

Swati Sharma

Assistant Professor

School of Engineering

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Educational Qualifications

- **Ph.D: Materials and Manufacturing Technology**, University of California, Irvine, CA, USA, 2013.
Thesis title: Microstructural tuning of glassy carbon for electrical and electrochemical sensors.
- **M.S.: Materials Engineering**, University of California, Irvine, CA, USA, 2012.
Thesis title: Graphitization in Carbon-MEMS and Carbon-NEMS.
- **B. E. (Hons.): Chemical Engineering**: BITS, Pilani, India, June 2004.

Work Experience

Post-PhD

- **July 2019 – present:** Assistant Professor, School of Engineering, Indian Institute of Technology Mandi, India
- **March 2015 - June 2019:** Scientist, Institute of Microstructure Technology, Karlsruhe Institute of Technology, Germany.
- **March 2014 – February 2015:** Scientist, Institute of Microsystem Engineering, University of Freiburg, Germany.

Pre-PhD

- **November 2009 - February 2010:** Researcher, Ulsan National Institute of Science and Technology, Ulsan, S. Korea.
- **March 2008 – July 2009:** Project Associate, Indian Institute of Technology Kanpur, India.
- **July 2004 – January 2008:** Research Scientist and Project Manager, Ranbaxy Research Laboratories, Gurgaon.
- **July 2003 – June 2004:** Research Trainee, Central Drug Research Institute, Lucknow, India.

Publications

1. Maria Vomero, Calogero Gueli, Elena Zucchini, Luciano Fadiga, Johannes B. Erhardt, **Swati Sharma**, and Thomas Stieglitz. Flexible Bioelectronic Devices Based on Micropatterned Monolithic Carbon Fiber Mats. *Advanced Materials Technologies*, 5, **2020**, 1900713.
2. Ninad Mehendale, Felix Jenne, Chandrakant Joshi, Swati Sharma, Shyam K. Masakapalli, Neil MacKinnon. A Nuclear Magnetic Resonance (NMR) Platform for Real-Time Metabolic Monitoring of Bioprocesses. *Molecules*, 25, **2020**, 4675.
3. Chandrakant Joshi, Swati Sharma, Neil MacKinnon, Shyam K. Masakapalli. Efficient System Wide Metabolic Pathway Comparisons in Multiple Microbes Using Genome to KEGG Orthology (G2KO) Pipeline Tool. *Interdisciplinary Sciences: Computational Life Sciences*. 12, **2020**, 4675.
4. Emil Mamleyev, Stefan Heissler, Alexei Nefedov, Peter G. Weidler, Nurdiana Nordin, Vladislav V. Kudryashov, Kerstin Länge, Neil MacKinnon, **Swati Sharma**. Laser-Induced Hierarchical Carbon Patterns on Polyimide Substrates for Flexible Urea Sensors. *npj Flexible Electronics*, 3(1), **2019**, 2.
5. **Swati Sharma**. *Polymer-to-Carbon Conversion: From Nature to Technology*. *Materials*, 12(5), **2019**, 774.
6. **Swati Sharma**, C. N. Shyam Kumar, Jan G. Korvink, Christian Kübel. Evolution of glassy carbon microstructure: In situ transmission electron microscopy of the pyrolysis process. *Scientific Reports*, 8, **2018**, 16282.
7. **Swati Sharma**. Glassy Carbon: A Promising Material for Micro- and Nanomanufacturing (Review). *Materials*, 11(10), **2018**, 1857.
8. Erwin Fuhrer, Anne Bäcker, Stephanie Kraft, Friederike J. Gruhl, Matthias Kirsch, Neil MacKinnon, Jan G. Korvink, **Swati Sharma**. 3D Carbon Scaffolds for Neural Stem Cell Culture and Magnetic Resonance Imaging. *Advanced Healthcare Materials*, 7(4) **2018**, 1700915.

9. Anna Zakhurdaeva, Philipp-Immanuel Dietrich, Hendrik Hölscher, Christian Koos, Jan G. Korvink, **Swati Sharma**. Custom-Designed Glassy Carbon Tips for Atomic Force Microscopy. *Micromachines*, 8(9), **2017**, 285.
10. **Swati Sharma**, Arpad Rostas, Lorenzo Bordonali, Neil MacKinnon, Stefan Weber, Jan Korvink. Micro and nano patternable magnetic carbon. *Journal of Applied Physics*, 120, **2016**, 235107.
11. Gerald Göring, Philipp-Immanuel Dietrich, Matthias Blaicher, **Swati Sharma**, Jan G. Korvink, Thomas Schimmel, Christian Koos, Hendrik Hölscher. Tailored probes for atomic force microscopy fabricated by two- photon polymerization. *Applied Physics Letters*, 109, **2016**, 063101.
12. **Swati Sharma**, Rahul Kamath and Marc Madou. Porous Glassy Carbon Formed by Rapid Pyrolysis of Phenol- Formaldehyde Resins and its Performance as Electrode Material for Electrochemical Double Layer Capacitors. *Journal of Analytical and Applied Pyrolysis*, 108, **2014**, 12-18.
13. Andrea Mardegan, Rahul Kamath, **Swati Sharma**, Paolo Scopece, Paolo Ugo, Marc Madou. Optimization of carbon electrodes derived from epoxy-based photoresist. *Journal of The Electrochemical Society*, 160(8), **2013**, B132-B137.
14. **Swati Sharma** and Marc Madou. A new approach to gas sensing with nanotechnology. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, **2012**, 370(1967), 2448-2473.
15. **Swati Sharma**, Ashutosh Sharma, Yoon-Kyoung Cho and Marc Madou. Increased Graphitization in electrospun single suspended carbon nanowires integrated with carbon-MEMS and carbon-NEMS platforms. *ACS Applied Materials and Interfaces*, **2012**, 4(1), 34-39.
16. Swati Sharma and Marc Madou. Micro and nano patterning of carbon electrodes for bioMEMS. *Bioinspired, Biomimetic and Nanobiomaterials*, 1(4), **2012**, 252-265.
17. Tanmoy Maitra, **Swati Sharma**, Alok Srivastava, Yoon-Kyoung Cho, Marc Madou and Ashutosh Sharma. Improved graphitization and electrical conductivity of suspended carbon nanofibers derived from carbon nanotube/ polyacrylonitrile composites by directed electrospinning. *Carbon*, 50(5), **2012**, 1753-1761.
18. N. Nandi, R. K. Roy, Anupriya, **Swati Upadhyay**, D. Vollhardt. Chiral interaction in enantiomeric and racemic dipalmitoyl phosphatidyl choline Langmuir monolayer. *Journal of Surface Science and Technology*, 18, **2002**, 51-66.
19. Calogero Gueli, Maria Vomero, **Swati Sharma** and Thomas Stieglitz, Senior Member IEEE. Integration of Micro-Patterned Carbon Fiber Mats into Polyimide for the Development of Flexible Implantable Neural Devices. *2019 IEEE Engineering in Medicine & Biology Society (EMBC)*, Berlin, Germany, **2019**, 3931-3934.
20. Emil R. Mamleyev, Nurdiana Nordin, Stefan Heissler, Kerstin Länge, Neil MacKinnon, **Swati Sharma**. Flexible Carbon-based Urea Sensor by Laser Induced Carbonisation of Polyimide. *2018 IEEE Flexible Electronics and Technology (IFETC) Transactions*, IEEE, Ottawa, ON, Canada, **2018**, 1-6.
21. **Swati Sharma**, Amirhossein Khalajhedayati, Timothy J. Rupert, Marc J. Madou. SU8 Derived Glassy Carbon for Lithium Ion Batteries. *Electrochemical Society (ECS) Transactions*, 61(7), **2014**, 75-84.
22. Monsur Islam, Ritwik Bandyopadhyay, **Swati Sharma**, Marc Madou, Polyacrylonitrile (PAN)-Carbon Intermediate Materials: Electrical and Chemical Properties, *ASME Early Career Technical Conference*, Birmingham, AL, USA, **2013**.

Book Chapter

1. **Swati Sharma**, Garima Agrawal. *Biomedical Applications of Electrospun Polymer and Carbon Fibers*, in: Reference Module in Materials Science and Materials Engineering, Elsevier, **2021**: p. B9780128203521001000. <https://doi.org/10.1016/B978-0-12-820352-1.00094-8>.
2. **Swati Sharma**, Neil MacKinnon, Vlad Badilita, Sebastian Kiss, Lorenzo Bordonali, Jan Korvink. *Carbon MEMS for Magnetic Resonance*. In 'Carbon: The Next Silicon?', Momentum Press, New York USA, **2016**.

Monographs

1. **Swati Sharma**. Microstructural Tuning of Glassy Carbon for Electrical and Electrochemical Sensor Applications. ProQuest Dissertations Publishing, 2013 (ISBN: 9781303603686).
2. **Swati Sharma**. Graphitization in Carbon-MEMS and Carbon-NEMS. ProQuest Dissertations Publishing, 2013 (ISBN: 9781303161674).

Book (ongoing project on contract)

1. Swati Sharma, *Carbon-based Micro and Nano Devices*, DeGruyter Publishing GmbH, Germany.

Patents

1. Calogero Gueli, Maria Vomero, **Swati Sharma**, Thomas Stieglitz. Flexible carbon microelectrodes for bioelectronic medicine. Filed in April 2019 to the German patent office.
2. **Swati Sharma** and Marc Madou. Carbon Nanotube Electrodes. 2015 UCI Ref: UC 2013-286, Mintz Ref: 49105- 502P01US.

Courses taught

- Carbon materials and manufacturing (via NPTEL, link: <https://nptel.ac.in/courses/113/106/113106099/>)
- Management of manufacturing and logistics systems (industrial engineering; at IIT Mandi)
- Product realization technology (workshop practice; at IIT Mandi)
- Reverse engineering (at IIT Mandi)
- Carbon materials and technology (at IIT Mandi)
- Micro and nano fabrication with carbon (at Karlsruhe Institute of Technology, Germany)

Funding/ grants

1. **FunTECH-3D Group Leader Award** (as PI), Topic: Flexible electronics with carbon materials, 3 years
2. **Pilot grant on BMBF-DBT Cooperative Science Program** (as Co-PI), Topic: Bioprocessing of waste for energy and carbon (BioPEC), 2 years
3. **Neutron Beam Time for 15 days (value: Euro 300,000) at ILL, Grenoble, France** for conducting Small Angle Neutron Scattering on various carbon materials (as PI). Ongoing project.

Awards and fellowships

1. Best oral presentation award. Carbon Materials and Technology Conference, Stockholm, May 2018.
2. DAAD Kongress und Vortragsreiseprogramm (DAAD Fellowship for Guest Lecture), May 2014.
3. Young Scientist Lecture Award, NANOSMAT, Granada, Spain, September 2013.
4. Teaching Assistant Excellence Award, Department of Mechanical and Aerospace Engineering, University of California, Irvine, CA, USA. For academic year 2012-13.
5. Best Poster Award, NanoBioTech Montreux, Switzerland, November 2010.

Editor work

1. Guest editor for special issue entitled "Glassy Carbon: Microstructure, Properties and Applications" in MDPI Journal *Materials*.