

Student perspectives to conducting astrobiology research at primarily undergraduate institutions. K. B. McCoy¹, I. Derecho¹, F. Dallal¹, K. Venkateswaran², and R. Mogul¹, ¹California State Polytechnic University, Pomona, Pomona, CA 91768, rmogul@csupomona.edu, ²Biotechnology and Planetary Protection Group, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109.

Introduction: Astrobiology is typically under-represented at primarily undergraduate institutions (PUI) due to differing and often contradictory reasons. For many institutions, astrobiology is regarded as unsuitable for undergraduate courses due to its over specialized nature. While others argue that the field is inherently too broad and over-encompassing for traditional undergraduate curricula. With the increased call for interdisciplinary learning in undergraduate education [1,2], however, astrobiology has become of growing interest to both state-funded and private institutions [3-5]. As a result, many introductory courses now do incorporate examples of astrobiology but often within limited contexts due to time and curricular constraints.

Further complicating the expansion of astrobiological education is the requisite need for completion of fundamental courses in biology, chemistry, physics, and math prior to any formal astrobiology learning experience. In other words, most students are not exposed to courses in astrobiology until their late junior or senior years. A majority of Master's graduate programs at PUI's are also deficient in astrobiology emphases for many of the same stated reasons. More direct and timely access to both undergraduate and Master's students, therefore, may be better attained through both the research and laboratory experience where the boundaries between the traditional disciplines and potential pre-requisites are less stringently defined.

Cal Poly Pomona is a Hispanic-serving institution in the greater Los Angeles area that has a rapidly expanding enrollment of women in the sciences. Like most California State University campuses, traditional science subjects due to both demand and budgetary concerns dominate the curricula at both the undergraduate and Master's levels. Accordingly, the challenges, concerns, and benefits to conducting astrobiological research at minority-serving PUI's will be discussed in this session.

The shared viewpoints will be student-based perspectives and will include the potential gender issues faced by our female Master's students, the research hurdles faced by both undergraduates and Master's students, and the role of targeted funding programs in sustaining and inspiring work in astrobiology. In summary, the NAI-MIRS program of Summer and

Fall 2009 was used to directly support the advanced education and training of Kelly McCoy, Ivy Derecho, Freida Dallal, Kelleen Chea, Kota Kaneshiga, and Omar Snoussi (**Figure 1**).

Kelly McCoy is a Master's student in Chemistry and is studying the stress responses of *Acinetobacter* bacterial strains that were isolated from NASA spacecraft assembly facilities. Ivy Derecho and Freida Dallal are also Master's students and are working on characterizing the proteomic profiles of these differing *Acinetobacter* strains. Kota Kaneshiga and Kelleen Chea, both chemistry undergraduates, are working on a separate astrobiology project that involves the detection of bacterial spores using inorganic luminescent reagents. And Omar Snoussi is an undergraduate biotechnology major who is working on developing simple colorimetric assays for the detection of Life in soils. Together, these students represent the ethnic, gender, and academic diversity that will define the future of science and astrobiology progress.

Figure:



Figure 1. The Mogul Research Group: Kelly McCoy, Ivy Derecho, Freida Dallal, Kota Kaneshiga, Kelleen Chea, Omar Snoussi, Rakesh Mogul (Advisor), and Kasthuri Venkateswaran (Mentor).

References:

1. Ares Jr M. (2004) *Nat. Struct. Mol. Bio.*, 11, 1170-1172.
2. George M, and Bragg S. (1996) Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology. DIANE Publishing.
3. Blumberg B. (2003) *Astrobiology*, 3, 463-470.
4. Luen Tang B. (2006) *Astr. Ed. Rev.*, 4, 110-114.
5. Staley J. (2003) *Curr. Op. Biotechnol.*, 14, 347-354.