

# Emily Alicea-Muñoz

Academic Professional  
Georgia Institute of Technology  
School of Physics  
837 State Street  
Atlanta, GA 30332-0430

Office: Howey C-201  
Office Phone: 404-894-5249  
Email: [alicea@gatech.edu](mailto:alicea@gatech.edu)  
Twitter: [@drealiceam](https://twitter.com/drealiceam)  
Pronouns: she/her

## Professional Interests

Professional development of physics graduate teaching assistants; Assessment of teaching effectiveness; Introductory-level physics education research; Educational development; Informal education in physics and astronomy; Diversity, Equity, and Inclusion (DEI) in physics and astronomy  
Black holes and astrophysical compact objects; Gravitational waves; Cosmology; Stellar evolution

## Education

**Georgia Institute of Technology (Atlanta, GA)**  
Ph.D. Physics, Doctoral Minor in Higher Education 2020

**Pennsylvania State University (University Park, PA)**  
Ph.D. A.B.D. Astronomy and Astrophysics A.B.D.  
M.S. Astronomy and Astrophysics 2011

**University of Puerto Rico, Mayagüez Campus (Mayagüez, PR)**  
B.S. Physics, Magna Cum Laude 2003

## Certifications and Professional Development

**Georgia Institute of Technology (Atlanta, GA)**  
The Inclusive STEM Teaching Project 2021  
Tech To Teaching, Advanced Certificate 2014  
Tech To Teaching, Intermediate Certificate 2013

## Employment History

**Georgia Institute of Technology (Atlanta, GA)**  
Academic Professional 2021 – present  
Research Technician 2020

**NASA Goddard Space Flight Center (Greenbelt, MD)**  
Student Trainee, Astrophysics Science Division 2004 – 2011

## Teaching

**Georgia Institute of Technology (Atlanta, GA)**  
Instructor of Record

- PHYS 2211 – Intro Physics 1 (Sections M, N, R, RBS) Fall 2022
- PHYS 8002 – Seminar/Responsible Conduct of Research Fall 2022
- CETL 8000 PH1 – Physics GTA Preparation Fall 2022
- PHYS 2211 – Intro Physics I (remote / Section M) Summer 2022
- PHYS 2212 – Intro Physics II (remote / Section K) Summer 2022

- PHYS 2211 – Intro Physics I (Sections K, M, R) Spring 2022
- PHYS 2211 – Intro Physics I (remote / Sections M, R) Fall 2021
- PHYS 8002 – Seminar/Responsible Conduct of Research Fall 2021
- CETL 8000 PH1 – Physics GTA Preparation Fall 2021
- PHYS 2211 – Intro Physics I (remote / Section M) Summer 2021
- PHYS 2212 – Intro Physics II (remote / Section K) Summer 2021
- PHYS 2211 – Intro Physics I (remote / Sections M, R, SZ) Spring 2021
- PHYS 2211 – Intro Physics I (remote / Sections M, R, SZ) Fall 2020
- PHYS 8002 – Seminar/Responsible Conduct of Research Fall 2020
- CETL 8000 PH1 – Physics GTA Preparation Fall 2020
- PHIL 6000 – Responsible Conduct of Research (Sections A, D, E) Summer 2020
- CETL 8000 PH1 – Physics GTA Preparation Fall 2019
- CETL 8000 PH1 – Physics GTA Preparation Fall 2018
- CETL 8000 PH1 – Physics GTA Preparation Fall 2017
- CETL 8000 PH1 – Physics GTA Preparation Fall 2016
- CETL 8000 PH1 – Physics GTA Preparation Fall 2015
- CETL 8000 PH1 – Physics GTA Preparation Fall 2014

#### Co-Instructor

- PHYS 2211 – Introduction to Physics I (SOUP) Summer 2020
- PHYS 2212 – Introduction to Physics II (SOUP) Summer 2020
- PHYS 2211 – Intro Physics I (online/GT Lorraine, Section R) Spring 2020
- PHYS 2212 – Intro Physics II (online/GT Lorraine, Section R) Spring 2020
- CETL 8000 PH1/PH2 – Physics GTA Preparation Fall 2013

#### Head TA

- PHYS 2211 – Introduction to Physics I (SOUP) Summer 2019
- PHYS 2212 – Introduction to Physics II (SOUP) Summer 2019
- PHYS 2212 – Introduction to Physics II (SOUP) Summer 2018
- PHYS 2212 – Intro Physics II (Sections P, Q) Spring 2017
- PHYS 2211 – Introduction to Physics I (SOUP) Summer 2016
- PHYS 2212 – Intro Physics II (Sections P, Q) Spring 2016
- PHYS 2211 – Intro Physics I (Sections C, M, N) Fall 2015
- PHYS 2211 – Introduction to Physics I (SOUP) Summer 2015
- PHYS 2211 – Intro Physics I (Sections K, M, N) Spring 2015
- PHYS 2211 – Intro Physics I (Sections M, N) Fall 2014
- PHYS 2211 – Intro Physics I (Section K) Spring 2014
- PHYS 2211 – Intro Physics I (Section M) Fall 2013
- PHYS 2211 – Intro Physics I (Sections K, M, N) Spring 2013

#### Teaching Assistant

- PHYS 2211 – Intro Physics I (online/GT Lorraine, Section R) Spring 2019
- PHYS 2212 – Intro Physics II (online/GT Lorraine, Section R) Spring 2019
- PHYS 2211 – Intro Physics I (online/GT Lorraine, Section R) Fall 2018
- PHYS 2212 – Intro Physics II (online/GT Lorraine, Section R) Fall 2018
- PHYS 2211 – Introduction to Physics I (SOUP) (Piazza) Summer 2017
- PHYS 2212 – Intro Physics II (curriculum revision) Summer 2014
- PHYS 2211 – Intro Physics I (Flipped Lab Section M01) Spring 2014

- Introductory Physics I with Laboratory MOOC (Piazza) Summer 2013
- PHYS 2211 – Intro Physics I (Lab Section N03) Fall 2012

**University of Texas at Brownsville (South Padre Island, TX)**

Teaching Assistant, Third Gravitational Wave Astronomy Summer School 5 – 9 June 2006

- Week 2: Gravitational Waves Sources (Dr. M. Coleman Miller)

**Pennsylvania State University (University Park, PA)**

Teaching Assistant, ASTRO 011 – Introductory Astronomy Lab Spring 2006

- Lab Section 9, Lab Section 12
- Development of TA Choice Lab (“Black Holes”)

## Research

**Georgia Institute of Technology (Atlanta, GA)**

Academic Professional, School of Physics 2020 – present

- Physics GTA Professional Development
- Ph.D. Candidate (Physics Education Research), School of Physics 2012 – 2020
- Dissertation: Transforming the Preparation of Physics Graduate Teaching Assistants
  - Supervisor: Dr. Michael F. Schatz

**NASA Goddard Space Flight Center (Greenbelt, MD)**

Student Trainee, Astrophysics Science Division 2004 – 2011

Code 663: Gravitational Astrophysics Laboratory

- Project: Black Hole Mergers as Probes of Structure Formation
- Supervisors: Dr. M. Coleman Miller, Dr. Joan M. Centrella

Intern, Summer Institute in Engineering and Computer Applications (SIECA) Summer 2003

Code 662: X-Ray Astrophysics Laboratory

- Project: PoST Pixel Differentiation at Low X-Ray Energies
- Supervisor: Dr. Enectali Figueroa-Feliciano

**Harvard-Smithsonian Center for Astrophysics (Cambridge, MA)**

Intern, Smithsonian Astrophysical Observatory Summer 2002

- Project: Search for Pulsations in Metal-Deficient Field Giants
- Supervisor: Dr. Andrea K. Dupree

**National Institute of Standards and Technology (Gaithersburg, MD)**

Summer Undergraduate Research Fellow Summer 2001

- Project: Diffraction Effects in SURF Beamline 3
- Supervisor: Dr. Eric L. Shirley

**University of Puerto Rico, Mayagüez Campus (Mayagüez, PR)**

Undergraduate Research Assistant, Department of Physics 2001 – 2002

- Project: Investigations of Single Pulses from Radio Pulsars
- Supervisor: Dr. Leszek A. Nowakowski

## Students Supervised

**Georgia Institute of Technology (Atlanta, GA)**

Steven W. Tarr (graduate) Summer 2022 – present

- Project: TBD

- Gregory T. Carroll (undergraduate) Spring 2022 – present
- Project: A National Survey of Physics Graduate TA Preparation
- Joan Espar Masip (undergraduate, Universitat Politècnica de Catalunya) Fall 2016
- Project: Effects of a Professional Development Program on GTA Teaching Effectiveness

## Outreach

### Georgia Institute of Technology (Atlanta, GA)

- Guest Lecturer, GT 1000 PHY – First-Year Seminar 2018 – 2021
- Presentation: “Black Holes”
- Public Talks for Breast Cancer Awareness 2021
- Presentation: “Breast cancer: detection, treatment, and survival // Things I wish I knew about breast cancer before my boob tried to kill me”
- Public Nights at the Georgia Tech Observatory 2012 – 2016
- Summer Camp, “Thrill-A-Minute: Roller Coaster Physics” 2013 – 2015
- Assisted Dr. Edwin Greco in running week-long physics summer camps for high school and middle school students
- Direct to Discovery (D2D) Participating Researcher 2013

### The School Break, “Fun, Learn, Go! Summer Camp” (Austell, GA)

- Guest Speaker, “Space is the Place” 10 June 2013

### NASA Goddard Space Flight Center (Greenbelt, MD)

- Volunteer, “Ask an Astrophysicist” Website 2006 – 2010
- [http://imagine.gsfc.nasa.gov/docs/ask\\_astro/ask\\_an\\_astronomer.html](http://imagine.gsfc.nasa.gov/docs/ask_astro/ask_an_astronomer.html)

### University of Puerto Rico, Mayagüez Campus (Mayagüez, PR)

- Physics Week 2002, 2003
- Physics demos for high school students
  - “Physics Show” performance and organizing committee
- Caribbean Astronomical Society 2000 – 2002
- Helped with Open Houses at UPRM Planetarium and Observatory
  - Public talks in various astronomy topics (celestial mechanics, pulsars, stars)

## Service

### Conference Organization & Peer Review

- Reviewer for: *PERC Proceedings, Physical Review Physics Education Research*,  
 POD Network Conferences, *The Physics Teacher*
- Program Committee, Dynamics Days 2022 7 – 8 January 2022
- Parallel session organizer, PERC 2020 July 2020
- Coordinator and Facilitator, Cottrell Scholars National TA Workshop 2019 29 – 31 May 2019
- Coordinator and Facilitator, Cottrell Scholars National TA Workshop 2017 31 May – 2 June 2017
- Pre-conference workshop organization, AAPT 2017 Winter Meeting 18 February 2017
- Coordinator, Cottrell Scholars National TA Workshop 2015 27 – 29 May 2015
- Coordinator, Cottrell Scholars National TA Workshop 2014 28 – 30 May 2014
- Co-facilitator, Atlanta Public Schools Teachers’ Workshop 13 October 2012

### Georgia Institute of Technology (Atlanta, GA)

- Member, Undergraduate Program Committee, School of Physics 2021 – present
- Co-Chair, Diversity, Equity, and Inclusion (DEI) Committee, School of Physics 2021 – present

Faculty Advisor, Society of Women in Physics (SWiP)	2020 – present
Member, Diversity, Equity, and Inclusion (DEI) Task Force, School of Physics	2020 – 2021
Volunteer, Chestatee Academy recruitment visit to Georgia Tech	30 January 2019
Volunteer, FOCUS 2019	19 January 2019
Volunteer, 5th Annual Latino College & STEM Fair	18 March 2017
Volunteer, SW Miami High School recruitment visit to Georgia Tech	17 November 2016
Volunteer, Chestatee Academy recruitment visit to Georgia Tech	14 November 2016
Volunteer, 4th Annual Latino College & STEM Fair	19 March 2016
Volunteer, FOCUS 2016	14, 16 January 2016
Volunteer, Chestatee Academy recruitment visit to Georgia Tech	4 December 2015

#### **NASA Goddard Space Flight Center (Greenbelt, MD)**

Organizer, Gravitational Astrophysics, Instrumentation, and Numerics Journal Club	Spring 2007
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#### **Pennsylvania State University (University Park, PA)**

Member, Website Committee, Department of Astronomy and Astrophysics	2005 – 2006
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## Honors and Awards

(2) Thank-a-Teacher Award (PHYS 2211, Fall 2021)	2021
(5) Thank-a-Teacher Awards (PHYS 2211, Spring 2021)	2021
(3) Thank-a-Teacher Awards (PHYS 2211, Fall 2020)	2020
(2) Thank-a-Teacher Awards (PHYS 2211, PHYS 2212, Summer 2020)	2020
OMED Tower Award (Georgia Tech)	2020
Weatherly Travel Award (Georgia Tech)	2017
SGA Conference Fund Award (Georgia Tech)	2017
Graduate Student Instructor of the Year (Georgia Tech)	2017
School of Physics Graduate Student Instructor of the Year (Georgia Tech)	2017
POD Network GPSD Career Development Award	2016
SGA Conference Fund Award (Georgia Tech)	2016
Goizueta Foundation Fellowship (Georgia Tech)	2015 – 2019
AAPT Outstanding Physics Teaching Assistant Award (Georgia Tech)	2015
AAPT Outstanding Physics Teaching Assistant Award (Georgia Tech)	2013
Time Off Award for Excellent Research Progress (NASA GSFC)	2010
Nominated, Sloan Fellows Program (Penn State)	2006, 2010
Bunton-Waller Fellowship (Penn State)	2003 – 2005
Braddocks/Roberts Fellowship (Penn State)	2003
Rahsaan Jackson Presentation Award (NASA GSFC)	2003
Enrico Fermi Physics Award (UPR Mayagüez)	2003

## Professional Societies

Professional and Organizational Development (POD) Network in Higher Education	2016 – present
American Association of Physics Teachers (AAPT)	2013 – present
<ul style="list-style-type: none"> <li>Physics Education Research Special Interest Group</li> </ul>	2002 – present
American Physical Society (APS)	
<ul style="list-style-type: none"> <li>Topical Group on Physics Education Research (GPER)</li> </ul>	
<ul style="list-style-type: none"> <li>Forum on Diversity and Inclusion (FDI)</li> </ul>	
<ul style="list-style-type: none"> <li>Forum on Early Career Scientists (FECS)</li> </ul>	
<ul style="list-style-type: none"> <li>Forum on Education (FEEd)</li> </ul>	
<ul style="list-style-type: none"> <li>Forum on Outreach and Engaging the Public (FOEP)</li> </ul>	

American Astronomical Society (AAS)	2001 – 2022
Golden Key (GK) International Honour Society, UPRM Chapter	2001 – 2003
Caribbean Astronomical Society (CAS)	2000 – 2003
Society of Physics Students (SPS), UPRM Chapter	2000 – 2003
• Historian, Webmaster	

## Refereed Publications

1. E. Alicea-Muñoz, C. Subiño Sullivan, M.F. Schatz. **Transforming the Preparation of Physics GTAs II: Program Assessment.** In preparation.
2. E. Alicea-Muñoz, C. Subiño Sullivan, M.F. Schatz. **Transforming the Preparation of Physics GTAs: Curriculum Development.** Phys. Rev. Phys. Educ. Res. 17, 020125 (2021)
3. E. Alicea-Muñoz, J. Espar Masip, C. Subiño Sullivan, M.F. Schatz. **Assessing a GTA professional development program.** Physics Education Research Conference Proceedings (2017)
4. S.S. Douglas, J.M. Aiken, S.-Y. Lin, E.F. Greco, E. Alicea-Muñoz, M.F. Schatz. **Peer Assessment of Student-Produced Mechanics Lab Report Videos.** Phys. Rev. Phys. Educ. Res., 13, 020126 (2017)

## Non-Refereed Publications

1. E. Alicea-Muñoz, M.C. Miller. **Black Hole Mergers as Probes of Structure Formation.** NASA Technical Reports Server (NTRS) Document ID 20080040733 (2008)

## Seminars, Colloquia, and Invited Talks

1. **Classroom observations as part of TA training.** Invited Talk, American Association of Physics Teachers 2022 Summer Meeting (Grand Rapids, MI), July 2022
2. **Time Management for Physics TAs.** Invited Workshop (remote), Engaging Physics Tutoring Hub, Department of Physics, ETH Zürich, Switzerland, 28 April 2022
3. **Transforming the Preparation of Physics Graduate Teaching Assistants.** Physics Colloquium (remote), Department of Physics, Ohio State University, 26 January 2021
4. **Transforming the Preparation of Physics GTAs.** Juried Talk, Virtual Physics Education Research Conference, July 2020
5. **Roleplaying in GTA Preparation: Microteaching and Lab Simulation.** Invited Talk, American Association of Physics Teachers 2020 Virtual Summer Meeting, July 2020
6. **Transforming the Preparation of Physics Graduate Teaching Assistants.** PER Seminar, Department of Physics and Astronomy at Michigan State University (East Lansing, MI), 4 December 2019
7. **TA Professional Development: A Graduate Student's Perspective.** Invited Talk, APS March Meeting 2016 (Baltimore, MD), 17 March 2016
8. **Mentoring TAs: Lessons Learned from the Physics GTA Development Program.** Invited Talk, CETL Engaging Conversations Brown Bag Lunch Series, Georgia Tech (Atlanta, GA), 3 September 2014
9. **Black Hole Mergers as Probes of Structure Formation.** Colloquium, Astrophysics Science Division Seminar, NASA Goddard Space Flight Center (Greenbelt, MD), 4 June 2010
10. **Black Hole Mergers as Probes of Structure Formation.** Invited Talk, Department of Astrophysics, American Museum of Natural History (New York, NY), 8 February 2007

## Contributed Research Talks

1. **Remote GTA Preparation: The Good, the Bad, and the Ugly.** Contributed Talk, American Association of Physics Teachers 2021 Virtual Summer Meeting, July 2021

2. **Research Results and Best Practices for GTA Preparation.** Contributed Talk, American Association of Physics Teachers 2020 Virtual Summer Meeting, July 2020
3. **Looking back on six years of GTA preparation.** Contributed Talk, American Association of Physics Teachers 2019 Summer Meeting (Provo, UT), 22 July 2019
4. **What elements of GTA development do GTAs find most useful?** Contributed Talk, American Association of Physics Teachers 2017 Summer Meeting (Cincinnati, OH), 24 July 2017
5. **Effects of a professional development program on GTA teaching effectiveness.** Contributed Talk, American Association of Physics Teachers 2017 Winter Meeting (Atlanta, GA), 20 February 2017
6. **Disciplinary TA Development: Partnerships between Centers and Departments.** Interactive Session (co-presented with Dr. Carol Subiño Sullivan), 41st Annual POD Network Conference (Louisville, KY), 12 November 2016
7. **Design and Implementation of a Physics GTA Development Program.** Contributed Talk, American Association of Physics Teachers 2015 Summer Meeting (College Park, MD), 29 July 2015
8. **Training and Career Development of Physics Teaching Assistants.** Contributed Talk, American Association of Physics Teachers 2014 Summer Meeting (Minneapolis, MN), 28 July 2014
9. **Black Hole Mergers as Probes of Structure Formation.** Research Talk, 11th Eastern Gravity Meeting, Pennsylvania State University (University Park, PA), 13 May 2008
10. **Black Hole Mergers as Probes of Structure Formation.** Minute Talk, Extragalactic Astronomy Conference 2, NASA Goddard Space Flight Center (Greenbelt, MD), 14 September 2007
11. **Black Hole Mergers as Probes of Structure Formation.** Research Talk, Department of Astronomy and Astrophysics, Pennsylvania State University (University Park, PA), 6 March 2007
12. **Massive Black Hole Merger Rates.** Research Talk, 9th Eastern Gravity Meeting, Massachusetts Institute of Technology (Cambridge, MA), 24 March 2006
13. **Massive Black Hole Binary Merger Rates in a Hierarchical Model of Structure Formation.** Research Talk, SIECA Intern Presentations, NASA Goddard Space Flight Center (Greenbelt, MD), 3 August 2004
14. **PoST Pixel Differentiation at Low X-Ray Energies.** Research Talk, SIECA Intern Presentations, NASA Goddard Space Flight Center (Greenbelt, MD), 29 July 2003
15. **Pulsations in Metal-Deficient Field Giants.** Research Talk, Smithsonian Astrophysical Observatory Intern Symposium, Harvard-Smithsonian Center for Astrophysics, (Cambridge, MA), 14 August 2002
16. **Investigations of Single Pulses from Radio Pulsars.** Research Talk, 22nd Puerto Rico Interdisciplinary Scientific Meeting (Arecibo, PR), 16 March 2002
17. **Diffraction Effects in SURF Beamline 3.** Research Talk, Summer Undergraduate Research Fellows Colloquium, National Institute of Standards and Technology, (Gaithersburg, MD), 10 August 2001
18. **Investigations of Single Pulses from Radio Pulsar PSR 0540+23.** Research Talk, 21st Puerto Rico Interdisciplinary Scientific Meeting (Ponce, PR), 10 March 2001

## Research Posters

1. G.T. Carroll, E. Alicea-Muñoz. **A National Survey of Physics Graduate TA Preparation.** Physics Education Research Conference (Grand Rapids, MI), July 2022
2. E. Alicea-Muñoz, J. Espar Masip, C. Subiño Sullivan, M.F. Schatz. **Assessing a GTA Professional Development Program.** Physics Education Research Conference (Cincinnati, OH), July 2017
3. E. Alicea-Muñoz, C. Subiño Sullivan, M.F. Schatz. **GTA Preparation in the School of Physics.** Georgia Tech STEM Education Research Expo (Atlanta, GA), February 2015

4. E. Alicea-Muñoz, C. Subiño Sullivan, D. Koh, M.F. Schatz. **Training and Career Development of Physics Teaching Assistants.** Physics Education Research Conference (Minneapolis, MN), July 2014
5. E. Alicea-Muñoz, M.C. Miller. **Using Black Hole Mergers to Explore Structure Formation.** 213th Meeting of the American Astronomical Society (Long Beach, CA), January 2009
6. E. Alicea-Muñoz, M.C. Miller. **Using Black Hole Mergers to Explore Structure Formation.** 24th Texas Symposium on Relativistic Astrophysics (Vancouver, BC, Canada), December 2008
7. E. Alicea-Muñoz, J. Baker, J. Centrella, P. Laguna, M.C. Miller, M. Ricotti. **Massive Black Hole Merger Rates.** 207th Meeting of the American Astronomical Society (Washington, DC), January 2006
8. E. Alicea-Muñoz, J. Baker, J. Centrella, P. Laguna, R. Matzner. **Massive Black Hole Binary Merger Rates in a Hierarchical Model of Structure Formation.** APS April Meeting 2005 (Tampa, FL), April 2005
9. E. Alicea-Muñoz, A.K. Dupree. **Pulsations in Metal-Deficient Field Giants.** 201st Meeting of the American Astronomical Society (Seattle, WA), January 2003
10. E. Alicea-Muñoz, E.L. Shirley. **Diffraction Effects in SURF Beamline 3.** 22nd Puerto Rico Interdisciplinary Scientific Meeting (Arecibo, PR), March 2002