Siddharth Maddali, Ph.D

Research Scientist, GPG/BBP Division (Broadband Plasma)

NOTE: Icons are clickable links.

Summary

Physicist specializing in computational microscopy and imaging for condensed matter systems.

Education

Ph.D, Applied physics — *Carnegie Mellon University* — **Pittsburgh, PA, USA** — 2010 — 2016

MS, Physics — *Carnegie Mellon University* — **Pittsburgh, PA, USA** — 2009 — 2010

M.Sc, Physics — *Indian Institute of Technology - Madras* — **Chennai, India** — 2007 — 2009

B.Sc, Physics, mathematics, electronics — *Bangalore University* — **Bengaluru, India** — 2004 — 2007

Skills

Proficiency	Physics	Computation	Programming
Research	Fourier optics, diffraction, scattering, microscopy, condensed matter physics	Linear algebra, imaging, reconstruction, signal processing, inverse problems	Python, MATLAB, dev. on Linux, scripting, automation
Expert	Quantum & statistical physics, mechanics, electromagnetism, acoustics	Statistics, probability, visualization, complex analysis	Parallel computing/HPC, GPU programming
Functional	Instrumentation/experimental design, nonlinear dynamics	Differential equations, machine learning, data science	C/C++, Linux sysadmin
Elementary	Dynamical systems, field theory	Bayesian inference, uncertainty quantification	HTML, Javascript, CSS

Experience

KLA Corp. (KLA-Tencor) — Milpitas, CA, USA
Research Scientist: Broadband Plasma (BBP) Division — Nov 2022 — present

— Optical wafer inspection with broadband illumination

Argonne National Laboratory — Chicago, IL, USA
Staff Scientist: Materials Science Division — Oct 2019 — Oct 2022

— ***Imaging***: Inverse problems for 3D nanoscale materials imaging using coherent X-ray probes.
— ***Time-resolved studies***: Signal processing methods for XPCS at free electron laser facilities.
— ***Experiments***: POCs & demonstrations for the above at APS/future APS-U instruments.
— ***Fundraising***: Research grants (LDRD, DoE), APS, ESRF user-time proposals.
— ***Dissemination/Outreach***: Publications, peer review, editorship, conferences, tech reports.
— ***Mentoring/Organization***: Postdocs, students (unofficial), workshop planning/chairing.

Argonne National Laboratory — Chicago, IL, USA
Post-doctoral researcher: Materials Science Division — Jan 2017 — Sep 2019

— Coherent X-ray diffraction -based 3D nanoscale materials imaging at very high beam energies.

National Energy Technology Laboratory — Pittsburgh, PA, USA

Post-doctoral researcher: ORISE Fellow May 2016 — Nov 2016

— Machine learning & materials discovery for new steel alloys in optimized power plant components.

Carnegie Mellon University Pittsburgh, PA, USA
Graduate student: Physics Dept. Aug 2009 — Feb 2016

— Dissertation on mining meso-scale materials physics from high-energy synchrotron data.
— Teaching mechanics & electromagnetism to undergraduate science majors.

🏆 Awards & Grants

— ANL LDRD: *Coherence-enhanced dark-field X-ray microscopy* (PI; $930,000).
— ANL LDRD: *Detecting critical micro-structural processes with AI* (PI, $100,000).
— Oak Ridge Institute for Science and Education (ORISE) post-doctoral fellowship (2016).
— Indian Institute of Technology Madras Merit Scholarship (2007 — 2009).
— Bangalore University undergraduate rank 5 (2007).

Hobbies & Activities

Swimming, hiking, biking, table tennis (ping-pong), squash.