Siddharth Maddali, Ph.D

Research Scientist, GPG/BBP Division (Broadband Plasma)

NOTE: Icons are clickable links.

Summary

Scientist with a demonstrated record of research and development. Skilled in X-ray and optical microscopy, wave propagation, Fourier/physical optics, imaging algorithms, signal processing, X-ray science, high-performance scientific computing and condensed matter physics. Professional with strong fundamentals and a Doctor of Philosophy (Ph.D.) in applied physics from Carnegie Mellon University. Previously post-doctoral researcher and scientific staff at top US national laboratories. Passionate about computational techniques in any applied scientific field.

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/physical/wave optics, microscopy, diffraction, scattering, condensed matter physics	Linear algebra, imaging, reconstruction, signal processing, inverse problems, simulations	Python, MATLAB, development on Linux, scripting, automation
Expert	Quantum & statistical physics, mechanics, electromagnetism, acoustics	Statistics, probability, visualization, complex analysis	High-performance/parallel computing, GPU programming
Functional	Semiconductors, Instrumentation/experimental design	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 -driven materials discovery applied to steel alloy data for 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.