Siddharth Maddali, Ph.D

Research Scientist, GPG/BBP Division (Broadband Plasma)

NOTE: Icons are clickable links.

Summary

Computational scientist with a demonstrated record of research and development. **1+ years** in the semiconductor industry. Previous stints at top US national laboratories. **7+ years' professional experience** in X-ray and optical microscopy, Fourier/wave optics, imaging algorithms, signal processing, high-performance computing, scientific software development and condensed matter physics. Professional with strong fundamentals and a Doctor of Philosophy (Ph.D.) in physics. Passionate about computation in any applied scientific field.

Citizenship: India

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/on the side**	Dynamical systems, field theory, quantum information	Bayesian inference, uncertainty quantification, quantum computing	HTML, Javascript, CSS, Qiskit, cuQuantum

Experience

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

— Sensitivity enhancement for optical wafer inspection with broadband illumination

Argonne National Laboratory — Chicago, IL, USA
Assistant Scientist (≅ Assistant Professor): 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).
— IIT-JAM (Joint Admission to M.Sc) all-India rank 5 (2007).
— Bangalore University overall undergraduate rank 5 (2007).

Hobbies & Activities

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