DR. MIRZA FAIZAAN

Manufacturing Engineer & Technical Operations Leader

fmirza.phd@gmail.com | +91-97390-31247 | Bangalore, Karnataka, India
mirzafaizaan.org | LinkedIn

PROFESSIONAL SUMMARY

PhD-qualified manufacturing engineer with 7+ years combined experience driving process excellence, quality systems, and operational efficiency in additive manufacturing and automotive sectors. Proven track record: 66% cost reduction (INR 20L+ annually), 92.5% first-pass yield improvement, enabled INR 25-50L+ equipment sales through technical validation. Expertise in Design for Manufacturability (dFMEA, GD&T), Design of Experiments (DOE/ANOVA), and cross-functional team leadership (8 direct reports). Strong background in root cause analysis (8D, Fishbone), process optimization, and quality documentation. Combines hands-on manufacturing engineering with strategic business acumen.

CORE COMPETENCIES

Manufacturing Engineering: dFMEA/Process FMEA | GD&T & Tolerance Analysis | Design of Experiments (Taguchi, ANOVA, RSM) | Root Cause Analysis (8D, Fishbone) | Process Capability Studies | Statistical Process Control
Quality Systems: SOP Development | ISO-Style Process Governance | Technical Documentation | Quality Audits | Corrective Action (CAPA) | Calibration Protocols
Additive Manufacturing: FDM/MEX-AM Process Optimization | Pellet Extrusion | High-Performance Polymers (PEEK, PCL) | Print Farm Operations | Parameter Development | Material Qualification
Leadership & Operations: Cross-Functional Team Management | Budget Management | Capacity Planning | Resource Allocation | Vendor Coordination | Strategic Planning
Technical Tools: MATLAB | Minitab | ANSYS | SolidWorks | Python | CMM Inspection | Mechanical Testing (UTM, ASTM)

PROFESSIONAL EXPERIENCE

Fracktal Works Pvt. Ltd., Bangalore, India **Aug 2025 – Present**

Chief of Staff (Technical Operations Lead)
Lead technical operations, manufacturing engineering, and commercial support for industrial 3D printer manufacturer. Direct 8-person cross-functional team across R&D, production, quality, sales, after-sales. Manage 15+ printer fleet producing 20+ orders monthly. Report to CEO.

Process Excellence & Operational Efficiency:

- Achieved **92.5% first-pass yield improvement** from 0% baseline through systematic calibration protocol implementation, reducing failure rate to <8% (3 failures per 40+ prints monthly); trained 4 shop floor personnel
- Increased production speed by **40%** via resonance compensation (input shaping) and reduced print time by **20%** through slicing parameter optimization while maintaining dimensional accuracy
- Expanded facility capacity by **33%** without physical expansion through vertical rack mounting, adding 5 printers, 2 workstations, and 1 troubleshooting station in existing footprint
- Established preventive maintenance and calibration systems for 15+ printer fleet; developed flow rate, scarf seam, and resonance testing protocols

Revenue Enablement & Customer Technical Support:

- Qualified high-performance materials enabling **INR 25-50L+ equipment sales**: PEEK (94 MPa tensile, samples to ISRO/NAL), PCL composite (120 specimens), direct powder pellet extrusion
- Led customer technical engagements for material compatibility and process validation across biomedical, aerospace, and automotive applications (4 active NDA projects)
- Designed sales enablement infrastructure: industry-segmented STL demo library, physical material swatches, and technical partnership programs

Quality Systems & Process Governance:

- Established comprehensive SOP framework across 6 functions (quality, testing, after-sales, communication, escalation, HR) reducing inter-departmental friction in 30+ member organization
- Audited and redesigned product documentation across printer catalog, identifying 30+ technical errors; established standard template for specifications, warranty, and troubleshooting
- Conducted dFMEA on in-house pellet extruder toolhead; identified feeding angle jamming and thermocouple placement issues; proposed design improvements for v2 iteration

Strategic Initiatives:

- Authored **INR 2.85 crore** technical proposals for ISRO space-based manufacturing systems (lunar regolith and zero-gravity printing); currently under review

- Managed equipment procurement including INR 11 lakh filament extruder and multi-technology AM lab establishment

Doctoral Researcher (Cotutelle PhD Program) **Jan 2020 – Mar 2025**

Manipal Institute of Technology, MAHE & Institute for Frontier Materials, Deakin University
Independent research program in additive manufacturing process optimization with qualification-scale testing rigor.

- Executed large-N statistical testing: 500+ parts including 190 tensile specimens across Taguchi DOE arrays with rigorous ANOVA; established defensible process-property relationships quantifying manufacturing variability
- Conducted 2000-hour accelerated weathering program characterizing time-dependent degradation via multi-modal analysis (FTIR, XRD, DSC); rare long-horizon durability study in AM field
- Performed high-resolution micro-CT imaging (2.9 μm voxel) establishing quantitative void architecture-mechanical performance correlations (0.117% to 4.99% void fraction)
- Managed INR 3-4 lakh annual research budget; secured INR 11 lakh equipment procurement; established multi-technology AM lab (FDM, SLA, LPBF)
- Published 5 peer-reviewed papers (3 published, 2 under review); awarded Best Paper (ICCMEH2024); granted Design Patent No. 383798-001

Research Assistant – SABIC Precursor Fiber Scale-Up **Oct 2023 – Apr 2024**

Carbon Nexus, Deakin University, Australia

- Supported pilot-to-production transition for carbon fiber precursor manufacturing; managed 6-hour production runs (3-person team)
- Identified metal debris contamination causing filter pressure spikes; enabled mid-run corrective action preventing production halt

Manufacturing Engineering Intern – Quality & Process Improvement **May 2018 – Oct 2018**

TVS Motor Company Ltd., Mysore, India

- Achieved **66% bearing scrap cost reduction** (INR 3.08L to INR 1.38L monthly, **INR 20.4L annually**) through 8D and Fishbone root cause analysis identifying operator mishandling at two critical assembly stations
- Developed SOPs, visual training materials, and process audits; sustained zero-defect rate over 2-week monitoring period
- Applied CMM inspection and GD&T principles eliminating housing tolerance issues as failure source

Manufacturing Engineering Intern – Robotic Welding Cell **Nov 2018 – Jul 2019**

Automotive Axles Ltd., Mysore, India

- Contributed to robotic welding cell setup for truck axle differential cover assembly; developed SOPs for production handover

EDUCATION

Doctor of Philosophy (PhD) – Cotutelle Program Jan 2020 – Oct 2025
Manipal Institute of Technology, MAHE, India & Deakin University, Australia
Dissertation: Structure-Property and Weathering Studies of Additively Manufactured Lightweight Cellular Structures

Master of Technology – Automobile Engineering 2017 – 2019
Manipal Institute of Technology, MAHE, India

Bachelor of Engineering – Automobile Engineering 2013 – 2017
Dayananda Sagar College of Engineering, Bangalore, India

PUBLICATIONS & INTELLECTUAL PROPERTY

Publications: 5 peer-reviewed journal articles (3 published in *Scientific Reports* and *Progress in Additive Manufacturing*, 2 under review) | Best Paper Award, ICCMEH2024
Patent: Indian Design Patent No. 383798-001 (Granted) – Tensile sample mount for accelerated weathering chamber

KEY ACHIEVEMENTS

- Cost Reduction: 66% (INR 20.4L annually) via root cause analysis and corrective action
- Quality Improvement: 92.5% first-pass yield achieved from 0% baseline
- Revenue Enablement: INR 25-50L+ equipment sales via material qualification
- Process Efficiency: 40% speed increase, 20% time reduction, 33% capacity expansion
- Strategic Planning: INR 2.85 crore proposals (ISRO, under review)
- Leadership: 8 direct reports across R&D, production, quality, sales, after-sales
- Publications: 5 peer-reviewed papers, 1 granted patent, 1 best paper award