

Curriculum Vitae and Table of Contents

Steven W. Tarr

Graduate Student

School of Physics

Georgia Institute of Technology (Georgia Tech)

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Georgia Institute of Technology (Georgia Tech)

I. Earned Degrees

Ph.D. (in progress), Physics, 2019–present Georgia Tech, Atlanta, GA, USA (advisor: E. Alicea-Muñoz)
B.S. *cum laude*, Physics, 2015–2019 Brandeis University, Waltham, MA, USA (advisor: B. Chakraborty)

II. Employment History

2022–present Graduate Research/Teaching Assistant, Georgia Tech (advisor: E. Alicea-Muñoz)
2020–2023 Graduate Research/Teaching Assistant, Georgia Tech (advisor: D. I. Goldman)
2017–2019 Undergraduate Research Assistant, Brandeis University (advisor: B. Chakraborty)
2016 Intern, Maker Depot, LLC
2015–2019 Student Worker, Brandeis University MakerLab
2013–2015 Ambassador, Liberty Science Center

III. Honors and Awards

2026 Awarded part of the Amelio Travel Fund from the Georgia Tech School of Physics Graduate Committee
2026 Recipient of the Georgia Tech School of Physics Charles K. Rice Jr. Fellowship award
2025 Awarded part of the Amelio Travel Fund from the Georgia Tech School of Physics Graduate Committee
2025 Recipient of Tech to Teaching Certificate from the Georgia Tech Center for Teaching and Learning
2025 Recipient of the Georgia Tech Institute-wide Graduate Teaching Assistant of the Year award
2025 Recipient of the Georgia Tech School of Physics Graduate Teaching Assistant of the Year award
2024 Awarded part of the Amelio Travel Fund from the Georgia Tech School of Physics Graduate Committee
2023 Recipient of CIRTL Associate Certificate from the Georgia Tech Center for Teaching and Learning
2022 Awarded part of the Amelio Travel Fund from the Georgia Tech School of Physics Graduate Committee
2021 Awarded part of the Amelio Travel Fund from the Georgia Tech School of Physics Graduate Committee
2019 Recipient of Highest Honors in Physics from Brandeis University

IV. Research, Scholarship, and Creative Activities

(* after name indicates an undergraduate co-author)

(" after name indicates co-first-authorship)

(† before item indicates work done at Brandeis University; all other work was at Georgia Tech)

A. Refereed Publications and Submitted Articles

A1. Published and Accepted Journal Articles

Tarr, S. W., Brunner, J. S.*, Alicea-Muñoz, E., & Goldman, D. I. (2025). The value of hands-on experiments in an upper-division classical mechanics course. *Emergent Scientist*, 9(1). <https://doi.org/10.1051/emsci/2024003>

Tarr, S. W., Brunner, J. S.*, Soto, D., & Goldman, D. I. (2024). Probing Hydrodynamic Fluctuation-Induced Forces with an Oscillating Robot. *Physical Review Letters*, 132(8), 084001. <https://doi.org/10.1103/PhysRevLett.132.084001>

Li, S., Gynai, H. N.*, **Tarr, S. W.**, Alicea-Muñoz, E., Laguna, P., Li, G., & Goldman, D. I. (2023). A robophysical model of spacetime dynamics. *Scientific Reports*, 13(1), 21589. <https://doi.org/10.1038/s41598-023-46718-4>

A2. Conference Presentations with Proceedings (Refereed)

Tarr, S. W., & Alicea-Muñoz, E. (2024). Reflecting to learn in a physics multimedia communication course. 2024 *Physics Education Research Conference Proceedings*, 432–437. <https://doi.org/10.1119/perc.2024.pr.Tarr>

A3. Submitted Journal Articles (with date of submission)

Alicea-Muñoz, E., Tarr, S. W., Carroll, G. T.*, Subiño Sullivan, C., & Schatz, M. F. (2026). Transforming the preparation of physics graduate teaching assistants: Evidence from a decade of longitudinal program assessment. Submitted to *Physical Review Physics Education Research* on 10 July 2025.

A4. Journal Articles in Preparation

Tarr, S. W., & Alicea-Muñoz, E. (2026). Developing Oral Presentation Skills in Science with Seminar Courses. I. Interdisciplinary Observations and Holistic Assessment of Student Growth, in preparation.

Tarr, S. W., & Alicea-Muñoz, E. (2026). Developing Oral Presentation Skills in Science with Seminar Courses. II. Outcomes and Recommendations from Research-based Curriculum Interventions, in preparation.

Tarr, S. W., Creyts, A., Hill, C.*, & Alicea-Muñoz, E. (2026). Impacts beyond plug-and-chug from numbers in introductory mechanics exam problems, in preparation.

B. Other Publications and Creative Products

Appell, D. (2024). An oscillating robot can propel itself via the reflection of water waves [Press Release featured in *Tech Xplore*], <https://techxplore.com/news/2024-03-oscillating-robot-propel.html>

†Tarr, S. (2019). Comparing the dynamics of three types of lattice-bound active particles [Undergraduate Thesis, Brandeis University]. <http://hdl.handle.net/10192/36664>

C. Presentations

C1. Invited Presentations at Conferences

Tarr, S. W. (2027, April). TBD [Oral Presentation by Tarr in an invited session tentatively titled *Scientific communications skills across the curriculum*]. American Physical Society Global Physics Summit, Atlanta, GA, USA.

C2. Invited Presentations at Universities & Institutes

Tarr, S. W. (2026, October). *The Science of Science Communication: Lessons from Research on Giving Presentations and Teaching Them, Too* [Oral Presentation by Tarr]. University of Georgia Science Café, Athens, GA, USA.

Tarr, S. W. (2026, June). *Education Research & Science Communication* [Oral Presentation by Tarr]. Georgia Tech Research Experiences for Pre-Service Teachers Program Lunch and Learn, Atlanta, GA, USA.

Tarr, S. W. (2025, June). *Education Research & Science Communication* [Oral Presentation by Tarr]. Georgia Tech Research Experiences for Pre-Service Teachers Program Lunch and Learn, Atlanta, GA, USA.

C3. Contributed Presentations at Conferences

Tarr, S. W., Hill, C.*, Creyts, A., & Alicea-Muñoz, E. (2026, July). “*I generally hate numbers.*”: Translating Instructor Attitudes about Problem-solving Representations to Student Performance in Introductory Mechanics [Poster Presentation by Tarr]. Physics Education Research Conference, Pasadena, CA, USA.

Tarr, S. W., Hill, C.*, Creyts, A., & Alicea-Muñoz, E. (2026, July). “*I generally hate numbers.*”: Translating Instructor Attitudes about Problem-solving Representations to Student Performance in Introductory Mechanics [Oral Presentation by Tarr]. American Association of Physics Teachers Summer Meeting, Pasadena, CA, USA.

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- Tarr, S. W.**, & Alicea-Muñoz, E. (2025, August). *Defining Success in Science Multimedia Communication Courses* [Poster Presentation by **Tarr**]. Physics Education Research Conference, Washington, DC, USA.
- Tarr, S. W.**, & Alicea-Muñoz, E. (2025, August). *Defining Success in Science Multimedia Communication Courses* [Oral Presentation by **Tarr**]. American Association of Physics Teachers Summer Meeting, Washington, DC, USA.
- Creyts, A.*, **Tarr, S. W.**, & Alicea-Muñoz, E. (2025, August). *Can Students Solve for x: Introductory Physics Students' Approaches to Problem Solving* [Poster Presentation by Creyts*]. Physics Education Research Conference, Washington, DC, USA.
- Creyts, A.*, **Tarr, S. W.**, & Alicea-Muñoz, E. (2025, August). *Can Students Solve for x: Introductory Physics Students' Approaches to Problem Solving* [Oral Presentation by Creyts*]. American Association of Physics Teachers Summer Meeting, Washington, DC, USA.
- Tarr, S. W.**, & Alicea-Muñoz, E. (2024, July). *Reflecting to Learn in a Physics Multimedia Communication Course* [Poster Presentation by **Tarr**]. Physics Education Research Conference, Boston, MA, USA.
- Tarr, S. W.**, & Alicea-Muñoz, E. (2024, July). *Reflecting to Learn in a Physics Multimedia Communication Course* [Oral Presentation by **Tarr**]. American Association of Physics Teachers Summer Meeting, Boston, MA, USA.
- Tarr, S.**, Brunner, J. S.*, Soto, D., & Goldman, D. I. (2023, March). *Boundary-driven Surface Wave Forces from a Self-propelling Vibrating Robot Boat* [Oral Presentation by **Tarr**]. American Physical Society March Meeting, Las Vegas, NV, USA.
- Chong, B., Diaz, K., **Tarr, S.**, Erickson, E.*, & Goldman, D. I. (2023, March). *Water surface swimming dynamics via continuous contact in lightweight centipedes* [Oral Presentation by Chong]. American Physical Society March Meeting, Las Vegas, NV, USA.
- Diaz, K., **Tarr, S.**, Chong, B., & Goldman, D. I. (2023, January). *Water surface swimming via continuous contact in a centipede* [Oral Presentation by Diaz]. SICB Annual Meeting, Austin, TX, USA.
- Soto, D., Hwang, J.*, **Tarr, S.**, Diaz, K., & Goldman, D. I. (2022, May). *Novel robot design for collective transport of soft matter in complex environments* [Poster Presentation by Soto]. ICRA 2022 Workshop on Collective Robotic Construction as part of the IEEE International Conference on Robotics and Automation, Philadelphia, PA, USA.
- Tarr, S. W.**, Aydin, E., & Goldman, D. I. (2022, March). *Locally Induced Analog Casimir Force from a Self-propelling Vibrating Robot Boat* [Oral Presentation by **Tarr**]. American Physical Society March Meeting, Chicago, IL, USA.
- Diaz, K., **Tarr, S. W.**, & Goldman, D. I. (2022, March). *Water surface swimming dynamics in centipedes* [Oral Presentation by Diaz]. American Physical Society March Meeting, Chicago, IL, USA.
- Brunner, J. S.*, Margolis, J.*, **Tarr, S.**, Soto, D., & Goldman, D. I. (2022, March). *Investigating Orbits of a Textbook Mass-Pulley System* [Oral Presentation by Brunner*]. American Physical Society March Meeting, Chicago, IL, USA.

- Tarr, S.**, Aydin, E., & Goldman, D. I. (2021, November). *Surface Wave and Transport Dynamics of a Self-propelling Vibrating Robot Fan Boat* [Oral Presentation by **Tarr**]. Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ, USA.
- Diaz, K., **Tarr, S.**, & Goldman, D. I. (2021, November). *Surface swimming dynamics of centipedes* [Oral Presentation by Diaz]. 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ, USA.
- Tarr, S.**, Castleman, B.*, Aydin, E., & Goldman, D. I. (2021, March). *Active Transport Dynamics with Wave-Based Interactions* [Oral Presentation by **Tarr**]. American Physical Society March Meeting, online.
- Li, S., Gynai, H.*, Ozkan-Aydin, Y., **Tarr, S.**, Laguna, P., & Goldman, D. I. (2021, March). *Substrate-mediated interaction of active agents on an elastic substrate* [Oral Presentation by Li]. American Physical Society March Meeting, online.
- Gynai, H.*, Li, S., Ozkan-Aydin, Y., **Tarr, S.**, Aydin, E., Laguna, P., & Goldman, D. I. (2021, March). *Nonlocal control of active agents on a deformable substrate* [Oral Presentation by Gynai*]. American Physical Society March Meeting, online.
- †**Tarr, S.***, Dutta, B., Chakraborty, B., & Goldman, D. I. (2018, October). *Programming Collective Behaviors with Brownian Robots* [Table Talk by **Tarr***]. Greater Boston Area Statistical Mechanics Meeting, Waltham, MA, USA.
- †**Tarr, S.***, Dutta, B., Chakraborty, B., & Goldman, D. I. (2018, August). *Programming Collective Behaviors with Brownian Robots* [Poster Presentation by **Tarr***]. Brandeis University SciFest VIII, Waltham, MA, USA.
- †Roy, I., Tynes, J., Henning, T.*, Simonson, A.*, **Tarr, S.***, & Cox, K.* (2017, September). *Instilling a Maker Mindset on Campus: Case Studies and Projects from the Student Perspective* [Panel Discussion moderated by Roy & Tynes]. World Maker Faire 2017, Corona, NY, USA.

D. Grants and Contracts

D1. Past Funding (obtained by my Ph.D. advisor in support of my research)

1. Role: Graduate Student (Not senior personnel)
 PI: Emily Alicea-Muñoz
 Collaborators: None
 Agency: Georgia Tech School of Physics (Needs Funding (Spring 2025))
 Total Amount: \$ 1,500
 Funds were used to purchase a laptop and software licensing for my Ph.D. work.
2. Role: Graduate Student (Not senior personnel)
 PI: Emily Alicea-Muñoz
 Collaborators: None
 Agency: Georgia Tech School of Physics (Seed Funds (Spring 2024))
 Total Amount: \$ 12,000
 Funds were used for my Graduate Research Assistant support in the Spring 2024 semester.

D2. Proposals Submitted but not Funded

1. Role: Graduate Student (Not senior personnel)
 PI: Emily Alicea-Muñoz
 Collaborators: None
 Title: The Many Faces of Science Communication in the Classroom

Agency: Spencer Foundation (Large Research Grants on Education)

Total Amount: \$ 253,675

Submitted: June 2025

2. Role: Graduate Student (Not senior personnel)

PI: Emily Alicea-Muñoz

Collaborators: None

Title: The Many Faces of Science Communication in the Classroom

Agency: National Science Foundation (IUSE: Improving Undergraduate STEM Education)

Total Amount: \$ 399,924

Submitted: January 2025

3. Role: Graduate Student (Not senior personnel)

PI: Emily Alicea-Muñoz

Collaborators: Michael F. Schatz (Co-PI)

Title: The Many Faces of Science Communication in the Classroom

Agency: National Science Foundation (IUSE: Improving Undergraduate STEM Education)

Total Amount: \$ 387,372

Submitted: January 2024

E. Other Professional Activities

05/01/2025

Completed **Tech to Teaching**, a three-semester certificate program offered by the Georgia Tech Center for Teaching and Learning designed to prepare Georgia Tech graduate students and postdocs for college teaching positions.

04/28/2025–04/29/2025

Completed **Canvas Campaigns**, a two-day training workshop for instructors offered by the Georgia Tech Center for Teaching and Learning designed to improve instructor capabilities with course web design on the Canvas platform.

02/21/2025–02/23/2025

Applied to, admitted to, and attended **ComSciCon-Atlanta 2025**, a series of workshops designed to empower graduate students to better communicate science across multiple disciplines and to the general public.

10/27/2021

Completed **Entering Mentoring** training workshop for graduate students and postdoctoral researchers offered by the Georgia Tech Undergraduate Research Opportunities Program in partnership with the Georgia Tech Graduate Education and Faculty Development office.

V. Teaching

A. Courses Taught

Spring 2027	PHYS 4605 (3 sections)	Scientific Communication	Co-instructor of record with Prof. I. Kimchi
Fall 2026	PHYS 6803	Physics GTA Preparation	Instructor of record
Spring 2026	PHYS 4605 (3 sections)	Scientific Communication	Co-instructor of record with Prof. I. Kimchi
Spring 2025	PHYS 4602 (2 sections)	Senior Seminar II	Co-instructor of record with Prof. I. Kimchi

B. Individual Student Guidance

B1. Undergraduate Students

Kevin Nguyen Georgia Tech Mathematics major, Fall 2026

Carson Hill Georgia Tech Physics major, Fall 2025 through Spring 2026

Abigail Creyts	Georgia Tech Physics major, Fall 2024 through Summer 2025
Dev Shah	Georgia Tech Mechanical Engineering major, Spring 2024 through Summer 2024
Joseph Brunner	Georgia Tech Physics major, Summer 2021 through Summer 2023
Joshua Margolis	Georgia Tech Physics major, Summer 2021 through Fall 2021
Blake Castleman	Georgia Tech Mechanical Engineering major, Fall 2020

B2. High School Student Interns

Ryan Hirsh Intern at Georgia Tech, Summer 2022

C. Other Teaching Activities

(† before item indicates work done at Brandeis University; all other roles were at Georgia Tech)

C1. Teaching Assistantships

Summer 2026	PHYS 2212	Principles of Physics II	Dr. S. Behrens
Fall 2025	PHYS 6803	Physics GTA Preparation	Dr. E. Alicea-Muñoz
Fall 2024	CETL 8000-PH1	Physics GTA Preparation	Dr. E. Alicea-Muñoz
Summer 2024	PHYS 2212	Intro Physics II	Dr. S. Behrens
Fall 2023	CETL 8000-PH1	Physics GTA Preparation	Dr. E. Alicea-Muñoz
Spring 2023	PHYS 2212 Head TA	Intro Physics II	Dr. E. Alicea-Muñoz & Prof. Z. Jiang
Fall 2022	CETL 8000-PH1	Physics GTA Preparation	Dr. E. Alicea-Muñoz
Summer 2022	PHYS 2212	Intro Physics II	Drs. E. Alicea-Muñoz & E. Greco
Spring 2022	PHYS 2212	Intro Physics II	Drs. E. Murray & M. Jarrio
Fall 2021	PHYS 3201	Classical Mechanics I	Prof. D. Goldman
Summer 2020	PHYS 2212	Intro Physics II	Prof. M. Schatz & Dr. E. Greco
Spring 2020	PHYS 2212	Intro Physics II	Drs. E. Murray & M. Jarrio
Fall 2019	PHYS 2212	Intro Physics II	Drs. E. Murray & M. Jarrio
†Spring 2019	PHYS 110A	Mathematical Physics	Prof. B. Chakraborty

C2. Guest Lectures

11/06/2026	PHYS 8002	Seminar & RCR Training	Part 2 of a two-part series on oral presentation skills in science (Georgia Tech School of Physics, GA, USA).
10/23/2026	PHYS 8002	Seminar & RCR Training	Part 1 of a two-part series on oral presentation skills in science (Georgia Tech School of Physics, GA, USA).
†04/2019	Waltham High School Science Class (4 sections)		Individualism in STEM and how to turn a passion for creative arts into success in science. Arranged by the Brandeis University Scientists in the Classroom Workshop (Waltham HS, MA, USA).

VI. Service**A. Professional Contributions**

Communications Manager for ComSciCon-Atlanta 2026, a series of workshops designed to empower graduate students to better communicate science across multiple disciplines and to the general public, from July 2025 through March 2026 with conference dates 02/12/2026–02/14/2026.

B. Public and Community Service

Mentor for five cohorts of first-year physics graduate students through the Graduate Association of Physicists Mentoring Program at Georgia Tech, Fall 2021 through Spring 2026.

Volunteer moderator for the U.S. Department of Energy Science Bowl regional competition hosted at Georgia Tech in February 2024.

C. Peer Review

Conference Proceedings: *Physics Education Research Conference Proceedings*

Journal: *The American Biology Teacher*