Abhinav Parakh

Department of Materials Science and Engineering
Stanford University, CA 94305

Current Position

- Fourth-year PhD student, Wendy Gu Lab, Stanford University, CA USA

Education

- PhD, Department of Materials Science & Engineering, Stanford University 2017-current
- B.Tech., Chemical Engineering, Indian Institute of Technology Madras 2013-2017

Honors

- Nano@Stanford fellowship under NNCI by the National Science Foundation (NSF)
- Neukermans' graduate fellowship – Stanford University
- Reliance Heat Transfer award for the best academic performance in B.Tech. Chemical Engineering, Indian Institute of Technology Madras
- S.R.I. award for the best inter-disciplinary B.Tech. project, Indian Institute of Technology Madras
- Best paper award – Design is in my DNA by Asian Paints
- UNO Advantage Scholarship by the University of Nebraska at Omaha

Activities

- Written five successful beamline proposals for APS, ALS and SSRL synchrotrons.
- Beamline publications –
  A. Parakh et al., Stress-Induced Structural Transformations in Au Nanocrystals, Nano Letters 20 (10), 7767-7773, 2020.
  A. Parakh et al., Nucleation of Dislocations in 3.9 nm Nanocrystals at High Pressure, Physical Review Letters 124 (10), 106104, 2020.
- Conferences –
  The Minerals, Metals and Materials Society (TMS) 2021, 2020 and 2019, Materials Research Society (MRS) Fall and Spring 2019, Vacuum Ultraviolet and X-ray Physics (VUVX) 2019, and Gordon Research Conference (GRC) 2018.

Interests

- Mechanical properties of materials – I use powder and single-crystal X-ray diffraction, and X-ray absorption spectroscopy beamlines for understanding mechanical deformation and

structural transformations in materials. I have studied mechanical properties of Au nanocrystals, NiB metallic glass nanoparticles, structural alloys like Inconel and Al7075, nanotwinned metals, and nanoclusters with precise number of atoms. These materials are used in optics, electronics, catalysis and structural applications.

- Hydrogen embrittlement – Hydrogen makes structural metals and alloys brittle which leads to fracture and poor mechanical properties. This makes transport of hydrogen for green energy a challenging task. I use X-ray imaging/tomography beamline for understanding behavior of structural alloys under electrochemical hydrogen charging.

Goals for advocacy for the user community

- Hosting proposal writing workshops to educate graduate and postdoc community for writing successful beamline proposals.
- Improving education and outreach events about beamline capabilities, planning experiments and data processing/analysis.
- Increasing user access to data processing software available at beamlines to analyze datasets from their home institutions e.g. commercial X-ray tomography analysis software available at beamlines are hard to get through home institutions.
- Providing suggestions for upgrading experimental capabilities at beamlines and increasing remote access experiments.
- Planning and executing post-COVID on-site access and addressing student/postdoc concern about safety and exposure.