

# Sajid Ali

*PhD Candidate  
Applied Physics  
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## 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.*  
○ Developing 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 simulate the effect of tilt misalignment.
- 2015–2016 **Magnetism in Graphene,**  
*Computational Condensed Matter Group, IIT Madras, PI: Prof Ranjit Nanda.*  
○ Investigated the magnetic properties of intercalated bilayer graphene using DFT.  
○ Performed stability analysis for those which exhibited a non-trivial magnetic moment.
- Summer 2015 **A preliminary DFT Study on the stability of cathode materials,**  
*Center for Automotive Energy Materials, ARCI IITM Research Park, PI: Dr Sahana MB.*  
○ Studied the relative stability of three structural phases of a novel cathode material for Li-ion batteries.  
○ Created complex heterostructures and studied their electronic structure using DFT.

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## Teaching Experience

- 2018 **Dept. of Physics & Astron., Northwestern University, Evanston, IL**, Teaching Assistant.
- Undergraduate Lab methods course for calculus based EM
  - Led laboratory sections to demonstrate and facilitate experiments.
  - Held discussion hours to facilitate learning by one-on-one discussion of homework problems.
- 2015 **Dept. of Electrical Engg., IIT Madras, Chennai, India**, Teaching Assistant.
- Introduction to the basics of scientific computing using C and Python.
  - Facilitated lab sessions, held office hours and graded assignments.

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## 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** Syed 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*

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## 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 theoretical and computational tools to study strongly correlated electron systems.

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## Outreach, Volunteer and Leadership Experience

- 2020 Member, Student Program Committee, PEARC20
- 2019–Present XSEDE Student Champion at NU

2019–Present Literature Review volunteer at NumFOCUS DISC  
2018–Present Contributor to open source software  
2018 Taught a class on Emergence for Splash at NU  
2013 Graphic Designer for Saarang, IIT Madras  
2013 Coordinator for Shaastra Symposium, IIT Madras  
2012–2013 Coordinator for Colloquium, IIT Madras

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## Computer Skills

Programming C/C++, Python, Matlab, Bash  
Software PETSc, Scientific Python, QuantumEspresso  
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  
Platforms Linux (CentOS/RHEL, Ubuntu), Windows