First Impressions Last: The Astronomy Research Seminar

Jae Calanog, PhD Physics & Astronomy Miramar ACT× 3/3/17



Boyce Research Initiatives and Education Foundation (BRIEF)



Pat Boyce Principal Educator



Grady Boyce Executive Director



Russ Genet Senior Advisor

Miramar Physical Science Department



Gina Bochicchio Department Chair



Fred Garces Interim Dean of MBEPS

And of course... our students!

Miramar College Fall 2016 Research Teams





That's me (not a student).







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People learning a sport professionally or for fun play asap. We can apply the same idea to our students who are serious or curious about STEM.



Overview of the Seminar

- Unique opportunity for students to get started and involved with professional scientific research.
- Main objective is not to impart knowledge, but provide <u>experience</u>.
- Open to everyone! No prerequisites and prior experience necessary.
- Primary goal: Get *published* in a peer-reviewed journal!
- Secondary but ALSO VERY IMPORTANT goal: Give students a great first impression of what it means to be a scientist!

Typical Semester Timeline



A Glimpse of the Seminar



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Why Double Stars?









Double Star Astrometry and Research Paper Proposal

Team Name: S.T.A.R.K.A.S.M. - Star Targeted Astrometry and Research of Kelvin Ariane Sibi and Max

Research Scientists:

Kelvin Nguyen - Engineering Physics Student Max Schoenbrunner - Biochemistry Student Ariane Nazemi - Electrical Engineering Student Sibi Radhakrishnan - Aerospace & Mechanical Engineering Student

Team Leader: Kelvin Nguyen

Instructors: Pat Boyce, Grady Boyce, Jae Calanog

Other Organizations & Resources Used:

Boyce Research Initiatives and Education Foundation (B.R.I.E.F.), *iTelescope Network*, Washington Double Star Catalog (WDS), Stelledoppie Star Search Database, Stellarium/Maxim DL 6/Mira Pro x 64 Softwares

Research Objectives and Methods:

Our primary objective is to scientifically examine the position angle (theta, measured in degrees) and separation distance (rho, measured in arcseconds) to track the relative movement of the binary star system 00023-7238 HJ 5439. We propose to obtain images of 00023-7238 HJ 5439 to critically analyze the changes in position angles and separation distances to construct a more accurate orbital illustration of the system. We will be using the *iTelescope Network*, specifically Telescope 27 in Australia, to conduct our research. In addition, we will utilize the Hydrogen-Alpha filter to precisely distinguish our two stars.



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Korat et al. 2017, JDSO accepted





Nguyen et al. 2017, JDSO accepted

Astrometric Observations and Analysis of the Physical Binary Pair STF 296AB

Parth Korat¹, Alexander Beltzer-Sweeney², William Vazquez¹, Kyle Correia¹, Jae Calanog¹, Pat Boyce³, and Grady Boyce³

- 1. Miramar Community College
- 2. Mesa Community College
- 3. Boyce Research Initiatives and Education Foundation

Abstract: We obtained astrometric measurements of the double star system WDS 02442 +4914 (STF 296AB) using the iTelescope Network. By performing CCD astrometry, a position angle of $305.4^{\circ} \pm 0.3^{\circ}$ and an angular separation of $21.14^{\prime\prime} \pm 0.09^{\prime\prime}$ was determined. Based on historical data, the position angle and angular separation has changed from the previous measurement of 304.7° and 20.69° from 2013.

CCD Astrometric Measurements of WDS 0023-7238 HJ 5439

Kelvin Nguyen¹, Sibi Radhakrishnan¹, Max Schoenbrunner¹, Ariane Nazemi¹, Jae Calanog¹, Pat Boyce², and Grady Boyce²

- 1. Miramar College, San Diego, California, USA
- 2. Boyce Research Initiatives and Education Foundation (BRIEF), California, USA

Abstract: We obtained astrometric measurements of the double star system 0023-7238 (HJ 5439) using the iTelescope network and MaximDL v6 software. We measured a mean position angle of $79.2^{\circ} \pm 0.2^{\circ}$ and an average separation distance of $9.53'' \pm 0.04''$; these measurements show a decrease of 0.4 ° and 0.23'' from the last measurement in epoch 1998.50. Historical and current data show no obvious signs of orbital motion, which suggests that HJ 5439 is a visual double.



Development For Our Students

Tangible + Intangible Milestones = Professional/Personal Growth

Tangibles:

- Develop a research proposal
- Present findings to peers and experts
- Publish in a peer-reviewed journal

Intangibles:

- Develop determination and persistence in reaching a goal <u>focused</u>
- Handling responsibility working in a collaboration <u>engaged</u>
- Gain exposure to the "rules" and "politics" of science <u>directed</u>
- Participate in a community of practice <u>connected</u>
- Professionally address critics during peer-review process <u>nurtured</u>
- Justify methods and conclusions to provide new ideas- <u>valued</u>

Breaking the Cycle



Breaking the Cycle



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The Seminar Opens Up Future Opportunities

- Gives writing points for students when applying for paid internships.
- Increases their eligibility for admission and makes them stand out.

For ex: UCSD S.T.A.R.S. Program Personal Statement Prompt

https://grad.ucsd.edu/degrees/summer-researches/stars/application.html

- How did you become interested in your field of study?
- What experiences have contributed toward your preparation for your educational and career goals?
- What are your research interests?

Ever felt like this when a student asks you for a letter of recommendation?

SURE, I'LL WRITEVOUALETTEROF RECOMMENDATION

WHAT BYOURNAME, AGANP

quickmeme.con

 Working directly with students allows me to write strong, genuine, and compelling letters of recommendation.

For ex: UC Irvine INSPIRE Letter of Recommendation Prompt

http://sites.uci.edu/inspire/

Please provide any comments that you feel might assist us in making a decision concerning the applicant's suitability for a summer engineering and computer science program. Please pay particular attention to:

- motivation and commitment of the student to a career in engineering, computer science, mathematics, physics or technology
- a general assessment of the strengths and weaknesses of the applicant
- applicant's ability to adapt to supervision and work in a team setting.

 How do some universities view students that have completed honors contracts?

"During the admissions process, we see a number of students who look stellar on paper, but when you go to interview them, there is nothing that they can speak passionately about.

Being part of an honors contract means you are working on something that you are passionate about, therefore, you can go into the entire process from beginning to end, especially at the community college level.

Sometimes as part of an honors contract, students are required to present to the class, forum, or some other setting, where you know you may be asked questions and you are well prepared. Honors will prepare you well."

- Regional Admissions Counselors of California

The Seminar Aligns with Miramar College's Integrated Planning

SAN DIEGO MIRAMAR COLLEGE

Student Success Framework for Long-Term Integrated Planning • Fall 2016 - Spring 2020



A Culture of Action... in Action



Goal 4: Offering and promoting program,

outreach, and student activities

that recruit a student

population which includes those

from underrepresented groups

Strategy 3.1, 3.2

in S.T.E.M. includes:

Women

African Americans

Latinos

American Indians

Alaskan Natives

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Spring 2017 Seminar Demographics (8 students)

Women	6
African Americans	1
Latinos	5
American Indians	1
Alaskan Natives	0

Astronomy Research Seminar Spring 2017







Jose



Janet



Alex





Anna



Cheyenne

Aura

Main Takeaways

- The Astronomy Research Seminar:
 - introduces students from diverse backgrounds to scientific research.
 - fosters professional and personal growth of our students.
 - opens new doors for opportunities for students upon completion, eventually leading to their success.
 - aligns with the goals and plans of Miramar College.

