Sanad Shaha

BS Electronics and Communication Engineering
Indian Institute of Science Education and Research, Bhopal

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Homepage
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Education

Degree	Institute	CGPA/Percentage	Year
B.S. Electronics and Communication	Indian Institute of Science Education and Research, Bhopal	8.39/10	2022-Present
Senior Secondary	Alard Public School, CBSE Board	82.0%	2022
Secondary	Spicer Higher Secondary School, ICSE Board	92.83%	2020

Experience

Position	Institute/Company	Year	Advisor
Research Intern	Indian Institute of Technology, Kanpur	May 2025 - July 2025	Dr. Soumya Ranjan Sahoo
Research Intern	Indian Institute of Science Education and Research, Bhopal	March 2024 - Present	Dr. Arijit Sen

Projects

- **Three Dimensional UAV Formation Control on Time-Varying Inclines** *May 2025 - July 2025*
  Research Project / Dr.Soumya Ranjan Sahoo and Dr.Arijit Sen
  – Formulated a nonlinear Lyapunov-based control law to stabilize UAV formation geometry, enabling precise 3D tracking of moving target on surfaces with time-varying inclination.
  – Proved the asymptotic stability of the controller mathematically and validated its performance via extensive MATLAB simulations.

- **Cooperative Localization to Maximize Target Information in Three Dimensions** *March 2024 - Present*
  Research Project / Dr.Arijit Sen
  – Architected a Cooperative Localization framework for 3D target estimation.
  – Derived non-linear control laws that drive a multi-UAV agents into optimal geometric configurations by maximizing the Fisher Information Matrix (FIM).
  – Currently implementing the closed-loop simulation in MATLAB to benchmark the proposed strategy against static formation baselines.

- **Safe and Autonomous Docking of an Autonomous Underwater Vehicle** *Sept 2025-Nov 2025*
  Intelligent Robotics ECS 418 Course Project/ Prof.Sujit PB
  – Investigated Safety-Critical Control methods to solve the constrained docking problem for underactuated AUVs.
  – Formulated a non-linear control framework integrated with a extended kalman filter for precise estimation of docking in realistic conditions.
  – Validated the controller in MATLAB simulations, demonstrating that the AUV respects safety constraints even when the nominal controller attempts to violate them, ensuring collision-free docking.

PUBLICATIONS

- **S. Shaha, A. Sen and S.R. Sahoo, Three Dimensional UAV Formation Control on Time-Varying Incline (under preparation)**
- **S. Shaha, G.V.S. Sriram and A. Sen, Cooperative Localization to Maximize Target Information in Three Dimensions using Agents in Formation (under preparation)**

Technical Skills

- **Programming**: Python (Numpy, Matplotlib), LaTeX
- **Software**: MATLAB, Simulink, AutoCAD, LTSpice

Key Courses Taken

Intelligent Robotics, Linear Control Systems, Optimization Techniques, Robotic Perception, Signals and Systems, Digital Circuits and Systems

Awards

- **IOQM Awardee**, Qualified Indian Olympiad Qualifier in Mathematics *2021*
- **Indian Control Conference 11 Student Support Award**, Held at IISc Bengaluru *2025*
- **Indian Control Conference 10 Student Support Award**, Held at IISER Bhopal *2024*
- **SURGE Internship Program, IIT Kanpur**, *2025*