Brayan Osegueda Velazquez

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Education

Washington State University, Pullman, WA Graduated May 2025
Bachelor of Science in Bioengineering
GPA: 3.950 | Scale of 4.0 Summa cum laude
President's Honor List

Research Experience

Research Mentor: Dr. Alla S. Kostyukova August 2021-Present
Voiland School of Chemical Engineering and Bioengineering, Pullman, WA

- *Determined the competition binding interface of homologous proteins inside sarcomere filaments based on affinity*
- *Using circular dichroism, I evaluated structural changes induced by introduced point mutations*
- *Optimized point mutation selection for in vitro testing by predicting structural changes using molecular dynamics simulations*

Summer Research

Research Mentor: Dr. Michael Regnier June – August 2022
Institute for Stem Cell and Regenerative Medicine, University of Washington, Seattle, WA

- *Investigated functional changes in troponin complex interactivity related to calcium binding in Troponin C*
- *Designed mutations (cTnC 365A and sTnC 364A/D28A) to knock out calcium binding on active TnC domains.*
- *Used cardiac and skeletal isoforms to model analogous mutation effects.*

Peer-Reviewed Publications

Mohran, S., McMillen, T. S., Mandrycky, C., Tu, A. Y., Kooiker, K. B., Qian, W., Neys, S., **Osegueda, B.**, Moussavi-Harami, F., Irving, T. C., Regnier, M., & Ma, W. (2024). Calcium has a direct effect on thick filament activation in porcine myocardium. *The Journal of General Physiology, 156*(11), e202413545. DOI link

Eduardo Sánchez Díaz, **Brayan Osegueda**, Svetlana Minakhina, Nickolas Starks, Stefanie Novak, Dmitri Tolkatchev, Carol C. Gregorio, Alla S. Kostyukova, and Garry E. Smith Jr. *Prediction and Biological Significance of Small Changes in Binding of Leiomodin to Tropomyosin. The Journal of General Physiology* DOI Link

Skills

Programming: Python and MATLAB with applications in modeling and dataset analysis

Software: SigmaPlot, USCF Chimera, and Amber 22

Technical: Extensive laboratory experience including mutagenesis, protein purification, molecular dynamics simulations, f-actin cosedimentation assays, protein analysis using native and SDS gel electrophoresis, and circular dichroism

Language: Bilingual (English and Spanish)

Research Presentations

"Investigating the binding capabilities of leiomodin-2's C-terminal actin-binding sites" at the Annual Biophysical Society Meeting, Los Angeles, CA **Brayan Osegueda***, Mason D. Summers*. Alan Palma Guillen , Garry E. Smith Jr. Alla S. Kostyukova — February 2025

"Testing the Effect of Tropomyosin on Huntingtin's Actin-Binding Ability" at the Showcase for Undergraduate Research and Creative Activities (SURCA) annual conference, Pullman, WA. **Brayan Osegueda**, Garry E. Smith Jr., Alla S. Kostyukova — March 2024

"Troponin Complex Interactions; Are They Calcium Independent?" at the Annual Biomedical Research Conference for Minoritized Scientists (ABRCMS), Phoenix, AZ. **Brayan Osegueda**, An-Yue Tu, Kerry Kao, Michael Regnier — November 2023

"Troponin Complex Interactions and How Mutations Affect Troponin Function" at the UW Institute for Stem Cell & Regenerative Medicine, Seattle, WA. **Brayan Osegueda**, An-Yue Tu, Kerry Kao, Michael Regnier — August 2023

"Leiomodin-Tropomyosin Binding and How Point Mutations Affect Affinity" at the Pacific Northwest LSAMP annual conference, Portland, OR. **Brayan Osegueda**, Nickolas C. Starks, Garry E. Smith Jr., Alla S. Kostyukova — April 2023

"Leiomodin-Tropomyosin Binding and How Point Mutations Affect Affinity" at the Showcase for Undergraduate Research and Creative Activities (SURCA) annual conference, Pullman, WA. **Brayan Osegueda**, Nickolas C. Starks, Garry E. Smith Jr., Alla S. Kostyukova — March 2023

"Structure-Based Design of Mutations in Leiomodin Tropomyosin Interface" at the Voiland College of Engineering and Architecture Advisory Board meeting, Pullman, WA (invited presentation). Nickolas C. Starks, **Brayan Osegueda,** Garry E. Smith Jr., Alla S. Kostyukova — March 2022

Research Awards and Honors

Barry Goldwater Scholarship Recipient — 2024
National Award

ABRCMS National Poster Award in Engineering, Physics, and Mathematics — 2023

First Place Poster at PNW LSAMP Regional Conference — 2023

Early Career Award at SURCA Local Conference — 2023

MARC-WSU Program Trainee (NIH T34 GM141971) — 2023
Selected as one of five juniors for the Maximizing Access to Research Careers Program

LSAMP Undergraduate Research Fellowship Awardee — 2023

ESTEEMED MIRA Program Trainee (NIH R25 EB027606) — 2021

Academic Awards and Honors

Voiland College Outstanding Bioengineering Sophomore Award — 2023

Voiland School of Engineering and Architecture James and Carol Graybill Scholarship — 2022

Hauser-Emtman Endowed Honors Scholarship — 2022

VCEA Dean Award Recipient — 2021

Teaching Experience

MARC/MIRA/LSAMP Mentor — May 2025-July 2025
Prepared students for graduate applications, graduate life, and career preparations

Bioengineering Tutor September 2024-May 2025
Assisted students with coursework and exam preparation, ensuring conceptual clarity and academic readiness.

General Science and Math February-March 2023
Helped high school students understand challenging physics topics and stay on track with their assignments.

Precalculus Math Tutor June-August 2022
Prepared lesson plans and provided individual support to Honors College freshmen for their pre-calculus curriculum.

Laboratory Undergraduate Mentor
Mentored incoming students, organized lab tours, and supported capstone teams September 2021-June 2025

Professional Development

Annual Biophysical Society Meeting, Los Angeles, CA (Member) 2025

Annual Biomedical Engineering Society Conference, Seattle, WA (Member) 2023

Annual Biomedical Research Conference for Minoritized Scientists, Phoenix, AZ 2023

Annual Biomedical Research Conference for Minoritized Scientists (Virtual) 2021