

RESUME

PERSONAL DETAILS

Name: Saptarshi Bandyopadhyay
Date of Birth: 23rd October, 1987

Educational Qualifications

Examination	Institute	Year	CPI/%
Dual Degree (Bachelor & Master of Technology)	Department of Aerospace Engineering, Indian Institute of Technology Bombay	2010	8.83/10
GRE: 1450/1600	Quantitative: 800/800	Verbal: 650/800	Analytical Writing: 4.5/6.0
TOEFL: 113/120	Reading: 29/30	Listening: 27/30	Speaking: 28/30 Writing: 29/30

SCHOLASTIC ACHIEVEMENTS

- Won Gold Medal for India in 9th International Astronomy Olympiad held in Ukraine [2004]
- Won Silver Medal in the 6th National Astronomy Olympiad [2004]
- Won Gold Medal in the National Physics Olympiad [2005]
- Won Gold Medal in the International Competition for Schools (Mathematics) by the University of New South Wales (UNSW), Australia [2000]

PUBLICATIONS AND GUEST LECTURES

- Bandyopadhyay S. et al., "Robust Control and Path Planning Algorithms for Small Satellites in Formation Flying Missions", *International Astronautical Congress*, Paper ID: IAC-09-B4.6A.3, Daejeon South Korea, October 2009 organized by International Astronautical Federation. The manuscript has been invited for publication in *Acta Astronautica*.
- Bandyopadhyay S. et al., "Introduction to Pratham, IIT Bombay's Student Satellite Project", *Indian Small Satellite Systems Conference*, Bangalore, India, April 2010, organized by Indian Space Research Organisation (ISRO).
- Bandyopadhyay S. et al., "Development of Sliding Mode Controller for Small Satellite in Planetary Orbital Environment Formation Flying Missions", *International Astronautical Congress*, Paper ID: IAC-10-C1.5.6, Prague, Czech Republic, September 2010 organized by International Astronautical Federation.
- Bandyopadhyay S. et al., "Measurement of Total Electron Count of the Ionosphere and the Social Goal of Pratham, Indian Institute of Technology Bombay's first Student Satellite" *International Astronautical Congress*, Paper ID: IAC-10.B4.2.4, Prague, Czech Republic, September 2010 organized by International Astronautical Federation.
- Bandyopadhyay S. et al., "System Engineering and Integration of Pratham, Indian Institute of Technology Bombay's first Student Satellite", *International Astronautical Congress*, Paper ID: IAC-10.B4.1.8, Prague, Czech Republic, September 2010 organized by International Astronautical Federation.
- Delivered a Guest Lecture on Pratham at the *National Small Satellite Symposium* of the *SEDS India National Conference* at Vellore, India 2009.
- Delivered a Guest Lecture on 'System Engineering of Pratham' in the *National Systems Conference* at Roorkee, India, 2008.
- Bandyopadhyay S. et al., "Path Planning and Robust Control of Satellite Formation Flying and Reconfiguration", submitted to *AIAA Journal of Guidance, Control, and Dynamics*.

PROJECT MANAGER and SYSTEM ENGINEER of

PRATHAM, IIT BOMBAY STUDENT SATELLITE PROJECT

[Aug 2007 to present]

www.aero.iitb.ac.in/pratham

- Co-founded the 1st Student Satellite Project of IIT Bombay support from Indian Space Research Organization (ISRO) and Leading a team of 40 students. Pratham is in the Detailed Design Phase and will be launched in March 2011.
- Responsible for the System Integration and Quality Assurance of the Mission.
- Interactions with various organization of ISRO for the procurement of parts, manufacture of solar panels and batteries, testing and launch of Pratham.
- Discussions with scientists from National Atmospheric Research Laboratory, India and Institut de Physique du Globe de Paris, France for the use of the TEC data of Pratham.
- Captured System and Sub-System Requirements and generated Critical Parameters for all the 10 Sub-Systems.
- Maintained Weight, Power and Data Budget and retained 15-20% margin in all the Budgets.
- Developing the Hardware in Loop Simulator (HILS) along with the On Board Computer Sub-System, for testing the electrical Sub-Systems of the integrated Satellite.
- Conducted 2 national level workshops along with the *Communication and Ground Station Sub-System*, to help students from 11 universities to build low cost (INR 25000, \$500) Ground Stations for Pratham in their own universities.

- Worked with the *Thermals Sub-System* in establishing a Virtual Laboratory, by web-enabling their simulations, that is accessible to students all over the country. This endeavor is supported by the Center for Distance Engineering Education Programme, IITB and the Ministry of Human Resource and Development (MHRD).

ACADEMIC PROJECTS

Masters Thesis

[Jan 2009 to present]

Guides: Prof. B. Bandyopadhyay, Dr. C. Saaj (SSC)

Topic: Position and Attitude Control of Satellites in Formation Flying Mission using Sliding Mode Control

- Project funded by the Royal Society, UK and in collaboration with Surrey Space Center, UK.
- Implemented the Artificial Potential Field concept for navigation and Sliding Mode Control for controlling the motion of Satellites in a Formation Flying Mission.
- Innovative results of Position Control for a Formation of Satellites in Deep Space and in Planetary Orbital Environment have been published in IAC 2009 and 2010. A couple of journal papers have been submitted.
- Pioneering work on Decoupling Satellite Formation Flying from Orbital Dynamics using SMC and APF has been published.
- Developed a back-up Attitude Control algorithm for Pratham using SMC.

Junior Year Thesis (Seminar)

[Spring 2008]

Guide: Prof. S. P. Bhat

Topic: Passive Stabilization of Satellites using Gravity-Gradient Booms

- Carried out a detailed literature survey of the mathematical modeling of the gravity gradient torque and the stability and accuracy it offers to the Satellite under certain conditions.
- Carried out a Mathematical Analysis of the Satellite Capture Problem, i.e. the conditions under which the Satellite is captured in the stable region, using the Energy method.

Other Projects

- Hypersonic Flow Simulation over **Mercury Re-entry Capsule** [Apr 2008]
- **Reducing Overshoot** and **Settling-time** of 3 axis Momentum Wheels for a step input, using PID Controllers. [Apr 2008]
- **Aeroelastic Analysis** of the Swept Back Wings of the XB-47 bomber airplane using Beam Theory (Structures) and Strip Theory (Aerodynamics). [Apr 2009]
- Conducted observations of the Nova outburst of the Rho Ophiuchi star with the **Giant Meterwave Radio Telescope (GMRT)** at the Visiting Student Research Programme at National Center for Radio Astronomy (NCRA), Tata Institute of Fundamental Research (TIFR), Pune. [July 2006]

EXTRA CURRICULAR ACTIVITIES

- Won 2nd place in the Finals of Junkyard Wars, where the task was to make a manually driven car from bicycles. Also stood 1st among 60 teams in the Qualifying Round, where the task was to make the fastest sail boat that could carry 1 kg load. (Techfest, IITB) [Jan 2008]
- Awarded Best Design and reached the Quarter Final Stage of Grip among over 120 teams, where the task was to make a car that could hang from intersecting GI pipes, move on them and pick up magnetic blocks lying on the ground. (Techfest, IITB) [Jan 2006]
- Built an Autonomous Line Follower for Umesh Mashruwala Innovation Cell (UMIC), IITB. [Dec 2005]
- Won 1st place in Product Design for designing an innovative fruit seller's cart. (Techfest, IITB) [Jan 2010]

REFERENCES

Prof K. Sudhakar	Professor, Department of Aerospace Engineering, IIT Bombay [Phone: +91-22-27567111, sudhakar@aero.iitb.ac.in]
Prof P. M. Mujumdar	Professor, Department of Aerospace Engineering, IIT Bombay [Phone: +91-22-27567116, mujumdar@aero.iitb.ac.in]
Prof. H. Arya	Associate Professor, Department of Aerospace Engineering, IIT Bombay [Phone: +91-22-27567118, arya@aero.iitb.ac.in]
Prof. B. Bandyopadhyay	Professor, Interdisciplinary Programme in Systems and Control Engineering, IIT Bombay [Phone: +91-22-27567889, bijnan@ee.iitb.ac.in]
Dr. C. Saaj	Faculty of Engineering & Physical Sciences, University of Surrey, UK [Phone: +44-1483-682225, c.saaj@surrey.ac.uk]