

MIRZA FAIZAAN [PHD]*

MATERIALS RESEARCHER; POLYMER ADDITIVE MANUFACTURING

mirzaifaizaan.org

+91 97390 31247

mrzfaizaan@gmail.com

DOB: 16 November 1994

SUMMARY

Dedicated materials researcher specialising in material extrusion additive manufacturing (MEX-AM) with over 5 years of experience, strongly emphasising weathering effects and establishing structure-property relationships through mechanical and material characterisation. I am passionate about meta-materials and lattice structures, particularly for lightweight structural applications. Proficient in CAD and static structural analysis, I am also familiar with ASTM standards for the mechanical characterisation of plastics. My hands-on experience includes working with single and twin-screw extruders, internal mixers, universal testing machines (UTM), and advanced techniques like optical microscopy, micro-CT, XRD, FTIR, and DSC. I also possess skills in analysing SEM micrographs, image processing using ImageJ and GIMP, and programming in MATLAB for data visualisation and analysis. In my spare time, I enjoy 3D printing as a hobby.

RESEARCH EXPERIENCE

CARBON NEXUS, DEAKIN UNIVERSITY, WAURN PONDS, VIC. AU

OCT 2023 – APR 2024

Casual Research Assistant.

- Worked as a research assistant as part of a three-member team on the wet spinning line to produce and manage pre-cursor fibres (white fibre) under a project for SABIC, Saudi.
- Prepared the dope mixture (PAN + DMSO), the spinneret and two filter assemblies to ensure a smooth operation on the wet spinning day.
- Carried out single-fibre testing (FAVIMAT) and density measurements of the in-house manufactured white and carbon fibre across different stages of its process. Also prepared cross-section samples for microscopy.

MANIPAL INSTITUTE OF TECHNOLOGY, MAHE, MANIPAL, KA. IN.

JAN 2020 – MAR 2025

INSTITUTE FOR FRONTIER MATERIALS, DEAKIN UNIVERSITY, VIC. AU.

Doctoral Candidate

- Conducted optimisation studies and established structure-property relationships for tensile performance and void characteristics as a function of nozzle diameter and layer thickness for additively manufactured (AM) parts [FDM].
 - Developed a MATLAB program to clean and analyse raw tensile data to output tensile strength, tensile modulus and plots for each sample type.
- Carried out a time-dependent accelerated weathering study on AM - PLA to establish the tensile strength and material degradation through FTIR, XRD and DSC analysis over prolonged exposure times.

- Developed a MATLAB program to smooth and baseline correct FTIR, XRD and DSC raw data. Additionally, developed a program to identify and assign FTIR peaks and functional groups to output in a simple Excel sheet.
- Designed a repeating functional cellular infill structure as an alternative to conventional 100% solid additively manufactured parts for better specific compressive performance. Explored the use of short fibre reinforcements in material extrusion AM.
 - Carried out static structural simulations on different compression sample types.
 - Gained first-hand experience in polymer extrusion with single and twin-screw extruder setups.

EXPERIENCE

FREELANCE [3D PRINTING SERVICE], MANIPAL, KA. IN.

NOV 2024 - CURRENT

- Independently operated a profitable freelance 3D printing service fulfilling client orders, handling material sourcing, quotations and quality control to meet diverse client needs, demonstrating strong organisational and time-management skills.

AUTOMOTIVE AXLES LTD, MYSORE, KA. IN.

NOV 2018 – JUL 2019

Project Intern.

- Managed assembly and set-up of the new Robotic arm ‘Ring and Cover Welding’ station.
- Carried out ECRS on Ring and Cover welding machines to reduce process time.
- Suggested improvements to reduce the processing time from 227 seconds to under 200 seconds: Weld time from 154 seconds to 142 seconds and travel time from 23 seconds to 12 seconds by adopting twin wire-arc torch and pneumatic motors over servo motors, respectively.

TVS MOTOR COMPANY LTD, MYSORE KA. IN.

MAY 2018 – OCT 2018

Project Intern.

- Identified two primary root causes for crankshaft bearing noise and established SOPs for bearing handling.
- Designed a Do’s and Don’ts chart to educate operators on bearing mishandling
- Successfully reduced crankshaft bearing-related engine rework and rejections on the assembly line to zero for two consecutive weeks before I departed from the establishment.
- Carried out a Value Stream Mapping (VSM) to eliminate buffer time for entirely manufactured vehicle holding locations throughout the plant and improve the value-added ratio of products.

MANIPAL INSTITUTE OF TECHNOLOGY, MAHE, MANIPAL, KA. IN

OCT 2017 – APR 2018

Teaching Assistant.

- Assistant staff member in Automotive Engineering Labs
- Explained lab experiments to engineering students.

EDUCATION

MANIPAL INSTITUTE OF TECHNOLOGY, MAHE, MANIPAL. KA. IN.

JAN 2020 – *APR 2025

INSTITUTE FOR FRONTIER MATERIALS, DEAKIN UNIVERSITY, VIC. AU.

Doctor of Philosophy [*Due for Examination].

Title: Structure-property and weathering studies of additively manufactured lightweight cellular structures

MANIPAL INSTITUTE OF TECHNOLOGY, MAHE, MANIPAL. KA. IN.

2017 - 2019

Master of Technology in Automobile Engineering.

DAYANANDA SAGAR COLLEGE OF ENGINEERING, BANGALORE, KA. IN.

2013 - 2017

Bachelor of Engineering in Automobile Engineering.

PUBLICATIONS, PATENTS AND AWARDS

PUBLICATIONS

1. *Due for Submission:* Mirza, F., Baloor Shenoy, S., Nunna, S. et al. Time-dependent structure-property relationship of artificially weathered material extruded PLA.
2. Mirza, F., Baloor Shenoy, S., Nunna, S. et al. A study on the overall variance and void architecture on MEX-PLA tensile properties through printing parameter optimisation. Scientific Reports (2024). <https://doi.org/10.1038/s41598-025-87348-2>
3. *Accepted:* Faizaan, M., Shenoy, S., & Kini, C. R. et al. Impact of Lattice Geometry on Compressive Strength: A Finite Element Analysis.
4. Faizaan, M., Shenoy, S., & Kini, C. R. (2024). Tensile and Flexural Performance of Hybrid FDM and Compression Moulded PLA/Basalt Biocomposite. In Materials Science Forum (Vol. 1120, pp. 77–84). Trans Tech Publications, Ltd. <https://doi.org/10.4028/p-duyo7m>
5. Mirza, F., Baloor Shenoy, S., Nunna, S. et al. Effect of material extrusion process parameters on tensile performance of pristine and discontinuous fibre reinforced PLA composites: A review. Prog Addit Manuf (2024). <https://doi.org/10.1007/s40964-024-00825-4>

CONFERENCES

1. Poster presented at the IFM Research Conference, Geelong, VIC, AU, titled ‘To what extent do FDM printing parameters really affect PLA tensile performance?’. November 2023.
2. Paper Presented in 3rd International Conference on Advances in Material Sciences 2023 (ICAMS2023); May 2023.

PATENTS

1. Design Patent: “Tensile sample mount for accelerated weathering chamber” bearing design number: 383798-001

AWARDS

1. Won **Best Paper Award** for paper presented at The International Conference on Computational Methods on Engineering & Health Sciences (ICCCMEH2024), organised by Manipal Institute of Technology, Manipal, Udipi, KA. IN. December 2024.

SKILLS AND SOFTWARE

-
- **3D Printing/Rapid Prototyping:** FDM printer diagnosis and repair. SLA.
 - **Polymer Extrusion:** 3Devo single screw extruder and Wayne twin-screw extruder.
 - **Microscopy:** SEM, Optical Microscopy, Micro-CT
 - **Mechanical Characterisation:** UTM (ASTM – Tensile, Flexural, Compression),
FAVIMAT+ Single fibre tensile testing
 - **Material Characterisation:** Density column, XRD, FTIR, DSC.
 - **CAD & CAE:** SolidWorks, CATIA, Ansys – Static Structural
 - **Programming:** MATLAB (Data visualisation and analysis)
 - **Statistics:** Minitab, OriginLAB.
 - **Image Processing:** ImageJ, GIMP
 - **Proficient in MS Office:** Excel Word and PowerPoint
 - **IELTS (Academic):** 8.0 (2020); **GRE:** 305 (2019)

CERTIFICATES

-
- Safety Induction and Training, Deakin University, 2023
 - Additive Technologies in Metallurgy and Mechanical Engineering, Coursera, 2021.
 - MATLAB Fundamentals & Introduction to statistical methods with MATLAB, Mathworks. 2021
 - Technological Leadership for Inclusive Digital Society, Sikkim Manipal Institute of Technology 2021
 - Scientific Writing and Publishing, Nature Masterclass, 2021
 - Research Integrity Training, Deakin University, 2021.
 - 3D printing & Applications in Engineering, Indian Space Industries Exhibitors 2020
 - Workshop on ‘Writing scientific and technical research paper’, Manipal Institute of Technology 2019

REFERENCES

Dr Satish Shenoy B.

Professor
Manipal Institute of Technology,
MAHE.
Manipal, KA. IN. 576104
+91 98442 32761
satish.shenoy@manipal.edu

Dr Claudia Creighton

A/Prof
Carbon Nexus, IFM
Deakin University.
Waurm Ponds, VIC. AU. 3216
+61 4 2365 2791
claudia.creighton@deakin.edu.au

Dr Srinivas Nunna

Lecturer
School of Engineering
RMIT University
Melbourne, VIC. AU. 3000
+61 4 22877 718
srinivas.nunna@rmit.edu.au

DECLARATION

I hereby declare that the particulars, as mentioned above, are true and to the best of my knowledge.

Place: Manipal, KA. IN.