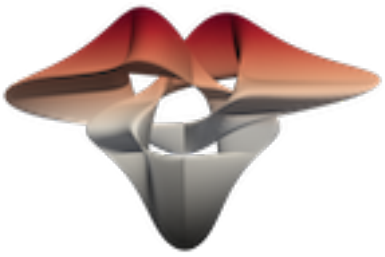
Computational Tools for PDEs with Complicated Geometries and Interfaces



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

162 5th Avenue

Scientific Program

June 10
Morning session
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 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: Introduction to Skellysim, David Stein
3:00 - 3:30pm: Handling collisions in fluid simulations, Bryce Palmer

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 Stekelov (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