Andrea J. Welsh, Ph.D.

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RESEARCH EXPERIENCE

Texas A&M University — College Station, TX
Visiting Assistant Professor, Department of Mathematics — August 2024 - Present

University of Pittsburgh — Pittsburgh, PA
Postdoctoral Associate, Department of Mathematics — August 2020 - July 2024

- Producing oscillatory plane waves in discrete and continuum models
- Mouse colon motility modeling and data analysis
- Modeling cluster states in firefly flashing dynamics

Georgia Institute of Technology — Atlanta, GA
Postdoctoral Researcher, School of Physics — August 2019 - July 2020

- Bistability in coupled saline oscillators
- Modeling brine shrimp as self-propelled Brownian particle
- Temperature effects on brine shrimp swimming dynamics

Graduate Research Assistant, School of Physics — August 2012 - July 2019

- Bistability and chimera states in an extended FitzHugh Nagumo model
- Spontaneous pattern formation of brine shrimp swarms in shallow suspensions
- "Living Simulations" of human crowds with cellular automata rules
- Creating Arduino set-ups for waves, chaos and synchronization visualization
- Dynamics and patterns from local coupling in Kuramoto Models

CERN — Meyrin, Switzerland
Undergraduate Research Assistant — January 2010 - August 2010

- Muon Drift tube chamber alignment simulations
- Test beam experiments

SUNY Stony Brook — Stony Book, NY
Undergraduate Research Assistant — May 2009 - August 2009

- High Voltage Filter Modules of the Liquid Argon Calorimeter
- Coded and ran J/ψ Monte Carlo simulations in C++
- Analyzed data from Monte Carlo simulations using ROOT

Boston University — Boston, MA
Undergraduate Research Assistant — May 2008 - May 2009

- Graphene fabrication
- Low temperature annealing

EDUCATION

Georgia Institute of Technology
Ph.D. Physics, *Advisor: Professor Flavio H. Fenton* — *July 2019*
M.S. Physics — *December 2013*

University of Texas - Austin
Graduate course work in mathematics and physics — *August 2011-July 2012*

Boston University
B.A. Physics and Mathematics, minor in Latin *May 2011*

Universitè de Genève
Undergraduate coursework in physics *January 2010-May 2010*

PUBLICATIONS

Peer-Reviewed

8. Andrea J Welsh et al. "Rhythmic motor networks in proximal colon: An evidence-based hypothesis and computational model". In: *Manuscript in Preparation* (2025)
7. Andrea J Welsh and Flavio H. Fenton. "Dynamics and Chimeras in the fifth order FitzHugh-Nagumo model". In: *Manuscript in Preparation* (2025)
6. Wilmarie Morales-Soto et al. "Rhythmic motor networks in the proximal colon are altered by inflammation". In: *Neurogastroenterol. Motil.* Vol. 36. 2024. DOI: https://doi.org/10.1016/S0016-5085(24)00588-2
5. Andrea J Welsh and Bard Ermentrout. "Mechanisms for Producing Oscillatory Plane Waves in Discrete and Continuum Models". In: *SIAM Journal on Applied Mathematics* (2023), S151–S171. DOI: https://doi.org/10.1137/22M150652
4. Brian Edwards et al. "Cyclical ICC-ENS interactions act as the pacemaker for the rhythmic motility in the proximal colon: and evidence-based hypothesis". In: *GE.* vol. 164. 6. Elsevier, 2023, S93–S94. DOI: https://doi.org/10.1016/S0016-5085(23)01186-1
3. Andrea J Welsh et al. "Simulating waves, chaos and synchronization with a microcontroller". In: *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29.12 (2019). DOI: https://doi.org/10.1063/1.5094351
2. Andrea J Welsh. "Coming together individuals at different scales working for a common goal". Available at http://hdl.handle.net/1853/62292. PhD thesis. Atlanta, GA: Georgia Institute of Technology, Dec. 2019
1. Andrea J Welsh, Edwin F Greco, and Flavio H Fenton. "Dynamics of a human spiral wave". In: *Physics Today* 70.2 (2017), pp. 78–79. DOI: http://dx.doi.org/10.1063/PT.3.3474.

Commentary

9. Andrea J Welsh. "Scientists Don't Succeed in a Vacuum. Why Expect This of Graduate Students?" In: *APSNews The Back Page* 31.9 (Oct. 2022). URL: https://www.aps.org/publications/apsnews/202210/backpage.cfm
8. Andrea J Welsh. "My Queer Imposter Syndrome". In: *Voices of Academia* (Nov. 2020)
7. Zoë Ayres, Andrea Welsh, and Joeri Tijdink. "Speaking up for Mental Health". In: *Physics* 13 (2020), p. 93. URL: https://physics.aps.org/articles/v13/93
6. Andrea J Welsh. "Student Feature". In: *The Dynamical Systems Web* (2020). URL: https://dsweb.siam.org/The-Magazine/All-Issues/student-feature-andrea-welsh
5. Andrea J Welsh. "Supportive Groups Are Vital for Mental Health". In: *Physics Magazine* (Aug. 2020). URL: https://physics.aps.org/articles/v13/93
4. Andrea J Welsh. "Covert Care: The Cycle of Mental Health and Conference Fatigue". In: *oSTEM Blog* (Apr. 2019). URL: https://www.ostem.org/stories/covert-care
3. Andrea J Welsh. "It's time for physicists to talk about mental health". In: *Physics Today* (2017). DOI: http://dx.doi.org/10.1063/PT.6.3.20170531a

2. Andrea J Welsh. "Snowbird Meeting Turns Chaotic: SIAM Dynamical Systems 2015 Conference Review". In: *The Dynamical Systems Web* (July 2015). URL: https://dsweb.siam.org/The-Magazine/All-Issues/snowbird-meeting-turns-chaotic

1. Christopher Marcotte and Andrea Welsh. "Dynamics Day US XXXIII Conference Review". In: *The Dynamical Systems Web* (Jan. 2014). URL: https://dsweb.siam.org/The-Magazine/Article/dynamics-days-2014-1

AWARDS (7)

1. APS GSNP Student Speaker Award Finalist — March 2019
2. APS FGSA Travel Award for Excellence in Graduate Research — October 2018
3. Best Contributed Talk, 15th ECC Conference, Madrid, Spain — June 2018
4. GT Lavender Award for LGBTQIA Student Leadership — Spring 2017
5. GT Diversity Championship Award — Fall 2015
6. AAPT Outstanding Teaching Assistant Award — Spring 2015
7. GT Women's Leadership Conference- Outstanding Graduate Student — Fall 2014

GRANTS AND FELLOWSHIPS(15)

1. NSF: Materials Research Science and Engineering Centers (MRSEC) *(Submitted June 2025)*
2. American Physical Society
   (a) Simons Travel & Professional Development Award ($8400) — February 2025
3. Georgia Institute of Technology, School of Physics, Atlanta, GA
   (a) Weatherly Travel Grant ($1000) — June 2018
   (b) Weatherly Travel Grant ($1000) — May 2017
4. SIAM Travel Awards
   (a) Conference on the Life Sciences (LS16), Boston, MA ($650) — March 2016
   (b) Conference on Applications of Dynamical Systems (DS15), Snowbird, UT ($650) — Dec 2014
5. Miscellaneous Travel Awards
   (a) Active Materials Project Summer School, ($500)
   Georgetown University, Washington, DC — June 2017
   (b) Frontiers in Physics, Pattern Formation, and Complex Materials Far From Equilibrium, ($500)
   National Academy of Sciences, Washington DC — October 2015
   (c) Dynamics of Coupled Oscillators: 40 years of the Kuramoto Model Workshop, (550€)
   Max Planck Institute for Physics of Complex Systems, Dresden, Germany — July 2015
6. Graduate Woman of Distinction ($1000) — October 2014
   Women's Leadership Conference, Georgia Institute of Technology, Atlanta, GA
7. John L and Anne Crawford Endowed Presidential Scholarship ($15000) — Spring 2012
   University of Texas- Austin, Austin TX
8. Undergraduate Research Opportunities Program (UROP) Grants, Boston University
   (a) Calibration and Monitoring of LHC's ATLAS Muon Spectrometer, ($2000) — Summer 2010

(b) Calibration and Monitoring of LHC's ATLAS Muon Spectrometer, ($4000) Spring 2010

(c) Graphene Fabrication and Spectroscopy, ($500) Spring 2009

9. Research Experience for Undergraduates (REU) Internships

(a) Particle Physics Experiment and Computation, SUNY Stony Brook, ($3300) Summer 2009

(b) Graphene Annealing, Boston University Photonics Center, ($4400) Summer 2008

INVITED TALKS (TOTAL 22)

1. Colloquium, Auburn University, Department of Physics April 2024
Gut Instincts: A data-driven dynamical model of mouse colons

2. MathFest Invited Paper Session, Trends in Mathematical and Computational Biology August 2023
Gut Instincts: A data-driven dynamical model of mouse colons

3. ~~MathFest Invited Paper Session, Trends in Mathematical and Computational Biology August 2022~~
~~*Gut Instincts: A data-driven dynamical model of mouse colons*~~ (Cancelled due to health)

4. Seminar, Center for Nonlinear Dynamics, University of Texas -Austin May 2022
The emergence of plane waves and targets in networks of locally neurooscillator

5. Colloquium, Department of Physics, University of Texas -Austin April 2022
Mental Health of Academics: How a High Pressure Environment and Lack of Guidance leads to higher levels of Stress and Mental Health Concerns

6. APS Division of Particle Physics Women+ Reception Speaker November 2021
Mental health in the Sciences

7. European Physical Society: Young Minds May 2021
Dealing with Mental Health as a Young Scientist

8. Colloquium – Department of Physics, College of William and Mary April 2021
Dealing with Mental Health as a Young Scientist

9. Snowmass Town Hall, February 2021
Panel of experts on mental health concerns

10. Grad Student Seminar, University of Notre Dame, Department of Physics January 2021
Dealing with Mental Health as a Young Scientist

11. LIGO-Virgo-KAGRA Collaboration Meeting September 2020
Mental health challenges for early career physicists

12. APS March Meeting, FECS Invited Session, Denver, Colorado (hosted virtually) March 2020
Mental health challenges for early career physicists

13. Seminar, Department of Physics and Astronomy, Tufts University March 2019
Swarms and Cells: Collective Behavior via Local Interactions in Biological Systems

14. Seminar, Department of Physics, Loyola University, New Orleans February 2019
Swarms and Cells: Collective Behavior in Biological Systems

15. Colloquium, Department of Physics and Astronomy, University of Mississippi November 2018
Coming Together: Individuals at Different Scales Working for A Common Goal

16. Seminar, Society of Women in Physics, University of Mississippi November 2018
Caring for your Mental Health as a Graduate Student

17. Colloquium - Department of Physics and Astronomy, Agnes Scott College November 2018
Coming Together: Individuals at Different Scales Working for A Common Goal

18. 88th LHCb Week, CERN, Meyrin, Switzerland June 2018
Mental Health Care in Academia: A graduate student perspective

19. Seminar, Universitat de València, València, Spain June 2018
Mental Health Care in Academia: A graduate student perspective

20. Seminar, Syracuse University, Syracuse, NY November 2017
Managing your mental health as a graduate student

21. APS March Meeting, FGSA Invited Session, New Orleans, LA March 2017
Dealing with Depression and Anxiety as a Graduate Student and the benefits of Reaching Out

22. Seminar, Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany July 2015
Multiple Stable Manifolds of a Spatially Extended Lattice Kuramoto Model

CONTRIBUTED TALKS (TOTAL 30)

1. SIAM Dynamical Systems, Denver, CO May 2025
Gut Instincts: Understanding Spontaneous Contractions in the Colon

2. APS Global Summit, Anaheim, CA March 2025
Gut Instincts: Understanding Spontaneous Contractions in the Colon

3. QCAM Workshop, ICERM, Brown University, Providence, RI June 2024
Gut Instincts: Understanding Spontaneous Contractions in the Colon

4. SIAM Nonlinear Waves and Coherent Structures, Baltimore, MD June 2024
A Gut Feeling: Developing a Model of Mouse Colon Motility Through Data

5. 2024 Dynamics Days US, Davis, CA January 2024
A Gut Feeling: Developing a Model of Mouse Colon Motility through Data

6. Society of Mathematical Biology, Columbus, OH July 2023
Gut Instincts: A data-driven dynamical model of mouse colons

7. SIAM Dynamical Systems, Portland, OR May 2023
Clustering Solutions in Pulse Coupled Model of Firefly-Flashing

8. APS March Meeting, Las Vegas, NV March 2023
Gut Instincts: A data-driven dynamical model of mouse colons

9. SIAM Dynamical Systems 2021, Hosted Virtually May 2021
Chimeras as a way to model anatomical reentry in cardiac models

10. APS March Meeting, (Hosted Virtually) March 2021
Chimeras as a way to model anatomical reentry in cardiac models

11. APS March Meeting, Denver, CO (Hosted Virtually) March, 2020
Pattern Selection in Shallow Suspensions of Brine Shrimp

12. SIAM Dynamical Systems 2019, Snowbird, UT May 2019
Using a Micro-Controller for Dynamics Visualization

13. APS March Meeting, Boston, MA — March 2019
Pattern Selection in Brine Shrimp Swarms

14. 15th Experimental Chaos and Complexity Conference, Madrid, Spain — June 2018
Spatial Pattern Formation in Aggregations of Artemia Franciscana

15. APS March Meeting, Los Angeles, CA — March 2018
Chimera States with Local Coupling: the 5th Order FitzHugh-Nagumo Model

16. SIAM Dynamical Systems 2017, Snowbird, UT — May 2017
Pattern Formation of Swarms of Artemia Franciscana

17. Physics of Living Systems Seminar, Georgia Tech, Atlanta, GA — April 2017
Pattern Formation of Swarms of Artemia Franciscana

18. APS March Meeting, New Orleans, LA — March 2017
Chimera states in 1 and 2 dimensions in a 5th order FitzHugh-Nagumo model

19. American Association of Physics Teachers Winter Meeting, Atlanta, GA — February 2017
Creating Space for Mental Health at CUWIP

20. SIAM Conference on the Life Sciences 2016, Boston, MA — July 2016
Crowds as an Excitable Medium for Spiral Wave Dynamics

21. APS March Meeting, Baltimore, MD — March 2016
Crowds as an Excitable Medium for Spiral Wave Dynamics

22. 9th Southeast Meeting on Soft Materials, Atlanta, GA — May 2016
Pattern Formation of Artemia franciscana

23. SIAM Dynamical Systems 2015, Snowbird, UT — May 2015
Studies of Stable Manifolds of a Spatial Extended Lattice Kuramoto Model

24. Wet & Wild Seminar, Georgia Institute of Technology, Atlanta, GA — September 2019
Kuramoto, the Mean Field Model, and how it fails

25. SIAM Conference on the Life Sciences 2014, Charlotte, NC — August 2014
Phase synchronization of nearest-neighbor coupled oscillators: A bio-inspired approach from a Mexican Jumping Beans Network

26. First BCAM Workshop on Nonlinear Dynamics in Biological Systems, Basque Center for Applied Mathematics, Bilbao, Spain — June 2014
Studies of Synchronization and Wave Solutions of the KM Model Using Mexican Jumping Beans

27. Advances in Cardiac Dynamics Workshop, Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany — June 2014
Studies of Synchronization and Wave Solutions of the KM Model Using Mexican Jumping Beans

28. Physics of Living Systems Seminar, Georgia Tech, Atlanta, GA — April 2014
Learning More About Synchronization Through Mexican Jumping Beans

29. Undergraduate Research Seminar, CERN, Meyrin, Switzerland — June 2010
Muon Drift Tube Chamber Alignment

30. Physics/Astronomy REU Student Symposium, SUNY Stony Brook, NY — June 2009
Testing the High Voltage Filter Modules of the Liquid Argon Calorimeter and Simulations for ATLAS

POSTER PRESENTATIONS (TOTAL 15)

1. oSTEM 8th Annual Conference, Houston, TX — November 2018
   Pattern formation of brine shrimp aggregation
2. Soft Matter Forefronts, Georgia Institute of Technology — April 2018
   Pattern formation of brine shrimp aggregation
3. XXXVI Dynamics Days US 2017, Silver Spring, MD — January 2017
   Dynamics of a Human Spiral Wave
4. oSTEM 6th Annual Conference, Denver, CO — November 2016
   Dynamics of a Human Spiral Wave
5. Frontiers in Physics, Pattern Formation, and Complex Materials Far From Equilibrium, National Academy of Sciences, Washington DC — October 2015
   Multi-stable Manifolds of a Spatially Extended Lattice Kuramoto Model
6. Dynamics of Coupled Oscillators: 40 years of the Kuramoto Model Workshop, Max Planck Institute for Physics of Complex Systems, Dresden, Germany — July 2015
   Multi-stable Manifolds of a Spatially Extended Lattice Kuramoto Model
7. Georgia Tech Research & Innovation Conference Georgia Tech, Atlanta, GA — March 2014
   Coupling-Induced Synchronization of Mexican Jumping Beans
8. Georgia Scientific Computing Symposium, Kennesaw, GA — February 2014
   Coupling-Induced Synchronization of Mexican Jumping Beans
9. XXXIII Dynamics Days US, Georgia Institute of Technology, Atlanta, GA — January 2014
   Coupling-Induced Synchronization of Mexican Jumping Beans
10. Physics of Living Systems Conference, Princeton University, Princeton, NJ — August 2013
    Three Excitable Systems of Cardiac Dynamics
11. Society of Physics Students Zone 1 Conference, UMass, Dartmouth, MA — April 2011
    Calibration and Alignment of Muon Drift Tube Chambers of ATLAS
12. UROP Symposium, Boston University, Boston MA — October 2010
    Calibration and Alignment of Muon Drift Tube Chambers of ATLAS
13. Society of Physics Students Zone 1 Conference, Boston University, Boston, MA — March 2009
    The Fabrication and Electronic Properties of Graphene
14. Conference for Undergraduate Women in Physics, Yale University, CT — January 2009
    Annealing and Raman Spectroscopy of Graphene
15. REU Photonics Symposium, Boston University, Boston MA — August 2008
    Annealing and Raman Spectroscopy of Graphene

TEACHING EXPERIENCE

1. *Instructor*, **Texas A&M University**, College Station, TX
   MATH 151 Engineering Calculus I (Honors) — Fall 2025
   MATH 308 Differential Equations — Fall 2024
   MATH 152 Engineering Calculus II — Spring 2025

2. *Instructor*, **University of Pittsburgh**, Pittsburgh, PA
   MATH 0220 Differential Equations — Fall 2020, Spring 2021, Spring 2022
   MATH 0290: Intro to Calculus & Analytic Geometry I — Fall 2021, Spring 2022
   MATH 1180: Intro to Linear Algebra — Spring 2023
   MATH 0280: Intro to Matrices and Linear Algebra — Fall 2023
   MATH 1270: Ordinary Differential Equations 1 — Spring 2024

3. *Private Tutor*, (> 300 hrs) through Wyzant, Austin, TX, Atlanta, GA — 2012-2022
   Subjects: high school physics, AP Physics B & C, college physics I & II, pre-algebra, algebra pre-calculus, AP Calculus, differential calculus, integral calculus, differential equations, SAT Math prep, ACT Math prep, quantum mechanics, linear algebra, high school chemistry

4. **Georgia Institute of Technology**, Atlanta, GA
   Guest Lecturer, "Introductory Physics I" — Spring 2020
   1 Lecture on circular motion

   Guest Lecturer, "Computational Physics" — Spring 2019
   2 Lectures on Arduino Programming

   Teaching Assistant, "Computational Physics" — Spring 2015

   Guest Lecturer, "Computational Physics" — Spring 2015
   2 Lectures on Chaos and Nonlinear dynamics
   2 Lectures on Arduino Programming

   Lab Instructor, "Introduction to Physics I" — 2012-2013

5. **Loyola University New Orleans**, New Orleans, LA
   Guest Lecturer, "Introduction to Electromagnetism" — Spring 2019

6. **ITT Tech**, Kennesaw, GA
   Guest Lecturer, "Calculus II" — Dec 2014-Jan 2015

7. **University of Texas-Austin**, Austin, TX
   Teaching Assistant, "Integral Calculus — Fall 2011

CONFERENCES ORGANIZED

2. SIAM Dynamical Systems 2021 Conference — 2021
1. APS 2016 Conference for Undergraduate Women in Physics @ Georgia Tech — 2016
   - 200+ attendees from the south east US
   - First time at Georgia Institute of Technology/in Georgia

CONFERENCE SESSIONS ORGANIZED

6. "Modeling Dynamics in Organ Tissue"
   mini symposium at SIAM on Applications of Dynamical Systems, Denver, CO — May 2025
5. "Clustering and Chimeras: Spatio-Temporal Dynamics in Biological Systems"
   mini symposium at SIAM on Applications of Dynamical Systems, Portland, OR — May 2023
4. "Simple Systems with Complex Dynamics"
   mini symposium at SIAM on Applications of Dynamical Systems, Snowbird, UT — May 2019
3. "Simple Systems with Complex Dynamics PT 1 & 2"
   mini-symposium at SIAM on Applications of Dynamical Systems, Snowbird, UT — May 2017

2. "Stress & Strain: Mental Health in Graduate School"
   Invited session at APS March Meeting, New Orleans, LA — March 2017

1. "Simple Systems with Complex Dynamics"
   mini-symposium at SIAM on Applications of Dynamical Systems, Snowbird, UT — May 2015

CAMPS ORGANIZED

1. Georgia Institute of Technology, Atlanta GA
   Facilitator, Organizer, "Chaos Campus" — Summer 2018

   - Developed curriculum for hands on camp for High School Students
   - Facilitated one session with 24 students respectively

   Facilitator, Organizer, "Roller Coaster Physics", Atlanta GA — Summer 2017, 2018

   - Developed curriculum for hands on camp for Middle & High School Students
   - Facilitated two sessions each year with 30 and 40 students respectively

SERVICE

Professional Service

1. APS Conference for Graduate Women and Gender Minorities — August 2024
   - Organized and Facilitated "Mental Health in Physics" Workshop
2. APS 2024 Conference for Undergraduate Women in Physics, Georgia Tech — January 2024
   - Organized and Facilitated "Mental Health in Physics" Workshop (x3)
3. APS Forum of Diversity, Equity and Inclusion, Member at Large — January 2022-December 2023
   - Organized and Facilitated "Mental Health Roundtable" at March Meeting 2023
   - Organized Conference Accessibility Committee
   - Representative for LGBT+ Physicists
4. APS 2023 Conference for Undergraduate Women in Physics, Princeton University — January 2023
   - Organized and Facilitated "Mental Health in Physics" Workshop (x3)
5. APS DBIO Mental Health Panel Virtual — January 2023
6. APS Advancing Graduate Leaderships Conference — August 2022
   - Organized and Facilitated "Mental Health in Physics" Workshop
7. McGill University, Department of Physics — May 2022
   - Fireside chat on Mental Health and Well Being in physics
8. Women in Physics, North Carolina State — January 2022 Virtual
   - Invited talk "Disorder, chaos, and formation of patterns: My journey through a nonlinear physics PhD"
9. oSTEM Conference panel organizer — October 2021
   - Co-organized and co-facilitating panel "Quitting is often the hardest thing to do"

10. APS REU Seminar Virtual August 2021

    - Facilitated workshop "Dealing with Mental Health as a Young Scientist"

11. Women in Physics, University of Bath, Virtual March 2021

    - Invited talk "Disorder, chaos, and formation of patterns: My journey through a nonlinear physics PhD"

12. APS 2021 Conference for Undergraduate Women in Physics January 2021 Virtual

    - Participated on LGBTQ+ Panel (x2), and Mental Health in Physics Panel (x2)

13. Georgia Tech Graduate Student Diversity Council, Physics Rep., Atlanta GA January 2019-June 2020

14. Georgia Tech Grad Pride, Vice President, Atlanta GA Fall 2018-Summer 2019

15. LGBTQIA+ Resource Center, Georgia Tech, Atlanta, GA Fall 2015-Fall 2019

    - Peer-Education Safe Space Facilitator

16. APS 2019 Conference for Undergraduate Women in Physics, University of Alabama, Tuscaloosa, AL January 2019

    - Facilitated 4 workshops: mental health x2, imposter syndrome, How to Be an Ally

17. President's Undergraduate Research Awards (PURA) Reviewer Georgia Institute of Technology, Atlanta GA 2014-2019

18. APS 2018 Conference for Undergraduate Women in Physics @ U of Virginia University of Virginia, Charlottesville, VA January 2018

    - Facilitated workshops on mental health

19. oSTEM Conference, Chicago, IL November 2017

    - "Destigmatizing Invisible (Dis)Abilities and Illnesses within the LGBTQA+ Community" Panelist
    - "It's Okay to Not Be Okay: Managing Your Mental Health" Panelist

20. APS Forum of Graduate Student Affairs, Member at Large Jan 2016-Dec 2017

    - Travel Award Committee Chair
    - March and April Meeting Program Committee
    - Social Media Representative

21. APS 2017 Conference for Undergraduate Women in Physics @ Virginia Tech January 2017 Virginia Tech, Blacksburg, VA

    - Co-facilitated "LGBT+ Roundtable" breakout session with 18 attendees

22. Society of Women in Physics, President, Georgia Institute of Technology, Atlanta, GA 2014-2017

    - Organized networking events in and outside of the School of Physics
    - Organized monthly activities
    - Developed mentoring program for students and faculty (which had over 30 participants)

- Meet with incoming and prospective female undergraduate and graduate students through FASET and other programs
- Organized panels for undergraduates on preparing for graduate school
- Established SWiP as an official Georgia Tech organization
- Organized the first Women's Research Symposium on GT Campus
- Diversity Committee Chair (2017)

23. Center for Global Diversity and Inclusion, Agnes Scott College Fall 2016

- National Coming Out Day Panelist

24. APS 2016 Conference for Undergraduate Women in Physics, Georgia Tech, Atlanta, GA 2014-2016

- Chair of the local organizing committee
- Invited speakers, secured conference space, advertised, organized workshops
- Secured funding from institution, professional organizations, and corporations
- Member of the National Organizing Committee through the American Physics Society
- Organized and facilitated workshops "LGBTQIAP+ Roundtable", and "Being a Leader: Starting a WiP Group, Leadership Skills, Mentoring"

25. APS 2015 Conference for Undergraduate Women in Physics, NC Research Triangle, Durham, NC January 2015

- Moderator for "Sexuality Roundtable"
- Panelist for "How to Get Involved in Research"

26. NOGLSTP'S Out to Innovate and oSTEM's 4th Annual Conference, Atlanta GA November 2014

- Poster Judge

27. Girls' Incorporated STEM Summit Volunteer, Atlanta, GA October 2014

- Developed and facilitated activity with middle school girls

28. Peach State Louis Stokes Alliance for Minority Participation, Georgia Tech September 2014

- Poster judge

29. Experienced TA Panel participant, Georgia Tech, Atlanta GA August 2013, 2014, 2016

- Talked with incoming first year graduate students about teaching

30. Graduate Student Panel participant, Georgia Tech, Atlanta GA July 2014

- Invited to participate on a panel to talk to SURE/REU students about graduate school and fellowships in science fields

31. Boston University Physics Tour Coordinator, Boston, MA Spring 2011

- Interacted with incoming freshmen physics majors and parents to talk about the department

Community Service

1. Mathematics in Motion March 2018

- Helped plan math portion of a performance piece on the subject of "The Seven Bridges of Königsberg," aimed at children and families

2. Meadowcreek High School Go-STEM Fair, Atlanta, GA October 2013, 2014 , 2015
   - Participated with hands on activities about physics
3. Atlanta Science Festival Demonstrator, Atlanta, GA March 2015
   - Organized a booth called "Oscillations-The Rhythm of Life" where we preformed demonstrations on chemical and mechanical oscillations for a general audience
4. Atlanta Science Festival Demonstrator, Atlanta, GA March 2014
   - Organized a booth called "How the Heart Works or Doesn't" for families attending the event
5. 2nd Annual Latino College and STEM Fair Demonstrator, Atlanta GA March 2014 § Conducted physics demonstrations for Latino children and parents
   - Advised about college education and careers in physics
6. Rabun County Middle School and Osborne High School, Atlanta, GA October 2013
   - Performed physics demonstrations via video conference
7. Saturday Morning Math Group, University of Texas-Austin 2011-2012
   - Aided middle and high school students work on problems after lecture
8. Science, Engineering and Technology (SET) in the City, Boston, MA April 2011
   - Organized and presented physics demonstrations for young women in middle and high school
   - Facilitated hands-on lab activities
9. Chenery Middle School, Belmont, MA Dec. 2010
   - Organized and presented kinematics and mechanics demonstrations for two classes
10. Peabody Public Middle School, Peabody, MA 2008, 2009
    - Organized and presented material on the sun (2008) and energy (2009) to two classes
    - Facilitated a related hands-on activity
11. U-Design (Formally DesignCamp), Boston University College of Engineering July 2008
    - Facilitated middle school students in hands-on activities

IN THE NEWS

1. How to be Human in Physics, Symmetry Magazine 2021
2. Stressed? Depressed? You are not alone, Physics Today 2020
3. The Mathematical Concepts of a D&D Campaign, Pitt Math News 2020
4. Pride Perspectives: Andrea Welsh on Grad Pride, Friendships, Feeling Connected, GT College of Sciences 2020
5. Andrea Welsh: PhD in Physics, GT College of Sciences 2019
6. oSTEM March 2019 Rising Star, oSTEM 2019

7. Minding Mental Wellness, GT College of Sciences 2018
8. Physics Today 2017's most read articles, Physics Today 2017
9. Women in Physics Meet in Georgia Tech, GT College of Sciences 2016
10. Nonlinear Dynamics in Flavio Fenton's Lab at Georgia Tech, The Dynamical Systems Web 2015

PROFESSIONAL SOCIETIES

American Physical Society (APS) 2007-present
Forum of Equity and Inclusion, Nomination Committee May 2024-present
Forum of Equity and Inclusion, Member-at-Large Jan 2022-Dec 2023
Forum of Graduate Student Affairs, Member-at-Large Jan 2017- Dec 2018
Society of Physics Students (SPS) 2007-2011
Boston University Chapter President Sept 2010- Aug 2011
Out in STEM (oSTEM) 2014-present
Society for Industrial and Applied Mathematics (SIAM) 2014-present
Dynamical Systems Organizing Committee 2021
American Association of Physics Teachers (AAPT) 2015-present
American Mathematical Society (AMS) 2022-present
Mathematical Association of America (MAA) 2022-present

MENTORED STUDENTS

Student, degree, school, project, year.

- Katherine Dryer, B.S. Texas A&M University, stimulation in 5th order FitzHugh Nagumo, Spring 2025
- Adam Usamov, B.S. University of Pittsburgh, Modeling colon dynamics, Spring 2023 to present
- Madeline McCrea, post-bac, University of Pittsburgh, modeling chimeras in firefly flashing, Fall 2023 to Summer 2024
- Anant Barwat, B.S. Mathematics, University of Pittsburgh, Summer-Fall 2022
- Gwen Kvasnicka, Post BS, Smooth particle fluid simulations, Spring 2020
- Divya Velivela, high school, Coupling of Saline Oscillator Flows, Summer 2018, 2019
- Ellie Finch, high school, Tracking brine shrimp at different temperatures, 2018-2019
- Michael Barnhill, B.S. in Physics, Georgia Institute of Technology, Pattern formation of brine shrimp aggregation, 2018
- Krishma Singal, B.S in Physics, Georgia Institute of Technology, Reaction-Diffusion and photosensitive brine shrimp, 2014-2017
- Zoha Naqwe, B.S. in Physics and Biology, Georgia Institute of Technology, Synchronization of Mexican Jumping Beans 2016-2017
- Sophia Wiesenfeld, high school, Parameters that affect period of the Saline Oscillator, Summer 2016
- Madeline Lazar, B.S. in Physics, Georgia Institute of Technology, Modeling the Newton beads 2014-2015