

Abhimat Krishna Gautam

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EDUCATION

2010 - [2014]: University of California, Berkeley

Majors: Astrophysics, Physics

(Full list of courses available at www.ocf.berkeley.edu/~abhimat/education)

2006 - 2010: Barrington High School, Barrington, RI

RESEARCH EXPERIENCE

Automated Pipeline for Pulsar Searches — Summer 2011 - Now

I am working with CASPER at Berkeley on constructing an automated pipeline to search for pulsars with the tools in PRESTO. The goals of the pipeline includes taking in raw data, processing the data, and producing a list of periodic candidates and single pulse candidates. I am currently using this pipeline to search for pulsars in the Kepler field of view. Through this project, I have gained experience in working with quantization techniques, removing radio frequency interference, and techniques to search for periodic and transient objects.

Calibration of Sgr A* VLBI Observations — Summer 2011 - Now

I am working closely with Dr. Melvyn Wright to calibrate millimeter VLBI observations of Sgr A*. I have been using the tools in MIRIAD to perform the necessary calculations for the calibration. In addition, I am creating my own scripts that work with MIRIAD to generate required values and plots. Through this project, I have been learning about interferometry and VLBI, and some radio astronomy concepts like correlation and phase differences between multiple antennas.

High Angular Resolution Imaging of Multiple Asteroids — Fall 2010 - Spring 2011

I worked at Berkeley with Dr. Franck Marchis on collecting, processing, analyzing, and organizing observations of multiple asteroid systems. These data were taken from telescopes such as the Keck telescope and the Hubble Space Telescope. As part of the work, I learned about concepts such as Point Spread Functions and Full Width at Half Maximum, and working with these and other data in IDL and PHP. The project was especially interesting for me particularly because I discovered that learning more about multiple asteroid systems can help us understand the composition of the Solar System, and provide clues about its formation and evolution.

High School Senior Project — Fall 2009 - Spring 2010

For my senior project, I expanded on my Summer Science Program work (below) with the help of a local amateur astronomer, Mr. Herbert Peterson. I performed observations of a few asteroids on the Minor Planet Center's critical list, which are difficult to obtain observations of due to faintness or fast speeds. We submitted the astrometric data to the Minor Planet Center. I then used a program I had written to calculate the orbit of the asteroids. Later, we also attempted to determine the rotational period of asteroids, by collecting photometric data. However, this part of the project was unsuccessful since our equipment was not sensitive enough. At the end, in

addition to my high school final presentation, I gave a presentation at a meeting of the Astronomical Society of Southern New England to share my process and findings.

Summer Science Program (SSP), Ojai, CA — Summer 2009

I carried out an orbit determination project in a small group of 3 students. The project involved performing multiple observations of a Near Earth Asteroid (Asteroid 138883 (2000 YL29)). Alongside this, each of us wrote a program in Python and VPython that would use the location of the asteroid from three different observations we collected and calculate the orbit of the asteroid using the Gaussian Method of Orbit Determination. As part of SSP, I got my first exposure to real scientific research outside the classroom, while also learning valuable physics, math, and astronomy concepts.

POSTERS PRESENTED

Constructing an Automated Pipeline for Pulsars and Periodic Signals: CASPER Workshop,
October 2011, Pune, India

COMPUTER SKILLS

Experienced: Python, Java, MATLAB, IDL, Unix

Some experience: Mathematica, PHP, MySQL

HONORS AND ACHIEVEMENTS

State Science Olympiad: First Place, Astronomy and It's About Time events (2009, 2010)

National Science Olympiad Participant (2010)

American Mathematics Competition 12 School Winner (2009, 2010)

American Computer Science League International All-Stars Tournament: Second Place Team
(2010)

National AP Scholar (2010)

AP Scholar with Distinction (2009)

PERSONAL INTERESTS AND ACTIVITIES

In my spare time, a few activities I enjoy include drawing, running, photography, stargazing, and writing. I also like to write for a personal blog about astronomy. On the blog, I share my personal experiences in astronomy and important news events that interest me. It is available at <http://astronomyandspace.tumblr.com>.