

Building a soft matter research community at UPRM: Step 1. Develop and execute a REU program ^[1]

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REU RMSM 2015

Soft matter includes a wide range of materials that flow or experience deformation when exposed to stresses or forces. Colloids, polymers, vesicles, and bubbles are a few examples. The relationship between the magnitude and duration of the ‘deforming’ force gives rise to unique and dynamic material properties. Understanding and mastering these properties are main areas of intensive research.

For a few years now, I’ve been helping organize and promote the soft matter research community of the University of Puerto Rico – Mayagüez (UPRM). More than 20 professors are identified as researchers in this multidisciplinary field. My colleague Dr. Patricia Ortiz and I took first steps in this direction in the spring of 2014. Our plan was to bring this community closer through a NSF REU program. After hard work, the proposal was accepted and this summer that just ended we had our first cohort.

In spite of very little time to promote the REU site in Reconfigurable and Multifunctional Soft Materials, more than 80 students from all over the US applied to our program. After careful evaluation of the applications, 11 students were selected from the following academic institutions: Stanford University, Carnegie Mellon University, University of Wisconsin – Madison, UPRM, Kennesaw State University, North Carolina Agricultural and Technical State University, and East Los Angeles College.

The participants embarked in a journey into an exciting network of opportunities and experiences. The research activities of our REU site focus on: (i) synthesis, characterization, and modeling of particulates (encompassing length scales from nanoparticles to grains) resulting in novel behavior at the macroscopic scale and (ii) characterization and understanding of how biomaterials operate where structure or modifications result in novel functionality. The educational seminars planned for the summer gives the participants a clear sense of what research is and hopefully motivate them to pursue graduate studies.

This REU site provided the students a broad experience of the soft matter field and helped them identify the interconnected properties and features that make these materials relevant for emerging needs and applications in nanotechnology, bioengineering, and the industry. The students learned from their mentors how the deformation of materials with multifunctional and/or reconfigurable properties correlates to their fundamental composition and structure. This understanding is key to properly place in context the operative forces that govern these materials at different length and time scales and acquire a necessary training to continue finding underlying principles that connect them.

Results gathered from informal and formal assessment of the program show that the REU participants gained significant positive skills during the summer to become better researchers and the motivation to pursue graduate school.

On a personal note, I'm happy that the REU participants had many opportunities to enjoy our beautiful landscape and to learn from our culture and history. Puerto Rico offers so many good things that sometimes locals forget they exist. It became very clear from the planning stages of our REU that the combination of a culturally rich location like ours, a meaningful research experience at UPRM and a thoughtful training in research and scientific communication provides the best experience one can hope to obtain as an undergraduate student fully committed to a career in STEM.

I would like to thank all the students, mentors, professors, staff and collaborators involved with this effort. In a few months, we would start promoting the program for our second cohort – summer 2016. Stay tuned for details and updates at softmatter.uprm.edu.

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