

Computational Tools for PDEs with Complicated Geometries and Interfaces



Monday, June 10, 2024 - Friday, June 14, 2024

162 5th Avenue

Scientific Program

June 10

Morning session

09:50 - 10:00am: Opening remarks, Jeremy Hoskins

10:00 - 10:30am: An introduction to boundary integral equations, Leslie Greengard

10:45 - 11:45am: Boundary value problems and layer potentials, Fruzsina Agocs and Alex Barnett

12:00 - 12:30pm: Discretization and quadrature, Hai Zhu

Afternoon session

2:00 - 5:00pm: Boundary integral equations in two dimensions using chunkie, Software demo led by Travis Askham, Tristan Goodwill, and Hai Zhu

June 11

Morning session

10:00 - 11:00am: A primer on fast algorithms for elliptic and parabolic problems, Shidong Jiang and Jun Wang

11:15 - 12:30pm: Potential theory for Stokes flow in three dimensions, Shravan Veerapaneni

Afternoon session

2:00 - 5:00pm: Boundary integral equations in three dimensions using fmm3dbie, Software demo led by Felipe Vico and Manas Rachh

June 12

Morning session

10:00 - 12:30pm: Parallel breakout rooms

Acoustic and electromagnetic modeling. Chair: Mike O'Neil

Singular quadrature for layer and volume potentials. Chair: Ludvig Af Klinteberg

Biophysical modeling at low Reynolds number. Chair: Mike Shelley

Fast direct solvers. Chair: Per-Gunnar Martinsson

Boundary integral equation office hours. Chairs: Jeremy Hoskins and Jason Kaye

Afternoon session

2:00 - 3:30pm: Computational Audio Acoustics with applications in Spatial Sound, Perrin Meyer

3:45 - 5:00pm: Poster session

June 13

Morning session

10:00 - 11:00am: Active fluids and swimmers, David Saintillan

11:15 - 11:45am: Modeling membranes and vesicles, Yuan-Nan Young

12:00 - 12:30pm: Hydrodynamics of twisting, bending, and inextensible filaments, Ondrej Maxian

12:30 - 1:00pm: Convergent slender body theory, Dhairya Malhotra

Afternoon session

2:30 - 3:00pm: Handling collisions in fluid simulations, Bryce Palmer

3:00 - 3:30pm: Introduction to Skellysim, David Stein

3:45 - 5:00pm: Simulating flexible filaments, motor proteins, and arbitrary rigid bodies using Skellysim, Software demo led by Reza Farhadifar and Chris Edelmaier

6:00 - 8:00pm: Reception

June 14

Morning session

10:00 - 10:30am: Spectral overset methods for fluid simulation, David Stein

10:30 - 11:15am: Hierarchical Poincare Steklov (HPS) solvers, an introduction, Anna Yesypenko

11:30 - 1:00pm: surfacefun, an efficient PDE solver on surfaces, Software demo led by Dan Fortunato

Afternoon session

2:30 - 3:00pm: An outlook for the field - I, Timo Betcke

3:15 - 4:00pm: An outlook for the field - II, Leslie Greengard