SAYURI KOLEKAR

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EDUCATION

Carnegie Mellon University **Aug 2024 – May 2026**
Master of Science in Material Science and Engineering. **CGPA 3.5/4.0**
Relevant coursework: solidification process, Finite Element Analysis, HackerFab, Metal environment reaction, Processing of Semiconductors and thin films.

Pillai College of Engineering, Mumbai University, India **Jun 2020 - May 2024**
Bachelor of Technology in Mechanical Engineering
specialization in Vehicle systems **CGPA 8.5/10**

SKILLS

Technical -**Materials Characterization**, **Failure Analysis, Experimental Design, Microstructural Analysis, Surface Preparation,** Thermal Analysis, Structural Analysis, **PID Control, Thermal Profiling, Optical Microscopy** Deposition (CVD, PVD)**, SEM, EDS, Optical Microscopy,** Thin Film, Process Optimization, Process Troubleshooting, GPC Analysis, 3D printing, Laser Cutting.
Software - Solidworks, Ansys, Crystal Maker, Thermo-calc, Quickcast, CorelDraw, MS Office, FactSage.

EXPERIENCE

Carnegie Mellon University | Prof. Chris Pistorius | Research Assistant ***Jan 2025 - Present***

- Conducting **induction-furnace experiments** on **electrolytic iron** to analyze Slag-metal reactions behavior and impurity transfer mechanisms relevant to **ladle refining in steelmaking**.
- Performed **tensile and hardness testing** along with optical microscopy, SEM and **Nital/Picric acid etching** to evaluate microstructure, impurity effects and Inclusion control.
- Analyzing production data to identify how process settings affect **iron quality** and to evaluate whether the **CO_2-free electrowinning process** can be scaled for industrial use.

Carnegie Mellon University | Prof. Chris Pistorius | Research Assistant ***May 2025 - Present***

- Conducting experiments on heat transfer through **solidified mold flux** under continuous casting conditions.
- Implemented **PID-controlled heating profiles** to maintain stable melt temperatures.
- **Integrating a motorized system** to control vertical probe positioning and **maintain precise probe placement** during heat transfer experiments.

Carnegie Mellon University | Scanning Electron Microscopy (SEM) Training ***Mar 2025***

- Completed formal SEM training and performed **SEM-based characterization** to evaluate thin-film growth, **defects**, and **failure modes**.
- Applied EDS and XRD techniques to analyze **surface composition** and understand process variables influencing material performance.

Carnegie Mellon University | HackerFab ***Jan 2026 - Present***

- Developed and optimized ALD thin-film processes for ZrO_2 and HfO_2 (ITO in progress) by tuning temperature, pulse–purge sequences, carrier-gas flow, and chamber pressure to ensure self-limiting growth.
- Verified ALD growth via linear GPC analysis and assessed thickness uniformity across 4-inch wafers to ensure film quality and yield.
- Operated and troubleshot vacuum deposition systems with MFCs, pneumatic valves, heater controls, and safety interlocks.

ARAI (Automotive Research Association of India) | Intern – Engine Development Lab ***Feb 2024 - Apr 2024***

- Conducted dynamometer-based optimization testing on heavy-duty and off-road engines.
- Performed emissions diagnostics and failure analysis for system optimization.
- Performed **data analysis** and **trend reporting on (SCR)** for NOx reduction, ensuring compliance with regulatory standards.

Design and Develop Plantation Panels to Reduce the Emissions from the Vehicles | Academic Research **May 2023 - May 2024**

- Developed an algae-based live panel - an active air-filtration system to reduce exhaust emissions.
- Designed the panel containing a 3D Tesla valve(with 94% accuracy), a one-way valve without mechanical moving components.
- Presented a research paper for the same in Conference on Technologies for Future Cities-2023.

Maruti Suzuki | Maintenance and Repair Technician Intern | Mumbai, IN ***Jun 2022 - Jul 2022***

- Performed engine dismantling and analysis, diagnosing mechanical failures, honing expertise in engine systems.
- Learned basic vehicle maintenance on the service floor while troubleshooting engine issues.

Vanguard Racing Team, Powertrain Engineer | Navi Mumbai, IN ***May 2021 - May 2023***

- Specialized in powertrain systems, covering fundamental calculations, precision design, and the manufacturing of gears, shafts, and casings.
- Gained extensive knowledge of drivetrain components, contributing to accurate calculations and the efficient design and manufacturing of powertrain systems.

LEADERSHIP

- Acted as the Secretary of the ISHRAE committee, improved communication and organizational skills by hosting events, mentoring students, organizing seminars, K12's and coordinating industrial visits.