

Sundar Gurumurthy

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Professional Summary

Mechanical Engineer and Computational Scientist with 2.5+ years of experience in **CAE, structural mechanics, and engineering software development**. Skilled in **FEA (static/dynamic, fatigue, thermal, modal), first principles engineering, and computational automation**. Experienced with **Python, C++, MATLAB, FORTRAN**, and proficient in **CI/CD pipelines, deal.II, and GUI development (Qt6/Tkinter)**. Proven ability to **translate requirements into load cases, build validated models, and deliver compliance evidence**. Eligible to work in the UK on a **Graduate Visa until October 2026** (after which I qualify for **new entrant points** under Skilled Worker).

Work Experience

Research Assistant

Cranfield University, UK

Jun 2024 – Present

- Developed **thermo-mechanical FEA workflows** for additive manufactured aero-engine components (WAAM casings).
- Created new algorithms for **heat source modelling** in FORTRAN.
- Designed and maintained **Python/C++ toolchains** for laser-scan analysis and FEA automation, used for **simulation validation and compliance**.
- Conducted **static, dynamic, fatigue, and thermal analyses** in ABAQUS and deal.II; correlated models with **3D scanning, XRD, SEM, and thermal imaging**.
- Built **C++ user subroutines** and **Python CI/CD workflows** for solver automation and result traceability.

Graduate Engineering Trainee

Sona Comstar, India

Jul 2021 – Jul 2022

- Designed **drivetrain and e-axle components** using Siemens NX, performing fatigue, tolerance, and lifecycle analyses.
- Created **Python and VBA automation scripts** for CAD/FEA integration (NX and Simcentre Nastran).
- Delivered **S–N curves, LTCA, and gear analysis**, applying **first principles and simulation correlation**.

Student Trainee – Crash Structures

Mercedes-Benz R&D India

Feb 2021 – Jun 2021

- Built **LS-Dyna crash and composite models** of fibre-reinforced tyre–rim assemblies.
- Automated **meshing and preprocessing** via Python–ANSA macros.
- Gained experience in **modal/dynamic behaviour** and **simulation validation with experimental data**.

Education

MSc by Research in Manufacturing

Cranfield University, UK

Jan 2023 – Oct 2024

Thesis: *Improving the Inherent Strain Method for WAAM Simulation*

- Reduced distortion prediction error from 14% → 3% via algorithmic optimisation.
- Applied **thermo-mechanical modelling, fatigue life estimation, and experimental calibration** for aerospace structures.

B.E. Mechanical Engineering

BITS Pilani, India

Aug 2017 – Jun 2021

- CGPA: 7.71 / 10 (First class)

Technical Skills

- **Simulation & CAE:** ABAQUS, LS-Dyna, MSC Nastran/Patran, ANSA, ANSYS; static/dynamic FEA, fatigue, modal, NVH, thermal-mechanical coupling, composites
- **Programming & Automation:** Python (NumPy, SciPy, pandas, CI/CD automation), C++ (deal.II, Abaqus subroutines), FORTRAN, Rust, Bash, Git
- **CI/CD & Workflows:** GitLab CI/CD, GitHub Actions, HPC job schedulers (SLURM), unit/versioning (UV) for Python projects
- **GUI Development:** Qt6, Tkinter for engineering applications
- **CAD & Design:** Siemens NX, CATIA V5, Fusion 360; GD&T and tolerance analysis
- **Manufacturing:** Welding & WAAM (PTA, MIG, CWGMA, Laser), Forging, Machining
- **Validation Tools:** 3D Scanning, XRD, EBSD, Thermal Imaging

Additional Skills

- Strong **documentation and reporting** for compliance and design reviews
- Mentoring and training students in **simulation and automation**
- Adaptable to **multi-sector engineering** (aerospace, automotive, energy, manufacturing)

Awards

- **AIAA/USU SmallSat Travel Award** – Sponsored by Blue Origin

Selected Projects

Rapid Simulation of WAAM of Al-Mg-Sc Alloys for launch vehicles

Cranfield University, UK

Sep 2025 – Present

- Developing rapid prediction FEA models for aluminium alloy WAAM to predict cracking and defects in weld beads.

Python library for tolerance and process variation analysis of laser scanned components

Cranfield University, UK

Jul 2025 – Present

- Developing a comprehensive Python library for quality control and process window analysis with laser scan point clouds.

Thermal and microstructural analysis of WAAM for aero-engine components

Cranfield University, UK

Oct 2024 – Present

- Predicting thermal profiles and microstructure evolution in WAAM components using FEA.

Publications

Full list: <https://sundar.guru/publications>

References

- **Dr. Pradeptta Taraphdar**, Manufacturing Research Engineer, Jaguar Land Rover
pkumarta@jaguarlandrover.com – Okay to contact immediately
- **Dr. Yongle Sun**, Lecturer, Cranfield University
yongle.sun@cranfield.ac.uk – Do not contact without asking