Sundar Gurumurthy

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Professional Summary

Computational engineer with 3+ years of hands-on experience in FEA, materials modeling, and design for manufacturing. Skilled in developing physics-based simulation workflows for WAAM, crashworthiness, and gear systems.

Work Experience

Research Assistant

Welding and Additive Manufacturing Centre, Cranfield University Jun 2024 – Present

- Developed thermo-mechanical FEA models for Wire Arc Additive Manufacturing (WAAM) using ABAQUS, analyzing residual stress, distortion, and phase transformations.
- Applied solid-state phase transformation (SSPT) modeling techniques for steels to improve simulation accuracy.
- Integrated martensitic transformation effects into multi-physics simulation workflows for dissimilar metal joints.
- Automated simulation pre- and post-processing via Python and C++ to optimize research throughput.
- Performed experimental validation with 3D scanning, SEM, and thermal imaging, ensuring robust correlation with computational results.

Graduate Engineering Trainee

Sona Comstar, Gurugram, India Jul 2021 – Jul 2022

- Designed and optimized drivetrain components under stringent tolerance and performance requirements using Siemens NX CAD tools.
- Developed advanced gear tooth surface modeling tools incorporating crowning, improving proprietary design software capabilities.
- Conducted Loaded Tooth Contact Analysis (LTCA) and fatigue life simulations, enhancing component durability predictions.
- Collaborated with suppliers and cross-functional teams to ensure manufacturability and quality compliance.

Student Trainee – Crash Structures

Mercedes-Benz R&D India, Bangalore, India Feb 2021 – Jun 2021

- Developed non-linear finite element models of tires using LS-Dyna for dynamic crash impact analysis.
- Investigated contact algorithm accuracy and air pressure modeling in dynamic simulation environments.
- Supported validation of composite material behavior models to improve predictive crashworthiness.

Education

Cranfield University

MSc by Research in Manufacturing Jan 2023 – Oct 2024

Thesis: *Understanding and Improving the Inherent Strain Method for Mechanical Analysis of WAAM*

- Developed novel tools to predict distortion and residual stresses in additive manufacturing.
- Contributed to the NEWAM project focusing on Ti6Al4V aerospace components.
- Expanded expertise in metal additive manufacturing and multi-scale materials modeling.

Birla Institute of Technology and Science (BITS), Pilani

B.E. Mechanical Engineering , First Class Aug 2017 – Jun 2021

CGPA: 7.71 / 10

Technical Skills

CAD & Design: CATIA V5, Siemens NX, Fusion 360
Simulation: ABAQUS, LS-Dyna, NASTRAN, ANSYS
Programming Languages Python, C++, FORTRAN, MATLAB, Git, Bash, Rust
Scientific Computing: FEniCS, deal.II
Materials Modeling: Solid-State Phase Transformations (SSPT) in steels, Crystal Plasticity Finite Element Method (CPFEM) fundamentals
Analysis: FEA, Residual Stress, Fatigue Life, LTCA
Manufacturing: Wire Arc Additive Manufacturing (WAAM), GD&T, Tolerance Stack-up, Rapid Prototyping
Characterization & Tools: 3D Scanning, SEM, XRD, EBSD, Thermal Imaging

Additional Skills

- Strong analytical and problem-solving skills in multi-scale materials and manufacturing processes.
- Effective communicator with experience presenting complex research to multidisciplinary teams.
- Skilled in technical report writing and documentation with attention to detail.
- Adaptable and quick learner, thriving in research and industrial environments.

Awards

- **AIAA/USU SmallSat Travel Award** – Sponsored by Blue Origin for conference presentation.

Publications

Full list available at: https://sundar.guru/publications

References

Available upon request.

Volunteering

NSS BITS Pilani Jan 2018 – Dec 2018

- Tutored underprivileged teenagers enrolled under India's Right to Education Act.
- Assisted in fundraising and donation drives for student scholarships.