Swarup Kumar Subudhi

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EXPERIENCE

UNIVERSITY OF MARYLAND, College Park, MD, USA   Jan 2021 – present
Graduate Research Assistant III
- Development of Three-Dimensional Hard X-Ray Photoelectric Polarimeter Assembly Using Additive Manufacturing Technology
Sponsor: NASA-APRA Grant [Jan 2024 – present]
  - Relevant Skills: CAD, Additive Manufacturing, Hardware-System Integration, Controls, Thermal-Structural Analysis, Vibration Analysis, Accelerated Testing (Thermal Cycling & Vibration)
- Thermal Cycling Reliability of Printed Electronics
Sponsor: Laboratory of Physical Sciences [June 2023 – Dec 2023]
  - Relevant Skills: CAD, Structural FEA, Thermal & Fatigue Analysis, Material Selection
- Reliability Validation and Sustainment of Direct-Write Printed RF Devices
Sponsor: NextFlex [Jan 2022 – May 2023]
  - Relevant Skills: Additive Manufacturing, Printed Electronics (MIS Capacitors), RF Testing, Accelerated Testing (Thermal Cycling & Temperature-Humidity Bias)

TATA MOTORS LTD. CVBU, Jamshedpur, India   Aug 2016 – Dec 2020
Senior Manager, Manufacturing - Transmissions
- Reduced Warranty Costs pertaining to Bearing failures in Gearboxes by 50% for 24 MIS gearboxes
- Improved Operational Line Efficiency of Gearbox Assembly Line by 12% by (i) reducing takt time of low performing stations, (ii) reducing quality defects of affected stations through PFMEA control with a focus on operator ergonomics using RULA assessment tool
- Reduced OEM Manufacturing Costs using Value Engineering methodology for G1150 (9-speed gearbox) and hydraulic tipping kits in dumper trucks
- Implemented IoT-based low-cost ANDON analysis system to capture real-time line stoppage and loss monitoring
  - Relevant Skills: Six-Sigma, Production Planning, Production Management, Process Control, Quality Control, Line Balancing, Value Engineering

Asst. Manager, New Product Introduction - Transmissions
- Launched an auxiliary transmission system for 8WD TATA Kestrel incl. Part development, quality inspection, assembly, integration and testing
- Implemented various change-management procedures for new and updated commercial vehicle gearboxes
  - Relevant Skills: Change management, DFA/DFM, Prototyping, Assembly and testing, PLM integration

EDUCATION

Ph.D., Mechanical Engineering, 2025 (exp) | GPA: 3.7/4
University of Maryland, College Park, MD, USA
> *Major:* Mechanical Engineering
> **Courses:** Composite Materials, Failure Mechanisms, Mechanical Fundamentals of Electronic Components, Thermal Management of Electronics, Applied ML for Engineering & Design, Interfacial Fluid Dynamics, Probabilistic Physics of Failure & Accelerated Testing, Engineering Optimization, etc.
> *Graduate Teaching Assistant:* Fluid Mechanics ENME331, Mechanics I ENES102

B.Tech., Mechanical Engineering, 2016 | GPA: 8.35/10
National Institute of Technology, Rourkela, India
> *Major:* Mechanical Engineering; *Minor:* Mathematics
> *Other Coursework:* Digital Logic Design, Materials Technology, Machine Design, Tool Design

TOP TECHNICAL SKILLS/ TOOLS

CAD/CAM: SolidWorks, Pro-E, Autodesk Fusion
CAE/CFD: ANSYS Mechanical, Thermal, Fluent; Abaqus CAE (Structural, Thermal, Vibration, Fatigue), Icepak
Computational: Matlab & SimuLink, Wolfram Mathematica, Minitab
Programing Languages: Python, Arduino IDE, C++, HTML5, CSS3, JavaScript
Laboratory: VNA, nScrypt, VSM, Microscopy (SEM, SAM, Laser), DAQ, Thermal & Environmental Chambers, 1DOF Shaker, Image Processing
Machining/Assembly: CNC, 3D Printing, GD&T, EDM, Fixture & Testbed Design

OTHER ACADEMIC PROJECTS

- Development and RF performance testing of a printable flexible antenna using CNT-GO-based inks
  - Relevant skills: Additive Manufacturing, RF testing, HFSS simulations
- Synthesis and Analysis of a 5-DOF Reconfigurable Manipulator Assembly based on five-bar linkage
  - Relevant skills: CAD, Ansys Mechanical, Hardware-system integration
- Chassis and bodywork design of an electric karting vehicle. Structural deformation and stress analysis at given payload; and working model validation.
  - Relevant skills: CAD, Ansys Mechanical, Assembly and Electronics Integration
- Two-zone mathematical modelling of performance and combustion formation in direct-injection diesel engine operating on carbon black-water-diesel slurry
  - Relevant skills: Engine Testing, Emissions testing, Statistical Analysis
- Statistical modelling and optimization of MRR (material removal rate) and taper angle in reverse EDM (electro-discharge machining) using response-surface methodology
  - Relevant skills: Manufacturing Tech., Statistical Analysis

RELEVANT ACADEMIC PUBLICATIONS

- Janamanchi, P., Subudhi, S., Dasgupta, A., and Quinn, E. (2025) Thermal Cyclic Fatigue Reliability of Printed Hybrid Electronics (PHE). *(scheduled to be presented in EuroSimE 2025, April 6)*
- Subudhi, S.K., Zhao, B., Wang, X., Ting, J., Takeuchi, I., Dasgupta, A., and Das, S. (2024) Flexible and twistable free-standing PDMS-magnetic-nanoparticle-based soft magnetic films with robust magnetic properties. *Flexible and Printed Electronics*, 9(1), 015013.
- Subudhi, S.K. and Das, S. (2023) Reliability of Lab-on-a-Chip Technologies for Wearable Electronics: A Perspective. *Frontiers in Sensors*, 4, 1283402.
- Zhao, B., Sivasankar, V.S., Subudhi, S.K., Dasgupta, S., and Das, S. (2023) Printed carbon nanotube-based humidity sensors deployable on surfaces of widely varying curvatures. *ACS Applied Nano Materials* 6(2), 1459-1474.
- Zhao, B., Sivasankar, V.S., Subudhi, S.K., Sinha, S., Dasgupta, A., and Das, S. (2022) Applications, fluid mechanics, and colloidal science of carbon-nanotube-based 3D printable inks. *Nanoscale* 14(40), 14858-14894
- Dhamsania et al. (2022) Physically soft magnetic films and devices: fabrication, properties, printability, and applications. *Journal of Materials Chemistry C* 10(17), 6563-6589.