Smruti Parimita

Ph.D., Indian Institute of Technology Madras, India

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Research Interest

3D and 4D printing of polymers, smart materials, fibre-reinforced polymer composites, product design and development

Employment History

July 2023 – Sep 2023
Project Officer
Department of Mechanical Engineering,
Indian Institute of Technology Madras, India

July 2017 – May 2018
Assistant Professor
Department of Production Engineering,
Parala Maharaja Engineering College, Berhampur, India

Education

2018 – 2025
Ph.D., Mechanical Engineering
Indian Institute of Technology Madras, India
Thesis title: *Design and fabrication of soft intelligent structures by additive manufacturing- A 4D Printing approach*
Thesis advisors: Dr. Hariharan Krishnaswamy and Dr. Pijush Ghosh

2015 – 2017
M.Tech, Production Engineering
Veer Surendra University of Technology, Sambalpur, India
Thesis title: *: Parametric Study and Process Monitoring on Drilling of CFRP Composites.*
Thesis advisor: Dr. Kamal Pal

2011 – 2015
B.Tech, Manufacturing Engineering
Central Institute of Plastics Engineering and Technology, Bhubaneswar, India
Thesis title: *Fabrication of Striker by Manufacturing Process - A Brief Study of Material Selection, Process, Testing and Inspection.*
Thesis advisor: Dr. Aswini Mohapatra

Research Publications

Patent

1. **Smruti Parimita**, Soundarapandian Santhanakrishnan and Jamin Thakorbhai Desai. A System for Additive Manufacturing of Continuous Fibre Reinforced Thermoset Polymer Composites by Liquid Deposition Modeling and Methods Thereof. Indian Patent Application no.: **202041046746**,27-10-2020 (Granted)

Journal Articles

1. **Smruti Parimita**, Umamaheshwari Ravikumar, Hariharan Krishnaswamy, Pijush Ghosh. Solvent-assisted rapid manufacturing of free-form soft polymer structures with hierarchical pores. *Journal of Manufacturing Processes* **133**, 1196-1206, **2025** Link
2. **Smruti Parimita**, Amit Kumar, Hariharan Krishnaswamy, Pijush Ghosh. 4D printing of pH-responsive bilayer with programmable shape-shifting behaviour. *European Polymer Journal* **222**, 113581, **2025** Link
3. Amit Kumar, **Smruti Parimita**, Kumari Kiran, Nitish R. Mahapatra, Pijush Ghosh. Superhydrophobic Asymmetric pH-responsive Soft Actuators: Implications for the Development of Anti-fouling Medical Devices. *Chemical Engineering Journal* **497**, 154772, **2024** Link
4. **Smruti Parimita**, Amit Kumar, Hariharan Krishnaswamy, Pijush Ghosh. Solvent triggered shape morphism of 4D printed hydrogels. *Journal of Manufacturing Processes* **85**, 875-884, **2023** Link
5. Tarakeswar Barik, Kamal Pal, **Smruti Parimita**, Priyabrata Sahoo, and Karali Patra. Monitoring of hole surface integrity in drilling of bi-directional woven carbon fiber reinforced plastic composites. *Proceedings of IMechE Part C (2020): Journal of Mechanical Engineering Science*, **234**, 2432-2458, **2020** Link
6. Anas Saifi, **Smruti Parimita**, Amit Kumar, Pijush Ghosh. Programmable 4D-Printed Soft Actuators: Harnessing Bending Strain Distribution for Embedded Topological Functionality (Accepted in ACS Applied Engineering Materials)

Oral/Poster Presentations

1. **Smruti Parimita**, Umamaheshwari Ravikumar, Hariharan Krishnaswamy and Pijush Ghosh, "Solvent-assisted ink-based 3D printing of free-form structures via phase separation", *CompFlu 2023*,18th - 20th December 2023, IIT Madras, India
2. **Smruti Parimita**, Hariharan Krishnaswamy and Pijush Ghosh, "Suspension bath mediated 3D printing of soft polymers and their unprecedented possibilities", *3D GRAPHY ENGINEERING AND MEDICAL 2023*, 9th - 10th December 2023, IIT Bombay, India
3. **Smruti Parimita**, Hariharan Krishnaswamy and Pijush Ghosh, "Bidirectional shape-morphing of pH-responsive 4D printed hydrogels ", *3rd Asia-Pacific International Conference on Additive Manufacturing* (APICAM), 21st – 23rd June 2023, University of Sydney, Australia
4. **Smruti Parimita**, Hariharan Krishnaswamy and Pijush Ghosh, "Solvent responsive 4D printing of soft structures ", *14th International Conference on Advancements in PolymericMaterials* (APM-2023), 17th – 19th March 2023, CIPET (SARP)-APDDRL, India
5. **Smruti Parimita**, Hariharan Krishnaswamy and Pijush Ghosh, "Direct-Ink-Write 4D printing of solvent-triggered hydrogels for biomimetic structures", *International Conference on Biomaterials, Regenerative Medicine and Devices* (BIORemedi 2022), 14th – 18th December 2022, IIT Guwahati, India
6. **Smruti Parimita**, Neeraj Kumar Bhoi, "An experimental study on feasibility of drilling in electro discharge machining of carbon fibre reinforced composites," *An International Conference on Materials and Technologies* (Material TECH 2021), 9-10 January 2021, NIT Raipur, India
7. **Smruti Parimita**, Vinoth Kumar Paramasivam and Soundarapandian Santhanakrishnan, "Additive Manufacturing of CFRP Composites: Issues and Challenges," *26th Assembly of Advanced Material Congress (AMC), International Association of Advanced Materials* (IAAM), 10 - 13 June 2019, Stockholm, Sweden
8. Tarakeswar Barik, **Smruti Parimita**, and Kamal Pal, "Parametric Study and Process Monitoring on Drilling of CFRP Composites," *Proceedings of 10th international Conference on Precision, Meso, Micro and Nano engineering* (COPEN 10), 6-9 December 2017, IIT Madras, India Link

Workshops attended

1. Advanced Manufacturing and Materials Processing with focus on Emerging technologies for Industry Competitiveness, 25^{th} - 30^{th} March 2019, Indian Institute of Technology Madras, India
2. Additive Manufacturing of Bio-Implants - Academic & Industry Perspectives, 10^{th} - 11^{th} March 2023, Indian Institute of Technology Madras, India

Research Experience

2018-2025 — **Graduate Research Student**, IIT madras
Research on additive manufacturing of polymers and polymer composites using the material extrusion process

2015-17 — **Master Research Student**, Veer Surendra Sai University of Technology
Research on the parametric study and process monitoring on drilling of fiber-reinforced composites

Teaching Experience

IIT Madras
- Teaching Assistant, Unconventional Machining process
- Teaching Assistant, Automation in Manufacturing
- Teaching Assistant, Solid free form Manufacturing

VSSUT, Burla
- Teaching Assistant, Metrology Lab

Skills

Languages — Strong reading, writing and speaking competencies for English, Hindi, and Odia.
Software — Solidworks™, Matlab™, Origin, Image J, Repitier Host, Ultimaker Cura
Instrument — 3D printer, FTIR, Goniometer, UTM, Optical Microscope, Scanning Electron Microscope, TGA, DSC

Awards and Achievements

March 2023 — **Women Leading IIT Madras Grant 2023:** Awarded with a fellowship of INR 2.1 Lakhs
July 2018 - July 2023 — **MHRD Scholarship**: For pursuing doctoral degree
July 2015 - July 2017 — **MHRD Scholarship**: Qualified GATE and fellowship for pursuing masters

References

Available on Request