Daniel M. Harris

Curriculum Vitae

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Research Interests

Fluid Mechanics, Interfacial Phenomena, Transport Phenomena, Vibrations.

Education

2010–2015 **Ph.D., Mathematics**, *Massachusetts Institute of Technology*.
Focus in Physical Applied Mathematics.
Thesis Title: The pilot-wave dynamics of walking droplets in confinement.
Advisor: John W. M. Bush.

2006–2010 **B.S., Mechanical Engineering**, *Cornell University*.
Concentration in Thermo-Fluids Engineering, Minor in Applied Mathematics.
Research Advisor: Charles H. K. Williamson.

Professional Positions

2024–Present **Associate Professor of Engineering**, *Brown University*.
School of Engineering, Fluids and Thermal Sciences (FTS) Group.

2017–2024 **Assistant Professor of Engineering**, *Brown University*.
School of Engineering, Fluids and Thermal Sciences (FTS) Group.

2015–2017 **Postdoctoral Research Associate**, *University of North Carolina at Chapel Hill*.
Department of Mathematics, Joint Applied Math and Marine Sciences Fluids Lab.
Mentors: Roberto Camassa and Richard M. McLaughlin.

Honors and Awards

2024 National Science Foundation CAREER Award.
2023 Winner of American Physical Society Gallery of Fluid Motion.
2023 Dedicated Faculty Award, Brown Engineering Class of 2023.
2023 Winner of American Physical Society Gallery of Soft Matter.
2022 Excellence in Research Mentoring Award, Brown University.
2021 Dean's Award for Excellence in Teaching in Engineering, Brown University.
2016 Expert's Choice Winner in NSF/Popular Science Visualization Challenge.
2015 Winner of American Physical Society Gallery of Fluid Motion (3 awards).
2015 Housman Award for Excellence in Teaching at MIT.
2012 Winner of American Physical Society Gallery of Fluid Motion.
2011 National Science Foundation Graduate Research Fellowship.
2010 NASA Aeronautics Graduate Scholarship.
2009 Winner of American Physical Society Gallery of Fluid Motion.
2009 New York/NASA Space Grant Fellowship.

Manuscripts Under Review or In Revision

[1] Robert Hunt, Eli Silver, and Daniel M Harris. FIEVel: A Fast InExpensive Velocimeter based on an optical mouse sensor. *Under Review*. [Preprint: arXiv:2410.23176].

[2] Jack-William Barotta, Giuseppe Pucci, Eli Silver, Alireza Hooshanginejad, and Daniel M Harris. Synchronization of wave-propelled capillary spinners. *Under Review*. [Preprint: arXiv:2409.06652].

[3] Robert Hunt, Roberto Camassa, Richard M McLaughlin, and Daniel M Harris. Diffusion-limited settling of highly porous particles in density-stratified fluids. *In Revision*. [Preprint: arXiv:2409.02419].

[4] Stuart J Thomson, Jack-William Barotta, and Daniel M Harris. Nonequilibrium capillary self-assembly. *In Revision*. [Preprint: arXiv:2309.01668].

Publications

[1] John T Antolik, Jesse L Belden, Nathan B Speirs, and Daniel M Harris. Formation of undulatory cavities during hydroelastic water entry. *Physical Review Fluids*, 9(11):110503, 2024.

[2] Maya Lewis, Eli Silver, Robert Hunt, and Daniel M Harris. OpenFlume: An accessible and reproducible benchtop flume for research and education. *HardwareX*, 20:e00583, 2024.

[3] Alireza Hooshanginejad, Jack-William Barotta, Victoria Spradlin, Giuseppe Pucci, Robert Hunt, and Daniel M Harris. Interactions and pattern formation in a macroscopic magnetocapillary SALR system of mermaid cereal. *Nature Communications*, 15:5466, 2024. [Selected as "Editors' Highlight"].

[4] Anand U Oza, Giuseppe Pucci, Ian Ho, and Daniel M Harris. Theoretical modeling of capillary surfer interactions on a vibrating fluid bath. *Physical Review Fluids*, 8(11):114001, 2023. [Selected as "Featured in Physics"].

[5] Ian Ho, Giuseppe Pucci, Anand U Oza, and Daniel M Harris. Capillary surfers: wave-driven particles at a vibrating fluid interface. *Physical Review Fluids*, 8(11):L112001, 2023. [Selected as "Editors' Suggestion" and "Featured in Physics"].

[6] John T Antolik, Jesse L Belden, Nathan B Speirs, and Daniel M Harris. Slamming forces during water entry of a simple harmonic oscillator. *Journal of Fluid Mechanics*, 974:A23, 2023.

[7] John T Antolik, Amanda Howard, Fernando Vereda, Nikolay Ionkin, Martin Maxey, and Daniel M Harris. Hydrodynamic irreversibility of non-brownian suspensions in highly confined duct flow. *Journal of Fluid Mechanics*, 974:A11, 2023.

[8] Robert Hunt, Ze Zhao, Eli Silver, Jinhui Yan, Yuri Bazilevs, and Daniel M Harris. Drag on a partially immersed sphere at the capillary scale. *Physical Review Fluids*, 8(8):084003, 2023. [Selected as "Editors' Suggestion"].

[9] Jack-William Barotta, Stuart J Thomson, Luke FL Alventosa, Maya Lewis, and Daniel M Harris. Bidirectional wave-propelled capillary spinners. *Communications Physics*, 6:87, 2023.

[10] Luke FL Alventosa, Radu Cimpeanu, and Daniel M Harris. Inertio-capillary rebound of a droplet impacting a fluid bath. *Journal of Fluid Mechanics*, 958:A24, 2023. [Selected for volume cover image].

[11] Elvis A Agüero, Luke Alventosa, Daniel M Harris, and Carlos A Galeano-Rios. Impact of a rigid sphere onto an elastic membrane. *Proceedings of the Royal Society A*, 478:20220340, 2022.

[12] Eugene Rhee, Robert Hunt, Stuart J Thomson, and Daniel M Harris. Surferbot: a wave-propelled aquatic vibrobot. *Bioinspiration & Biomimetics*, 17:055001, 2022.

[13] Asimanshu Das, Matthew Styslinger, Daniel M Harris, and Roberto Zenit. Force and torque-free helical tail robot to study low Reynolds number microorganism swimming. *Review of Scientific Instruments*, 93(4):044103, 2022.

[14] Ian Ho, Ajay Harishankar Kumar, and Daniel M Harris. Reconfigurable mechanical vibrations laboratory kit. *Journal of Open Hardware*, 6(1):4, 2022.

[15] Riley L Howard, Francesca Bernardi, Matthew Leff, Emma Abele, Nancy L Albritton, and Daniel M Harris. Passive control of silane diffusion for gradient application of surface properties. *Micromachines*, 12(11):1360, 2021.

[16] Daniel M Harris, Kristy Schlueter-Kuck, Elizabeth Austin, and Kristina Cohen. Course-based undergraduate research in upper-level engineering electives: A case study. *Journal of STEM Education: Innovations and Research*, 22(3):46–55, 2021.

[17] Ajay Harishankar Kumar, Stuart J Thomson, Thomas R Powers, and Daniel M Harris. Taylor dispersion of elongated rods. *Physical Review Fluids*, 6(9):094501, 2021. [Selected as "Editors' Suggestion"].

[18] Garam Lee, Alan Luner, Jeremy Marzuola, and Daniel M Harris. Dispersion control in pressure-driven flow through bowed rectangular microchannels. *Microfluidics and Nanofluidics*, 25:34, 2021.

[19] Carlos A Galeano-Rios, Radu Cimpeanu, Isabelle A Bauman, Annika MacEwen, Paul A Milewski, and Daniel M Harris. Capillary-scale solid rebounds: experiments, modelling and simulations. *Journal of Fluid Mechanics*, 912:A17, 2021.

[20] Jeong-Hyun Kim, Rohit Puranik, Jessica K Shang, and Daniel M Harris. Robust transferrable superhydrophobic surfaces. *Surface Engineering*, 36(6):614–620, 2020.

[21] Roberto Camassa, Daniel M Harris, Robert Hunt, Zeliha Kilic, and Richard M McLaughlin. A first-principle mechanism for particulate aggregation and self-assembly in stratified fluids. *Nature Communications*, 12:5804, 2019.

[22] Ian Ho, Giuseppe Pucci, and Daniel M Harris. Direct measurement of capillary attraction between floating disks. *Physical Review Letters*, 123:254502, 2019. [Selected as "Editors' Suggestion" and "Featured in Physics"].

[23] Abigail W Taylor and Daniel M Harris. Optimized commercial desktop cutter technique for rapid-prototyping of microfluidic devices and application to Taylor dispersion. *Review of Scientific Instruments*, 90(11):116102, 2019.

[24] Giuseppe Pucci, Ian Ho, and Daniel M Harris. Friction on water sliders. *Scientific Reports*, 9(1):4095, 2019.

[25] Nikolay Ionkin and Daniel M Harris. Note: A versatile 3D-printed droplet-on-demand generator. *Review of Scientific Instruments*, 89(11):116103, 2018.

[26] Daniel M Harris, P-T Brun, Adam Damiano, Luiz M Faria, and John WM Bush. The interaction of a walking droplet and a submerged pillar: from scattering to the logarithmic spiral. *Chaos*, 28(9):096105, 2018.

[27] Avishai Halev and Daniel M Harris. Bouncing ball on a vibrating periodic surface. *Chaos*, 28(9):096103, 2018.

[28] Manuchehr Aminian, Francesca Bernardi, Roberto Camassa, Daniel M Harris, and Richard M McLaughlin. The diffusion of passive tracers in laminar shear flow. *Journal of Visualized Experiments*, 135:e57205, 2018.

[29] Matthew DiSalvo, Daniel M Harris, Saurin Kantesaria, Alexis N Peña, Jules D Allbritton-King, Jacqueline H Cole, and Nancy L Allbritton. Characterization of tensioned PDMS membranes for imaging cytometry on microraft arrays. *Analytical Chemistry*, 90(7):4792–4800, 2018.

[30] Giuseppe Pucci, Daniel M Harris, Luiz M Faria, and John WM Bush. Walking droplets interacting with single and double slits. *Journal of Fluid Mechanics*, 835:1136–1156, 2018.

[31] Anand U Oza, Emmanuel Siéfert, Daniel M Harris, Jan Moláček, and John WM Bush. Orbiting pairs of walking droplets: Dynamics and stability. *Physical Review Fluids*, 2(5):053601, 2017.

[32] Daniel M Harris, Julio Quintela, Victor Prost, P-T Brun, and John WM Bush. Visualization of hydrodynamic pilot-wave phenomena. *Journal of Visualization*, 20(1):13–15, 2017.

[33] Manuchehr Aminian, Francesca Bernardi, Roberto Camassa, Daniel M Harris, and Richard M McLaughlin. How boundaries shape chemical delivery in microfluidics. *Science*, 354(6317):1252–1256, 2016.

[34] Lucas D Tambasco, Daniel M Harris, Anand U Oza, Rodolfo R Rosales, and John WM Bush. The onset of chaos in orbital pilot-wave dynamics. *Chaos*, 26(10):103107, 2016.

[35] Adam P Damiano, P-T Brun, Daniel M Harris, Carlos A Galeano-Rios, and John WM Bush. Surface topography measurements of the bouncing droplet experiment. *Experiments in Fluids*, 57(10):163, 2016.

[36] P-T Brun, Daniel M Harris, Victor Prost, Julio Quintela, and John WM Bush. Shedding light on pilot-wave phenomena. *Physical Review Fluids*, 1(5):050510, 2016.

[37] Roberto Camassa, Daniel M Harris, David Holz, Richard M McLaughlin, Keith Mertens, Pierre-Yves Passaggia, and Claudio Viotti. Variable density vortex ring dynamics in sharply stratified ambient fluids. *Physical Review Fluids*, 1(5):050503, 2016.

[38] Daniel M Harris, Giuseppe Pucci, Victor Prost, Julio Quintela Casal, and John WM Bush. Merger of a bubble and a soap film. *Physical Review Fluids*, 1(5):050505, 2016.

[39] Brendan G McBennett and Daniel M Harris. Horizontal stability of a bouncing ball. *Chaos*, 26(9):093105, 2016.

[40] Giuseppe Pucci, Daniel M Harris, and John WM Bush. Partial coalescence of soap bubbles. *Physics of Fluids*, 27(6):061704, 2015.

[41] Daniel M Harris, Tanya Liu, and John WM Bush. A low-cost, precise piezoelectric droplet-on-demand generator. *Experiments in Fluids*, 56(4):83, 2015.

[42] Daniel M Harris and John WM Bush. Generating uniaxial vibration with an electrodynamic shaker and external air bearing. *Journal of Sound and Vibration*, 334:255–269, 2015.

[43] Charles HK Williamson, Thomas Leweke, Daniel J Asselin, and Daniel M Harris. Phenomena, dynamics and instabilities of vortex pairs. *Fluid Dynamics Research*, 46(6):061425, 2014.

[44] Anand U Oza, Øistein Wind-Willassen, Daniel M Harris, Rodolfo R Rosales, and John WM Bush. Pilot-wave hydrodynamics in a rotating frame: Exotic orbits. *Physics of Fluids*, 26(8):082101, 2014.

[45] Anand U Oza, Daniel M Harris, Rodolfo R Rosales, and John WM Bush. Pilot-wave dynamics in a rotating frame: on the emergence of orbital quantization. *Journal of Fluid Mechanics*, 744:404–429, 2014.

[46] Daniel M Harris and John WM Bush. Droplets walking in a rotating frame: from quantized orbits to multimodal statistics. *Journal of Fluid Mechanics*, 739:444–464, 2014.

[47] Daniel M Harris, Julien Moukhtar, Emmanuel Fort, Yves Couder, and John WM Bush. Wavelike statistics from pilot-wave dynamics in a circular corral. *Physical Review E*, 88(1):011001, 2013.

[48] Daniel M Harris and John WM Bush. The pilot-wave dynamics of walking droplets. *Physics of Fluids*, 25(9):091112, 2013.

[49] Øistein Wind-Willassen, Jan Moláček, Daniel M Harris, and John WM Bush. Exotic states of bouncing and walking droplets. *Physics of Fluids*, 25(8):082002, 2013.

[50] Daniel M Harris and Charles HK Williamson. Instability of secondary vortices generated by a vortex pair in ground effect. *Journal of Fluid Mechanics*, 700:148–186, 2012.

[51] Daniel M Harris, Victor A Miller, and Charles HK Williamson. A short wave instability caused by the approach of a vortex pair to a ground plane. *Physics of Fluids*, 22(9):091106, 2010.

[52] Victor A Miller, Daniel M Harris, and Charles HK Williamson. Briefing: Interaction of a counter-rotating vortex pair with the ground. *Proceedings of the Institution of Civil Engineers-Engineering and Computational Mechanics*, 162(4):181–183, 2009.

Invited Presentations

Pattern Formation and Propulsion of Macroscopic Particles at a Fluid Interface.
- Levich Institute Seminar.
  - *City College of New York*, New York, NY (scheduled December 2024).

Propulsion and Interaction of Wave-Propelled Interfacial Particles.
- 77th Annual American Physical Society Division of Fluid Dynamics (APS-DFD) Meeting.
  - Salt Lake City, UT (scheduled November 2024).

Bioreactor Modeling for Cultivated Meat Production.
- National Institute for Cellular Agriculture (NICA) Seminar.
  - *Tufts University*, Medford, MA (November 2024).

Propulsion and Interaction of Wave-Propelled Interfacial Particles.
- Physics of Living Systems (PoLS) Seminar.
  - *Georgia Tech*, Atlanta, Georgia (September 2024).

Capillary-Wave Propulsion: From Walking to Surfing.
- International Meeting in Memory of Yves Couder.
  - Keynote Speaker.
  - *Université Paris-Cité & École Normale Supérieure*, Paris, France (June 2024).

Water Entry of a Simple Harmonic Oscillator.
- LadHyX Seminar.
  - *LadHyX, École Polytechnique*, Paris, France (June 2024).

At the Interface: Physical Analogy with Interfacial Fluid Mechanics.
- Northwestern Institute on Complex System's (NICO) Wednesdays@NICO Seminar.
  - *Northwestern University*, Virtual (May 2024).

Propulsion and Interaction of Wave-Propelled Interfacial Particles.
- Mechanical and Mechatronics Department Seminar.
  - *University of Waterloo*, Waterloo, Ontario, Canada (April 2024).

A Flexible Approach to Water Entry.
- Water Entry S&T Group Seminar.
  - *Naval Undersea Warfare Center*, Newport, RI (February 2024).

Flexible Interfacial Impacts.
- Mechanical and Industrial Engineering Seminar.
  - *Northeastern University*, Boston, MA (October 2023).

Pattern Formation and Propulsion of Macroscopic Capillary Floaters.
- 97th American Chemical Society (ACS) Colloid and Surface Science Symposium.
  - Keynote Speaker: Wetting and Adhesion.
  - *North Carolina State University*, Raleigh, NC (June 2023).

Water Entry of a Simple Harmonic Oscillator.
- Mechanical Engineering Seminar.
  - *King Abdullah University of Science and Technology (KAUST)*, Virtual (May 2023).

Wave-Propelled Interfacial Particles.
- Physical Mathematics Seminar, Department of Mathematics.
  - *Massachusetts Institute of Technology*, Cambridge, MA (May 2023).

Inertio-Capillary Rebound of a Droplet Impacting a Fluid Bath.
- Workshop on Drop Dynamics, SIG Meeting.
  - *University of Oxford*, Oxford, UK (March 2023).

Flexible Interfacial Impacts.

- Fluids Seminar.
  - *University College London*, London, UK (March 2023).
- Fluid Dynamics Research Centre Seminar.
  - *University of Warwick*, Coventry, UK (March 2023).
- Special Fluid Mechanics Seminar.
  - *University of Bristol*, Bristol, UK (March 2023).
- Imperial Fluid Dynamics Seminar.
  - *Imperial College of London*, London, UK (March 2023).

Active and Driven Wave-Propelled Interfacial Particles.

- American Physical Society (APS) March Meeting.
  - Las Vegas, NV (March 2023).
- Applied Physical Sciences Colloquium.
  - *University of North Carolina at Chapel Hill*, Chapel Hill, NC (December 2022).

Dynamic Fluid-Solid Interactions at the Capillary Scale.

- Mechanical Engineering Seminar.
  - *University of California, Santa Barbara*, Virtual (May 2022).

Driven Interfacial Matter.

- Condensed Matter Seminar.
  - *University of Massachusetts Amherst*, Amherst, MA (April 2022).
- Physics Colloquium.
  - *Clark University*, Worcester, MA (April 2022).

Dynamic Fluid-Solid Interactions at the Capillary Scale.

- Colloquium, Fluid Dynamics Research Consortium.
  - *Pennsylvania State University*, State College, PA (March 2022).

The Emerging Landscape of Computer Modeling in Cultivated Meat.

- The Science of Alternative Protein Seminar Series.
  - *Good Food Institute*, Virtual (March 2022).
  - Joint presentation with *Cultivated Meat Modeling Consortium (CMMC)*.

Broken Symmetry: Self-Propulsion at a Vibrating Fluid Interface.

- 74th Annual American Physical Society Division of Fluid Dynamics (APS-DFD) Meeting.
  - Phoenix, AZ (November 2021).

Dynamic Fluid-Solid Interactions at the Capillary Scale.

- Math Colloquium, Department of Mathematical Sciences.
  - *Worcester Polytechnic Institute*, Virtual (October 2021).

The Art and Craft of Science.

- Intellectual Storytime.
  - *Naval Undersea Warfare Center*, Newport, RI (July 2021).

Dynamic Fluid-Solid Interactions at the Capillary Scale.

- Industrial and Applied Mathematics Seminar, Mathematical Institute.
  - *University of Oxford*, Virtual (June 2021).

Interactions of Passive and Active Capillary Disks.

- Physical Mathematics Seminar, Department of Mathematics.
  - *Massachusetts Institute of Technology*, Virtual (May 2021).
- Cornell Fluids Seminar, School of Engineering.
  - *Cornell University*, Virtual (April 2021).
- Applied Mathematics Seminar, Courant Institute of Mathematical Sciences.
  - *New York University*, Virtual (March 2021).

Building New Opportunities: Integration of Outreach, Education and Research.
- Joint Mathematics Meetings (JMM).
  - Virtual (January 2021).

Research Topics in Interfacial Phenomena.
- Guest Lecture for CHE 347 (Transport Phenomena I), Department of Chemical Engineering.
  - *University of Rhode Island*, Virtual (November 2020).

Taylor-Aris Dispersion of Elongated Rods.
- The Second Joint SIAM/CAIMS Annual Meeting (AN20).[†]
  - Toronto, Ontario, Canada (scheduled July 2020).

Hydrodynamic Mechanisms for Particle Aggregation at Fluid Interfaces.
- Fluid Dynamics Research Centre Seminar, School of Engineering.[†]
  - *University of Warwick*, Coventry, UK (scheduled May 2020).
- Applied and Interdisciplinary Math Seminar, Department of Mathematical Sciences.
  - *University of Bath*, Virtual (May 2020).

Forces on Capillary Disks.
- Applied Math Colloquium, Carolina Center for Interdisciplinary Applied Mathematics.[†]
  - *University of North Carolina at Chapel Hill*, Chapel Hill, NC (scheduled April 2020).

Hydrodynamic Mechanisms for Particle Aggregation at Fluid Interfaces.
- Applied Math Seminar, Courant Institute of Mathematical Sciences.[†]
  - *New York University*, New York, NY (scheduled March 2020).
- Mathematics Colloquium, Department of Mathematics.
  - *Florida State University*, Tallahassee, FL (February 2020).

The Art and Craft of Science.
- 72nd Annual American Physical Society Division of Fluid Dynamics (APS-DFD) Meeting.
  - Seattle, WA (November 2019).

Hydrodynamic Mechanisms for Particle Aggregation at Fluid Interfaces.
- 80th New England Complex Fluids (NECF) Workshop.
  - *Brandeis University*, Waltham, MA (September 2019).

Diffusion-Induced Aggregation.
- 16th Annual Conference on Frontiers in Applied & Computational Mathematics (FACM'19).
  - *New Jersey Institute of Technology*, Newark, NJ (May 2019).

Forces on Capillary Disks.
- Squishy Physics Seminar, School of Engineering and Applied Sciences.
  - *Harvard University*, Cambridge, MA (May 2019).
- Applied Math Colloquium, Department of Mathematical Sciences.
  - *New Jersey Institute of Technology*, Newark, NJ (March 2019).
- Amgen Seminar Series in Chemical Engineering, Department of Chemical Engineering.
  - *University of Rhode Island*, Kingston, RI (March 2019).

Research Topics in Interfacial Phenomena.
- Guest Lecture for CHE 347 (Transport Phenomena I), Department of Chemical Engineering.
  - *University of Rhode Island*, Kingston, RI (December 2018).

Fluid-Solid Interactions at the Capillary Scale.
- Physical Mathematics Seminar, Department of Mathematics.
  - *Massachusetts Institute of Technology*, Cambridge, MA (September 2018).
- Visiting Scholar Lecture.
  - *Naval Undersea Warfare Center*, Newport, RI (September 2018).

[†]Cancelled due to COVID-19 pandemic.

Digital and Continuous Microfluidics.

- Cornell Fluids Seminar, School of Engineering.
  - *Cornell University*, Ithaca, NY (April 2018).
- Tufts Mechanical Engineering Colloquium, School of Engineering.
  - *Tufts University*, Medford, MA (April 2018).

Follow the Bouncing Ball.

- Applied Math Colloquium, Carolina Center for Interdisciplinary Applied Mathematics.
  - *University of North Carolina at Chapel Hill*, Chapel Hill, NC (January 2018).

Digital and Continuous Microfluidics.

- Mechanical and Industrial Engineering Seminar, College of Engineering.
  - *New Jersey Institute of Technology*, Newark, NJ (March 2017).
- Mechanical & Aerospace Engineering Seminar, School of Engineering and Applied Science.
  - *University of Virginia*, Charlottesville, VA (March 2017).
- Fluids and Thermal Sciences Seminar, School of Engineering.
  - *Brown University*, Providence, RI (February 2017).
- Engineering Science and Mechanics Seminar, College of Engineering.
  - *Pennsylvania State University*, State College, PA (February 2017).

Taylor Dispersion and Microfluidics.

- Physical Mathematics Seminar, Department of Mathematics.
  - *Massachusetts Institute of Technology*, Cambridge, MA (November 2016).
- Differential Equations Seminar, Department of Mathematics.
  - *North Carolina State University*, Raleigh, NC (October 2016).
- Graduate Mathematics Association (GMA) Seminar, Department of Mathematics.
  - *University of North Carolina at Chapel Hill*, Chapel Hill, NC (September 2016).

Bouncing and Walking Droplets.

- Graduate Mathematics Association (GMA) Seminar, Department of Mathematics.
  - *University of North Carolina at Chapel Hill*, Chapel Hill, NC (March 2016).
- Complex Matter and Biophysics Seminar, Department of Physics.
  - *North Carolina State University*, Raleigh, NC (October 2015).
- Joint Applied Math/Applied Physical Sciences Seminar, College of Arts and Sciences.
  - *University of North Carolina at Chapel Hill*, Chapel Hill, NC (February 2015).

Contributed Presentations

[1] DM Harris, R Cimpeanu, O Sand, E Silver, LF Alventosa, A Mohammadi, TC Sykes and AA Castrejón-Pita. "Bouncing to coalescence transition for drop impact onto moving liquid pools." APS-DFD Meeting 2024, Salt Lake City, UT.

[2] DM Harris, SJ Thomson, and J-W Barotta. "Nonequilibrium capillary self-assembly." 96th New England Complex Fluids Workshop (September 2023), Waltham, MA.

[3] DM Harris, E Rhee, R Hunt, and SJ Thomson. "SurferBot: a wave-propelled aquatic vibrobot." APS-DFD Meeting 2022, Indianapolis, IN.

[4] DM Harris and SJ Thomson. "Non-equilibrium capillary self-assembly." 93rd Society of Rheology Annual Meeting 2022, Chicago, IL.

[5] T-M Achilli, J Valles, DM Harris, and RM Colwill. "How COVID-19 made me a more effective teacher: Leveraging resources for student centered learning in online/hybrid environments." 2021 Massachusetts PKAL Winter Meeting, Virtual.

[6] DM Harris, K Schlueter-Kuck, E Austin, and K Cohen. "Course-based undergraduate research in upper-level fluid dynamics electives: A case study." APS-DFD Meeting 2020, Virtual.

[7] DM Harris, R Camassa, R Hunt, Z Kilic, and RM McLaughlin. "Diffusion-induced aggregation." 79th New England Complex Fluids Workshop (June 2019), Boston, MA.

[8] DM Harris, G Pucci, and I Ho. "Friction on water sliders." APS March Meeting 2019, Boston, MA.

[9] DM Harris, I Bauman, and A MacEwen. "Impact of a hydrophobic sphere onto a bath." 75th New England Complex Fluids Workshop (June 2018), Cambridge, MA.

[10] DM Harris, BG McBennett, and A Halev. "Horizontal stability of a bouncing ball." APS March Meeting 2018, Los Angeles, CA.

[11] DM Harris, J Edmonds, CA Galeano-Rios, and PA Milewski. "Impact of a hydrophobic sphere onto a bath." APS-DFD Meeting 2017, Denver, CO.

[12] DM Harris, M Aminian, F Bernardi, R Camassa, and RM McLaughlin. "Tailoring tails in Taylor dispersion: how boundaries shape chemical delivery in microfluidics: experiments." APS-DFD Meeting 2016, Portland, OR.

[13] DM Harris, AU Oza, RR Rosales, and JWM Bush. "Pilot-wave hydrodynamics in a rotating frame." SIAM Southeastern Atlantic Section Conference 2016, Athens, GA.

[14] DM Harris, G Pucci, and JWM Bush. "Partial coalescence of soap bubbles." APS-DFD Meeting 2015, Boston, MA.

[15] DM Harris, G Pucci, and JWM Bush. "Diffraction of walking droplets." APS-DFD Meeting 2014, San Francisco, CA.

[16] DM Harris and JWM Bush. "Droplets walking in a rotating frame: from quantized orbits to wavelike statistics." APS-DFD Meeting 2013, Pittsburgh, PA.

[17] DM Harris and JWM Bush. "Pilot-wave dynamics in confined geometries." APS-DFD Meeting 2012, San Diego, CA.

[18] DM Harris and CHK Williamson. "A shortwave instability caused by the approach of a vortex pair to a ground plane." APS-DFD Meeting 2010, Long Beach, CA.

External Funding

2024–2025 USDA National Institute for Cellular Agriculture Seed Grant Program: "Open-Source Computational Modeling of Fluid Motion, Mass Transport, and Cellular Dynamics in Bioreactors for Cellular Agriculture".
- PI – Award amount: $50,000 (with co-PI Minki Kim).

2024–2025 ASEE Engineering for One Planet Mini-Grant Program (EOP-MGP).
- co-PI – Award amount: $8,000 (with Louise Manfredi).

2024–2025 ACCESS AGR240019: "Developing an Open-Source Bioreactor Modeling Simulation Tool for Cultivated Meat Production".
- co-PI – Award resources: 400,000 ACCESS Credits (with PI M. Kim & co-PI R. Cimpeanu).
  - Estimated value of resources: $2,391.

2024–2028 NSF CBET-2338320: "CAREER: Inertio-Capillary Dynamics of Particles at Interfaces".
- PI – Award amount: $570,000.

2024–2025 AFOSR DURIP: "High Speed Cameras for Shared Uses in Research of Bio-inspired, Environmental and Aerodynamic Flows".
- co-PI – Award amount: $280,419 (with PI K. Breuer).

2024 American Physical Society Division of Soft Matter (APS DSOFT): "99th New England Complex Fluids Workshop".
- PI – Award amount: $1,000.

2021–2023 Cultivated Meat Modeling Consortium (CMMC): "Bioreactor Modeling Across Scales with focus on Dissolved Oxygen".
- Subaward – Award amount: $25,000.

2021–2025 NSF CBET-2123371: "CBET-EPSRC: Droplet Impact on Fluid Interfaces: 3D Effects Across Scales".
- PI – Award amount: $397,000.
- Companion EPSRC (UK) Award: £464,892 to A. Castrejón-Pita (Oxford) & R. Cimpeanu (Warwick).

2021–2026 ONR N00014-21-1-2816: "Bio-inspired engineering and design for naval applications".
- co-PI – Project amount: $1,235,527; Total award: $5.4M total (with PI K. Breuer).

2021–2026 ONR N00014-21-1-2670: "Predictive Modeling and Simulation for Next Generation Naval Undersea Vehicles and Platforms".
- co-PI – Project amount: $600,314; Total award: $4.7M (with PI Y. Bazilevs).

2021 Good Food Institute: "Computational Modeling of Fluid Dynamics and Transport Processes in Wave Bioreactors via Open-Source CFD Software".
- PI – Award amount: $50,000 total ($14,488 subaward to Radu Cimpeanu, U. Warwick, UK).

2020–2022 Good Food Institute: "REALSENSE2 – From lab-on-a-chip to custom bioreactor: scale-up modeling study".
- co-PI – Award amount: $84,403 ($250,000 total with BioSense Institute, Serbia).

2019–2022 NSF DMS-1909521: "Collaborative Research: Self-assembly and aggregate formation in stratified fluids".
- PI – Award amount: $93,000 ($347,000 total with R. McLaughlin & R. Camassa, UNC).

2019–2022 NSF CBET-1902512: "EAGER: Collaborative Research: Modeling Silane Spreading and Deposition for Liquid Lithography".
- PI – Award amount: $53,364 ($73,031 total with F. Bernardi, FSU).

2018–2019 NSF DMR-1841840: "8th Meeting on Hydrodynamic Quantum Analogs".
- PI – Award amount: $5,000 (with co-PI Giuseppe Pucci).

Internal Funding (Brown)

2023–2025 SOE Hazeltine Innovation Award: "Development of a Low-Cost High-Speed Fluid Velocimeter".
- PI – Award amount: $50,000 (with co-PIs R. Hunt and E. Silver).

2021-2022 Dean of the College: Curriculum Development Funds for Undergraduate STEM Courses.
- ENGN 1735 (Spring 2022): Award amount: $2,000.
- ENGN 0810 (Fall 2021): Award amount: $2,610 (with R. Zenit).
- ENGN 1860 (Spring 2021): Award amount: $2,838.

2020–2021 COVID-19 Research Seed Fund: "BrunO_2: Rapid-Prototyped Open-Source Ventilator Design for Targeted COVID-19 Therapy".
- PI – Award amount: $50,000 (with R. Zenit and J. Rosenstein).

2020–2021 OVPR Salomon Award: "Tailoring Taylor Dispersion for Microfluidic Applications".
- PI – Award amount: $12,000.

2019–2021 HHMI-Sheridan Research Course Initiative.
- Program Director: M. Johnson (Brown).
- Award amounts: $12,582 (2019), $17,091 (2020), $1,000 (2021).

2018–2019 OVPR Seed Award: "Making an Impact: Dynamic Free-Surface Interactions".
- PI – Award amount: $50,000.

Teaching Experience

Spring 2025 Design Brief (ENGN 0620), Course Instructor, *Brown*.
Fall 2024 Vibration of Mechanical Systems (ENGN 1735/2735), Course Instructor, *Brown*.
Fall 2023 Vibration of Mechanical Systems (ENGN 1735/2735), Course Instructor, *Brown*.
Fall 2022 Fluid Mechanics (ENGN 0810), Course Instructor, *Brown*.
Spring 2022 Vibration of Mechanical Systems (ENGN 1735/2735), Course Instructor, *Brown*.
Fall 2021 Fluid Mechanics (ENGN 0810), Course Instructor, *Brown*.
Spring 2021 Advanced Fluid Mechanics (ENGN 1860), Course Instructor, *Brown*.
Fall 2020 Vibration of Mechanical Systems (ENGN 1735/2735), Course Instructor, *Brown*.
Spring 2020 Advanced Fluid Mechanics (ENGN 1860), Course Instructor, *Brown*.
Fall 2019 Vibration of Mechanical Systems (ENGN 1735/2735), Course Instructor, *Brown*.
Spring 2019 Advanced Fluid Mechanics (ENGN 1860), Course Instructor, *Brown*.
Spring 2018 Vibration of Mechanical Systems (ENGN 2911N), Course Instructor, *Brown*.
Fall 2017 Fluid Mechanics I (ENGN 2810), Course Instructor, *Brown*.
Summer 2017 Undergraduate Seminar in Math (MATH 294), Asst. Course Instructor, *UNC-CH*.
Summer 2017 Math Methods for the Physical Sciences I (MATH 528), Course Instructor, *UNC-CH*.
Spring 2017 Math Methods for the Physical Sciences II (MATH 529), Course Instructor, *UNC-CH*.
Fall 2016 Math Methods for the Physical Sciences I (MATH 528), Course Instructor, *UNC-CH*.
Spring 2016 Math Methods for the Physical Sciences II (MATH 529), Course Instructor, *UNC-CH*.
Fall 2015 Math Methods for the Physical Sciences I (MATH 528), Course Instructor, *UNC-CH*.
Summer 2015 Computational Science and Engineering I (18.085), Course Co-Instructor, *MIT*.
Winter 2015 Calculus (18.02A), Recitation Instructor and Course Administrator, *MIT*.
Fall 2014 Calculus (18.01A), Recitation Instructor and Course Administrator, *MIT*.
Fall 2013 Linear Algebra (18.06), Recitation Instructor, *MIT*.

Professional Service Activities

2024–Present **Graduate Program Advisor for Fluid Mechanics (Engineering)**, *Brown University*.
2024–Present **Student Group Faculty Advisor: Alternative Protein Project**, *Brown University*.
2017–Present **Engineering Project Team Advisor**.
- Brown Formula Racing (Formula SAE), *Brown University*.

2018–2024 **Engineering Liaison: Sheridan Center for Teaching**, *Brown University*.
2021–2023 **Member: Committee on Education (COE)**, *American Physical Society (APS)*.
- Subcommittee Chair: Awards Subcommittee (2022–2023).

2023 **Concentration Advisor: Design Engineering**, *Brown University*.
2019–2022 **Seminar Series Organizer: Center for Fluid Mechanics**, *Brown University*.
2019 **Member: Design Engineering Commitee**, *Brown University*.

Meeting Organizer.

- 99th New England Complex Fluids Meeting (2024), *Brown University.*
- 82nd New England Complex Fluids Meeting (scheduled 2020)[†], *Brown University.*
- 8th Meeting on Hydrodynamic Quantum Analogs (2018), *Brown University.*

Journal Peer Review.

- Fluid Mechanics: *J. Fluid Mechanics, Flow, Physical Review Fluids, Physics of Fluids, Experiments in Fluids, Fluid Dynamics Research, J. Fluids and Structures, J. Non-Newtonian Fluid Mechanics, Intl. J. of Multiphase Flow, Water Waves.*
- General Physics: *Physical Review Letters, Science Advances, Scientific Reports, Physical Review E, Soft Matter, Chaos, Proceedings of the Royal Society A, Physics Letters A, J. Computational Physics, Microelectronic Engineering, European Physical Journal Plus.*
- Open Hardware: *HardwareX.*

Conference Service.

- Invited Panelist, *APS-DFD (2024) – Networking: Applying for Post Doc & Faculty Positions.*
- Invited Judge, *APS-DFD (2024) – Gallery of Fluid Motion.*
- Invited Table Host, *APS-DFD (2024) – Student Lunch.*
- Invited Table Host, *APS-DFD (2023) – Student Lunch.*
- Session Chair, *APS Colloids (2023) – Wetting and Adhesion.*
- Invited Panelist, *APS-DFD (2022) – Fluids Education Lunch Workshop.*
- Invited Judge, *APS-DFD (2022) – Student Poster Session.*
- Invited Panelist, *APS-DFD (2021) – Fluids Education Lunch Workshop.*
- Session Chair (Virtual), *APS March Meeting (2020) – Interfacial Flows & Complex Fluids.*
- Session Chair, *APS March Meeting (2019) – R48: Drops I.*
- Invited Judge, *APS-DFD (2018) – Gallery of Fluid Motion.*
- Session Chair, *APS-DFD (2017) – Q20: Free Surface Flows: Fluid-Solid Interactions.*

Outreach Activities

2024 Engineering event organizer for "Girls Get Math" Program, *ICERM (Brown).*

2024 STEM event organizer for Barrington Public Library, *(Barrington, RI).*

2024 STEM event organizer for Community Libraries of Providence, *Rochambeau Library (Providence, RI).*

2023 STEM event organizer for Youth Pride Inc., *(Providence, RI).*

2023 Engineering event organizer for "Girls Get Math" Program, *ICERM (Brown).*

2023 STEAM event organizer for Community Libraries of Providence, *Rochambeau Library (Providence, RI).*

2022 Engineering event organizer for "Girls Get Math" Program, *ICERM (Brown).*

2021 Panelist for "Fall 2021 Broader Impacts Workshop," *Brown (Virtual).*

2021 Engineering event organizer for "Girls Get Math" Program, *ICERM (Virtual).*

2020 Scientific demo leader for "STEM Day 2020," *Brown.*

2019 Engineering event organizer for "Girls Get Math" Program, *ICERM (Brown).*

2018 Demo designer for "Fluids Education Lunch," *APS-DFD (Atlanta, GA).*

2018 Speaker for "Girls Get Math" Program, *ICERM (Brown).*

2017 Speaker for "Girls Talk Math" Program, *UNC-CH.*

2017 Exhibit designer for "Arts Everywhere Day," *UNC-CH.*

2016 Volunteer for "Science Expo," *UNC-CH.*

[†]Cancelled due to COVID-19 pandemic.

2016 Speaker for "Undergraduate Society of Physics Students," *UNC-CH*.

2015 Panelist at "Career Symposium for Graduate and Postdoctoral Scholars," *UNC-CH*.

Advising and Mentoring

Visiting Researchers.

- Megan Delens (8/2024 – 10/2024). PhD student: *University of Liège (Belgium)*.
- Katie Kuehr (5/2024 – 8/2024). Undergrad: *Minerva University*.
- Basile Dhote (3/2023 – 8/2023). MS student: *École Normale Supérieure (Paris)*.
- Elvis Agüero (1/2023). Undergrad: *U. Federal de Integração Latinoamericana*.
- Prof. Fernando Vereda (6/2019 – 8/2019). Faculty: *University of Granada (Spain)*.
- Mackenzie Duce (6/2019 – 9/2019). Undergrad: *Cal Poly*.
- Dr. Giuseppe Pucci (6/2019 – 8/2019). Researcher: *Institut de Physique de Rennes (France)*.
- Nikolay Ionkin (7/2018 – 1/2019). Undergrad: *Columbia University*.
- Roy Glavanitz (5/2018 – 7/2018). Undergrad: *German Armed Forces University (Munich)*.

Research Staff.

- Eli Silver (6/2022 – Present). Research Engineer.

Postdoctoral Researchers.

- Chase Gabbard (7/2024 – Present). Hope Postdoctoral Fellow.
- Adrian Herrera-Amaya (7/2023 – Present). Presidential Postdoctoral Fellow.
- Minki Kim (2/2022 – Present).
- Robert Hunt (9/2021 – Present).
- Luke Alventosa (6/2023 – 11/2023).
- Alireza "Navid" Hooshanginejad (5/2022 – 10/2023). Hibbitt Postdoctoral Fellow.
- Stuart Thomson (6/2020 – 11/2021).
- Jeong-Hyun Kim (5/2018 – 7/2019). Hibbitt Postdoctoral Fellow.
- Giuseppe Pucci (11/2017 – 7/2018).

Doctoral Thesis Supervising.

- Elvis Agüero (9/2024 – Present). Diversity Fellow.
- Ashley Kraekel (9/2024 – Present).
- Jack-William Barotta (9/2021 – Present). NDSEG and Presidential Fellow.
- John Antolik (9/2020 – Present). NASA-Rhode Island Space Grant and Ostrach Fellow.
- Luke Alventosa (9/2018 – 5/2023). Presidential Fellow.

Masters Thesis Supervising.

- Maya Lewis (9/2023 – 5/2024). Master's Outstanding Capstone or Design Project Award.
- Ajay Harishankar Kumar (10/2018 – 6/2021).
- Garam Lee (9/2018 – 8/2020).
- Abigail Taylor (1/2018 – 8/2019).

Undergraduate Thesis Supervising.

- Audrey Gallagher (7/2023 – Present).
- Ela Lucas (9/2022 – 5/2024).
- Eugene Rhee (9/2020 – 5/2023). *Brown+RISD* Dual Degree Capstone. UTRA: Spring 2021.
- Ian Ho (1/2018 – 9/2021). UTRA Award: Fall 2019.
- Emma Abele (10/2018 – 12/2020). SPRINT Award: Summer 2020.
- John Antolik (9/2019 – 8/2020). SPRINT Award: Summer 2020.
- Camilla Faulhaber (11/2019 – 6/2020). *Brown+RISD* Dual Degree Capstone.
- Jesse Remeis (1/2019 – 5/2020). UTRA Award: Summer 2019.
- Aaron Brown (10/2018 – 5/2019).
- Isabelle Bauman (9/2017 – 5/2019). UTRA Award: Fall 2018.
- Annika MacEwen (9/2017 – 5/2018).
- Tanya Liu (2/2013 – 6/2014). *MIT*.

Undergraduate Research Mentoring.

- Luke Rossi (9/2024 – Present).
- Chandler Zhu (6/2024 – Present).
- Tristan Keyser-Parker (5/2024 – Present).
- Jacob Kolman (2/2023 – Present).
- Yesenia Gomez (9/2022 – Present).
- Arman Mohammadi (9/2022 – 1/2024).
- Eli Silver (5/2021 – 5/2022). Lab Staff (Research Engineer) as of 6/2022.
- Raymond Gresalfi (9/2022 – 5/2023).
- Zabari Ross (7/2022 – 5/2023).
- Oliver Sand (1/2022 – 8/2022).
- Matthew Derry (1/2022 – 5/2022). Domenico A. Ionata Award.
- Rebecca Rosen (1/2021 – 5/2022).
- Maya Lewis (10/2020 – 5/2022). DiMase Summer Internship: Summer 2021.
- Peyton Newman (12/2021 – 4/2022).
- Benny Smith (3/2021 – 12/2021).
- Matt Styslinger (9/2020 – 5/2021).
- Molly Pearson (8/2020 – 5/2021).
- Jacob Morse (2/2020 – 5/2021). UTRA Award: Summer 2020.
- Elizabeth Austin (6/2020 – 10/2020).
- Will Haddock (3/2020 – 6/2020).
- Daniel Wang (1/2020 – 5/2020).
- Charlie Bares (5/2019 – 8/2019). UTRA Award: Summer 2019.
- Pavlo Lyalyutskyy (9/2017 – 5/2019).
- Viktor Ladics (6/2018 – 7/2018).
- Olivia Banks (1/2018 – 5/2018).
- Jordan Hodder (9/2017 – 12/2017).
- John Edmonds (9/2016 – 6/2017). *UNC-CH.*
- Avishai Halev (9/2016 – 6/2017). *UNC-CH.*
- Brendan McBennett (9/2015 – 6/2016). *UNC-CH.*
- Sarah Green (8/2015 – 6/2016). *UNC-CH.*
- Mitchell Underwood (1/2016 – 5/2016). *UNC-CH.*
- Lucas Tambasco (5/2011 – 6/2013). *MIT.*

High School Research Mentoring.

- Maisie McLaughlin (5/2024, 7/2023).
- Victoria Spradlin (6/2023 – 8/2023, 7/2022 – 8/2022).
- William Dalton (7/2023).
- Raoul Silver (1/2023).
- Sami Belkadi (10/2014 – 12/2014). *MIT.*