Nathan Tompkins

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Educational Background

Brandeis University — **Waltham, MA**
Doctor of Philosophy in Physics — *May 17, 2015*
Dissertation: "Synchronization Dynamics of Coupled Chemical Oscillators"

Brandeis University — **Waltham, MA**
Master of Science in Physics — *August 31, 2010*

Reed College — **Portland, OR**
Bachelor of Arts in Physics — *May 15, 2005*

Professional Experience

Wabash College — **Crawfordsville, IN**
Associate Professor — *Fall 2024 – Present*

Wabash College — **Crawfordsville, IN**
Byron K. Trippet Assistant Professor — *Fall 2019 – Summer 2024*

Wabash College — **Crawfordsville, IN**
Visiting Assistant Professor — *Fall 2017 – Summer 2019*

Brandeis University — **Waltham, MA**
Postdoctoral Fellow — *Spring 2015 – Summer 2017*
Assistant Director of Research and Education

Fellowships & Awards

- **Equity & Inclusion Pedagogy Fellowship**: Summer 2024 – *Wabash College*
  Collecting feedback from medical professional alumni on content for introductory pre-health physics courses
- **Equity & Inclusion Pedagogy Fellowship**: Summer 2022 – *Wabash College*
  Creating a senior seminar course where students reflect on the connections between physics and society
- **Predominantly Undergraduate Institution Fund**: Summer 2018 – *Gordon Research Conference*
- **Provost Teaching Innovations Grant**: Fall 2016 - Spring 2017 – *Brandeis University*
  "Revitalizing Introductory Physics with Collaborative Team Teaching"
- **Science Communication Fellow**: Fall 2016 – *Discovery Museums, Acton, MA*
  Creating and presenting science activities for grade school children
- **Faculty/Student Collaborative Research Grant**: Spring 2016 – *Brandeis University*
  "Control of Chemomechanical Materials"
- **Richard M. Noyes Fellowship**: Summer 2014 – *Gordon Research Conference*
- **Berko Memorial Prize**: Spring 2013 – *Berko Student Research Symposium, Brandeis University*
  "Turing@101: Establishing the Turing mechanism using synthetic cells"
- **Judges' Choice Award**: Spring 2012 – *IGERT Video and Poster Competition*
  "One Dimensional Rings of Coupled Oscillators - Turing's Theory Realized"
- **Martin Fisher Endowed Fellowship in Physics**: Fall 2009 - Spring 2010 – *Brandeis University*
- **Grunebaum Endowed Fellowship in Astrophysics**: Fall 2009 - Spring 2010 – *Brandeis University*
- **A. A. Knowlton Physics Scholarship**: Fall 2004 - Spring 2005 – *Reed College*

Courses Taught

Wabash College — **Crawfordsville, IN**
Professor — *Fall 2017 – Present*

- Freshman Tutorial – Why trust science? - What do we know, and how do we know it? (Fall 2020)
- Freshman Colloquium – Enduring Questions (Spring 2021)
- Physics 109 – Physics I - Algebra (Fall 2017, Fall 2019, Fall 2020, Fall 2021, Fall 2023, Fall 2024)
- Physics 110 – Physics II - Algebra (Spring 2018, Spring 2020, Spring 2021, Spring 2022, Spring 2023, Spring 2024)
- Physics 209 – Introduction to Thermal Physics and Relativity (Fall 2018, Fall 2019, Fall 2022)
- Physics 210 – Introduction to Quantum Theory & Applications (Spring 2019, Spring 2020)
- Physics 220 – Electronics (Spring 2019)
- Physics 277 – Special Topics: Nonlinear Dynamics and Chaos (Fall 2021)
- Physics 310 – Classical Mechanics (Fall 2017, Fall 2018, Fall 2022)
- Physics 314 – Electromagnetic Theory (Spring 2018, Spring 2022)
- Physics 381 – Advanced Laboratory I (Fall 2022, Spring 2023, Spring 2024, Fall 2024)
- Physics 382 – Advanced Laboratory II (Fall 2022, Spring 2023, Fall 2023, Spring 2024, Fall 2024)
- Physics 400 – Senior Seminar (Fall 2023)

Brandeis University — **Waltham, MA**
Lecturer — *Fall 2012 – Spring 2017*

- Physics 10 – Introduction to Physical Laws and Phenomena (Academic Year 2013/2014, 2016/2017)
- Physics 22 – The Science in Science Teaching and Learning (Fall 2012)
- Physics 23 – The Physics of Devices (Spring 2016) – An original physics course of my own design
- PRDV 76421 – Partnership for Curriculum Building (Academic Year 2015/2016)
  – A graduate education professional development course in partnership with Framingham State University
- Microfluidics Summer Course – Introduction to Microfluidics Technology (Summer 2016, Summer 2017)
- Brandeis Science Posse – Posse Bootcamp (Summer 2013 - Summer 2016)

Framingham State University — **Framingham, MA**
Visiting Lecturer — *Fall 2011*

- Physical Science 109 - Introduction to Physical Science (Fall 2011)

Research Students

- **Raymond Arebalo ('25)**
  – Project: Material Formation in a Microfluidic Device (Summer 2024)
- **Bryan Cherry ('24) and Aiden Orcutt ('24)**
  – Project: Material Formation in a Microfluidic Device (Summer 2023)
  – Publication: "Comparison of Double Casting Methods for Microfluidic Device Fabrication" *PrePrints* [2024]
- **Caleb Powell ('22) and Fardin Hoque ('24)**
  – Project: Brinicle Formation Simulations (Summer 2021)
- **Tyler Richmond ('21) and Hamza Moudden ('21)**
  – Project: Advection Diffusion Reaction Simulations (Summer 2020)
- **Tyler Richmond ('21)**
  – Project: 3D Printed PDMS Molds (Summer 2019 - Spring 2021)
  – Publication: "3D Microfluidics in PDMS: Manufacturing with 3D Molding" *Microfluidics and Nanofluidics* [2021]
- **Teddy Lupinski ('20)**
  – Project: Constant Pressure Pump (Summer 2018 - Spring 2020)
  – Publication: "An Arduino Based Constant Pressure Fluid Pump" *The European Physical Journal E* [2021]
- **Zach Ostrowski ('20)**
  – Project: Laminar Flow Reaction Chamber (Summer 2018 - Summer 2019))

Guest Lectures, Discussions, & Invited Talks

- **Wabash College** *Senior Colloquium (COL 401/402)*:
  Spring 2024 – Yu Hua, *To Live*
  Fall 2022 – St. Augustine, *Confessions*
  Fall 2021 – Gottfried von Strassburg, *Tristan*
  Spring 2021 – Chinua Achebe, *Things Fall Apart*
  Fall 2020 – Plato, *Symposium*
  Spring 2020 – Toni Morrison, *Song of Solomon*
  Fall 2019 – Galileo, *Selected Writings*
  Spring 2019 – Milan Kundera, *Unbearable Lightness of Being*
  Spring 2018 – Thomas Kuhn, *Structure of Scientific Revolutions*
- **Wabash College** *Freshman Tutorial (FRT 101)*:
  Fall 2022 – Guest lecture on the three body problem in classical mechanics
- **Wabash College** *Digital Rhetorics and Digital Humanities (RHE 270)*:
  Spring 2018 – Guest lecture on digital information
- **DePauw University** Fall 2017 – *Monon Bell Physics Lecture*
- **Colgate University** Fall 2015 – *Physics & Astronomy Seminar*
- **Saint Michael's College** Fall 2015 – *American Chemical Society/National Biological Honor Society Seminar*

Academic Conferences

- **American Association of Physics Teachers (AAPT)**
  AAPT Summer Meeting – 2025 (*pending*)
  AAPT Summer Meeting – 2024, 2025 (Intermediate and Advanced Labs – *Workshop Organizer*)
  AAPT Summer Meeting – 2023 (Intermediate and Advanced Labs)
  AAPT Summer Meeting – 2023 (Making Physics Labs and Apparatus More Accessible)
  New Faculty Workshop – 2019
- **American Society for Engineering Education (ASEE)**
  ASEE Summer Meeting – 2025 (*pending*)
- **Advanced Laboratory Physics Association (ALPhA)**
  Conference on Laboratory Instruction Beyond the First Year (BFY4) – 2023
  ALPhA Laboratory Immersions – 2019, 2022
  Partnership for Integration of Computation into Undergraduate Physics (PICUP) Immersion – 2019
- **Gordon Research Conference: Oscillations & Dynamic Instabilities In Chemical Systems**
  Poster – 2010, 2012, 2014, 2016, 2018, 2022, 2024
  Presentation – 2014 (GRS), 2016 (GRC)
- **American Physical Society: March Meeting**
  Physics Research Presentation – 2011, 2012, Physics Education Research Presentation – 2016
- **Dynamics Days: International Conference on Nonlinear Dynamics**
  Poster – 2012, Presentation – 2013
- **New England Complex Fluids Workshop**
  Presentation – 2010, 2011, 2012

Publications

- J. McDermott, **N. Tompkins**
  "Scaling Mentoring for Graduate School: An Algorithm to Streamline the Formation of Mentoring Circles..."
  in press [2025]
- B. Cherry[‡], A. Orcutt[‡], **N. Tompkins**
  "Comparison of Double Casting Methods for Microfluidic Device Fabrication"
  PrePrints [2024]
- **N. Tompkins**, K. Gunther
  "Color Vision Deficiency and Teaching Electromagnetism"
  The Physics Teacher, **60** (6), 466-468 [2022]
- T. Richmond[‡], **N. Tompkins**
  "3D Microfluidics in PDMS: Manufacturing with 3D Molding"
  Microfluidics and Nanofluidics, **25** (9), 76 [2021]
- T. Lupinski[‡], M. Ludwig, S. Fraden, **N. Tompkins**
  "An Arduino Based Constant Pressure Fluid Pump"
  The European Physical Journal E, **44** (2), 1-7 [2021]
- M. M. Norton[*], **N. Tompkins**[*], B. Blanc, M. C. Cambria[†], J. Held[†], S. Fraden
  "Dynamics of Reaction-Diffusion Oscillators in Star and other Networks with Cyclic Symmetries..."
  Physical Review Letters, **123** (14), 148301 [2019]
- **N. Tompkins**
  "Miniature Tesla Coil Teaching Lab"
  The Physics Teacher, **57** (6), 390-392 [2019]
- **N. Tompkins**, K. J. Spinelli, D. Choi, and P. G. Barr-Gillespie
  "A Model for Link Pruning to Establish Correctly Polarized and Oriented Tip Links in Hair Bundles"
  Biophysical Journal, **113** (8), 1868-1881 [2017]
- **N. Tompkins**, S. Fraden
  "An Inexpensive Programmable Illumination Microscope with Active Feedback"
  American Journal of Physics, **84** (2), 150 [2016]
- A. Wang[†], J. Gold[†], **N. Tompkins**, M. Heymann, K. Harrington, S. Fraden
  "Configurable NOR Gate Arrays from Belousov-Zhabotinsky Micro-droplets"
  European Physical Journal Special Topics, **225** (1), 211-227 [2016]
- **N. Tompkins**, M. C. Cambria[†], A. Wang[†], S. Fraden
  "Creation and Perturbation of Planar Networks of Chemical Oscillators"
  Chaos: An Interdisciplinary Journal of Nonlinear Science **25**, 064611 [2015]
- N. Li, **N. Tompkins**, H. Gonzalez-Ochoa, S. Fraden
  "Tunable Diffusive Lateral Inhibition in Chemical Cells"
  European Physical Journal E - Soft Matter & Biological Physics **38** (3), 18 [2015]
- **N. Tompkins**[*], N. Li[*], C. Girabawe, M. Heymann, G. B. Ermentrout, I. R. Epstein, S. Fraden
  "Testing Turing's Theory of Morphogenesis in Chemical Cells"
  Proceedings of the National Academy of Sciences **111** (12), 4397-4402 [2014]

[‡] denotes Wabash undergraduate student
[†] denotes undergraduate student
[*] authors contributed equally

Professional Memberships

- American Physical Society
- American Association of Physics Teachers
- Advanced Laboratory Physics Association
- Physics Instructional Resource Association
- American Society for Engineering Education
- National Society of Physics Students
- American Association for the Advancement of Science

Service to the College

- **Physics Department Chair**: Fall 2025 - *present*
- **Dual Degree Engineering Committee**: Fall 2019 - *present*
- **Graduate Fellowships Committee**: Fall 2020 - *present*
- **Academic Policy Committee**: Fall 2021 - Spring 2023