

NUMERICAL AND COMPUTATIONAL ASPECTS OF INTERFACE PROBLEMS

FREDERIC GIBOU* AND CHRISTIAN RATSCH†

* UCSB Mechanical Engineering and Computer Science Department
Engineering II Bldg
Santa Barbara, CA 93106-5070
fgibou@engineering.ucsb.edu <http://www1.engr.ucsb.edu/~fgibou/>

† UCLA and IPAM
UCLA Mathematics Department
Los Angeles, CA 90095-1555
cratsch@math.ucla.edu <http://www.math.ucla.edu/~cratsch>

Key words: Free Moving Boundary Problems, Interfaces, Multiphase Flows, Multiscale Phenomena, and Adaptive Mesh Refinement.

ABSTRACT

Several problems that arise in science and engineering can be formulated as a front evolution between two (or more) phases. Examples include dendritic growth in materials science, free surface flows, multiphase flows, cell biology and many more. The difficulty in solving such problems comes from the fact that the interface location must be resolved as part of the solution. As a consequence the interface must be tracked or captured accurately and complex partial differential equations must be solved in each phase with appropriate boundary conditions imposed at the front. In this minisymposium the focus will be given on recent advances in numerical and computational methods for interface problems and their application in materials science, multiphase flows and cancer growth. This minisymposium will cover a broad range of topics in the mathematics and other quantitative aspects of interface problems. Overall, this event will offer an excellent opportunity for researchers to learn about a wide variety of recent developments in computational methods as well as their applications and stimulate interactions.