

Rajat Agrawal | Curriculum Vitae

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Multidisciplinary engineer with a strong analytical aptitude, I am seeking a challenging position in a research-intensive environment where I can apply my knowledge and expertise. Through my academic pursuits and professional engagements, I have gained extensive theoretical and practical exposure to various aspects of mechanical engineering, including production, manufacturing, and product design. I possess exceptional communication skills, which enable me to collaborate effectively with colleagues from diverse backgrounds and work towards advancing scientific understanding and finding innovative solutions to real-world problems.

Technical skills

- **Industrial Software Skills:** PTC Creo, SolidWorks, AutoCAD Mechanical, Ansys Mechanical, MathCAD, Robot Operating Systems (ROS), ArduPilot, PX4, MS Office products.
- **Socio-Business Skills:** Presentation, collaboration, and teamwork.
- **Miscellaneous Skills:** Mechanical part design, designing flexible and unconventional manufacturing systems, writing detailed, organised, and structured reports.

Work Experience

- **Indian Institute of Science Education and Research Bhopal** **Bhopal, India**
Project Associate-I *August 2021–Present*
 - Currently working on a SERB-funded project titled "Design and Development of Autonomous Surface Vehicle for Bathymetry Applications" under the guidance of Dr. Sujit P.B.
 - Designing and developing an autonomous electric rickshaw for sustainable and eco-friendly transportation in urban India.
 - Working with the Central Institute of Agriculture Engineering (CIAE) to create an Autonomous Weeder that uses AI, sensors, and cameras to detect and remove weeds from crops without damaging them, by employing advanced algorithms and precision tools.
 - Designed and manufactured precise wafer probes for micro-level examination of flexible integrated circuits with minimal negative impact on the device under test (DUT) by utilizing 3D printing, tungsten pins, and a customized mechanical structure.
 - Set-up an agile and low-cost indoor autonomous swarm test-bed with multiple quad-copters to facilitate the testing of algorithms for autonomous guidance strategies.
 - Built and improved an autonomous off-road rover named 'Hound' by establishing electrical connections, addressing mechanical issues, and integrating computer vision sensors.
- **Indian Institute of Science Education and Research Bhopal** **Bhopal, India**
Project Associate-I *December 2020–April 2021*
 - Prototyped a portable low-cost Oxygen Concentrator device as a part of IISER Bhopal's efforts towards handling COVID-19.
 - 3D model optimization and slicing for 3D print production with 3D printer hardware including FDM, SLA technologies.

- **Bharat Heavy Electricals Ltd.** **Haridwar, India**
Contract Design Engineer *December 2019–December 2020, March 2019–May 2019*
 Worked in association with the Indian Mission Project of "Advanced Ultra Supercritical (AUSC) 800MW Steam Turbine" in the Research and Development group of Steam Turbine Engineering (STE) Department.
 - Carried out Fatigue Analysis (Low Cycle Fatigue) of High Pressure (HP) turbine based on Alloy 625 and GX12 Materials with operating Parameters of 710°C Temp. and 300 Bar Pressure in **Ansys Mechanical**.
 - Created the Dimensional Drawings, Main Assembly Drawing, Part Drawings and the complete Bill of Materials for Turbine Casings, Pedestals and its assembly components in **PTC Creo as well as in Autodesk AutoCAD**.
 - Designed 3D CAD digitization of Turbine Casings, Bearings, Pedestals and its assembly components.
 - Carried out Tolerance Analysis of HP turbine Inlet Connection in **Ansys Mechanical**.

- **Bharat Heavy Electricals Ltd.** **Haridwar, India**
Graduate Apprentice Trainee *March 2018–Feb 2019*
 Underwent Apprenticeship Training for one year where I was associated with Indian Mission Project of "Advanced Ultra Supercritical (AUSC) 800MW Steam Turbine" in Research and Development group of Steam Turbine Engineering (STE) Department.
 - Carried out Coupled Structural and Thermal FEA in Steady-State and Transient Conditions on Turbine Equipment's such as Inner Casing, IP Inlet Connections etc. and to optimize the generated results.
 - Managed all phases of the design process for a multitude of products, components, parts, assemblies and sub-assemblies, including drafting, dimensioning, tolerance, prototyping and documenting results.

- **Vivetto Systems Pvt Ltd.** **Mandsaur, Madhya Pradesh, India**
Site Engineer *Dec 2016–June 2017*
 Wad worked with Vivetto Systems Private Limited, Gurgaon as a Site Engineer at NTPC's 250 MW Solar Power Plant.
 - Follow up with Supervisors and check completion work and timely raise inspections and coordinate with consultant/client for approval.
 - Before consultant/client inspection, conducting internal inspections for MEP works and reporting to concerned project supervisor for rectification of works.
 - Responsible for incoming materials inspection along with a client representative.
 - Ensure all logs are updated, daily monitoring the Project Activities.

Publications

- Pranav Niturkar, Pallov Anand, Swaraj Nistane, **Rajat Agrawal**, Manav Mishra, A. Pedro Aguiar and P. B. Sujit. "A Lyapunov Vector Field-Based Guidance for Cooperative Standoff Target Tracking with Collision Avoidance" (Submitted at IEEE Conference on Decision and Control (CDC 2023)).
- Pallov Anand, Pranav Niturkar, A. Pedro Aguiar, **Rajat Agrawal**, Manav Mishra and P.B. Sujit. "Finite-Time Cooperative Stand-off Target Tracking in The Presence of Wind" (Submitted at IEEE Control Systems Letters (L-CSS)).
- Raghav Thakar, **Rajat Agrawal** and Sujit PB. "A COLREGs-Compliant Conflict Resolution Strategy for Autonomous Surface Vehicles" (Submitted at International Conference on Intelligent Robots and Systems (IROS)).
- Manav Mishra, Prithvi Poddar, **Rajat Agrawal**, Jingxi Chen, Pratap Tokekar and P.B. Sujit. "Multi-Agent Deep Reinforcement Learning For Persistent Monitoring With Localization Constraints" (To be Submitted at IEEE Transactions on Automation Science and Engineering).

- **R. Agrawal**, P. Poddar & P.B. Sujit. "Modelling the accuracy and precision of swarm localization using Lighthouse Positioning System and Crazy-flies" (To be Submitted at IEEE Robotics Automation Magazine).

Education

- **Dr A.P.J. Abdul Kalam Technical University, Uttar Pradesh** **Mathura, India**
Bachelor of Technology in Mechanical Engineering , 68.66 % *2012–2016*
- **Amarnath Vidya Ashram Sr. Sec. School** **Mathura, India**
AISSCE, CBSE, Class XII, 69.16% *2012*
- **St. Dominic's Sr. Sec. School** **Mathura, India**
AISSCE, CBSE, Class X, C.G.P.A 6.6 *2010*

Projects

- **B.Tech Project:** '*Analysis of Advance Aerodynamics Changes (GENERIC BUMP) in Aerospace Industry Using CFD*'

I was part of a team whose aim was to investigate the effects of generic bump in a fighter aircraft and its application as a boundary layer diverter (BLD) and compression surface for a Diverterless Supersonic Inlet (DSI). The task was to divert as much of the boundary layer as possible or prevent the boundary layer from entering the inlet of an aircraft by using generic bumps. Properties such as pressure recovery, boundary layer diversion, surface flow, change in Mach number and mass flow are the major parameters that are being analysed.

[Link to the Project Presentation](#)