Sajid Ali

PhD Candidate
Applied Physics
Northwestern University

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Overview

Objective
To continually enhance my expertise in computational science so as to accelerate development of reusable scientific software and maintain software infrastructure for high performance computing.

Summary
Extensive experience in computational physics across various domains including modeling, simulations and inverse problems. Skilled in scientific software engineering, parallel programming and management of software stacks on clusters.

Education

2016–Present
Northwestern University, *Evanston, IL*,
Ph.D., Applied Physics,
Computational x-ray optics, Technique development for X-ray Microscopy.

2011–2016
IIT Madras, *Chennai, India*,
Masters of Tech. in Microelectronics and VLSI Design Electrical Engg.,
Master's Thesis : Impurity induced magnetism in Graphene.

2011–2016
IIT Madras, *Chennai, India*,
Bachelors of Technology, Electrical Engg.,
Minor: Physics.

Professional Experience

Summer 2020
WJ Cody Associate,
Mathematics and Computer Science Division, Argonne National Laboratory, PI: Dr Wendy Di.
○ Improving the performance and scalability of a tomography reconstruction code written in C++/PETSc.

Research Experience

2018–Present
X-Ray Wave Propagation,
X-Ray Microscopy Group, Northwestern University, PI: Prof Chris Jacobsen.
○ Developed parallelized computer codes for large scale wave propagation.
○ Implemented finite difference based wave propagation in PETSc.

2016–2019
Zone Plate Testing,
X-Ray Microscopy Group, Northwestern University, PI: Prof Chris Jacobsen.
○ Tested high aspect ratio zone plates for efficiency and tilt tolerance at APS and NSLS.
○ Developed code to simluate the effect of tilt misalignment.

2015–2016
Magnetism in Graphene,
Computaional Condensed Matter Group, IIT Madras, PI: Prof Ranjit Nanda.
○ Investigated the magnetic properties of ntercalated bilayer graphene using DFT.
○ Performed stability analysis for those which exhibited a non-trivial magnetic moment.

Publications

2020
Comparison of distributed memory algorithms for X-ray wave propagation in inhomogeneous media **Sajid Ali**, Ming Du, Mark F. Adams, Barry Smith, and Chris Jacobsen *Optics Express Vol. 28, Issue 20, pp. 29590-29618*

2020	Benchmark informed software upgrades on Quest, Northwestern's HPC cluster **Sajid Ali**, Alper Kinaci, and Alexander John Mamach *In Practice and Experience in Advanced Research Computing (PEARC '20), Association for Computing Machinery (526–529)*
2020	Tunable hard x-ray nanofocusing with Fresnel zone plates fabricated using deep etching Kenan Li, **Sajid Ali**, Michael Wojcik, Vincent De Andrade, Xiaojing Huang, Hanfei Yan, Yong S. Chu, Evgeny Nazaretski, Ajith Pattammattel, and Chris Jacobsen *Optica Vol. 7, Issue 5, pp. 410-416*
2020	Effect of tilt on circular zone plate performance **Sajid Ali** and Chris Jacobsen *Journal of the Optical Society of America A Vol. 37, Issue 3, pp. 374-383*
2018	Zone Plate Performance as a Function of Tilt Analyzed via Multislice Simulations **Sajid Ali**, Kenan Li, Michael Wojcik and Chris Jacobsen *Vol 24, Suppl. S2 (Proc. of the 14th Intl. Conf. on X-ray Microsc. 2018) pp. 298-299*
2016	Magnetism in intercalated graphene **Sajid Ali**, BRK Nanda *AIP Conference Proceedings 1731, 130040*

Conference & Workshops

2020	**PEARC20**, *Virtual*, Poster: Benchmark informed software upgrades on Quest, Northwestern's HPC cluster.
2019	**PEARC19**, *Chicago, USA*, Award : Most Outstanding Student Modeling Challenge Presentation.
2019	**PETSc User Meeting**, *Atlanta, USA*, Talk: X-Ray Wave Propagation in PETSc, Panel: Simulation Beyond PDEs (Can PETSc do more?).
2018	**X-Ray Microscopy**, *Saskatoon, Canada*, Poster: Zone Plate Performance as a Function of Tilt Analyzed via Multislice Simulations.
2016	**DAE Solid State Physics Symposium**, *New Delhi, India*, Poster: Magnetism in Intercalated Graphene.
2014	**Strongly correlated systems: From models to materials**, *Bengaluru, India*, Workshop on therorical and computational tools to study strongly correlated electron systems.

Professional Activities

Organizing	Member, Student Program Committee, PEARC20
Volunteering	Student Volunteer, PEARC19, Literature Review volunteer at NumFOCUS DISC
Membership	US-Research Software Engineering Association

Parallel & Scientific Computing Skills

Languages	(Proficient) C, Python, (Novice) C++, Bash, Matlab
Parallel Prog.	PETSc, MPI
Platforms	ALCF-Theta, ANL-LCRC
Workflows	Balsam, Maestrowf
Perf. Eng.	Intel VTune, Intel APS, Caliper
Sys. Admin.	Spack, Environment Modules, yum/dnf, apt
Soft. Eng.	Git , GitLab CI, Travis CI, Codecov, GNU Debugger

Outreach, Volunteer and Leadership Experience

2019–Present	XSEDE Student Champion at NU
2018–Present	Contributor to open source software
2018	Taught a class on Emergence for Splash at NU