**14th World Congress on Computational Mechanics (WCCM XIV)**
**8th European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS 2020)**
***July 19- 24, 2020, Paris, France***

# APPROACHES, APPLICATIONS, AND ANALYSIS OF HETEROGENEOUS NUMERICAL METHODS

## TRACK NUMBER 700

**PAUL KUBERRY*, PAVEL BOCHEV*, AND ROB JACOB†**

* Sandia National Laboratories,
Center for Computing Research,
1450 Innovation Boulevard, Albuquerque, NM 87123
{pakuber,pbbochev}@sandia.gov

† Argonne National Laboratory
9700 S. Cass Avenue, Lemont, IL, 60439
jacob@anl.gov

**Key words:** Heterogeneous Numerical Methods, Coupled Problems, Multi-physics.

## ABSTRACT

Next generation computing platforms provide the capability to model and simulate increasingly sophisticated mathematical descriptions of complex physical phenomena. Frequently, these descriptions include multiple constituent components having different mathematical properties. Our ability to fully utilize these resources will require new approaches for the formulation of Heterogeneous Numerical Methods (HNMs) in which "different types of discretizations, appropriate to a particular scale in different portions of the domain, are employed" [1].

This goal of this session is to bring together researchers and application scientists from areas that require the solution of HNMs, researchers who develop the numerical and software technologies for solving HNMs, as well as numerical analysts who investigate the properties of the HNMs as they are posed.

The topics discussed will range from mathematical foundations for HNMs such as heterogenous domain decomposition, optimization-based couplings and generalized Schwarz methods, to current advances in software frameworks for the coupling of different simulation codes.

## REFERENCES

[1] Scientific Grand Challenges. Crosscutting technologies for computing at the exascale. Report from the Workshop Held February 2-4, 2010, U.S. Department of Energy, Advanced Scientific Computing Research (ASCR) program, http://www.er.doe.gov/ascr/index.html, May 2010.