

Department of Mathematics

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## Scientific Computing Seminar

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### A hybrid finite element level set/front tracking approach for fluid flows with free boundaries and interfaces

Thursday, November 21, 2013

3:00 PM- 4:00 PM

Room 646 PGH

**Abstract:** A hybrid level set/front tracking approach for the representation of sharp interfaces in finite element discretizations of two-phase flow models is presented. The hybrid approach makes use of an implicit representation of the interface by means of a level set function. The computational mesh is obtained by deforming a fixed simplicial reference mesh to be aligned with the implicitly described geometry. Resulting meshes therefore provide an additional explicit representation of the interface while optimality of the mesh quality is guaranteed. The proposed method is based on a variational approach to optimal meshes and leads to a fully automated mesh optimization procedure. Since mesh topology is retained, the proposed approach can be easily integrated into existing finite element codes. We demonstrate and evaluate the framework in the context of two application scenarios: we consider a particulate flow application and a two-phase flow problem with surface tension.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.