

Sayan Mandal

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Junior Undergraduate in Aerospace Engineering

Education

- 2015–present **B.Tech, Third Year UG, Aerospace Engineering, IIT-Kharagpur, CGPA - 8.16/10**, IV-Sem.
- 2015 **All India Senior School Certificate Examination, Atomic Energy Central School, Jaduguda, 94%.**
- 2013 **Secondary School Certificate, Atomic Energy Central School, Turamdih, CGPA - 10/10.**

Experience

- May-Jul 17 **Summer Research Internship, Indian Institute of Sciences-Bangalore, Aerospace Engineering, under the guidance of Dr. S N Omkar, Chief Research Scientist,**
- **"Design, Analysis and Development of Engine mounts for a Hybrid UAV concept"**: Designed Hybrid Engine Mount to decrease vibrations for better control and reducing sensor errors. Structural, Modal and Harmonic Analysis done in ANSYS and Vibration control in Matlab,
 - **"Design and Analysis of a high speed UCAV"**: Designed Jet-engine propelled UCAV with payload greater than 10kg and speed greater than 200mph for high range and endurance. Aerodynamics analysed in XFLR5, Structure made and analysed in CATIA and Vectric Aspire, Control system implemented for stability in MATLAB.

Research Groups

- Jul17-present **Founder/Team Leader, Hybrid UA-UV (Unmanned Aerial - Underwater Vehicle) Team of IIT-Kharagpur, Aerospace Engineering, Guides: Dr.Sandeep Saha, Dr.D K Maiti, Dr.Sudip Misra, Dr.Sikha Hota,**
- **Control Systems**: To model, develop and implement control algorithms for guidance and navigation for stable UAV transition between the media.
 - **Aerodynamics and Mechanical Systems**: To design and analyze the bot such that it can conform to variation in aerodynamic and hydrodynamic characteristics of the environment.
- Feb17-present **Controls Team Member, Team AUV, Autonomous Underwater Vehicles Research Group of IIT-Kharagpur, Mechanical Engineering, Guides: Dr.C S Kumar, Dr.Vishwanath Nagarajan,**
- Designed and optimized Control Systems in MATLAB and Firmware in ROS to implement in AUV.
 - Developed & implemented SLAM, State estimation, Localization, Fuzzy & nonlinear control modules.

Research Projects

- Jul17-present **Development of Transition Control and Dynamic Modelling for Hybrid UA-UV, under the guidance of Dr.Sikha Hota,** Developing nonlinear dynamic models and investigating various transition algorithms for the bot, Simultaneously using MATLAB and ROS to implement SLAM, LQG, Fuzzy controls, etc.
- Apr17-present **Modelling a stable path following control algorithm for AUV, under the guidance of Dr.Vishwanath Nagarajan,** Working on Acquisition and Filtering of data from various sensors of AUV, Implementing PID/ other control systems for stability of the same.
- Jul17–present **Investigation and Control of Aerodynamic Forces on Morphing Wings, under the guidance of Dr.Sandeep Saha,** Investigating aerodynamics and control laws of servo-actuated morphing wing with intrinsic multidisciplinary attitude involving structure, actuation, sensing and control.
- Jul17–present **Development of an autonomous, affordable Room Cleaning Robot, Product Development,** under the guidance of **Dr.Pranab K Dan,** Developing a robot to vacuum a room autonomously at an affordable cost for Indian households, sponsored by the **Ministry of Human Resources and Development.**
- Sep16-Dec16 **Development of Flying Wing UAV,** The project involved modeling and construction of a Fixed-wing RC-plane, The modeling was done in XFLR5 and CATIA.

Grants and Fellowships

- Jul17-present **SRIC grant under Student Innovation Scheme (SGSIS), Indian Institute of Technology, Kharagpur,** Endorsed as Co-PI of **"Development of Hybrid Unmanned Aerial-Underwater Vehicle"**, by four esteemed professors **Dr.Sandeep Saha(PI), Prof.D K Maiti(co-PI), Dr.Sudip Misra(co-PI), Dr.Sikha Hota(co-PI),** Grant of about \$15,600 for duration of 2 years. **(Application Status: Pending).**
- 2015 **Kishore Vaigyanik Protsahan Yojana Fellowship, Indian Institute of Sciences,** Recipient of **KVPY**, a National Fellowship Program funded by Department of Science and Technology (Govt. of India).

Conferences

- Aug 17 **"Scope of UAVs in India," at Confederation of Indian Industry-Manufacturing Excellence, Speaker.**

Competitions

- Jan17-Feb17 **Honeywell Aerospace Design Challenge - 2017**, *Designed Navigation System to project Flight Trajectory using Flight Management System and User Haptic Feedbacks during emergencies (in solidworks).*
- Nov16-Feb17 **Kryotech, Ecozen IIT National Product Design Competition**, *Designed a Cryogenic Tank (unpowered) capable of keeping vaccines at 275K with a tolerance of (+/-) 1Kelvin. (Finalist).*
- Nov16-Jan17 **BOEING IIT Aeromodelling Competition, KSHITIJ**, *Made a robust RC motor powered Plane using balsa with proper analysis in XFLR5 and CATIA V5.*
- Mar11-Dec11 **Automated Agricultural Devices, All India Science Exhibition by DAE**, *Designed high end devices with user friendly interfaces to assist in agricultural activities. (Consolidation prize).*

Certifications

- October 2015 **Code.fun.do Hackathon, Microsoft Boot Camp for App Development.**
- May 2012 **All India Junior Science and Maths Olympiad by Homi Bhabha Centre for Science Education.**

Skills

- Softwares **MATLAB|Simulink|Ansys|CATIA v5|Solidworks|XFLR5|Vectric Aspire|MSC Nastran|Autodesk Fusion 360|Inventor|Visual Studio|Microsoft Office Suite|Adobe Suite.**
- Libraries **ROS Gazebo|Simulink|OpenCV.**
- Programming **MATLAB|C/C++|Python|ROS|LATEX|HTML/CSS|XAML.**
- Languages **English(Advanced)|Hindi(Intermediate)|Bengali(Native)|French(Basic).**

Relevant Degree Curriculum

- Ongoing **Mechanics of Flight, Aircraft Stability and Control, Computer Application in Aerospace Engineering, High-Speed Aerodynamics, Aerospace Propulsion, Aerospace Structural Analysis.**
- Completed **Introduction to Flight Vehicle Controls, Dynamics for Aerospace Engineers, Probability and Statistics, Introduction to Aerospace Structures, Low-Speed Aerodynamics.**
- Ongoing MOOCs **Control of Mobile Robots(GeorgiaTech), Robotics(U@Penn), Convex Optimization(Stanford), Neural Networks for Machine Learning(U@Toronto).**

Positions of Responsibility

- Jul17-present **Coordinator** of Tech Events – Product Design and Ad Design.
- Oct16-Apr17 **Secretary Technology** at Lala Lajpat Rai Hall of Residence.
- Jan16 **Volunteer** at Spring Fest – Annual Socio-Cultural Fest of IIT Kharagpur.
- May12-Mar13 **House Captain** at Atomic Energy Central School, Turamdih.

Achievements and Additional Experience

- **All India Rank- 3013(Gen.)** in JEE Advanced 2015 Examination among 1.5 million candidates (*99.81 percentile*).
- **All India Rank- 226(Gen.)** in WBJEE-2015 among 0.3 million candidates (*99.85 percentile*).
- **All India Rank- 194(Gen.)** in National Science Talent Search Examination 2015 conducted by Unified Council.
- Qualified for **All India Junior Science and Maths Olympiad-2013** conducted by BARC, Mumbai.
- **First position** in All India Inter AECS Science Quiz by Homi Jehangir Bhabha Atomic Research Centre in collaboration with BARC, Mumbai.
- **Best Student Award** at Atomic Energy Central School, Jaduguda - 2015

Extracurricular Activities

- Won **Silver** in Open IIT Dramatics among 12 teams which participated.
- Former member of Druheen, Technology Dramatics Society of IIT-Kharagpur.
- Won **Gold** in Free Style Swimming at zonal level in Tata Steel Sports-2014.