

Sara Oliveira Santos

ssantos@ig.utexas.edu

Professional Experience

Distinguished Postdoctoral Scholar

2024 - Present

University of Texas at Austin, Institute for Geophysics

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

Can hair help you swim faster? Yes, if you ask shrimp!

S. Oliveira Santos, M.M. Wilhelmus

Under prep, available upon request

Analysis of Shrimp Appendage Cupping on Swimming Performance through a Bio-inspired Model

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

Under prep, available upon request

[Going around the bend to understand the role of leg coalescence in metachronal swimming](#) (2024)

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

Submitted, Journal of Experimental Biology. Pre-print: *bioRxiv* 2024.07.24.605009

[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

Accepted, Marine Biology. Pre-print: *arXiv* 2404.04413

[From dust to seed: a lunar chickpea story](#) (2024)

J. Atkin, **S. Oliveira Santos**

Pre-print: *bioRxiv* 2024.01.18.576311

[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

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

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

October, 2023

Towards a unifying theory of metachronal swimming

EEOB, Brown University, Providence, RI

March, 2023

Grants

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
Undergraduate Fluid Mechanics Winter 2021

Graduate Teaching Assistant, University of California, Riverside, CA, USA
Graduate Fluid Mechanics Winter 2021

Graduate Assistant, NSF-REU, Iowa State University, Ames, IA, USA
*Launching Aerospace’s Underrepresented Students into the Next Chapter-
Unmanned Aerial Systems* Summer 2019

Graduate Teaching Assistant, The University of Akron, OH, USA
Introduction to Fluid Mechanics Spring 2017

Graduate Teaching Assistant, The University of Akron, OH, USA
Gas Turbine Lab Spring 2017

Mentoring

Undergraduate students

Mageean Brown 2023-2024

Nondi Walters 2021-2022

High School students

Casper Bilderback Summer 2023

General impact

[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

[New Scientist \(Feb 16 2022\)](#) [↗](#)
Meet RoboKrill the one-legged robot that mimics the way krill swim [Video]

[British Broadcasting Corporation \(BBC\) \(Feb 21 2022\)](#) [↗](#)
RoboKrill: The tiny swimming robot inspired by krill

Service

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 – Present
Volunteer, Youth Pride Rhode Island	2023 – 2024
Society of Women Engineers, Iowa State University	2018 - 2019
Volunteer Scientist, Proyecto Raices, Akron, OH, USA	2015 - 2017

Fellowships, Honors & Awards

Simon Ostrach Graduate Fellowship, Brown University	2023
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	2017-2019
Mechanical Engineering Advisory Council Scholarship, University of Akron	2016
Dr. Paul C. Lam Memorial Scholarship, University of Akron	2016