

Saibal De

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Graduate Student Research Assistant, Department of Mathematics, University of Michigan
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RESEARCH INTERESTS

High performance computing · Fast algorithms · Machine learning · Quantum Computing
Boundary integral methods · Granular media flow · Tensor factorizations

EDUCATION

- University of Michigan, Ann Arbor Sep 2016 – Current
Ph.D. in Applied and Interdisciplinary Mathematics and Scientific Computing
Advisor: Dr. Shravan Veerapaneni, Co-advisor: Dr. Xun Huan
- Indian Institute of Science, Bangalore Aug 2012 – May 2016
B.Sc. (Research) in Mathematics, with a minor in Physics
Advisor: Dr. A. K. Nandakumaran

PUBLICATIONS

- **Saibal De**, Hadi Salehi and Alex Gorodetsky. “Efficient MCMC sampling for Bayesian matrix factorization by breaking posterior symmetries.” In: arXiv preprint arXiv:2006.04295 (2020).
- **Saibal De**, Eduardo Corona, Paramsothy Jayakumar and Shravan Veerapaneni. “Scalable solvers for cone complementarity problems in frictional multibody dynamics.” In: 2019 IEEE High Performance Extreme Computing Conference (HPEC). IEEE. 2019.

WORKS IN PROGRESS

- “Fast solvers for Stokes boundary integral equations on surfaces of revolutions” with Bogdan Viooreanu and Shravan Veerapaneni.
- “Compression of DEM simulation data with tensor-train decomposition for acceleration of machine learning models” with Guanchu Chen, Eduardo Corona, Paramsothy Jayakumar, Hiroyuki Sugiyama, Shravan Veerapaneni and Hiroki Yamashita.
- “Data-driven multifidelity reduced order model generation with tensor factorizations” with Eduardo Corona, Xun Huan, Paramsothy Jayakumar and Shravan Veerapaneni.
- “Fast solvers for quantum rotor Hamiltonian eigenvalue problems in context of continuous optimization” with Giuseppe Carleo, Vojtěch Havlíček, James Stokes and Shravan Veerapaneni.

SCHOLARSHIPS AND AWARDS

- MICDE Fellow 2019
Funded by Michigan Institute for Computational Discovery and Engineering, University of Michigan
- KVPY Fellow 2011 – 2015
Funded by Department of Science and Technology, Government of India

TALKS AND PRESENTATIONS

Contributed Talks

- IEEE HPEC, Waltham, MA Sep 2019
Scalable solvers for cone complementarity problems in frictional multibody dynamics
- ARC Annual Meeting, Ann Arbor, MI May 2019
Fast algorithms and high-performance computing for high-fidelity terramechanics simulations
- SIAM Great Lakes Section Annual Meeting, Ann Arbor, MI Apr 2019
A fast solver for Stokes boundary integral equations on axisymmetric surfaces

Poster Presentations

- ARC Annual Meeting, Ann Arbor, MI May 2020
Tensor factorization based data compression and dimensionality reduction for autonomous mobility
- ARC Annual Meeting, Ann Arbor, MI May 2020
Fast algorithms and high-performance computing for high-fidelity terramechanics simulations
- Mathematical Fluids, Materials and Biology, Ann Arbor, MI June 2019
A fast solver for Stokes equation in rotationally symmetric geometries
- ARC Annual Meeting, Ann Arbor, MI May 2019
Fast algorithms and high-performance computing for high-fidelity terramechanics simulations
- MICDE Annual Symposium, Ann Arbor, MI Apr 2019
A fast solver for Stokes equation in rotationally symmetric geometries

Student Seminar Talks

- SIAM Student Mini-symposium in Applied Mathematics, University of Michigan May 2020
Large scale simulation of non-smooth dynamics of granular media
- Student Machine Learning Seminar, University of Michigan Feb 2019
Optimization for training deep neural networks
- Student Machine Learning Seminar, University of Michigan Oct 2018
Adaptive submodularity and active learning
- Student AIM Seminar, University of Michigan Feb 2018
On Green's functions, boundary integral equations and rotational symmetry

WORKSHOPS ATTENDED

- XSEDE Summer Boot Camp Jun 2020
- Petascale Computing Institute Aug 2019

TEACHING AND MENTORING

- Directed Reading Program Mentor, University of Michigan Summer 2020
Statistical Machine Learning (*Student*: Lance Ying)
- Guest Lecturer, University of Michigan Fall 2019
Math 371 (Numerical Methods for Engineers and Scientists)

- Directed Reading Program Mentor, University of Michigan
Nonlinear Dynamical Systems (*Student: Ziyi Zhou*) Winter 2019
- Lab Instructor, University of Michigan
Math 216 (Differential Equations) Fall 2018
- Primary Instructor, University of Michigan
Math 115 (Calculus I) Winter 2018
- Primary Instructor, University of Michigan
Math 115 (Calculus I) Fall 2017
- Primary Instructor, University of Michigan
Math 115 (Calculus I) Winter 2017
- Primary Instructor, University of Michigan
Math 105 (Pre-calculus) Fall 2016

TECHNICAL SKILLS

- Programming Languages:
 - Proficient in C/C++, Python, MATLAB
 - Basic knowledge of Julia, Fortran
- Parallel Programming:
 - Proficient with MPI, OpenMP
 - Basic knowledge of OpenACC, CUDA
- Software Tools: L^AT_EX, Linux command line

EXTRACURRICULAR ACTIVITIES

- Co-organizer of Mathematics Directed Reading Program
University of Michigan Fall 2019 – Current
- Co-organizer of Student Machine Learning Seminar
University of Michigan Fall 2018 – Winter 2019