

Invitation Letters

Dear Colleagues:

Concurrent multi-length scale modeling is very important in systems with strong coupling between scales, and it is also very challenge. We cordially invite you to participate in the United States Association for Computational Mechanics (USACM)'s 13th U.S. National Congress on Computational Mechanics (USNCCM13) by giving a talk in our minisymposium entitled **Multiscale Concurrent Multi-length scale modeling: from Finite Elements to Atoms and Electrons**. The Congress will be held in San Diego, California, at the Manchester Grand Hyatt, July 26-30, 2015.

The state-of-art super computers can explicitly deal with atoms in order of billions, which are about the atoms within one micron cube. It is unlikely in near future that the brutal force atomistic modeling can solve engineering material systems that involve physical phenomena across 10 orders of magnitude in length scale, such as fracture. Finite element modeling cannot reach the accuracy but the atomistic modeling cannot fit the size requirements. Multiple length scale modeling is required to perform atomics (as well as quantum) simulations over macro scales. It requires the coupling between finite elements to the atoms and electrons side-by-side (hands-shaking). Such concurrent multi-length scale modeling is very challenging. Talks are solicited for both the development of algorithms and applications of concurrent multi-length scale modeling in computational mechanics, such as Quasi-Continuum method, coupled atomistic and discrete dislocation method, concurrent atomistic-continuum method, multiscale coarse-graining method, super-atom method, dissipative particle dynamics, coarse-grained molecular dynamics, micromorphic theory, and atomistic field theory. This minisymposium (numbered as **MS304**) is dedicated to concurrent multi-length scale modeling. Some of the topics of interest are:

1. Multiscale modeling from Finite elements (All FEMs, including XFEM and meshfree) to atomistic;
2. Quantum mechanics – molecular mechanics couplings;
3. Full spectrum multiscale couplings (FEM/MM/QM and more);
4. All the methodologies and applications are welcome.

Contributions that integrate experimental and computational approaches in mechanics and materials are particularly encouraged.

Some important dates:

- Abstracts due: February 15, 2015.
- Acceptance notification: April 8, 2015
- Travel Award Applications: Jan 10 – Mar 31, 2015
- Early registration: March 15-May 15, 2015

We look forward to meet you at San Diego.

Best Regards,

Qing Peng

Department of Mechanical, Aerospace and Nuclear Engineering,

Rensselaer Polytechnic Institute,

Gmail: qpeng.org@gmail.com

Webpage: <http://qpeng.org>

Shaofan Li

Department of Civil and Environmental Engineering,

University of California at Berkeley

Email: li@ce.berkeley.edu

Suvranu De

Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute,

Email: des@rpi.edu