

PREFACE

ICSAAM 2011 focuses on the development of methods to predict the behaviour of materials, in order to design materials with specific properties. This requires a multiscales materials modeling framework that is based on the fundamental laws of nature and links the electronic modeling hierarchy through the atomistic and mesoscale modeling regimes to macroscopic material behaviour. It is evident that such a framework may not be based on rigid, formal parameterizations alone but must emerge from a detailed understanding of the mechanistic behaviour of materials, a robust knowledge of materials properties and metallurgical trends, and must take into account the processing of materials as the basis of dynamical structure property relations. Through bundling expertise on modeling and simulation of materials across all length and time scales at "ICSAAM 2011" and the advanced study researchers with is a position that will allow it to fast-track the development of advanced multi-scale modeling methods.

ICSAAM 2011 focused on three areas to achieve its objectives:

- **Research:** Modeling of materials across the length scales is an interdisciplinary task as different disciplines tend to focus on certain aspects and length scales of materials. The expertise and experience available at ICSAAM and in the advanced study researchers will help us to tackle complex materials modeling problems and to establish ICSAAM as a meeting for multi-scale materials modeling.
- **Application:** Input and feedback from industry and experiment is vital for the development of successful multi-scale materials modeling frameworks. Only a problem-driven approach will be able to contribute to technological development and deliver a multi-scale modeling frame-work that will help guide the design of new materials.
- **Education:** A long-term impact of materials modeling can be sustained only by educating students that will then apply their knowledge and skills in industry and academia. ICSAAM will setup a course with focus on multi-scale modeling and also contributes special lectures to the curricula of mechanical engineering and physics.

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Guest editor