eigensolvers for Analysis of Microarray Gene Expression Data  
*Andrew V. Knyazev*
- 15:20 A Jacobi-Davidson Algorithm for Large Eigenvalue Problems from Opto-electronics  
*Peter Arbenz, Christof Voemel and Ratko Veprek*
- 15:40 Computing Interior Eigenvalues of a Generalized Complex-Symmetric Pencil arising from the Modeling of Resonant MEMS Systems  
*Tsuyoshi Koyama and Sanjay Govindjee*

**Room: EXC1.2**

**MS107 Meshfree and Generalized/Extended Finite Element Methods V**

Organizers: J. S. Chen, Ivo Babuska, Ted Belytschko, C. Armando Duarte, Vitor Leitão, Wing Kam Liu, Hirohisa Noguchi and Angelo Simone

- 14:00 Dynamic Crack Branching and Adaptive Refinement in Peridynamics  
*Florin Bobaru, Leonardo A. Alves, Stewart A. Silling and Abe Askari*
- 14:20 A Method for Crack Simulations of Heterogeneous Solids using Nodal-Integration FEM  
*Mao Kurumatani and Kenjiro Terada*
- 14:40 Partition of Unity Based Cohesive Crack Modeling in a Phase-Changing Medium  
*Thomas Hille, Sergio Turteltaub and Akke Suiker*
- 15:00 A Comparison between GFEM and an Embedded Discontinuity Approach  
*D. Dias da Costa, Jorge Alfaiate, L. J. Sluys and E. Júlio*
- 15:20 Numerical Simulation of Failure of Ventricular Tissue due to Deep Penetration  
*Caroline Forsell, T. Christian Gasser, Peter Gudmundsson and Gottfried Dohr*
- 15:40 Automated Generation of Code for Modelling Discontinuities  
*Mehdi Nikbakht and Garth Wells*

**Room: EXC1.3**

**MS098 Meshless and Related Methods IV**

Organizers: Janusz Orkisz, Sergio Idelsohn and Suvranu De

- 14:00 Fast Multi-Level Meshless Methods combined with Boundary Interpolation  
*Csaba Gáspár*
- 14:20 Transient Heat Diffusion Analysis using a Collocation Method with Modified Equilibrium on Line Method for Imposition of Neumann and Robin Boundary Conditions  
*Alireza Sadeghirad, Iradj Mahmoudzadeh Kani and Ali Vaziri Astanteh*
- 14:40 Analysis of Cracked Orthotropic Media by an Enriched Finite Point Method (EFPM)  
*Moslem Shahverdi and Soheil Mohammadi*
- 15:00 Application of a Three-Fields Natural Neighbour Method in Elastoplasticity  
*Li Xiang, Serge Cescotto and Laurent Duchene*
- 15:20 Comparison of SPH and RANSE Methods for the Evaluation of Impact Problems in the Marine Field  
*Stefano Brizzolara, Michele Viviani and Luca Savio*

**Room: EXC2.1**

**MS084 Advances in Time-Integration II**

Organizers: Adrian Lew, Eric Darve and Isaac Harari

- 14:00 High-order Multistep Asynchronous Splitting Integrators (MASI)  
*Minyong Shin and Matthew West*
- 14:20 Convergence of Avis for the Linear Elastodynamics of Simple Bodies  
*Matteo Focardi and Paolo Maria Mariano*
- 14:40 Stability of Asynchronous Variational Integrators  
*William Fong, Eric Darve and Adrian Lew*
- 15:00 An Asynchronous Explicit Dynamics Contact Algorithm  
*Raymond Ryckman and Adrian Lew*
- 15:20 Homogeneous Variational Integrators for Lagrangian Dynamics on Two-Spheres  
*Taeyoung Lee, Melvin Leok and N. Harris McClamroch*

**Room: EXC2.2**

**MS083 Structural Stability II**

Organizers: Herbert Mang and Zsolt Gaspar

- 14:00 The Critical Left and Right Eigenvectors extracted from the LDU-Decomposed Non-Symmetric Jacobian Matrix  
*Fumio Fujii, Yuki Yamakawa and Hirohisa Noguchi*
- 14:20 Elastic Postbuckling Analysis: How to recover Accurate Nonlinear Structural Models from the Linear Ones  
*Raffaele Casciaro, Giovanni Garcea and Antonio Madeo*
- 14:40 Imperfection Sensitivity of Cylindrical Shells subject to Hoop Compression - Numerical Buckling Analyses Versus Experimental Results  
*Werner Schneider, Marco Gettel and Jerzy Ziolko*
- 15:00 Direct Determination of Initial Imperfections: The most Unfavourable and most Favourable Initial Shape  
*Joze Korelc and Niko Kristanic*
- 15:20 Some Stability and Post-Buckling Behaviour Problems of Thin-Walled Structures  
*Czesław Szymczak and Tomasz Szczęsny*
- 15:40 Buckling Analysis of Rectangular Orthotropic Plate subjected to In-Plane Pure Bending  
*Alexander V. Lopatin and Evgeny V. Morozov*

**Room: CAS0.1**

**MS065 Topology Optimization in Civil and Structural Engineering V**

Organizers: Matthew Gilbert and Tomasz Lewinski

- 16:30 Inverse Homogenization and Optimal Design of Composite Structures for Strength and Stiffness  
*Robert Lipton and Michael Stuebner*
- 16:50 Topology Optimization under Multiple Load Case using a Biomimetic Approach  
*Michal Nowak*
- 17:10 Saint Venant's Principle and its Implications to Topology Optimization  
*Cristian Barbarosie*
- 17:30 Stress Constraints Aggregation in Structural Topology Optimization  
*Jose Paris, Ignasi Colominas, Fermín Navarrina and Manuel Casteleiro*
- 17:50 Topological Derivative in Steady-State Orthotropic Heat Diffusion Problem  
*Sebastián Giusti and Antonio André Novotny*

**Room: CAS1.1**

**MS136 Minisymposium on Computational Methods for Seismic Analysis and Design II**

Organizers: Manolis Papadrakakis, Dimos Charmpis and Nikos Lagaros

- 16:30 An Innovative Seismic Resistant Composite Beam-Column Joint  
*Roberto Scotta and Leopoldo Tesser*
- 16:50 Member Endochronic Model for Nonlinear Analysis of Frame Structures  
*Shuo Ying Zhang and Fei Zhang*
- 17:10 Non Linear Static Analyses of RC Frame Structures: Influence of Corrosion on Seismic Response  
*Luisa Berto, Anna Saetta, Paola Simioni and Renato Vitaliani*
- 17:30 Substratum Assesment of Various Minimum Torsional Design Philosophies via Structural Optimization Techniques  
*Nikolaos Bakas, Nikos Lagaros and Manolis Papadrakakis*

**Room: CAS1.2**

**MS167 Inverse Problems for Parameter Identification VII**

Organizers: George Dulikravich, Giulio Maier and Helcio Orlande

- 16:30 Identification of Adhesive Properties in GLARE Laminates by Digital Image Correlation  
*Roberto Fedele, François Hild and Stéphane Roux*
- 16:50 Neural Networks for Output-Only Parameter Identification  
*Luca Facchini, Michele Betti and Paolo Biagini*
- 17:10 Inverse Problems in Atomic and Molecular Physics  
*Jacek Karwowski*

**Room: CAS1.4**

**MS070 Patient Specific Computational Modelling III**

Organizers: Perumal Nithiarasu and Rainald Lohner

- 16:30 Patient Specific Simulation of the Human Proximal Femur  
*Alexander Düster, Zhengxiong Yang and Ernst Rank*
- 16:50 Superplastic Forming of Patient-Specific Dental and Maxillofacial Prostheses  
*Antonio J. Gil, Richard V. Curtis, Rajab Said, Daniel Thomas and Marwan Khraisheh*
- 17:10 Impact Simulation related to the Mechanism of Diffuse Brain Injury using the Voxel Head Model  
*Dai Watanabe, Kohei Yuge, Tetsuya Nishimoto, Shigeyuki Murakami and Hiroyuki Takao*
- 17:30 Computational Modelling of Blood Clotting: A Coupled Lattice Boltzmann and Discrete Element Approach  
*K. Han, Y. T. Feng and D.R.J. Owen*

**Room: CAS1.5**

**MS025 Finite Element Technology and Meshfree Approaches: Innovative Formulation Applied to Metal Forming III**

Organizers: Renato Natal Jorge, Robertt Valente, Stefanie Reese and Elías Cueto

- 16:30 Numerical and Experimental Analysis of Subtle Surface Distortion in Sheet Metal Forming  
*Jian Cao, Wonoh Lee, Ying Huang and Hui-Ping Wang*
- 16:50 Springback Behaviour of Al6022 Sheets: Evaluating the Influence of the Sitting Time Variable  
*Ricardo Alves de Sousa, João Pedro Correia, Fábio Simões, José Gracio, Rui Cardoso, Jorge Ferreira and Jeong Yoon*
- 17:10 The Course of the Evolution of the Dislocation Structure and Geometry of the Plastic Strain Area as the Main Criterion for verifying Numerical Simulations of Processes based on Material Shearing  
*Edward S. Dzikowski*
- 17:30 An Integrated Methodology for Parameter Identification and Shape Optimization in Metal Forming and Structural Applications  
*Jose F. Carvalho, Paulo S. Cruz, Antonio Andrade-Campos and Robertt Valente*
- 17:50 The Natural Neighbour Radial Point Interpolation Method extended to the Non-Linear Analysis  
*Lúcia Dinis, Renato Natal Jorge and Jorge Belinha*
- 18:10 Variation of Pressure and Microstructural Changes with Web to Flange Ratio and Die Land Length in Cold Extrusion of T-Shaped Sections  
*Joseph Ajiboye*

**Room: CAS1.6**

**TS316 Industrial Applications III**

- 16:30 Finite Element Modelling of Clinched Connections  
*Dimitri Debruyne, Sam Coppieters, Steven Cooreman and Maarten De Strycker*
- 16:50 Coupled Thermoelasticity of FG Thin Shells: Effect of Temperature Field Across the Thickness  
*Ali Bahtui and M. Reza Eslami*
- 17:10 Local Shakedown Analysis of Reactors subject to Pressure and Thermal Loads  
*Grzegorz Widlak and Andrzej P. Zielinski*
- 17:30 Determination of Welding Residual Distortions of Large Structures  
*Yonggang Duan and Jean Michel Bergheau*
- 17:50 Computational System to Help the Stress Analysis around Boreholes in Petroleum Industry  
*Fabiana Leta, Maria Souza, Esteban Clua, Mauro Biondi and Toni Pacheco*
- 18:10 Characterization of the Austenitic Stainless Steel: Design, Simulation and Experimental Testing of Cupping Tool for the Deep Drawing Process  
*Juan Carlos Cisneros, Fernando Torres, Daniel Sola, Emilio Royo and M<sup>a</sup> José Oliveros*

**Room: CAS1.7**

**MS059 Modelling and Optimisation for Coupled Multi-Physics Processes II**

Organizers: Francois Bay and Mark Cross

- 16:30 Electromechanical Microdevice Pull-in Voltage Maximization Using Topology Optimization  
*Etienne Lemaire, Véronique Rochus, Jean-Claude Golinval and Pierre Duysinx*
- 16:50 Shape Optimization of Electromechanical Microsystems for Prescribed "Capacitance-Voltage" Curve  
*Fabien Clement, Véronique Rochus, Etienne Lemaire, Claude Fleury and Pierre Duysinx*
- 17:10 Multiphysics Simulation of Microwave Processing using a Multidomain Coupled Solver Approach  
*Tim Tilford, Kevin Parrott, Chris Bailey and Koulis Pericleous*
- 17:30 Discrete Modeling of Granular Shear Flows: Parameter Study  
*Viet Dung Nguyen, Jérôme Fortin, Mohamed Guessasma, Emmanuel Bellenger and Patrice Coorevits*
- 17:50 Numerical Studies on Aero-acoustic Phenomena Associated with Wall Bounded Shear Flow  
*Debasish Biswas and Koichi Ohtomi*
- 18:10 Design of Thermal Properties for Maximum Penetration  
*Ivo Babuska, Robert Lipton and Michael Stuebner*

**Room: CAS1.8**

**MS106 Optimization and Inverse Engineering for Industrial Applications III**

Organizers: Michele Chiumenti and Valentino Pediroda

- 16:30 Optimal Blade Shapes for Viscous Dense Gas Flows through Turbine Cascades  
*Paola Cinnella and Pietro Marco Congedo*
- 16:50 Multi-Objective Design Optimization for Stator Blade Configuration of Steam Turbine  
*Shu Yoshimizu, Koji Shimoyama, Shinkyu Jeong, Shigeru Obayashi and Yasuyuki Yokono*
- 17:10 Practical Shape Optimization Method for Design of Three Dimensional Structure  
*Masatoshi Shimoda, Shintaro Motora and Hideyuki Azegami*
- 17:30 A Genetic Algorithm Approach for the Detection of Corrosion in Large-Scale Structures  
*Giulia Deolmi, Fabio Marcuzzi, Silvia Poles and Sergio Marinetti*
- 17:50 Application Oriented Optimisation of Subsequent Redraw Processes for Circular Containers  
*Geza Nagy and Johannes Mulder*
- 18:10 Large Deflection of Rectangular Plates using Optimization Technique  
*Seiichi Ohtaki, Toshiaki Horiuchi and Takae Ohtsuka*

**Room: CAS2.3**

**MS130 Theory and Applications of Discontinuous Galerkin Methods VI**

Organizers: Slimane Adjerid, Clint Dawson, Adrian Lew, Beatrice Riviere and Chi-Wang Shu

- 16:30 An Unconditionally Stable Space--Time Discontinuous Galerkin Method for Linear Thermo-Elasto-Dynamics with Propagating Weak Discontinuities  
*Francesco Costanzo*
- 16:50 Bubble Stabilized Discontinuous Galerkin Method using a Symmetric Formulation for Second Order Elliptic Problems. Part I: Stability without Penalty for the Symmetric Formulation  
*Erik Burman and Benjamin Stamm*
- 17:10 High Order Discontinuous Galerkin Schemes on General 2D Manifolds  
*Paul-Emile Bernard and Jean-François Remacle*
- 17:30 Bubble Stabilized Discontinuous Galerkin Method using a Symmetric Formulation for Second Order Elliptic Problems. Part II: Stokes' Problem, Time Dependent Problems and Numerical Aspects  
*Erik Burman and Benjamin Stamm*
- 17:50 High-Order Discontinuous Galerkin Methods for solving High Conservation Laws on General 2D Manifolds  
*Paul-Emile Bernard, Jean-François Remacle and Vincent Legat*

**Room: CAS2.4**

**MS048 Second Level Preconditioners for Krylov Subspace Methods II**

Organizers: Reinhard Nabben and Kees Vuik

- 16:30 On the Choice of Abstract Projection Vectors for Second Level Preconditioners  
*Kees Vuik, Jok Tang and Reinhard Nabben*
- 16:50 On the Connection of Projected CG Methods derived from Deflation, Domain Decomposition and Multigrid  
*Jok Tang*
- 17:10 A BDDC Preconditioner for the Reissner-Mindlin Plate Bending Problem  
*Lourenco Beirao da Veiga, Claudia Chinosi, Carlo Lovadina and Luca Pavarino*
- 17:30 Substructuring Preconditioners for Mortar Discretization of a Degenerate Evolution Problem  
*Micol Pennacchio and Valeria Simoncini*
- 17:50 A Rigorously Justified Robust Algebraic Preconditioner for High-Contrast Diffusion Problems  
*Burak Aksoylu, Hector Klie, Ivan G. Graham and Robert Scheichl*



**Room: CAS2.6**

**MS062 Numerical Modelling of Hydrodynamic Geophysical Flows IV**

Organizers: Tomas Chacon Rebollo and Edie Miglio

- 16:30 Optimal Control of Eutrophication Processes  
*Lino J. Alvarez-Vazquez, Francisco J. Fernandez, Aurea Martinez and Rafael Muñoz-Sola*
- 16:50 Data Assimilation & Local Zoom for Shallow-Water Models  
*Jerome Monnier and Joel Marin*
- 17:10 Preliminary Results of a Finite Element Model of the Ecohydrodynamics of the Scheldt Estuary and the Adjacent Belgian/Dutch Coastal Zone  
*Olivier Gourgue, Eric Deleersnijder, Benjamin de Brye, Anouk de Brauwere, Pierre Servais and Julien Passerat*
- 17:30 River Pollution Remediation: An Optimal Control Problem  
*Lino J. Alvarez-Vazquez, Aurea Martinez, Miguel E. Vazquez-Mendez and Miguel A. Vilar*
- 17:50 Modeling and Simulation of Turbidity Currents  
*Tomas Morales de Luna, Manuel J. Castro, Carlos Pares Madroñal and Enrique Fernández Nieto*
- 18:10 On the Turbulent Natural Convection in Thermal Storage Tanks submitted to Heat Losses to the Environment  
*Ivette Rodríguez, Assensi Oliva, Carlos D. Perez-Segarra and Oriol Lehmkuhl*

**Room: CAS3.2**

**MS024 Scale Bridging in Science and Engineering III**

Joint IACM – IUTAM Minisymposium

Organizers: Jacob Fish and Kenjiro Terada

- 16:30 A Method of Numerical Material Testing for Composite Materials  
*Kenjiro Terada and Mao Kurumatani*
- 16:50 Numerical Analysis of Micro and Nano Fabrication by Stereolithography  
*Satoshi Suzuki, Yutaka Tanaka and Hiroshi Takeda*
- 17:10 Simulation of Nano-particulate Epoxy Composites considering Cross-links  
*Suyoung Yu, Seunghwa Yang and Maenghyo Cho*
- 17:30 Multi-Scale Analysis of Nanoparticle Reinforced Composites: Scale Bridging Method for Non-Dilute Concentration  
*Seunghwa Yang, SuYoung Yoo and Maenghyo Cho*
- 17:50 Multi-Scale Modeling of Nanocomposites: Enhanced Mean-Field Homogenization and Finite Element Analysis  
*Koen Delaere and Issam Doghri*
- 18:10 Eulerian Finite Cover Method for Multi-scale Analysis of Large Deformed Composites  
*Mitsuteru Asai, Kenjiro Terada and Atsushi Maruyama*

**Room: CAS3.4**

**MS096 Efficient Computational Methods for Coupled Problems III**

Organizers: Harald van Brummelen and Tayfun Tezduyar

- 16:30 Implicit Time Integration Algorithms for High-Order Methods on Unstructured Tetrahedral Grids with p-Multigrid Strategy  
*Matteo Parsani, Kris Van den Abeele and Christian Lacor*
- 16:50 Pressure Boundary Condition for the Schur Complement of Compressible Flow Equations  
*Mika Malinen*
- 17:10 Heat and Moisture Transfer, Deformation and Stress Analysis during Drying of Ceramic Bricks  
*Daniel Avelino, Joselito da Silva, Severino Farias Neto and Antonio G.B. de Lima*
- 17:30 A Framework for developing Finite Element Codes for Multi-Disciplinary Applications  
*Pooyan Dadvand, Riccardo Rossi and Eugenio Oñate*
- 17:50 DNS of a Small Particle in 3D Flow  
*Antoine Dechaume and Peter Mineev*
- 18:10 Development of a Finite Elements based on Software Tool for the Global Thermomechanical Analysis of Plate-Fin Heat Exchangers  
*Johan Dib, François Bilteyst, Jean-Louis Batoz and Ivan Lewon*

**Room: CAS3.6**

**MS033 Multiscale Methods in Computer Materials Science III**

Organizers: Maciej Pietrzyk, Peter Hodgson and Tadeusz Burczyński

- 16:30 Optimization of Microstructure in Multiscale Problems with use of Parallel Evolutionary Algorithm  
*Waclaw Kus and Tadeusz Burczyński*
- 16:50 Object-Oriented HP Adaptive Finite Element Method System for Multiscale Problems  
*Maciej Paszynski, Piotr Gurgul, Marcin Sieniek, Michal Wrzeszcz and Robert Schaefer*
- 17:10 Multi Scale Modelling and Optimization of Production Chains based on Metal Forming  
*Andrzej Stanislawczyk, Jerzy Gawad and Jan Kusiak*
- 17:30 Two-Scale Adaptive FEM Modeling of Nonlinear Heterogeneous Materials  
*Witold Cecot and Marta Serafin*
- 17:50 Multiscale Buckling Analysis of Heterogeneous Materials  
*Saeid Nezamabadi, Hamid Zahrouti, Michel Potier-Ferry and Julien Yvonnet*

**Room: CAS3.7**

**MS149 Multiscale Damage and Failure Mechanics of Engineering Materials V**

Joint IACM – IUTAM Minisymposium

Organizers: J. Woody Ju, Lizhi Sun, Pierre Ladevèze and Olivier Allix

- 16:30 Multiscale Micromorphic Theory for Material Failure  
*Franck Vernerey, Wing Kam Liu and Brian Moran*
- 16:50 Multiscale Modeling of Deformation and Fracture of Structural Materials in Nuclear Environments  
*Nasr Ghoniem, Giacomo Po, Tamer Crosby, Ming Wen and Shahram Sharafat*
- 17:10 Modeling of Damage Deactivation under Complex Cyclic Loadings  
*Blondin Mounounga, Donnè Razafindramary and Akrum Abdul-Latif*
- 17:30 Damage Computation for Non-Monotonic Multiaxial Solicitations applied to Anisotropic Ductile Steel Grades  
*Pierre-Olivier Bouchard and Ludovic Bourgeon*
- 17:50 A 2d Cosserat Model based on a Multi-Scale Technique for the Structural Response of Brick Masonry  
*Daniela Addessi, Maria Laura De Bellis, Vincenzo Ciampi, Sergio Oller and Achille Paolone*

**Room: CAS3.8**

**TS318 Computational Materials Mechanics V**

- 16:30 Evolving Higher-order Boundary Conditions in Strain gradient based Analysis of Plasticity in Heterogeneous Microstructures  
*Louise Mazzoni-Leduc, Thomas Pardoën and Thierry Massart*
- 16:50 Multi-Constraint Mesh Partitioning and Hybrid Solution Strategies for 3D Simulation of Heterogeneous Microstructures  
*Kai Schrader and Carsten Könke*
- 17:10 Effects of Interparticle Friction on the Rheology of Fibre Suspensions  
*Stefan Lindström and Tetsu Uesaka*
- 17:30 Simulation of Thermal Conductivity and Difusivity  
*Leonardo Oropeza, José Papa and Carmen Albano*



**Room: CIN0.1**

**MS017 Computational Methods in Impact Engineering III**

Organizers: Ashkan Vaziri, Zhenyu Xue, Dirk Mohr and Horacio Espinosa

- 16:30 The Use of Photogrammetry in Aiding Finite Element Modelling of Impact Engineering Experiments  
*Arin Jumpasut, Clive Siviour and Nik Petrinic*
- 16:50 Simulation of a Crash-Box for Racing Car based on Sandwich Material  
*Simonetta Boria and Giuseppe Forasassi*
- 17:10 Statistical Fragmentation of Heterogeneous Ceramics  
*Sarah Levy and Jean-François Molinari*
- 17:30 The Dynamics of Shock Amplification through Multiple Impacts  
*Bryan Rodgers, Suresh Goyal, Gerard Kelly and Michael Sheehy*
- 17:50 Topology Optimization for Crashworthiness using an Explicit Time Integration Scheme  
*Kohei Yuge, Kaoru Kobayashi and Yohei Tsuganezawa*

**Room: CIN0.2**

**TS300 Boundary Element Method II**

- 16:30 Analysis of a Symmetric BEM-FEM Method for the 3d Magnetostatic Problem using Scalar Potentials  
*Pilar Salgado and Virginia Selgas*
- 16:50 Evaluation of Attachments for Acoustic Barriers with the Boundary Element Methods  
*Luiz Alkimin Lacerda and Gabriel Pereira*
- 17:10 Boundary Element Methods for the Preliminary Design, Analysis and Optimization of Compliant Flapping Wings  
*David Willis, Per-Olof Persson and Jaime Peraire*
- 17:30 Boundary Element Method for Micropolar Fluid Flow Modeling in an Enclosure  
*Matej Zadavec, Matjaz Hribersek and Leopold Skerget*

**Room: CIN1.1**

**MS099 Computational Modeling in Cardiovascular Mechanics V**

Organizers: Gerhard A. Holzapfel, Jay D. Humphrey, Charles A. Taylor and David A. Vorp

- 16:30 One Dimensional Numerical Models for Simulation of the Blood Flow on Arteries  
*Eduardo Soudah and Eugenio Oñate*
- 16:50 The Grid Scheme Effect on Hemodynamics Numerical Analysis in the Iliac Arteries  
*Filipa Carneiro, Vasco Ribeiro, José Teixeira and Senhorinha Teixeira*
- 17:10 Computational Model of the Fluid Dynamics in Abdominal Aorta and Renal Branches  
*Ana Eduarda Silva, Senhorinha Teixeira and Pedro Lobarinhas*
- 17:30 Numerical Study of Non-Newtonian Inelastic Fluid Flow in a 2D Bifurcation at Ninety Degrees  
*Helder Matos and Paulo Oliveira*
- 17:50 Computer Simulation of Non-Newtonian Effects on Blood Flow in a Complete 3D Bypass Model  
*Jan Vimmr and Alena Jonasova*
- 18:10 An Overview of the Defective Boundary Conditions in Haemodynamics  
*Alessandro Veneziani and Christian Vergara*

## Friday Evening Sessions (16:30 - 18:30)

### Room: CIN2.1

#### MS075 Minisymposium on Advances in Mesh-Reduction Techniques: BEM and Meshless Methods II

Organizers: Eduardo Divo, Alain Kassab, Bozidar Sarler and Rizard Bialecki

- 16:30 Simulation of Continuous Casting of Steel by a Meshless Technique  
*Robert Vertnik and Bozidar Sarler*
- 16:50 Solution of Melting Problems by a Meshless Technique  
*Gregor Kosec and Bozidar Sarler*
- 17:10 A Partition of Unity Boundary Element Method for Fracture and Fatigue Analysis  
*Robert Simpson and Jon Trevelyan*
- 17:30 Efficient Calculation of Stress Intensity Factors using a Coupled BEM-SBFEM Algorithm  
*Gareth Bird, Jon Trevelyan and Charles Augarde*
- 17:50 Scaled Boundary Finite Element Formulations for Laminated Plates  
*Jochen Hebel and Wilfried Becker*

### Room: PGL

#### MS079 Multiphysics Modelling of Porous Media: Geomaterials, Biomaterials and Others IV

Joint IACM – IUTAM Minisymposium

Organizers: Younane N. Abousleiman, Stefan Diebels and Lorenzo Sanavia

- 16:30 Capillary Effects Modelling In Unsaturated Granular Materials  
*Luc Scholtès, Bruno Chareyre, François Nicot and Felix Darve*
- 16:50 Modeling of Freezing and Thawing Cycles of Saturated Porous Media  
*Joachim Bluhm, Tim Ricken and Wolfgang Moritz Bloßfeld*
- 17:10 Finite Element Formulation of Unilateral Boundary Conditions for Unsaturated Flow in Porous Solids  
*Andrea Abati and Carlo Callari*
- 17:30 Modelling of Steam Injection into Tar Sands  
*Xuming Shan and Garth Wells*
- 17:50 A Multiphase Approach for a Unified Modelling of Fully and Partially Saturated Porous Materials by Considering Air Dissolved in Water  
*Lorenzo Sanavia and Dariusz Gawin*

**Room: EXC1.1**

**MS023 Large Scale Eigenvalue Problems II**

Organizers: Heinrich Voss, Peter Arbenz, Zhaojun Bai, Ren-Cang Li, Yvan Notay, Richard Lehoucq, Michiel Hochstenbach, Qiang Ye, Chao Yang and Andrew Knyazev

- 16:30 The Computation of Resonances in Open Systems using a Perfectly Matched Layer  
*Joseph E. Pasciak*
- 16:50 Lanczos Algorithm on the Grassmann Manifold  
*Ana Paula Lopes, Ana Julia Viamonte and Antonio Jose Pascoal*
- 17:10 A Polynomial Multiparameter Eigenvalue Problem arising from Delay Differential Equations  
*Michiel Hochstenbach and Elias Jarlebring*
- 17:30 Reducing Large Unsymmetric Eigenproblems in Fluid-Solid Structures by Automated Multi-Level Substructuring  
*Heinrich Voss*
- 17:50 Fast Modal Frequency Response Analysis of Large Scale Finite Element Structures with Recursive Component Mode Synthesis  
*Chang-Wan Kim*
- 18:10 A Generalized Component Modal Analysis for Mega Structures  
*Yaoqing Gong and Earl H. Dowell*

**Room: EXC1.2**

**MS107 Meshfree and Generalized/Extended Finite Element Methods VI**

Organizers: J. S. Chen, Ivo Babuska, Ted Belytschko, C. Armando Duarte, Vítor Leitão, Wing Kam Liu, Hirohisa Noguchi and Angelo Simone

- 16:30 Advances on the Application of the FV-MLS Method for the Compressible Euler and Navier-Stokes Equations to High Accuracy Demanding Applications  
*Xesus Nogueira, Luis Cueto-Felgueroso, Ignasi Colominas, Fermín Navarrina and Manuel Casteleiro*
- 16:50 Characterisation of the Fast Multipole Approximation in Particle Simulations  
*Felipe A. Cruz and L. A. Barba*
- 17:10 The Extended Finite Element Method (XFEM) for Boundary Layers  
*Alaskar Alizada and Thomas-Peter Fries*
- 17:30 The Margination Dynamics of Non-Spherical Particles in Laminar Flows  
*Milos Kojic, Nenad Filipovic, B. Stojanovic, I. Vlastelica, Mauro Ferrari and Paolo Decuzzi*

**Room: EXC1.3**

**MS098 Meshless and Related Methods V**

Organizers: Janusz Orkisz, Sergio Idelsohn and Suvranu De

- 16:30 Convected Acoustic Radiation using a Mapped Infinite Partition of Unity Method: Axisymmetric and Three-Dimensional Applications  
*Tanguy Mertens, Jeremy Astley and Philippe Bouillard*
- 16:50 Quasi-Incompressible Updated Lagrangian Fluid and Monolithic Formulation for the Fluid-Structure Interaction Problems Involving Highly Deformable Solids  
*Pavel B. Ryzhakov, Riccardo Rossi, Sergio Idelsohn and Eugenio Oñate*
- 17:10 Simulation of High-Velocity Impact in Fluid-Filled Vessels with Adaptive SPH-FE Coupling  
*Martin Sauer, Uwe Scheffer and Klaus Thoma*

**Room: EXC2.1**

**MS084 Advances in Time-Integration III**

Organizers: Adrian Lew, Eric Darve and Isaac Harari

- 16:30 Spatial Stability of Linear Multistep Methods for First-Order Transient Equations  
*Isaac Harari and Eran Grosu*
- 16:50 Time Integration of Thermoelastic Systems based on an Energy/Entropy Formulation  
*Ignacio Romero*
- 17:10 A Generalized Multi-Time-Step Method for a Wide Range of Numerical Scheme applied to Transient Nonlinear Structural Dynamics  
*Najib Mahjoubi, Anthony Gravouil, Alain Combescure and Nicolas Greffet*
- 17:30 Two Geometric Integrators for Finite-Strain Viscoplasticity with Kinematic Hardening  
*Alexey V. Shutov and Reiner Kreissig*
- 17:50 Efficient Iterative Solver to compute Unsteady Flows solved with Higher Order Implicit Time Integration Schemes  
*Peter Lucas and Hester Bijl*

**Room: EXC2.2**

**MS083 Structural Stability III**

Organizers: Herbert Mang and Zsolt Gaspar

- 16:30 Stability and Sensitivity of Shell-Like Structures considering Imperfections and Contact  
*Karl Schweizerhof and Eduard Ewert*
- 16:50 Buckling Problems of Mindlin Plates by Analytical Quadrilateral P-Elements  
*Jie Fan and Andrew Y.T. Leung*
- 17:10 Geometrically Nonlinear 3D Beam Model based on Saint Venant Rod Theory  
*Giovanni Garcea, Antonio Madeo, Giuseppe Zagari and Raffaele Casciaro*
- 17:30 Impact and Failure Performance of Thin-Walled Lattice Structures  
*Hans Obrecht, Ulf Reinicke and Marcel Walkowiak*
- 17:50 Fire-Induced Collapse Analyses of High-Rise Towers using ASI-Gauss Technique  
*Daigoro Isobe and Tomonobu Omuro*
- 18:10 SCFJ – A Discrete Model for a Probabilistic Analysis of Continuous Welded Rail Stability and Appraisal of Temporary Train Speed Limits  
*Ungureanu Valentin-Vasile and Adam Dósa*

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CAS3.5				MS42		MS42		MS42				MS159		TS309		TS309				MS87		MS87		MS87															CAS3.5		
CAS3.6				MS118		MS118		MS111				MS200		MS200		MS143				MS26		MS26		MS187				MS187		MS187		MS187		MS33		MS33		MS33	CAS3.6		
CAS3.7				MS237		MS237		MS237		SP2		MS237		MS237		MS237		SP6		MS237		MS210		MS210		SP10		MS210		MS149		MS149		SP14		MS149		MS149	CAS3.7		
CAS3.8				MS81		MS81		MS50				MS50		MS50		MS64				MS64		MS109		MS109				MS109		TS318		TS318		TS318		TS318		TS318	CAS3.8		
CAS3.9				MS104		MS104		MS104				MS36		MS36		MS36				MS36		TS303		TS303				TS303		TS303		TS303		TS303		TS303			CAS3.9		
CAS3.10				MS150		MS150		MS150				MS114		MS114		MS114				TS313		TS313		TS313				MS103		MS103		MS103				MS100		MS100	CAS3.10		
CIN0.1				MS194		MS194		MS194				MS194		MS202		MS202				MS202		MS80		MS80				MS80		MS80		MS80				MS17		MS17	CIN0.1		
CIN0.2				MS78		MS78		MS20				MS193		MS193		MS193				MS127		MS127		TS314				MS66		MS117		MS117				MS131		TS300	CIN0.2		
CIN1.1	Intro	P1-P2		MS151		MS151		MS151		P3-P4	SP3	MS151		MS151		MS151		P5-P6	SP7	MS170		MS170		MS170		P7-P8	SP11	MS170		MS99		MS99		P9-P10	SP15	MS99		MS99	CIN1.1		
CIN2.1				MS180		MS180		MS180				MS16		MS16		MS16				MS16		MS43		MS43				MS43		MS43		MS43		MS43		MS75		MS75	CIN2.1		
PGL	Intro	P1-P2		MS29		MS29		MS29		P3-P4	SP4	MS29		MS29		MS29		P5-P6	SP8	MS208		MS208		MS208		P7-P8	SP12	MS208		MS208		MS208		P9-P10	SP16	MS79		MS79	PGL		
EXC1.1				MS88		MS88		MS155				MS155		MS155		MS155				MS53		MS53		MS53				MS53		MS185		MS185		MS185		MS23		MS23	EXC1.1		
EXC1.2				MS28		MS28		MS28				MS169		MS169		MS73				MS73		MS73		MS73				MS107		MS107		MS107		MS107		MS107		MS107	EXC1.2		
EXC1.3				MS141		MS141		MS141				MS141		MS124		MS124				MS37		MS37		MS37				MS37		MS98		MS98		MS98		MS98		MS98	EXC1.3		
EXC2.1				MS238		MS238		MS238				MS238		STS		STS				STS		STS		STS				STS		STS		STS		STS		MS84		MS84	EXC2.1		
EXC2.2						MS55		MS55				MS55		MS55		MS55				STS		STS		STS				STS		STS		STS		STS		MS83		MS83	EXC2.2		

