

## Benjamin E. Levy, Ph.D.

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### CONTACT INFORMATION

Visiting Assistant Professor  
Physics Department  
Davidson College  
P.O. Box 5000  
Davidson, NC 28035 USA

☎ +1-704-894-2347

✉ [belevy1@davidson.edu](mailto:belevy1@ davidson.edu)

🌐 [benphysics.com](http://benphysics.com)

### EDUCATION

**Ph.D. in Physics** **2022**

*The University of North Carolina at Chapel Hill, Chapel Hill, NC*

- Dissertation title: “Toward Magnetomotive Ultrasound Elastometry of Thrombosis”
- Dissertation advisor: Amy L. Oldenburg

**B.A. in Physics with honors** **2015**

*Carleton College, Northfield, MN*

### PROFESSIONAL TEACHING EXPERIENCE

**PHY 225, General Physics II: Studio** **2023**

*Davidson College, Davidson, NC*

- Taught via the “studio” format which promotes an inclusive learning environment via interactive combined laboratory and recitation sections in place of lectures
- Designed numerous medical imaging-related course components specifically relevant to this life sciences-focused audience.
- Developed a technique for fostering intra-group trust and camaraderie through motivating, meaningful lab journal assignments designed to reinforce daily material.
- Supervised an undergraduate teaching assistant

**PHY 330, Classical Mechanics** **2022**

*Davidson College, Davidson, NC*

- Incorporated at least one group activity or tutorial during every class period to promote active engagement with the material
- Emphasized both analytical and computational skill sets to broaden the range of tractable problems and make classical mechanics more relevant to students
- Implemented reflection essays designed to help students appreciate and engage with the physics community’s important “non-scientific” work including issues of diversity, equity, and inclusion
- Ended the term with an exciting three week-long final research project in which student groups built physical and computational models of a medieval trebuchet, performed optimization experiments, and presented their results to the department

**PHY 125, General Physics with Calculus I: Studio** **2022**

*Davidson College, Davidson, NC*

- Taught via the “studio” format which promotes an inclusive learning environment via interactive combined laboratory and recitation sections in place of lectures
- Developed and implemented new labs and group activities to highlight topics in biological physics
- Supervised an undergraduate teaching assistant

GRADUATE  
SCHOOL  
TEACHING  
EXPERIENCE

**Instructor: PHYS 281L, Experimental Techniques in Physics** 2019 - 2022

*The University of North Carolina at Chapel Hill, Chapel Hill, NC*

- Seven-term lead instructor for Sophomore-level modern physics laboratory course
- Developed in-person, remote-control, and at-home laboratory experiments including an X-ray Compton scattering apparatus, and an interferometer that students build at home (more details [here](#))
- Wrote a new full-term uncertainty analysis curriculum and led accompanying lectures employing active learning techniques
- Created communication-focused assignments for expert, peer, & general audiences
- Implemented a reflection essay series to help students actively engage with issues of diversity, equity, and inclusion in the physics community
- Taught two first-time co-instructors and managed three teaching assistants

**Instructor: PHYS 114, General Physics I** 2018

*The University of North Carolina at Chapel Hill, Chapel Hill, NC*

- Instructor of record for introductory mechanics course for life science majors
- Led lectures and “studios” (interactive, combined laboratory/recitation sections)
- Developed course materials, demos, and exam questions based on my research
- Supervised my graduate teaching assistant

**Graduate Teaching Assistant** 2015 - 2018

*The University of North Carolina at Chapel Hill, Chapel Hill, NC*

- Courses taught:
  - PHYS 118, Mechanics and Relativity (Fall 2015, Spring 2016, Spring 2017)
  - PHYS 119, Electromagnetism and Quanta (Fall 2017, Spring 2018)
- Led “studios” (interactive, combined laboratory/recitation sections)
- Developed course materials such as lab report assignments and mini-lectures

ADVISING AND  
MENTORING  
EXPERIENCE

**Research Students Mentored** 2023

*Davidson College, Davidson, NC*

- Pedagogical Simulations of Resonance in Springs, Wineglasses, Bridges, and Blood Clots using Finite Element Analysis
  - *Chenlu Qin*, '23 — Independent Research, Spring 2023
  - *Christopher Piatnichouk*, '26 — Summer Research 2023
- Developing and Validating an Improved Model Blood Clot for Magnetomotive Ultrasound (MMUS) Elastometry
  - *Juan Camilo Pérez Góngora*, '25 — Davidson Research Initiative Summer Fellow, 2023
  - *Griffin Whalen*, '25 — Davidson Research Initiative Summer Fellow, 2023

**Research Advisor for High School Students** 2021

*North Carolina School of Science and Mathematics, Durham, NC*

- Advised two high school students in cosmic muon and ultrasound research projects
- Coordinated oral presentations and activities for summer research program

**Graduate Teaching Assistant Mentor** 2021 - 2022

*The University of North Carolina at Chapel Hill, Chapel Hill, NC*

- Oversaw transition of *Experimental Techniques* course to a new instructor in preparation for my graduation
- Mentored successor graduate student in lecturing, grading, and administrative tasks

**Undergraduate Teaching Assistant Advisor** **2020**  
*The University of North Carolina at Chapel Hill, Chapel Hill, NC*  
• Advised student as she assisted in development of a remote laboratory experiment for my *Experimental Techniques* course

RESEARCH  
EXPERIENCE

**Graduate Research Assistant: Coherence Imaging Laboratory** **2016 - 2022**  
*The University of North Carolina at Chapel Hill, Chapel Hill, NC*  
• Developing a contrast-enhanced ultrasound-based imaging modality for biomedical and clinical applications  
• Using instrumentation, image processing, and finite element simulation techniques toward the measurement of tissue properties not usually captured by ultrasound  
• Advisor: Prof. Amy L. Oldenburg

**Undergraduate Research Fellow: Disorder Laboratory** **2014**  
*The University of Minnesota, Minneapolis, MN*  
• Developed a streamlined, repeatable method for measuring the optical absorption properties of mixed-phase thin films  
• Advisor: Prof. James Kakalios

**Undergraduate Research Fellow: Distributed Robotics Laboratory** **2014**  
*The University of Minnesota, Minneapolis, MN*  
• Advanced both mechanical and software aspects of an inexpensive and easy-to-use fleet of robotic platforms for distributed robotics and computer vision research  
• Advisor: Prof. Nikolaos Papanikolopoulos

**Undergraduate Research Fellow: Geophysics course development** **2013 - 2014**  
*Carleton College, Northfield, MN*  
• Developed a streamlined version of the Cavendish experiment for a geophysics laboratory course  
• Advisor: Prof. Bill Titus

**Undergraduate Research Fellow: LIGO Group** **2013**  
*California Institute of Technology, Pasadena, CA*  
• Performed optical instrumentation work toward finding an upper limit for “crackle noise” in a component of LIGO’s mirror mounts  
• Advisor: Prof. Rana Adhikari

PUBLICATIONS

B. E. Levy and A. L. Oldenburg. “*Elastometry of Clot Phantoms via Magnetomotive Ultrasound-Based Resonant Acoustic Spectroscopy.*” *Physics in Medicine & Biology*, **67**, 155010 (2022).

B. E. Levy and A. L. Oldenburg. “*Single Magnetic Particle Motion in Magnetomotive Ultrasound: An Analytical Model and Experimental Validation.*” *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, **68**(8), 2635-2644 (2021).

D. Thapa, B. E. Levy, D. L. Marks, and A. L. Oldenburg. “*Inversion of Displacement Fields to Quantify the Magnetic Particle Distribution in Homogeneous Elastic Media from Magnetomotive Ultrasound.*” *Physics in Medicine and Biology* **64**(12), 125019 (2019).

B. E. Levy, M. M. Hossain, J. M. Sierchio, D. Thapa, C. M. Gallippi, and A. L. Oldenburg. “*Effect of Model Thrombus Volume and Elastic Modulus on Magnetomotive Ultrasound Signal under Pulsatile Flow.*” *IEEE Transactions on Ultrasonics, Ferroelectrics, and*

Frequency Control 65(8), 1380-1388 (2018).

M. M. Hossain, B. E. Levy, D. Thapa, A. L. Oldenburg, and C. M. Gallippi. “Blind Source Separation Based Motion Detector for Imaging Super-Paramagnetic Iron Oxide (SPIO) Particles in Magnetomotive Ultrasound Imaging.” IEEE Transactions on Medical Imaging, 37(10), 2356-2366 (2018).

PRESENTATIONS  
AND POSTERS

B. E. Levy, M. Sankaran, S. Brogan, R. V. F. Janssens, and D. L. Deardorff. “Less is More: At-Home Interferometry in an Undergraduate Laboratory Course.” American Association of Physics Teachers Summer Meeting (2021).

J. Weinberg-Wolf, D. L. Deardorff, and B. E. Levy. “Meeting Laboratory Learning Objectives in a Remote Instruction Environment.” American Physical Society April Meeting (2021).

B. E. Levy and A. L. Oldenburg. “Toward Contrast-Enhanced Imaging and Elastography of Thrombosis Models via Magnetomotive Ultrasound.” UNC Blood Research Center Seminar Series (2020).

B. E. Levy. “Active Learning Approach for Teaching the Guide to the Expression of Uncertainty in Measurement (GUM).” North Carolina Section of the American Association of Physics Teachers, Fall Meeting (2019). *Received Best Graduate Paper Award.*

B. E. Levy, D. Thapa, and A. L. Oldenburg. “Toward an Analytical Model of Magnetomotive Ultrasound (MMUS) Signal Generation.” IEEE International Ultrasonics Symposium (2019).

B. E. Levy, M. M. Hossain, C. M. Gallippi, and A. L. Oldenburg. “Magnetomotive Ultrasound Imaging Under Pulsatile Flow using Super-Paramagnetic Iron Oxide as a Contrast Agent.” Frontiers in Biomagnetic Particles Conference (2017).

SERVICE

**University Teaching Award Selection Committee Member** **2021 - 2022**  
*The University of North Carolina at Chapel Hill, Chapel Hill, NC*

- Evaluate student and professor nominations for the *J. Carlyle Sitterson Award for Teaching First-Year Students*
- Conduct interviews with undergraduates to gain additional perspectives on nominees
- Collaborate with committee members in order to produce a short list of candidates

**Graduate Studies and Affairs Committee Member** **2017 - 2018**  
*UNC-Chapel Hill, Dept. of Physics and Astronomy, Chapel Hill, NC*

- Worked to modernize the graduate curriculum including PhD requirements, core courses, and elective offerings
- Coordinated studies of graduate population and collected quality feedback in order to accurately represent graduate student interests and needs

**Graduate Student Pre-Candidacy Mentoring Team Leader** **2016 - 2017**  
*UNC-Chapel Hill, Dept. of Physics and Astronomy, Chapel Hill, NC*

- Coordinated, and worked as part of a team of senior graduate students who provided mentoring sessions for first-year graduate students in the department

- Guided students through the process of passing the doctoral written exam by working through past problems, and sharing study strategies

**Prospective Graduate Student Visiting Days Coordinator** **2016 - 2017**  
*UNC-Chapel Hill, Dept. of Physics and Astronomy, Chapel Hill, NC*

- Collaborated with two fellow graduate students and a faculty member to coordinate logistics, meetings, meals, and other activities for students admitted to the physics & astronomy department
- Worked directly with admitted students to ensure their visiting days schedule was appropriately tailored to their interests

HONORS AND  
AWARDS

**Exceptional Teaching Award for Visiting Faculty** **May 2023**  
*Davidson College, Davidson, NC*

- This award recognizes visiting faculty for exceptional teaching, demonstrated by an exceptional commitment to their students and their discipline, ability to create and foster a lively and engaging classroom environment, and a tendency to inspire students and serve as a model for their colleagues.

**Tanner Award for Excellence in Undergraduate Teaching** **April 2021**  
*The University of North Carolina at Chapel Hill, Chapel Hill, NC*

- Highest university-wide teaching honor for graduate students at UNC

**Outstanding Graduate Teaching Assistant Award (2×)** **May 2016, May 2020**  
*UNC-Chapel Hill, Dept. of Physics and Astronomy, Chapel Hill, NC*

**Hamilton Award for Summer Research Funding (2×)** **April 2019, Feb. 2020**  
*UNC-Chapel Hill, Dept. of Physics and Astronomy, Chapel Hill, NC*

**Best Graduate Paper Award** **Nov. 2019**  
*North Carolina Section of the American Association of Physics Teachers*

**“Distinction” for Senior Thesis Presentation** **June 2015**  
*Carleton College, Northfield, MN*

DEI-FOCUSED  
SEMINARS &  
CERTIFICATIONS

- **Safe Zone:** allyship training to support members of the LGBTQIA+ community
- **Haven:** allyship training to support those affected by sexual and interpersonal violence and/or stalking
- **Mental Health First Aider:** training for response strategies when someone is developing a mental health problem or experiencing a mental health crisis
- **Birds of a Feather:** dynamics of academic collaborations across identity differences
- **Confidence and Empowerment:** discussion of students’ classroom experiences that foster or hinder confidence
- **Creating and Sustaining Belonging:** teaching practices to build a classroom that welcomes all students
- **Dimensions of Diversity:** discussion of identities and intersectionalities that can be overlooked in common DEI discourse