

# Sergio Mares

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## EDUCATION

### University of California, Berkeley

PhD, Computational Biology

Expected graduation - May 2026

### Oklahoma State University — Stillwater, OK

BS, Biochemistry

May 2021

BS, Microbiology and Molecular Genetics

May 2021

Minors: Plant Biology, Chemistry and Spanish

GPA: 3.5

## RESEARCH EXPERIENCE

University of California, Berkeley

December 2021 – February 2022

Developed a deep learning model studying CRISPR induced epigenetic memory

*Skills: Python, UCSC Genome Browser, and Machine Learning Libraries*

Oklahoma State University - Department of Microbiology

Patrauchan Lab

January 2018 – August 2021

Evolutionary studies in a calcium-regulated-Protein

involved on infection virulence in *Pseudomonas*

*Skills: R Programming, 3D-Protein Structure Prediction, and DNA extraction*

University of Puerto Rico – Rio Piedras - Department of Computer Science

Ortiz -Zuazaga

May 2020 – August 2020

Optimization of the ANOVA approach for Metagenomic

assembly of differential metagenomic data

*Skills: Assembly data processing, Python, and Bash*

University of California - Berkeley Department of Division of Cell and Developmental Biology

Welch Lab

June 2019 – August 2019

Focus on the effects of intracellular

pathogens in the cytoskeleton in mammalian cells.

*Skills: Live-cell Imaging, protein truncations, and cloning*

Oklahoma State University Department of Microbiology

August 2017 - December 2017

Hoff Lab

The Microbial Diversity Project focuses in identifying novel organisms on various sources.

*Skills: Pipetting, culture, media preparation and DNA Sequencing prep.*

## PUBLICATIONS

Biraj B. Kayastha, A. Kubo, J. Burch-Konda, R. L. Dohmen, J. L. McCoy, R. R. Rogers, **S. E. Mares**, J. Bevere, A. Huckaby, W. Witt, S. Peng, B. Chaudhary, S. Mohanty, M. Barbier, G. Cook, J. Deng & M. Patrauchan. EF-hand protein, EfhP, specifically binds Ca<sup>2+</sup> and mediates Ca<sup>2+</sup> regulation of virulence in a human pathogen *Pseudomonas aeruginosa*. Nature Scientific reports. May 2022. <https://doi.org/10.1038/s41598-022-12584-9>

Chelsea L. Murphy, R. Yang, T. Decker, C. Cavalliere, V. Andreev, N. Bircher, J. Cornell, R. Dohmen, C. J. Pratt, A. Grinnell, J. Higgs, C. Jett, E. Gillett, R. Khadka, **S. Mares**, C. Meili, J. Liu, H. Mukhtar, Mostafa S. Elshahed, Noha H. Youssef. Genomes of novel Myxococcota reveal severely curtailed machineries for predation and cellular differentiation. BioXRv. July 2021. <https://doi.org/10.1101/2021.07.06.451402>

Domokos I. Lauko, Taro Ohkawa, **Sergio E. Mares**, Matthew D. Welch. Baculovirus actin-rearrangement-inducing factor ARIF-1 induces the formation of dynamic clusters of invadosome structures. *Molecular Biology of the Cell*. July 2021.

<https://doi.org/10.1091/mbc.E20-11-0705>

Domokos I. Lauko, Taro Ohkawa, **Sergio E. Mares**, Matthew D. Welch. Baculovirus actin-rearrangement-inducing factor ARIF-1 induces the formation of dynamic clusters of invadosome-like structures. *BioXRv*. November 2020.

<https://doi.org/10.1101/2020.11.03.365502>.

**Sergio E. Mares**, M. King, A. Kubo, A. Khavov, E. Lutter, N. Youssef and M. Patrauchan. carP, encoding a Ca<sup>2+</sup>-regulated putative phytase, is evolutionarily conserved in *Pseudomonas aeruginosa* and has potential as a biomarker. *Journal of Microbiology*. December 2020. <https://doi.org/10.1099/mic.0.001004>

**Sergio E. Mares**, T. Varnon, J. Siller, J. Vernard and W. Mimbs. Association of pH Levels and Conductivity Levels with Algae Growth and the Implications on Water Quality. *Journal of Introductory Biology Investigations*. Vol 8, No 3 2018.

## ORAL PRESENTATIONS

ANOVA Approach to Metagenomic data assembly. Rio Piedras, PR. August 2020. **Sergio E. Mares**, H. Ortiz-Zuazaga.

Characterizing the functional sites of CarP, a *Pseudomonas aeruginosa* biomarker protein. Stillwater, OK. May 2020. **Sergio E. Mares**, M. M. King, A. Khanov, E. I. Lutter, N. Youssef, and M. Patrauchan.

Baculovirus protein Arif-1 from two closely related viruses is sufficient to induce ventral aggregate formation. Berkeley, CA. August 2019. **Sergio E. Mares**, D. Laukó, T. Ohkawa, M. Welch.

## POSTER PRESENTATIONS

CarP, an important component of Ca<sup>2+</sup> signaling network and a *Pseudomonas* biomarker. Wentz Scholarship Symposium. Stillwater, OK. March 2020. **Sergio E. Mares**, M. M. King, A. Khanov, E. I. Lutter, N. Youssef, and M. Patrauchan.

Novel component of Ca-signaling network, CarP, as a biomarker for *Pseudomonas aeruginosa* infections. OK NSF EPSCoR Research Day at the Capitol. Oklahoma City, OK. March 2020. **Sergio E. Mares**, M. M. King, A. Khanov, E. I. Lutter, N. Youssef, and M. Patrauchan.

Novel component of Ca-signaling network, CarP, as a biomarker for *Pseudomonas aeruginosa* infections. SACNAS National Conference. Honolulu, HI. October 2019. **Sergio E. Mares**, M. M. King, A. Khanov, E. I. Lutter, N. Youssef, and M. Patrauchan.

A Putative Phytase, CarP, Required for Calcium Tolerance and Virulence in *P. aeruginosa*, is Differentially Regulated by Host Factors. American Society of Microbiology National Conference. San Francisco, CA. June 2019. M. King, M. Jones, **S. E. Mares**, D. McLeod, L. Kafer, M. Barbier, M. Visser, and M. Patrauchan.

Conservation of Calcium-Regulated Protein, CarP, Involved in Virulence Among Clinical and Environmental Isolates of *Pseudomonas aeruginosa* Oklahoma Center of Respiratory Infections and Diseases Regional Conference. Stillwater, OK. April 2019. **Sergio E. Mares**, M. King, and M. Patrauchan.

Conservation of Calcium-Regulated Protein, CarP, Involved in Virulence Among Clinical and Environmental Isolates of *Pseudomonas aeruginosa*. Annual Microbiology Department Symposium. Stillwater, OK. April 2019. **Sergio E. Mares**, M. King, and M. Patrauchan.

Evolution of Bacterial Calcium Signaling and Regulation. SACNAS National Conference. San Antonio, TX. October 2018. **Sergio E. Mares**, M. King, and M. Patrauchan.

Evolution of Bacterial Calcium Signaling and Regulation. Life Sciences Freshmen Research Scholars Symposium. Stillwater, OK. April 2018. **Sergio E. Mares**, M. King, and M. Patrauchan.

## SCHOLARSHIPS

**total: \$62,849**

REU University of Puerto Rico – Rio Piedras  
McNair Research Scholar Support

2020; \$6,175  
2020; \$1,600

|  |                       |
|--|-----------------------|
| Oklahoma Louis Stokes  | 2020; \$2,000         |
| Alliance for Minority (OK-LSAMP)   |                       |
| Wentz Law Research Grant   | 2020; \$4,500         |
| Oklahoma State University Representative at the Capitol  | 2020; \$250           |
| College of Arts and Sciences   Kenneth & Hoye Harwell Scholarship  | 2020; \$3,000         |
| SACNAS National Conference Hawaii   OSU-HHMI   | 2019; \$3,000         |
| REU Berkeley Evolutionary Biology NSF  | 2019; \$8,458         |
| College of Arts and Sciences   Kenneth & Hoye Harwell Scholarship  | 2019; \$3,000         |
| Wentz Law Research Grant   | 2019; \$4,500         |
| Oklahoma Louis Stokes  | 2018; \$2,500         |
| Alliance for Minority (OK-LSAMP)   |                       |
| Ronald E. McNair Scholarship   | 2019; \$1,800         |
| College of Arts and Sciences   Nancy Charlene Malkenhorst  | 2018; \$1,366         |
| Wentz Honors Research Grant  | 2018; \$450           |
| Retention Initiative for Student Excellence  | 2018; \$800           |
| Ronald E. McNair Scholarship   | 2019; \$1,200         |
| Life Sciences Freshman Research Scholarship  | 2018; \$1,000         |
| Oklahoma Louis Stokes  | 2018; \$2,000         |
| Alliance for Minority (OK-LSAMP)   |                       |
| Society for the Advancement of Chicanos<br>and Native Americans in Science Scholarship<br>to San Antonio National Conference | 2018                  |
| Oklahoma Louis Stokes  | 2017; \$250           |
| Alliance for Minority (OK-LSAMP)   |                       |
| Inclusion Leadership Program   | 2017; \$1,000         |
| Academic Opportunity Award   | 2017 - 2020; \$10,000 |
| Oklahoma Tuition Aid Grant (OTAG)  | 2017 - 2020; \$4,000  |

## HONORS and AWARDS

|   |      |
|---|------|
| Senior of Significance – <i>OSU Alumni Association</i>  | 2020 |
| <ul style="list-style-type: none"> <li>Recognizes students who have excelled in scholarship, leadership, and service to campus and community and have brought distinction to OSU; they represent the top 1% of their graduating class.</li> </ul> |      |
| Oklahoma State University Representative in Presentation at the Capitol   | 2019 |
| <ul style="list-style-type: none"> <li>Showcases the outstanding undergraduate research being conducted at Oklahoma's colleges and universities in the areas of science</li> </ul>  |      |
| McNair Scholar  | 2019 |
| <ul style="list-style-type: none"> <li>Federally funded TRIO Program that provides encouragement, guidance, and mentorship to underrepresented students in preparation for graduate school.</li> </ul>  |      |
| Top Ten Freshman Research Scholar - <i>Achafoa Chapter of Mortar Board</i>  | 2018 |
| <ul style="list-style-type: none"> <li>Selected based on academic achievement, leadership and community service.</li> </ul>   |      |
| Scholar of the OK- Louis Stokes Alliance - <i>National Science Foundation</i> .   | 2018 |
| for Minority Participation (OK-LSAMP)   |      |
| <ul style="list-style-type: none"> <li>Current goals and activities of OK-LSAMP focus on undergraduate research experiences, graduate school preparation, and international experiences.</li> </ul>   |      |
| Life Sciences Freshman Research Scholar – Howard Hughes Medical Institute   | 2017 |
| <ul style="list-style-type: none"> <li>HHMI funded program that introduces students to a research experiences, the process of science writing and research-related activities.</li> </ul>   |      |
| RISE (Retention Initiative for Student Excellence) Program  | 2017 |
| <ul style="list-style-type: none"> <li>Students involved with the RISE program will participate in activities that will develop strong academic study habits and work ethics.</li> </ul>  |      |

|   |      |
|---|------|
| Outstanding Freshmen Dinner   | 2017 |
| • <i>OSU Student Affairs</i>  |      |
| Student Spotlight: A Mixture of Cultures, One Vision for the Future | 2017 |
| • <i>OSU College of Arts and Sciences</i>                           |      |
| Honors Student  | 2017 |
| • <i>OSU Honors College</i>   |      |

## LEADERSHIP AND CAMPUS INVOLVEMENT

|  |             |
|--|-------------|
| <b>Hispanic Student Association— President</b>   | 2019 - 2020 |
| Delegated, planned and informed the Hispanic student population at Oklahoma State University which is approximately 200 students               |             |
| <b>Sigma Delta Pi - ΣΔΠ Spanish Honor Society— President</b>   | 2019 - 2020 |
| Informed and introduced the new members to the society and encouraged professional development with Spanish Department Faculty                 |             |
| <b>Multicultural Affairs Committee—Committee Member</b>  | 2019 - 2020 |
| Allocated a total of \$30,000 to various organization with a focus in increasing and fomenting culture on campus                               |             |
| <b>Society for the Advancement of Chicano and Native Americans in Science— Vice President</b>  | 2018 - 2019 |
| Lead and scheduled professional development meetings with a focus in science careers as well as research education.                            |             |
| <b>Hispanic Student Association— Community Service Chairs</b>  | 2018 - 2019 |
| Communicated closely to communities about service opportunities in Stillwater, OK. Collaborated with 500+ students on a community service day. |             |