

A Novel Undergraduate Research Program for Underrepresented Students

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**Loyola
Marymount
University**

Loyola Marymount University

Private Jesuit R2 Institution

MSI 11:1 Coastal Los Angeles

7,094 undergraduate 2,906 graduate



A Novel Undergraduate Research Program for Underrepresented Students:

- ▶ Forming STEM Research Communities

June 18 at 10:20-11:20am ET

- ▶ Curriculum to Prepare Students for Research

June 24 at 1:00-2:00pm ET (online)



Howard Hughes Medical Institute Driving Change Initiative



The Driving Change program aims to **effect lasting culture change** on research university campuses **by creating a more inclusive learning environment** for all. Its goal is to support undergraduate students so that they may excel in STEM and assume leadership roles in the field

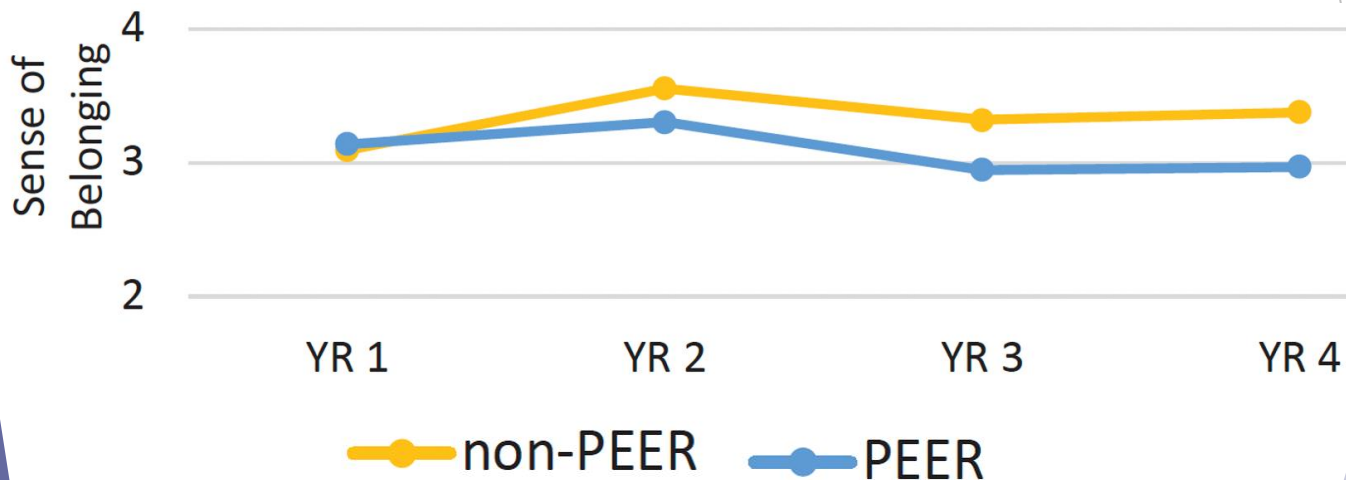


Understanding Climate & Culture

- ▶ Comprehensive self-study
 - Wide-reaching data collection
 - Analysis of extra-curricular activities
 - Continuing and exit surveys



Reported Sense of Belonging



PEER: Persons Excluded due to their
Ethnicity or Race (Asai, 2020)



Investigating Sense of Belonging

- ▶ Programs exist for first-year PEER students
 - ▶ TLC, First to Go, ACCESS
- ▶ Juniors and seniors are active in department activities and research programs
 - ▶ TAs, student organizations
 - ▶ SURP, SOAR, RAINS, university-wide RLC
- ▶ There is a void in the sophomore year



A Two-Pronged Intervention

- ▶ Part 1: Research learning community (RLC) course
- ▶ Part 2: Faculty-mentored research experience



Fall semester



Spring semester

Mentor Training



Majority of mentors participate in an equity-focused faculty development program

Periodic check-ins with all mentors

Mentor Matching

Preparing

- Faculty recruitment
- Student priming

Meeting

- A faculty-student research mixer during the 5th meeting of the RLC

Matching

- Student-initiated follow-up meetings
- Research contract to formalize placement

Project Scoping

Student skills:

- ▶ Basic math and science
- ▶ Little or no programming skills
- ▶ Limited ability to read scientific papers
- ▶ Not yet able to work independently on research

Recommendations:

- ▶ Carve out a small part of a larger project
- ▶ Schedule regular lab hours
- ▶ Use template for weekly check-ins
- ▶ Provide encouragement



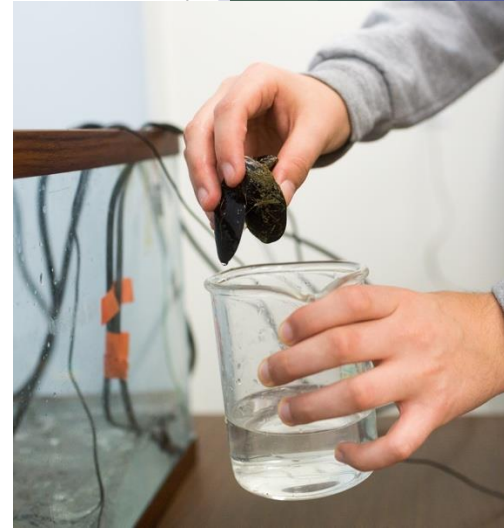
Project Examples

Overall project:

- ▶ Mimic intertidal zone conditions to study effect of climate change on mussels

RLC piece:

- ▶ Automate measuring the gap opening of an intertidal mussel



Project Examples

Overall project:

- ▶ Relationship between the structure and function of a viral RNA stem-loop

RLC piece:

- ▶ Synthesize and purify an RNA sample for hypothesis testing



Project Examples

Overall project:

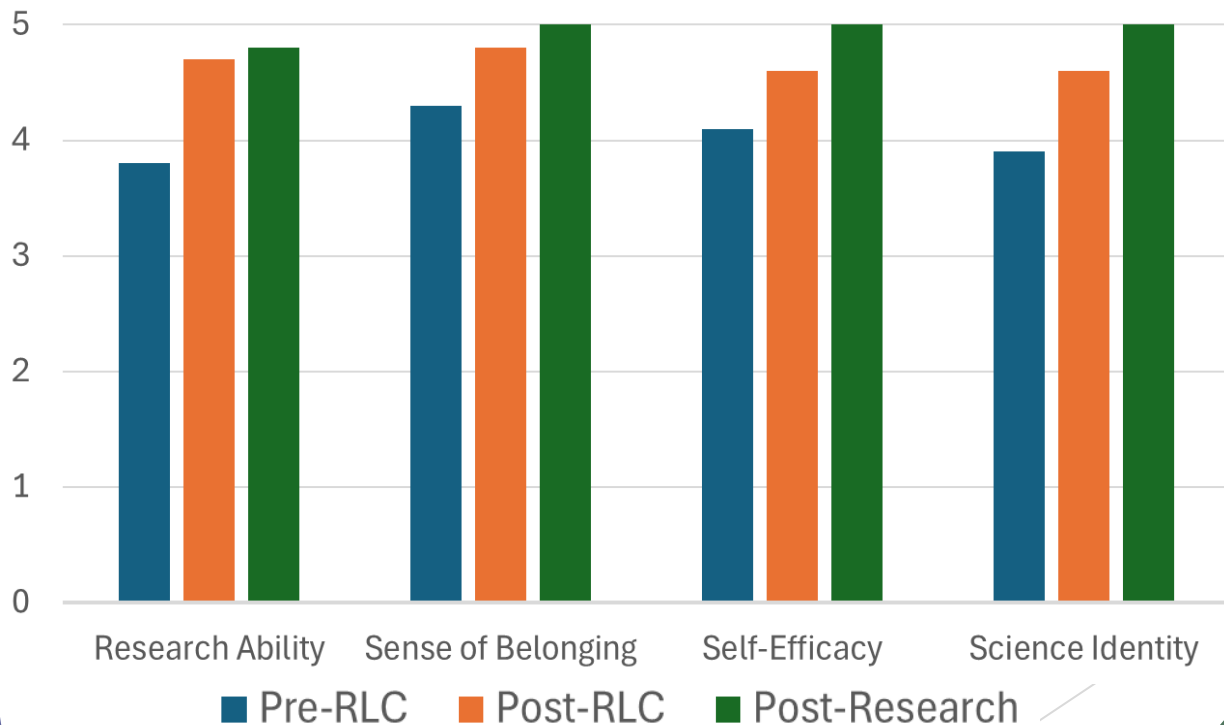
- ▶ Estimating the ecological services of the LA parks and their price value to the city

RLC piece:

- ▶ Smartphone data analysis of East LA parks, followed by quantifying biodiversity in Ascot Park



Quantitative Results



Qualitative Results

- ▶ **More impactful than the RLC course**
- ▶ Gained new skills, boosting confidence
- ▶ Some are now thinking about a PhD!



Qualitative Results: Perceived Research Ability

"It made me more interested in doing, or maybe **pursuing a career** in that industry."

"We're presenting our research at a couple conferences which I feel like is a really good opportunity to kind of **explore more** about the academic research world"



Qualitative Results: Belonging

"I'm a Mexican woman in STEM. There aren't too many people of color or women in, you know, tech. So it's nice that I was able to get started in research...So, yeah, I think it gave me **more confidence** that I could...succeed"

"I feel like research kind of helped me understand more than what my major is...It made me feel like I **belonged more.**"



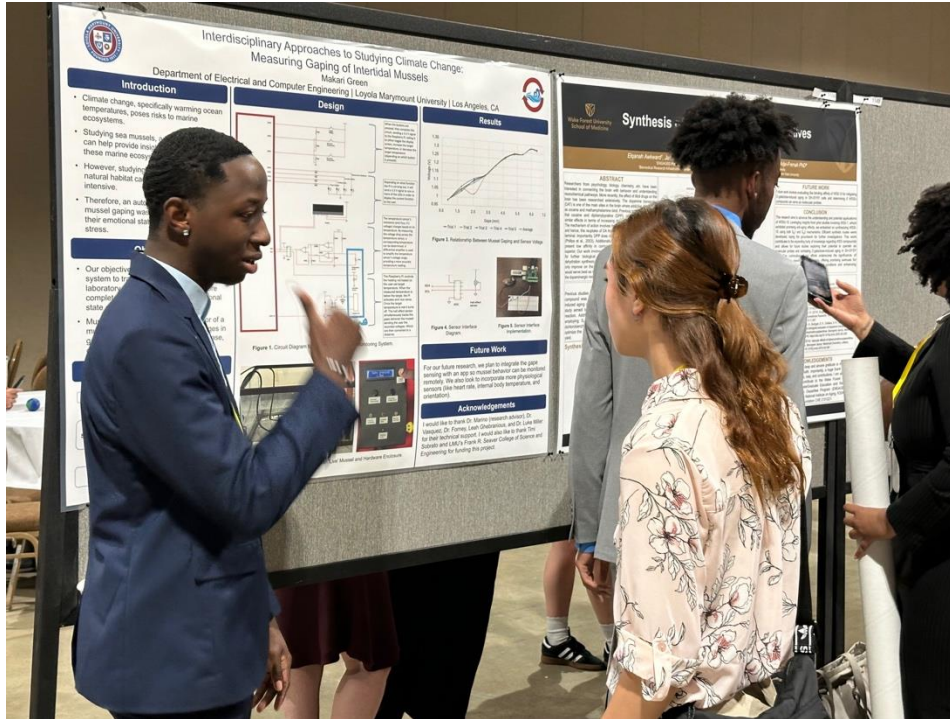
Qualitative Results: Self-efficacy

"Being exposed to like techniques and...
getting hands on practice and experience
kind of just **builds your confidence.**"

"I learned so many other skills to do my
research...communication, collaboration, or
being able to speak to my professors...I
realized as a semester went on, I **felt more
confident** in my classes too"



Student-Friendly Conferences



Student-Friendly Conferences

- ▶ ERN
- ▶ IFORE
- ▶ NCUR
- ▶ NDiSTEM
- ▶ SACNAS
- ▶ SCCUR
- ▶ STR
- ▶ WCBSURC
- ▶ ABRCMS
- ▶ NSBE
- ▶ SHPE
- ▶ SWE

Key Takeaways

- ▶ Design a sophomore PEER RLC
- ▶ Describe research projects that are appropriate for sophomores
- ▶ List student-friendly conferences



Future Work

- ▶ Recruit more faculty research mentors
- ▶ Increase mentor training
- ▶ Formalize mentor feedback
- ▶ Include social activities into the research semester

Thank you!

Questions? 😁

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References

- Trujillo, Gloriana and Kimberly D. Tanner. (2014). "Considering the role of affect in learning: Monitoring students' self-efficacy, sense of belonging, and science identity." *CBE—Life Sciences Education* 13.1: 6-15.
- Wimberly-Young, Elizabeth, Vanessa C. Morales, and Kathleen F. Weaver. (2025). "Gateways into Undergraduate Research Experiences: Creating a Foundational Learning Community to Increase Access in Undergraduate Research." In preparation. Office of Research and Creative Arts, Loyola Marymount University.
- Asai, David J. "Race matters." *Cell* 181.4 (2020): 754-757
- <https://juliepmartin.com/>

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