

GURU RATAN SATSANGEE

Doctoral Researcher • Engineer-in-Training (E.I.T.)

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RESEARCH PROFILE

Doctoral researcher and Engineer-in-Training at the University of Alberta working in additive manufacturing, thermal spray, and advanced manufacturing systems. Currently developing a flame thermal-spray based repair and remanufacturing system, which is a closed-loop flame spray platform for cost-effective, large-scale metal deposition and component repair. Research experience spans AM system and process design, thermal and process modelling, sensing and control, computer vision, and experimental prototyping.

EDUCATION

Doctor of Philosophy (PhD), Mechanical Engineering

Sep 2023 - Expected 2028

University of Alberta | Edmonton, Canada | GPA: 3.63/4.0 | Transferred from MSc to PhD in May 2025

- **Thesis:** Design and Development of a Flame-Based Deposition System for Repair and Remanufacturing of Worn Metallic Components.
- **Supervisor:** Dr. Rafiq Ahmad, **Co-supervisor:** Dr. André McDonald

Master of Business Administration (Integrated Program)

2021 - 2022

Dayalbagh Educational Institute | Agra, India | CGPA: 9.31/10

Bachelor of Technology, Mechanical Engineering

2018 - 2021

Dayalbagh Educational Institute | Agra, India | CGPA: 9.17/10

Diploma in Engineering, Mechanical Engineering

2015 - 2018

Dayalbagh Educational Institute | Agra, India | CGPA: 9.46/10

RESEARCH AND ACADEMIC EXPERIENCE

Graduate Research Fellow / Doctoral Researcher

Sep 2023 - Present

SMART Lab, University of Alberta | Edmonton, Canada

- Developing a gantry-coordinated combustion flame spray platform that enables flame spray to be a dimensionally controlled, layer-wise deposition process for the repair and remanufacturing of worn metallic components.
- Designing position and thermally synchronized closed-loop control architecture for dimensional, layer-wise deposition and repair.
- Supporting laboratory operations by training undergraduate and visiting researchers on equipment and safe-work procedures, contributing to safety and access audits; and maintaining equipment records and inventory audits.

Research Intern - Additive Manufacturing for Neurosurgical Training

Sep 2022 - Jul 2023

Neurosurgery Education and Training School, All India Institute of Medical Sciences (AIIMS) | New Delhi, India

- Supported the design and additive manufacture of anatomical and procedural simulation models for neurosurgical education and skills training.

Mitacs Globalink Research Intern

Jun - Aug 2021

Thermofluids & Heat Transfer Research Laboratory, York University | Toronto, Canada

- Modelled heat transfer in the liquefier of a material extrusion 3D printer to investigate thermal processing and pitch carbon-fibre breakage during printing.

Research Team Member – Prosthetics Design & Fabrication Using Additive Manufacturing

Jul - Dec 2019

Department of Mechanical Engineering, Dayalbagh Educational Institute | Agra, India

- Designed and fabricated a low-cost customized prosthetic limb using high-resolution 3D scanning, CAD, and additive manufacturing.

Research Intern - 3D Modelling, Scanning and Additive Manufacturing

May - July 2019

Indian Institute of Technology (IIT) Delhi | New Delhi, India

- Completed applied training in CAD, design for additive manufacturing, and 3D-printing workflows.
- Performed blue-light 3D scanning of human bones to support digital anatomical modelling and medical applications.

TEACHING AND MENTORING EXPERIENCE

Teaching Assistant - MECE 301: Mechanical Engineering Laboratory I

Winter 2025 - Winter 2026

University of Alberta | Edmonton, Canada | 4 academic terms

- Instructed undergraduate students in mechanical engineering measurement techniques and the treatment of measurement data, supervised laboratory sessions and explained experimental procedures and safety requirements.
- Assessed laboratory reports and provided written feedback on technical writing, data analysis, and the presentation of experimental results.

Mitacs Globalink Mentor - Edmonton Area

Apr 2024 - Dec 2025

Mitacs Globalink Research Internship Program | Edmonton, Canada

- Mentored and supported undergraduate Globalink Research Interns from multiple countries, providing academic, professional, and settlement guidance during their summer research placements in Edmonton.

RESEARCH PUBLICATIONS

Current profiles: [Google Scholar](#) • [ORCID 0009-0000-4381-8257](#)

- Rasool, A., **Satsangee, G. R.**, Warawa, M., Khan, A., Shah, M., Singh, A., & Ahmad, R. (2025). Design and simulation of a production line for plastic recycling with additive manufacturing. *Procedia Computer Science*, 253, 561–570. [DOI](#)
- Rasool, A., **Satsangee, G. R.**, Arickswamy, L., Ashfaq, M. M., & Ahmad, R. (2024). Winter-safe slip prevention rim for e-scooter: Design to production lifecycle analysis. *Engineering Proceedings*, 76(1), 88. [DOI](#)
- Alghamdy, M., He, I., **Satsangee, G. R.**, Keramati, H., & Ahmad, R. (2024). Enhancing printability through design feature analysis for 3D food printing process optimization. *Applied Sciences*, 14(20), 9587. [DOI](#)
- Satsangee, G. R.**, Al-Musaibeli, H., & Ahmad, R. (2024). A defect detection method based on YOLOv7 for automated remanufacturing. *Applied Sciences*, 14(13), 5503. [DOI](#)
- Singhal, I., **Satsangee, G. R.**, Bhardwaj, L., Sharma, G. S., Chandrakar, A. S., Gupta, H., Malik, G., Tyagi, B., Sahai, A., & Sharma, R. S. (2024). 3D-printing virtual simulation lab. *IEEE Transactions on Learning Technologies*, 17, 1504–1517. [DOI](#)
- Satsangee, G. R.**, Tyagi, B., Angajala, D. K., Sahai, A., & Sharma, R. S. (2023). Prosthetics advice, design & fabrication using digital manufacturing systems for improved healthcare systems. *Journal of Systems Science and Engineering*, 27(1), 22–28. [Full text](#)
- Singh, H., Agrawal, M., **Satsangee, G. R.**, Agrawal, S., Sharma, S., & Gautam, G. (2018). The development of viscous material (chocolate) 3D printer/food 3D printer. *International Research Journal of Engineering and Technology*, 5(4). [Full text](#)
- Satsangi, R., Singh, H., **Satsangee, G. R.**, Agrawal, S., Sharma, S., & Gautam, G. (2018). The concept of viscous material (chocolate) 3D printer/food 3D printer. *International Research Journal of Engineering and Technology*, 5(2). [Full text](#)

GRANTED PATENTS

1. System and Method for Fabricating Customized, Flexible Prosthetic Appendage Attachment (PAA)

Indian Patent No. 565287; Application No. 202211066319

Granted, 17 Apr 2025

2. System And Method for Fabricating Injected Printed Circuit Board using Matex Fabricator and Metal Injection Tool

Indian Patent No. 532232; Application No. 20231100665

Granted, 08 Apr 2024

3. Portable Precision Silent Cooling System for Storage of Vaccine Vials

Indian Patent No. 531774; Application No. 202011048692

Granted, 04 Apr 2024

4. System and Method to Simulate 3D Printer Machine.

Indian Patent No. 488543; Application No. 202011018294

Granted, 26 Dec 2023

5. Method and System for Making Silicone Washers and Gaskets.

Indian Patent No. 490716; Application No. 202011038309

Granted, 22 Sep 2023

SELECTED PRESENTATIONS AND POSTERS

Higher Education (MS and PhD) Opportunities in Canada	Nov 2025
<i>Invited interactive lecture, Department of Mechanical Engineering, Dayalbagh Educational Institute Agra, India</i>	
Metal Additive Manufacturing in Construction: Applications, Challenges, and Future Outlook	May 2025
<i>Poster presentation, The 2nd Canadian Sustainable Additive Construction Conference University of Alberta Edmonton, Canada</i>	
Custom Transtibial Prosthesis Manufacturing System and Method: A Case Study	Mar 2023
<i>Oral presentation, 45th National Systems Conference Indian Institute of Technology Kanpur, India</i>	
Prosthetics Advice, Design & Fabrication Using Digital Manufacturing Systems	Sep 2022
<i>Oral presentation, 45th National Systems Conference Agra, India Best Paper Award in Healthcare Systems Theme</i>	
Consciousness Engineering	Sep 2016
<i>Oral presentation, Annual Indian Students System Conference (PARITANTRA) Agra, India</i>	

AWARDS AND PROFESSIONAL CREDENTIALS

AWARDS:

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| • Graduate Research Assistance Fellowship , University of Alberta, Canada | 2023 - Present |
| • Mitacs Globalink Graduate Fellowship , University of Alberta, Canada | 2023 |
| • Best Paper Presentation Award - 45th National Systems Conference, India | 2022 |
| • Mitacs Globalink Research Internship Award , York University, Canada | 2021 |

PROFESSIONAL CREDENTIALS:

- **Engineer-in-Training (E.I.T.) – Member ID 322483**
Association of Professional Engineers and Geoscientists of Alberta (APEGA)

LEADERSHIP AND ACADEMIC SERVICE

- Organizing Committee Member, Canadian Sustainable Additive Construction Conference (CSAC 2025), University of Alberta, 2025.
- Facilitator/Organizer, TecBuilders STEM Workshop for High-School Students, 2024.
- Mitacs Globalink Mentor, Edmonton Area, 2024-2025.
- Student Coordinator, Training and Placement Cell, Faculty of Engineering, Dayalbagh Educational Institute.
- Organizing Committee Member, TEDxDEI, 2018.
- Head Student Editor, Department of Mechanical Engineering Yearbook, D.E.I. Technical College.
- Volunteer, National Service Scheme (NSS) camp and Unnat Bharat Abhiyan, India.

TECHNICAL SKILLS

- **Manufacturing:** Additive manufacturing, rapid prototyping and 3D scanning
- **Modelling and Design:** CAD (Autodesk Fusion 360), ANSYS Fluent, MATLAB
- **Automation and Experimentation:** Sensing, data acquisition, NI myDAQ, and experimental instrumentation
- **Research:** Experimental design, technical literature review, data analysis, and technical documentation

ADDITIONAL INDUSTRIAL INTERNSHIPS

Summer Intern - Research and Development	Jul - Aug 2017
<i>Romsons Scientific and Surgical Industries Pvt. Ltd. India</i>	
• Worked on a project related to zero tolerance manufacturing of precise molds for medical equipment using CNC and EDM machining.	
Summer Intern – Production	Jun - Jul 2017
<i>Mondelez India Foods Private Limited (formerly Cadbury India Ltd.) India</i>	
• Observed and applied value stream mapping for chocolate production plant. Learnt chocolate making process & quality control.	

REFERENCES

References available upon request.