# Poruri Sai Rahul

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## Education

- **BS. & MS. in Physics** — Chennai, India
  Indian Institute of Technology, Madras — Aug. 2009 – Present
  - Major: **Physics**; Minor: **Chemistry**
  - **TOEFL**: 110/120 (Reading: 27/30 Listening: 27/30 Speaking: 30/30 Writing: 26/30)
  - Key Courses: Computational methods in Physics, Mathematical Modelling in Industry, Introduction to Atmospheric Sciences, Electromagnetic Theory, Optics & Photonics, Laser Physics and Applications, Introduction to Engineering Optics, Waves & Oscillations, Mathematical Physics II, Atomic & Molecular Physics.
- **12th Grade, Board of Intermediate Education : 92%** — Hyderabad, India
  Narayana Junior College, Hyderabad, Andhra Pradesh. — Jun. 2007 – May 2009
  - Majored in Mathematics, Physics & Chemistry with English & Sanskrit as language subjects.
- **10th Grade, Board of Secondary Education : 91.5%** — Andhra Pradesh, India
  Montessori Public School, Ongole, Andhra Pradesh. — Jun. 1997 – May 2007

## Research Experience

- **Constructing a Tully-Fisher relationship for SAMI galaxies.** — Melbourne, Australia.
  Prof. Jeremy Mould, CAS, Swinburne University of Technology. — Dec 2013 – Jan 2014
  - Reduced and Analysed 3-dimensional Integral Field Spectra of galaxies observed by the SAMI survey for H $\alpha$ emission lines. In-house codes written in python and fortran were used.
  - Queried NED and SDSS DR10, using SQLquery, for galaxy inclinations and apparent magnitudes in the r, i & z bands for galaxies with positive H$\alpha$ detections.
  - Constructed a Tully-Fisher(TF) relation for SAMI galaxies using SDSS DR10 derived r, i & z band absolute magnitudes and FWHM extracted from positive H$\alpha$ detections.
  - Sources of scatter in the TF reln. were studied. Errors in galaxy inclination were observed to be a major source of scatter along side peculiar velocity corrections. Error due to incompleteness of the sample is also a major source of error, especially in our case as the sample size is relatively small.
  - Following the TF reln, we intend to extract velocity dispersion $\sigma$ from the Mg triplet lines using the pPXF package and use $\sigma/V_c$ as a dynamical third parameter to extend the TF reln into a 3D manifold. See Tonini et al. 2014 for reference.
  - 'Star formation rates in SAMI Early Data Release galaxies.' was presented as a poster at the conference 'The Role of Hydrogen in the Evolution of Galaxies'.
- **Colors of 146,659 Quasars in the SDSS DR9.** — Trivandrum, India.
  Prof. Anand Narayanan, Indian Institute of Space science & Technology. — June 2013 – July 2013
  - Reproduced and extended the results of Richards et al. 2001 on the 'Colors of 2625 Quasars from the SDSS DR3' to 146,000 quasars from the SDSS DR9.
  - Queried, using SQLquery and acquired apparent magnitudes and redshift values for the 146,000 values from the SDSS DR9 to produce color-color and color-redshift plots for quasars.
  - Simulated the color-redshift dependence using a Composite Quasar Spectrum from Vanden Berk et al. 2001 and the digital SDSS u, g, r, i & z filter throughputs.
- **Observation of the pulsar PSR B1749-28.** — Ooty, India.
  Ooty Radio Telescope, NCRA-TIFR. — July 2013.
  - Observed the pulsar PSR B1749-28 as part of the Pulsar Observatory for Students program.
  - The pulsar and it's calibrator source were observed for 30 minutes each using the Ooty Radio Telescope at a frequency of 326.5 MHz with a bandwidth of 16 MHz.
  - Raw data was analysed using SIGPROC and properties of the pulsar such as it's period, it's strength/flux and the dispersion measure were estimated and compared with catalogued data.
  - During data analysis, the spectral response of the calibrator was discovered to be non-uniform and reported to the authorities. Coincidentally, it was a problem the observatory was working to fix.
  - Participated in introductory courses on pulsar science.

- **Polarimetric study of the star-forming region Stock 8.** Nainital, India.
  Aryabhatta Research Institute for Observational Sciences. March 2013.
  - Analyzed polarimetric data corresponding to the star forming region Stock 8 in the constellation Auriga. Data was acquired using the ARIES Imaging Polarimeter AImPol at the Sampurnanand 104cm telescope.
  - The amount of polarization caused by dust particles in the star-forming cloud was estimated and the average size of the dust grains in the star forming region was inferred to be 0.58 $\mu$m, which is the galactic average.
  - The magnetic field orientation in the molecular cloud was also studied and found to be parallel to the galactic equator. Probable cluster members were also distinguished from foreground and background stars. Data analysis was done primarily in IRAF.
  - Attended introductory lectures on observational astronomy and astronomical instrumentation over the course of 2 weeks as part "ARIES Training School on Observational Astronomy" program by ARIES.
- **IIST Astronomy & Astrophysics School.** Trivandrum, India.
  Indian Institute of Space science & Technology. Dec 2012.
  - Attended lecture series on stellar formation & evolution, observational astronomy, galactic & extra-galactic astronomy and techniques in astronomy i.e astrometry, photometry, spectrosccopy, polarimetry & interferometry by professors at the Earth & Space Sciences department, IIST.

## Positions of Responsibility

- **Head, Astro IITM** Chennai, India
  IIT Madras Academic years 2010 – 2014
  - Handled the organization of talks on amateur astronomy and observation sessions.
  - As part of a club project, a rudimentary photometry was done of the Algol binary system using the 8-inch telescope on campus and a canon DSLR camera.
  - Organized outreach activities to schools in and around Chennai, to acquaint school students to astronomy and hopefully, and inspire towards pursuing science as a career.
- **Co-Ordinator, Astronomy Workshops** Chennai, India
  Shaastra, IIT Madras Oct. 2010 & Oct. 2011
  - Succesfully conducted workshops on Astro-Photography during Shaastra 2011 & on Telescope making during Shaastra 2010.
  - Lectures and hands-on sessions on Astro-Photography were conducted with the help of renowned astro-photographer, Dr. Suresh Mohan.
  - Theory sessions on the workings of a CCD, hands-on astro-photography sessions and Image processing were conducted over the course of 4 days.
  - At the end of the telescope making workshop, 10 participant teams had built fully operational 4 inch newtonian telescopes with dobsonian mounts.
- **Event Co-Ordinator, EML Team** Chennai, India
  Extra Mural Lecture Team, IIT Madras Academic Year 2010 – 2011.
  - Part of the team that organized lectures by eminent Indians such as Dr. A.P.J Abdul Kalam, Shri N. Gopalaswami, Cmd. C. Uday Bhaskar, Mr. P. Sainath, Mr. Atul Kulkarni.
- **Hostel Co-Ordinator & Counselor** Chennai, India
  Mitr team, IIT Madras Academic Years 2010 – 2014.
  - Co-Ordinated a team of 10 student counselors spread across all years to handle the counsel/facilitate the needs of 120 freshers across all branches, get them acquainted to college life and guide them through the perils of their first year of college.
  - I was previously part of the counseling team as a student counselor for 2 years.
  - As part of the Mitr team, we also organized mock quizzes for the freshers to get acquainted to the exam format.

## Skills

- **Languages:** C, Python, LaTeX, Bash, HTML, CSS, SQLquery
- **Scientific tools:** Matlab, Mathematica, GNUPlot.

## Achievements & Awards

- **SimChamp 2012:** Part of a 3 member team that placed 1st in an Intra-IIT programming contest. The challenge was to simulate the ant colon behavior as factors such as avg. ant age, load bearing capacity, speed of ants and duration between meals were taken into consideration for the simulations.
- **Stress Interview 2012:** Placed 2nd in an event where a panel of alumni put the participant in an interview scenario and judged their performance. The event was part of Deep Woods, the annual cultural festival of the Madras Christian College, Chennai.
- **INSPIRE Scholarship Recipient 2009 – 2011**
- Attended Vijyoshi Camp (Vigyan Jyoti Shibir) '09 held by KVPY during Oct 10-12 '09.
- Ranked **2944 in IIT-JEE '09**, among the top 3% applicants that year.
- Ranked **12009** in AIEEE B.E/B.Tech ỏ9 and **324** in AIEEE B.Arch/B.Planning ỏ9.
- Ranked **4th in '03, 232 in '04, 38th in '05 and 786th in '06** in a State Level Talent Search Exam conducted by the Vishwabharathy Foundation. Ranked **17th in '05** in a State Level Talent Search Exam conducted by the Master Minds Foundation.