KOTWAL ALANKAR SHASHIKANT | **12D070010**
Electrical Engineering | **UG Third Year(Dual Degree)**
Indian Institute of Technology Bombay | **Male**
Specialization: Microelectronics | **DOB: 13/03/1995**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2015	8.92
Intermediate/+2	MSBSHSE	Ratanbai Walbai Junior Science College	2012	93.83
Matriculation	MSBSHSE	SVPT's Saraswati Vidyalaya	2010	95.27

SCHOLASTIC ACHIEVEMENTS AND AWARDS

- **Gold Medal**, International Olympiad on Astronomy and Astrophysics, Brazil, with International **Rank 4** and a Special Prize for Best Data Analysis *[AUGUST 2012]*
- **Bronze Medal**, International Earth Sciences Olympiad, Italy, with **Best Performance** in Hydrosphere and Best Creativity Award for the ITFI *[SEPTEMBER 2011]*
- Selected for Olympiad Orientation-cum-Selection Camps (OCSCs), among the top 30 students in India (Astronomy: 2012 & 2010, Earth Sciences: 2011 & Junior Sciences: 2010 & 2009)
- Secured an **All India Rank of 105** (from a total of 5,90,000 entrants) in IIT-JEE *[2012]*
- Secured the Kishore Vaidnyanik Protsahan Yojana scholarship offered by the Department of Science and Technology, Govt. of India to students interested in pure sciences research *[2010]*
- Recipient of the coveted National Talent Search Exam (NTSE) Scholarship *[2008]*
- Recipient of the **INFOSYS** Award for International Olympiad Medallist twice *[2011, 2012]*
- Secured a medal and a certificate at the IGNOU-UNESCO Science Olympiad in SAARC countries
- Pursuing **Minor** in Computer Science and Engineering

MAJOR PROJECTS

GOOGLE SUMMER OF CODE 2014 *[MAY 2014 – AUGUST 2014]*

Prof. Robert J Brunner and Matias Carrasco Kind, Laboratory for Cosmological Data Mining, UIUC

A NEW PIXEL-LEVEL METHOD FOR ESTIMATION OF PHOTOMETRIC REDSHIFTS

- Developed the software package image-photo-z implementing this new method
- Worked with SDSS photometry data and extracted pixel-level information for training machine learning algorithms – k-nearest neighbour algorithm and trees for photo-z
- Worked on parallel programming and performance enhancement for this method

THE MARS SOCIETY OF INDIA *[MAY 2013 – PRESENT]*

DEVELOPMENT OF A SEMI-AUTONOMOUS MARS ROVER

- Worked on on-board software and controls development for the first Mars Rover prototype
- Working on ROS for on-board controls, autonomous navigation and image processing algorithms for rover guidance

ARKAROOLA MARS ROBOT CHALLENGE 2014

A joint venture of the Mars Society Australia & Saber Astronautics

- Tested the Mars Rover prototype developed by the Mars Society India in the Australian outback
- Participated in a series of exercises in Mars operations research conducted by Saber Astronautics which included simulated extra-vehicular activities in simulated space-suits
- Explored Arkaroola geology and studied its similarities to Martian geology

NATIONAL INITIATIVE FOR UNDERGRADUATE SCIENCE – ASTRONOMY

Organised by HBCSE, Tata Institute for Fundamental Research, India

ESTIMATING PHOTOMETRIC REDSHIFTS USING MACHINE LEARNING TECHNIQUES *[DECEMBER 2012]*

Prof. N. S. Philip, IUCAA

- Estimated Photometric Data from colour index information obtained from SDSS data using machine learning with artificial neural networks and worked on data-set generation

X-RAY STUDY OF X NOR X1 (4U 1630-47) | *Dr. Manojendu Choudhury, TIFR* *[DECEMBER 2013]*

- Analysed statistically timing information from RXTE to detect quasi-periodic oscillations and their possible relation to accretion disk thickening and synchrotron jets
- Fitted the spectra obtained with a thermal and non-thermal power-law distribution to obtain essential system parameters and observed unusual oscillations in the inner radius

OTHER PROJECTS

TEMPERATURE CONTROLLER ON A CPLD | *Prof. Jayanta Mukherjee* *[MARCH 2014]*

- Developed a temperature controller based on a Peltier plate and a p-controller on a CPLD

OPTIMUS DEVELOPMENT BOARD | *Electronics Club, IIT Bombay* *[JULY 2013]*

- Developed libraries for this ATmega32u4 board with functions like analog-digital conversion, pulse-width modulation and timing, resolved bugs and worked set fuse bits of the microcontroller

DESIGN EXPLORATION WORKSHOP | *Innovation Cell, IIT Bombay* *[DECEMBER 2012]*

- Built an innovative system for Wi-Fi tracking of objects in real time using Wi-Fi signal strength

TECHNICAL PROFICIENCY AND RELEVANT COURSES

PROGRAMMING: C/C++, Java, Python, Verilog, HTML, Shell Script, SQL

SOFTWARE PACKAGES: Latex, OpenCV, MATLAB, SPICE Circuit Simulation, EAGLE PCB Design, SolidWorks CAD, AutoCAD, LabView

SCIENCE SOFTWARE: SDSS, Montage, Astropy, SExtractor, Scikit-Learn, HEASoft, Numpy, Scipy and Matplotlib Python packages, GNUPlot, Stellarium

RELEVANT CS COURSES: Discrete Mathematics, Data Structures and Algorithms, Design and Analysis of Algorithms, Embedded Systems, Digital Image Processing

OTHER RELEVANT COURSES: Classical Mechanics I, General Theory of Relativity

POSITIONS OF RESPONSIBILITY

SUBSYSTEM HEAD, THE MARS SOCIETY OF INDIA *[JULY 2014 – PRESENT]*

- Heading Image Processing subsystem which works towards vision-guided activities on the rover
- Co-ordinating and integrate algorithms developed by other subsystems on the central controller

RESOURCE PERSON AND STUDENT FACILITATOR *[MAY 2013, MAY 2014]*

- Selected **twice** as a Student Facilitator and a **Resource Person** for the **Indian Astronomy Olympiad OCSC** (Orientation-Cum-Selection Camp) for mentoring camp students, handling academic and organizational arrangements and aiding in evaluations
- Involved in the selection and rigorous training of the 3 member Indian National team which won **3 Gold Medals** at the International Astronomy Olympiad 2013 held in Lithuania

MENTOR, INSTITUTE TECHNICAL SUMMER PROJECTS *[MAY 2014]*

- Mentored a team to make a holographic mouse using infrared sensors and image processing
- Participated in evaluation of the progress made by the participating teams in the program

WEB ADMIN

- Improving and maintaining the website for The Mars Society India
- Improved and maintained the website for Tinkerers' Laboratory, IITB

COMPETITIONS

- Secured IIT Bombay the second position in the second **Inter IIT Messier Marathon** by putting on board 72 messier objects including the entire Virgo cluster of galaxies *[DECEMBER 2013]*
- Won Celesticon – the Astronomy Quiz conducted by BITS Goa *[FEBRUARY 2013]*
- Won the Freshmen Competition 2012, for selection to the UMIC Team for the ASME Student Design Competition by making a gripping bot which completed a pick-and-place task in 14 sec
- Successfully flew a remote-controlled airplane in the RC Plane competition organized by the Aeromodelling Club, IIT Bombay