

Shraddha Sevlikar, PhD

Materials Scientist | Nanomaterials | Advanced Characterisation | Microstructure & Sustainable Materials R&D
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PROFESSIONAL PROFILE

Doctoral-trained materials scientist specialising in microstructure evolution, grain-boundary diffusion and nanomaterial characterisation. Experienced in severe plastic deformation, thin-film fabrication and advanced analysis techniques including SEM, EBSD/OIM, XRD, SIMS and radiotracer diffusion analysis. Skilled at planning experiments, interpreting data and communicating findings across disciplines. Motivated to apply microstructure-property knowledge to sustainable materials, circularity, renewable-energy innovations and high-tech R&D. Collaborative, careful and curious in how materials behave from processing to performance.

APPLIED R&D VALUE

- Connects microstructural evolution, diffusion and defect physics to practical questions of material reliability, recyclability and smart functionality.
- Brings hands-on experience in severe plastic deformation, thin films and nanomaterials processing for energy-related materials, coatings and circular technologies.
- Turns complex experimental datasets into clear technical insights, documentation and presentations for interdisciplinary research teams and stakeholders.

CORE TECHNICAL EXPERTISE

Microstructure & Processes: severe plastic deformation (HPT, ECAP), cold rolling, gradient materials, deformation-induced defects, grain-boundary diffusion and atomic transport.

Advanced Characterisation: SEM, EBSD/OIM, EDS, XRD, SIMS, EXAFS, radiotracer diffusion analysis, stress-strain/creep/hardness testing and microstructure-property correlation.

Thin Films & Nanomaterials: thin-film fabrication, nanostructured materials, gas-sensing films, controlled processing workflows and vacuum-compatible laboratory practice.

Data & Communication: experimental design, technical reports, manuscripts, presentations and reproducible workflows using Origin, ImageJ, LaTeX, MS Office and basic Python/C, COMSOL, Illustrator, Chemdraw

Collaboration: international research collaboration, task coordination, mentoring students/junior researchers, and clear communication with technical and non-specialist audiences.

Sustainable Materials: recyclability, smart functionality, low environmental footprint, reduced critical/toxic substances and circular materials thinking.

PROFESSIONAL EXPERIENCE

Research Scientist | Institute for Materials Physics, University of Münster, Germany | Sep 2018 - Jan 2024

- Drove experimental and analytical work in a DFG-funded France-Germany collaboration to understand diffusion-plasticity coupling and grain-boundary defects in metals.
- Engineered gradient microstructures via high-pressure torsion, equal-channel angular pressing and related deformation routes to tailor mechanical properties and diffusion pathways.
- Integrated radiotracer techniques, SIMS, SEM/EBSD, XRD and mechanical testing to correlate microstructure, defect states and mechanical response across scales.
- Prepared technical reports, manuscripts and presentations; contributed to project documentation and communication across collaborating institutes.
- Mentored MSc students and early-career researchers, supporting safe laboratory practice, data review and rigorous experimental execution.

Researcher | Department of Physics, Dr. Babasaheb Ambedkar Marathwada University, India | Nov 2013 - May 2017

- Conducted a nationally funded project on thin-film solar-cell fabrication and nanomaterial characterisation using XRD and EXAFS.
- Collaborated with RRCAT and BARC research centres to align experimental work with renewable-energy and materials-characterisation goals.
- Presented findings at national and international conferences, strengthening scientific communication and professional networking.

Teaching Associate (Part-time) | Physics/Nanotechnology, India | Aug 2015 - Mar 2016

- Taught nanomaterials fabrication, X-ray diffraction and organic chemistry; developed clear explanations for undergraduate students and mentored learners.

Teaching Associate (Part-time) | Analytical Chemistry, India | Aug 2013 - Mar 2014

- Taught introductory Analytical chemistry; developed clear explanations for undergraduate students and mentored learners.

EDUCATION

PhD in Materials Physics | Institute for Materials Physics, University of Münster, Germany | Sep 2018 - Jan 2025

Deformation, grain-boundary defects, atomic transport and diffusion in metals/alloys using severe plastic deformation, microstructural analysis and radiotracer methods.

MSc in Nanotechnology | Dr. Babasaheb Ambedkar Marathwada University, India | Jul 2011 - Jun 2013

Top-down and bottom-up nanomaterial fabrication; polyaniline thin films for gas-sensing applications.

BSc in Analytical Chemistry & Computer Science | Saraswati Bhuvan Science College, Aurangabad, India | Jul 2008 - May 2011

Foundation in analytical chemistry, laboratory methods, computer science and data handling.

Diploma in Intellectual Property Rights | NALSAR University of Law, Hyderabad, India | Jun 2016 - Nov 2017

Innovation protection, research documentation and intellectual-property awareness.

Diploma in Water Quality Management | Dr. Babasaheb Ambedkar Marathwada University, India | Jun 2012 - May 2013

Applied environmental analysis and water-quality management.

SELECTED RESEARCH HIGHLIGHTS

- Connected deformation processing, microstructure analysis and diffusion measurements to explain how defects and grain boundaries influence material behaviour.
- Developed gradient microstructures and analysed heterogeneous grain-boundary states in ultrafine-grained and bicrystal Ni systems.
- Produced peer-reviewed outputs and conference presentations from interdisciplinary materials research; supported knowledge transfer through mentoring and documentation.

SELECTED PUBLICATIONS

- **Grain boundary diffusion and segregation of Cr in Ni sigma 11 bicrystals: Decoding the role of grain boundary defects.** *Acta Materialia*, 2024. Defect-mediated atomic transport and grain-boundary diffusion using radiotracer techniques and 3D SEM/EBSD characterisation.
- **Intrinsic heterogeneity of grain boundary states in ultrafine-grained Ni: A cross-scale study by SIMS and radiotracer analyses.** *Materialia*, 2022. Diffusion behaviour, deformation-modified grain-boundary states and microstructural evolution in ultrafine-grained Ni.

AWARDS & LANGUAGES

Awards: Best Oral Presentation Award, University of Tokushima, Japan (2016); DFG Fellowship (2018); WE-Heraeus-Foerderprogramm, DPG (2019, 2023).

Languages: English (fluent), German (B1), Hindi , Marathi (native).