

Sara Oliveira Santos

Professional Experience

Distinguished Postdoctoral Scholar

2024 - Present

The University of Texas at Austin, Institute for Geophysics
Mentor: Krista Soderlund

Education

Ph.D. in Engineering, Graduate Ostrach Fellow

2019 - 2024

Brown University, Providence, RI, USA
(University of California, Riverside from 2019 to 2021)
Advisor: Prof. Monica Martinez Wilhelmus

M.S. in Aerospace Engineering, Presidential Scholar

2017 - 2019

Iowa State University, Ames, IA, USA
Advisors: Prof. Thomas Ward III, Prof. Benjamin Ahn

B.S. in Mechanical Engineering

2014 - 2016

The University of Akron, Akron, OH, USA

Publications (* = corresponding author, underline = mentored student)

Force generation in a rotating and pitching plate of variable area

S. Oliveira Santos, M. Brown, M. Kim, N. Tack, M.M. Wilhelmus

Under prep for Journal of Fluid Mechanics, manuscript available upon request

[Bioremediation of Lunar Regolith Simulant through Mycorrhizal Fungi and Plant Symbioses](#) (2025)

J. Atkin, T. Gentry, E. Pierson, **S. Oliveira Santos***

Accepted, Scientific Reports. Pre-print: *bioRxiv* 2024.01.18.576311

[Going around the bend to understand the role of leg coalescence in metachronal swimming](#) (2025)

N. Tack, **S. Oliveira Santos**, M.M. Wilhelmus

J Exp Biol (2025) 228 (12): jeb249330

[Ups and downs: Copepods reverse the near-body flow to cruise in the water column](#) (2024)

N. Tack, **S. Oliveira Santos**, B. Gemmell, M.M. Wilhelmus

Marine Biology, 171(11), 207.

[Pleobot: a modular robotic solution for metachronal swimming](#) (2023)

S. Oliveira Santos, N. Tack, Y. Su, F. Cuenca, O. Morales, P.A. Valdez, M.M. Wilhelmus

Scientific Reports, 13(1), 9574

[Why undergraduate students choose and discontinue an Aerospace Engineering degree](#) (2021)

B. Ciccotosto, U. Tobey, **S. Oliveira Santos**, B. Ahn

International Review of Aerospace Engineering, Vol 14, N. 5, pp 228-239.

Conference Proceedings (underline = mentored student)

Oliveira Santos, S., Nezami, A., Spiers., E. , Gunnarson, P. , Soderlund, K. *Designing for the environment: scaling underwater vehicles with ocean processes*, American Geophysical Union Meeting 2025, New Orleans, LA

Oliveira Santos, S., Tack, N., Herrera-Amaya, A. ,Brown, M., Wilhelmus, M.M. *Swimming across scales: shrimp kinematics and hydrodynamics across Reynolds numbers*, 78th meeting of the American Physical Society Division of Fluid Dynamics, Houston, TX.

Mohebbi, N., Tack, N., **Oliveira Santos, S.**,..., Wilhelmus, M.M. *How Women Do It All: Rheometry, flow visualization, and computational modeling of breastmilk expression*, 78th meeting of the American Physical Society Division of Fluid Dynamics, Houston, TX.

Daurenova, M., Tack, N., **Oliveira Santos, S.**. *1+1 \neq 2: mussels can't math*, 2025 Summer Research Symposium, July 30th, Austin, TX.

Oliveira Santos, S., Brown, M., Kim, M., Tack, N., Wilhelmus, M.M. *Exploring the trade-off of lift and thrust during shrimp swimming*, 77th meeting of the American Physical Society Division of Fluid Dynamics, Salt Lake City, UT.

Oliveira Santos, S., Wilhelmus, M.M. *Shrimpin' Ain't Easy: Understanding the shrimp locomotion success*, Ocean Sciences Meeting 2024, New Orleans, LA.

Oliveira Santos, S., Tack, N., Brown, M., Wilhelmus, M.M. *Can hair help you swim faster? Yes, if you ask shrimp!*, 76th meeting of the American Physical Society Division of Fluid Dynamics, Washington, DC.

Brown, M., **Oliveira Santos, S.**, Tack, N., Wilhelmus, M.M. *Analysis of shrimp appendage cupping on swimming performance through a Bio-inspired model*, 76th meeting of the American Physical Society Division of Fluid Dynamics, Washington, DC.

Brown, M., **Oliveira Santos, S.**, Tack, N., Wilhelmus, M.M. *Appendage cupping and hydrodynamics of shrimp-inspired model*, 2023 Summer Research Symposium, August 4th, Providence, RI.

Oliveira Santos, S., Tack, N., Su, Y., Wilhelmus, M.M. *Leakiness at intermediate Reynolds number in metachronal drag-based swimming*, SICB 2023 Annual Conference, Austin, TX

Oliveira Santos, S., Tack, N., Su, Y., Wilhelmus, M.M. *RoboKrill: the role of morphology on thrust production during metachronal swimming*, 75th meeting of the American Physical Society Division of Fluid Dynamics, Indianapolis, IN

Oliveira Santos, S., Valdez, A., Lopez, O., Cuenca-Jimenez, F., Di Santo, V., Wilhelmus, M.M. *Robokrill: pleopod morphology and vortex generation during drag-based metachronal swimming*, 19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX

Oliveira Santos, S., Valdez, A., Lopez, O., Cuenca-Jimenez, F., Tack, N., Su, Y., Wilhelmus, M.M. *Robokrill: a new method for understanding metachronal drag-based swimming*, Microscale Ocean Biophysics 2022, Mallorca, Spain

Oliveira Santos, S., Valdez, A., Lopez, O., Cuenca-Jimenez, F., Di Santo, V., Wilhelmus, M.M. *Robokrill: a metachronal drag-based swimmer robot*, Ocean Sciences Meeting 2022, Virtual

Oliveira Santos, S., Valdez, A., Lopez, O., Cuenca-Jimenez, F., Di Santo, V., Wilhelmus, M.M. *Robokrill: understanding vortex generation during drag-based metachronal swimming*, 73rd meeting of the American Physical Society Division of Fluid Dynamics, Virtual

Oliveira Santos, S., Ahn, B., Ward, T. *Flutter derivatives for 1-DOF bridge decks using semi-flexible cantilevers*, 71st meeting of the American Physical Society Division of Fluid Dynamics, Atlanta, GA

Invited lectures

Shrimp as a model organism for bio-inspired underwater vehicles

UT Robotics, UT Austin, TX, USA	October, 2025
Fluids Webinar, University of Houston, Houston, TX, USA	May, 2025
University of Texas Institute for Geophysics, UT Austin, TX, USA	April, 2025
Aerospace Engineering, UT Austin, TX, USA	March, 2025
Mechanical Engineering, The Cooper Union, NY, USA	March, 2025
Civil, Architectural and Environmental Engineering, UT Austin, TX, USA	January, 2025
University of Texas Marine Science Institute, Port Aransas, TX, USA	December, 2024
Integrated Bioscience, The University of Akron, Akron, OH, USA	August, 2024
CCOM, University of New Hampshire, Durham, NH, USA	April, 2024
Guest lecture, Bioinspired Robotics, University of Colorado, Boulder, CO, USA	October, 2023

How Shrimp Swim

Skype-a-Scientist, Online	May, 2025
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Towards a unifying theory of metachronal swimming

EEOB, Brown University, Providence, RI, USA	March, 2023
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Grants

Matagorda Bay Mitigation Trust, PENDING

"Oyster Reef Hydrodynamics from Organism to Matagorda Bay: A multi-scale approach to restoration"
PI: Benjamin Keisling, Co-I: Sara Santos (100%), Total Budget: \$448,182

Terry and Elliott Endowed Fund for Research in the Geosciences, UT Austin, 2025-2026

"Shaped-based navigation: Design of Passive Particle Tracers for Ocean Turbulence"
PI: Sara Santos, Total Budget: \$50,000

University of Texas Institute for Geophysics Innovation Award, 2024

"Design of Passive Particle Tracers for Ocean Turbulence Mapping"
PI: Benjamin Keisling, , Co-I: Sara Santos (100%), Total Budget: \$7,700

Brown University Hazeltine Innovation Award, 2023-2024

"The Fluid Mechanics of Breastfeeding"
PI: M.M. Wilhelmus, Total Budget: \$99,997

Teaching

Graduate Teaching Assistant, University of California, Riverside, CA, USA <i>Undergraduate Fluid Mechanics</i>	Winter 2021
Graduate Teaching Assistant, University of California, Riverside, CA, USA <i>Graduate Fluid Mechanics</i>	Winter 2021
Graduate Assistant, NSF-REU, Iowa State University, Ames, IA, USA <i>Launching Aerospace's Underrepresented Students into the Next Chapter- Unmanned Aerial Systems</i>	Summer 2019
Graduate Teaching Assistant, The University of Akron, OH, USA <i>Introduction to Fluid Mechanics</i>	Spring 2017
Graduate Teaching Assistant, The University of Akron, OH, USA <i>Gas Turbine Lab</i>	Spring 2017

Mentoring

Graduate students

Jessica Atkin	2022-Present
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Undergraduate students

Melissa Daurenova	2025
Mageean Brown	2023-2024
Nondi Walters	2021-2022

General impact

[The Andy Richter Call-In Show \(Jan 30 2025\)](#) , podcast

Animal Stories

[Discover Magazine \(Apr 10 2024\)](#) , in-print September/October 2024 issue

Space Hummus Anyone? Researchers Grow Chickpeas from Simulated Moondust

[New Scientist \(Nov 21 2023\)](#) 

Hairy legs make you swim better – if you're a shrimp

[Popular Science \(Jun 30 2023\)](#) 

This robotic leg could give machines krill-like swimming abilities

[New Atlas \(Jun 29 2023\)](#) 

Scientists copy krill to develop swarms of aquatic robots

[British Broadcasting Corporation \(BBC\) \(Feb 21 2022\)](#) 

RoboKrill: The tiny swimming robot inspired by krill

Service

University of Texas, Postdoc Research Symposium Committee	2025
University of Texas Institute for Geophysics, Graduate Award Committee	2025 - Present
Manuscript review, Journal of the Royal Society Interface	2024 - Present
Reviewer, American Society for Gravitational and Space Research	2024 - Present

Manuscript review, Biomimetics & Bioinspiration	2024 - Present
Manuscript review, Physical Review Fluids	2023 - Present
Volunteer Scientist, Skype a Scientist	2022 - Present
Volunteer Scientist, Sea Shepherd Portugal	2019 – 2024
Volunteer, Youth Pride Rhode Island	2023 – 2024
Society of Women Engineers, Iowa State University	2018 - 2019

Fellowships, Honors & Awards

Palisades Postdoctoral Fellowship, University of Texas at Austin	≈ \$200,000	2024–2026
Simon Ostrach Graduate Fellowship, Brown University	≈ \$96,000	2023–2024
Charlotte Mangum Support Award, SICB		2023
Graduate Travel Award, Brown University		2022, 2023
International Travel Fund Award, Brown University		2022
American Physical Society Travel Grant		2018
Presidential Scholar, Iowa State University	≈ \$150,000	2017–2019