Mauro Rodriguez Jr.

Assistant Professor of Engineering
Brown University, School of Engineering
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Nationality: American, U.S.-born citizen

Professional appointments

Assistant Professor of Engineering, 07/2021-Present
Brown University, School of Engineering

Postdoctoral Research Fellow, 06/2019-07/2021
California Institute of Technology, Division of Engineering & Applied Science
Postdoctoral mentor: Tim Colonius, Ph.D.

Graduate Research Assistant, 06/2012-12/2018
University of Michigan, Ann Arbor, Michigan, Department of Mechanical Engineering
Doctoral adviser: Eric Johnsen, Ph.D.

Education

University of Michigan (U-M), Ann Arbor
Doctorate of Philosophy, Mechanical Engineering, 2018
Thesis Title: Numerical Simulations of Bubble Dynamics Near Viscoelastic Media
Thesis Link: http://hdl.handle.net/2027.42/147536

Stanford University
Master of Science, Mechanical Engineering, 2012

University of Illinois at Urbana-Champaign (UIUC)
Bachelor of Science with Honors, Mechanical Science and Engineering, 2010

Honors

Selected and recent awards provided below, received +20 honors, full list available upon request

10. Dean's Award for Excellence in Diversity, Equity, and Inclusion in Engineering, The Harriet W. Sheridan Center for Teaching and Learning and Brown University's School of Engineering honor
9. Dedicated Faculty Award, The Rhode Island Alpha Chapter of the Tau Beta Pi, 2024
8. DEPSCoR Research Collaboration Winner, Department of Defense, 2022
7. NSF Alliances for Graduate Education and the Professoriate (AGEP) Postdoctoral Fellowship, 2019
6. Ford Foundation Postdoctoral Fellowship, 2019
5. Ford Foundation Dissertation Writing Fellowship, 2017
4. Edward A. Bouchet Graduate Honor Society Member, 2015
3. Rackham Graduate Engineering Fellowship Award, University of Michigan, 2012
2. National Science Foundation Graduate Research Fellowship Honorable Mention, Stanford, 2011
1. Stanford's Mechanical Engineering Graduate Engineering Fellowship Award, 2010

Research activity

Archived, peer-reviewed publications

17. B. Wilfong, H. A. Le Berre, A. Radhakrishnan, A. Gupta, D. Vaca-Revelo, D. Adam, H. Yu, H. Lee, J. R. Chreim, M. Carcana Barbosa, Y. Zhang, E. Cisneros-Garibay, A. Gnanaskandan, **M. Rodriguez Jr.**, R. D. Budiardja, S. Abbott, T. Colonius, S. H. Bryngelson, MFC 5.0: An exascale many-physics flow solver, Computer Physics Communications *Under review.*
DOI: 10.48550/arXiv.2503.07953
Contribution: Writing - original draft (equal), Writing - review & editing (equal)

16. J. Yang, A. McGhee, Z. Tong, G. Radtke, **M. Rodriguez Jr.**, and C. Franck, Inertial interface cavitation creates complex, flow-like structures within a soft solid, *Under review.*
DOI: 10.1101/2025.02.16.638549
Contribution: Writing - original draft (equal), Writing - review & editing (equal)

15. Z. Zhu, S. Remillard, B. A. Abeid, D. Frolkin, S. H. Bryngelson, J. Yang, **M. Rodriguez Jr.**, J. Estrada. Parsimonious inertial cavitation rheometry via bubble collapse time, Soft Matter.
DOI: 10.48550/arXiv.2302.04227
Contribution: Co-corresponding author (with J. Estrada), Conceptualization (equal), Writing - original draft (equal), Writing - review & editing (equal), Funding Acquisition (equal with J. Estrada), Project Administration (equal with J. Estrada), Supervision - (equal with J. Estrada)

14. A. Trevino, T. R. Powers, R. Zenit, **M. Rodriguez Jr.**, Low Reynolds number pumping near an elastic half space, Physical Review Fluids 2025.
DOI: 10.1103/PhysRevFluids.10.054003
Contribution: Conceptualization (equal), Writing - original draft (equal), Writing - review & editing (lead), Funding Acquisition (equal), Project Administration (equal), Supervision - (lead)

13. S. Bhola, **M. Rodriguez Jr.**, S. A. Beig, E. Johnsen, and C. N. Barbier, Inertial collapse of a gas bubble in a shear flow near a rigid wall, J. Fluid Mech. 2025
DOI: 10.1017/jfm.2024.1146.
Contribution: Conceptualization (equal), Formal analysis (equal), Writing - original draft (equal), Writing - review & editing (equal)

12. Anand Radhakrishnan, Henry Le Berre, Benjamin Wilfong, Jean-Sebastien Spratt, **Mauro Rodriguez Jr.**, Tim Colonius, Spencer H. Bryngelson. Method for scalable and performant GPU-accelerated simulation of multiphase compressible flow, Comp. Phys. Comm. 2024
DOI: 10.1016/j.cpc.2024.109238.
Contribution: Conceptualization (equal), Writing - original draft (equal), Writing - review & editing (equal), Software - equal

11. J. Yang, A. McGhee, G. Radtke, **M. Rodriguez Jr.**, and C. Franck, Estimating viscoelastic, soft material properties using a modified Rayleigh cavitation bubble collapse time, Phys. Fluids **36** (2024) 017136-1–9
DOI:10.1063/5.0179368.
Contribution: Writing - original draft (equal), Writing - review & editing (equal)

10. E. Hersey, **M. Rodriguez**, E. Johnsen, Dynamics of an oscillating microbubble in a blood-like Carreau fluid, J. Acoust. Soc. Am. **153** (2023) 1836–1845.
DOI:10.1121/10.0017342.
Contribution: Supervision (equal), Conceptualization (equal), Data curation (equal), Formal analysis (equal), Investigation (equal), Methodology (equal), Software (lead), Visualization (lead), Writing - original draft (equal), Writing - review & editing (equal)

9. **M. Rodriguez**, S. A. Beig, E. Johnsen, and C. N. Barbier, Dynamics of an inertially collapsing gas bubble between two parallel, rigid walls, J. Fluid Mech. 2022 **946** A43-1-21.

DOI:10.1017/jfm.2022.571
Contribution: Conceptualization (equal), Data curation (equal), Formal analysis (equal), Investigation (equal), Methodology (equal), Software (lead), Visualization (lead), Writing - original draft (equal), Writing - review & editing (equal)

8. J. S. Spratt, **M. Rodriguez**, K. Schimdmayer, S. H. Bryngelson, J. Yang, C. Franck, and T. Colonius, Characterizing viscoelastic materials via ensemble-based data assimilation of bubble collapse observations, J. Mechanics and Physics of Solids. 2021
DOI:10.1016/j.jmps.2021.104455
Contribution: Investigation (equal), Methodology (equal), Writing - review & editing (equal)

7. L. Mancia, **M. Rodriguez**, J. Sukovich, Z. Xu, E. Johnsen, Acoustic measurements of nucleus size distribution at the cavitation threshold, Ultrasound Med. Biol. 2021
DOI:10.1016/j.ultrasmedbio.2020.12.007.
Contribution: Investigation (equal), Methodology (equal), Writing - review & editing (equal)

6. L. Mancia, **M. Rodriguez**, J. Sukovich, Z. Xu, E. Johnsen, Single–bubble dynamics in histotripsy and high–amplitude ultrasound: Modeling and validation, Phys. Med. Biol. 2020 **65** 1-16
DOI:10.1088/1361-6560/abb02b.
Contribution: Investigation (equal), Methodology (equal), Writing - review & editing (equal)

5. L. Mancia, E. Vlaisavljevich, N. Yousefi, **M. Rodriguez**, T. J. Ziemlewicz, F. T. Lee, D. Henann, C. Franck, Z. Xu, and E. Johnsen, Modeling tissue–selective cavitation damage, Phys. Med. Biol. 2019 **64**.
DOI:10.1088/1361-6560/ab5010
Contribution: Investigation (equal), Methodology (equal), Writing - review & editing (equal)

4. C. T. Wilson, T. L. Hall, E. Johnsen, L. Mancia, **M. Rodriguez**, J. E. Lundt, T. Colonius, D. L. Henann, C. Franck, Z. Xu, J. R. Sukovich, A Comparative Study of the Dynamics of Laser and Acoustically Generated Bubbles in Viscoelastic Media, Physical Review E 2019 **99** 1-10.
DOI:10.1103/PhysRevE.99.043103
Contribution: Investigation (equal), Methodology (equal), Writing - review & editing (equal)

3. **M. Rodriguez**, K. G. Powell and E. Johnsen, A high-order accurate AUSM$^+$-up approach for simulations of compressible multiphase flows with linear viscoelasticity, Shock Waves 2019 **29** 717-734.
DOI:10.1007/s00193-018-0884-3
Contribution: Conceptualization (equal), Data curation (equal), Formal analysis (equal), Investigation (equal), Methodology (equal), Software (lead), Visualization (lead), Writing - original draft (equal), Writing - review & editing (equal)

2. **M. Rodriguez** and E. Johnsen, A high-order, finite-difference approach for numerical simulations of shocks interacting with interfaces separating different linear viscoelastic materials, J. Comput. Phys. 2019 **379** 70-90.
DOI:10.1016/j.jcp.2018.10.035
Contribution: Conceptualization (equal), Data curation (equal), Formal analysis (equal), Investigation (equal), Methodology (equal), Software (lead), Visualization (lead), Writing - original draft (equal), Writing - review & editing (equal)

1. S. Padhy, **M. Rodriguez**, E. S. G. Shaqfeh, G. Iaccarino, Jeffrey F. Morris, and N. Tonmukayakul, The effect of shear thinning and walls on the sedimentation of a sphere in an elastic fluid under orthogonal shear, J. Non-Newtonian Fluid Mech., 2013 **201** 120-129.
DOI:10.1016/j.jnnfm.2013.07.007
Contribution: Conceptualization (equal), Data curation (equal), Formal analysis (equal), Investigation (equal), Methodology (equal), Software (equal), Visualization (lead), Writing - review & editing (equal)

Invited Speaker

11. United States National Committee for Theoretical and Applied Mechanics AmeriMech Symposium on Mechanics of Materials in Extreme Environments, Brown University (September 2025).
10. 18th United States National Congress on Computational Mechanics, Minisymposium on Modeling, Computation, and Experiments for Materials and Structures in Extreme Environments, Chicago, Illinois, USA (July 2025).
9. University of Michigan Ann Arbor, Department of Mechanical Engineering, Fluid mechanics series (September 2025)
8. The University of Texas at Austin, Department of Aerospace Engineering and Engineering Mechanics, Fluid mechanics series (March 2025)
7. Georgia Institute of Technology, Department of School of Computational Science and Engineering, CSE seminar series (February 2025)
6. Georgia Institute of Technology, George W. Woodruff School of Mechanical Engineering, Fluid mechanics seminar series (February 2025)
5. Worcester Polytechnic Institute, Department of Mechanical Engineering (October 2024)
4. Oak Ridge National Laboratory, Manufacturing Demonstration Facility, Extreme Environment Materials Process Group (April 2023)
3. Illinois Institute of Technology, Mechanical Engineering Seminar (April 2021)
2. Ohio State University, Mechanical and Aerospace Engineering Seminar (April 2021)
1. Brown University, Center of Fluid Mechanics Seminar (April 2021)

Peer-reviewed conference proceedings

7. J. Yang, A. McGhee, Z. Tong, L. Bu, S. Wang, G. Radtke, **M. Rodriguez Jr.**, and C. Franck, Spatiotemporally-resolved Kinematic and Stress Measurements of Interfacial Cavitation in Soft Matter via DIC, IMAC-XLIII, Orlando, FL, Feb. 10 – 13, 2025.
6. **M. Rodriguez**, S. H. Bryngelson, T. Colonius, Bubble Growth and Phase Change Dynamics near Compliant Objects, 34th Symposium on Naval Hydrodynamics, Washington, DC, June 26 – July 1, 2022.
5. **M. Rodriguez**, S. H. Bryngelson, T. Colonius, Acoustically-induced bubble growth and phase change dynamics near compliant surfaces, 11^{th} International Symposium on Cavitation (CAV 2021), Virtual On-line.
4. J.-S. Spratt, **M. Rodriguez**, S. H. Bryngelson, S. Cao, T. Colonius, Eulerian Framework for Bubble-Cloud–Kidney Stone Interaction, 11^{th} International Symposium on Cavitation (CAV 2021), Virtual On-line.
3. **M. Rodriguez**, I. Hasbun, J. L. Estrada, D. Renaud, On the effect of SHPE's social-cognitive leadership theory to Hispanic STEM professionals' leadership self-efficacy (work in progress), 2020 Collaborative Network for Computing & Engineering Diversity, Virtual On-line. `https://peer.asee.org/36112`
2. **M. Rodriguez** and K. Siles, D. L. Renaud, A decade-long programmatic study of SHPE's chapter reporting program: best practices, lessons learned, and outcomes for national engineering diversity chapter-based organizations (Experience report), Paper presented at 2020 ASEE Virtual Annual Conference Content Access, Virtual On-line. `DOI:10.18260/1-2--33997`.
1. S. A. Beig, **M. Rodriguez** and E. Johnsen, Non-spherical bubble collapse near rigid and compliant surfaces, 31st Symposium on Naval Hydrodynamics, Monterey, CA, USA, September 11-16, 2016.

Published abstracts, posters, and presentations Presented +35 research talks, select talks below

20. X. Zhao, F. Khan, **M. Rodriguez**, Patient-Based CFD Analysis of Carotid Webs: Influence of Geometry on Blood Flow Patterns and Clot Formation, 18th United States National Congress on Computational Mechanics, Chicago, IL, July 2025.
19. V. Sanchez, S. Remillard, D. Henann, J. Yang, J. Estrada, S. Bryngelson, **M. Rodriguez**, A theory and data integrated method for inertial microcavitation rheometry in soft materials, SIAM/CAIMS AN25, Montereal, Quebec, Canada, July 2025.
18. E. Slaght, N. Koval, A. Trevino, **M. Rodriguez**, The role of the diagnostic ultrasound intensity on pulmonary alveolus deformation, APS 77th Annual Meeting Division of Fluid Dynamics conference, Salt Lake City, Utah Nov. 2024.
17. N. Koval, E. Slaght, A. Trevino, **M. Rodriguez**, Numerical simulations of a diagnostic ultrasound-induced deformation of a pulmonary alveolus interface, APS 77th Annual Meeting Division of Fluid Dynamics conference, Salt Lake City, Utah Nov. 2024.
16. A. Trevino, T. Powers, R. Zenit, **M. Rodriguez**, Low Reynolds number peristaltic pumping near a poroelastic half space, APS 77th Annual Meeting Division of Fluid Dynamics conference, Salt Lake City, Utah Nov. 2024.
15. S. Remillard, Z. Zhu, B. Abeid, D. Froklin, S. Bryngelson, J. Yang, J. Estrada, **M. Rodriguez**, Soft material mechanical property determination using a modified Rayleigh collapse time, APS 77th Annual Meeting Division of Fluid Dynamics conference, Salt Lake City, Utah Nov. 2024.
14. M. Carcana Barbosa, J. R. Chreim, Z. Tong, J. Yang, S. Bryngelson, D. Henann, T. Colonius, **M. Rodriguez**, Numerical simulations of inertial microcavitation near a gel-water interface with finite elasticity and phase change, APS 77th Annual Meeting Division of Fluid Dynamics conference, Salt Lake City, Utah Nov. 2024.
13. V. Sanchez, B. Abeid, J. Yang, J. Estrada, D. Henann, S. Bryngelson, **M. Rodriguez**, Bayesian constitutive model selection for inertial microcavitation rheometry, APS 77th Annual Meeting Division of Fluid Dynamics conference, Salt Lake City, Utah Nov. 2024.
12. S. Remillard, **M. Rodriguez**, Energy analysis of an initially non-spherical, inertially collapsing bubble, 12th Cavitation Symposium, Chania, Crete, Greece, June 2024.
11. M. Carcana Barbosa, J. Yang, J. Estrada, S. Bryngelson, **M. Rodriguez**, Numerical Simulations of Inertial Bubble Collapse near a Hyperelastic Object, 12th Cavitation Symposium, Chania, Crete, Greece, June 2024.
10. V. Sanchez, J. Estrada, J. Yang, S. Bryngelson, D. Henann, **M. Rodriguez**, Quantitative constitutive model selection for inertial microcavitation rheometry using Bayesian inference, 9th European Congress on Computational Methods in Applied Sciences and Engineering Lisbon, Portugal, June 2024.
9. S. Remillard, **M. Rodriguez**, Numerical simulations of an inertially collapsing gas bubble with spherical perturbations, APS 76th Annual Meeting Division of Fluid Dynamics Virtual conference, Washington DC, Nov. 2023.
8. **M. Rodriguez**, J. Yang, and J. B. Estrada, Numerical simulations of cavitation bubble growth near a soft gel object, APS 76th Annual Meeting Division of Fluid Dynamics Virtual conference, Washington DC, Nov. 2023.
7. **M. Rodriguez**, J. Estrada, and J. Yang, Numerical simulations of inertial cavitation at a compliant object interface, 11th International Conference on Multiphase Flows, Kobe, Japan, April 2023.
6. **M. Rodriguez**, S. Bryngelson, Cavitation bubble growth near an elastic object, APS 75th Annual Meeting Division of Fluid Dynamics Virtual conference, Indianapolis, Indiana Nov. 2022.
5. **M. Rodriguez**, S. Bryngelson, and T. Colonius, Bubble Dynamics with Phase Change near a Compliant Object, 34th Symposium on Naval Hydrodynamics, Washington, DC, June 2022.

4. **M. Rodriguez**, S. Bryngelson, and T. Colonius, Numerical Simulations of Cavitation Bubble Growth and Collapse Near a Viscoelastic Object, 19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, Texas, June 2022.
3. **M. Rodriguez**, S. Bryngelson, and T. Colonius, Numerical simulations of cavitation near an elastic object, 8th European Congress on Computational Methods in Applied Sciences and Engineering, Oslo, Norway, June 2022.
2. **M. Rodriguez**, S. Bryngelson, and T. Colonius, Vapor and gas bubble growth with phase transition near a wall, APS 74th Annual Meeting Division of Fluid Dynamics Virtual conference, Phoenix, Arizona, November 2021.
1. **M. Rodriguez**, S. Bryngelson, S. Cao, and T. Colonius, A unified Eulerian multiphase framework for fluid-structure interaction problems including cavitation, XXV International Congress of Theoretical and Applied Mechanics, Milano, Italy, August 2021, Virtual On-line.

Research awards

Active Federal Funding

2. Department of Defense DEPSCoR FOA-AFRL-AFOSR-2022-0006 (Award #: FA9550-23-1-0485)
Description: The lead federal agency leading the DEPSCoR program is AFRL. The research project is with the Office of Naval Research (ONR) Biological Soft Solid Mechanics program.
Role: Lead PI
Collaborators: Prof. David Henann
Title: Theoretical modeling of non-spherical inertial cavitation for anisotropic soft matter rheometry
Submission: February 2023
Start date: 07/01/2023
End date: 06/30/2026

1. National Science Foundation CMMI Mechanics of Materials PD 19-1630 (Award #: 2232427)
Role: Co-PI
Collaborators: Jon Estrada, lead PI (U-M), and Jin Yang, co-PI (UT-Austin)
Title: Collaborative Research: Mutually-informed experiments and modeling for spatial, finite, and fast rheometry of graded hydrogels using inertial cavitation
Submission: Early June 2022
Start date: 06/01/2023
End date: 05/31/2026

Active Internal Funding

1. Seed Award (Award #: GR300316)
Role: Lead PI
Collaborators: Patrick Green
Title: Bio-fluid-structure mechanics of cavitation bubble-mantis shrimp telson interaction
Submission: October 2024
Start date: 06/01/2025
End date: 12/30/2025

Completed Funding

1. Hazeltine Innovation Award (Award #: GR300313)
   Role: Lead PI
   Collaborators: Lucas Caretta, Banu Ozkazanc-Pan
   Title: nuSTEM - A scalable American career workforce development program to develop Brown graduate and postdoctoral scholars and attract diverse faculty talent
   Submission: May 2023
   Start date: 09/01/2023
   End date: 09/01/2024

2. Hazeltine Innovation Award (Award #: GR300316)
   Role: Co-PI
   Collaborators: Roberto Zenit, Thomas Powers
   Title: The flow of cerebrospinal fluid in the glymphatic system
   Submission: May 2023
   Start date: 09/01/2023
   End date: 09/01/2024

Computational Allocations

7. 2024 National Science Foundation (NSF) ACCESS computation Discovery account allocation (PI)
   Name: Numerical simulations of inertially deforming interfaces, bubble dynamics, and fluid-structure interactions
   Allocation amount: 1,500,000.0 computational credits
   Start date: 12/31/2024
   End date: 12/30/2025

6. 2023 National Science Foundation (NSF) ACCESS computation Discovery account allocation (PI)
   Name: Numerical simulations of inertially deforming interfaces, bubble dynamics, and fluid-structure interactions
   Allocation amount: 750,000.0 computational credits
   Start date: 07/01/2023
   End date: 06/30/2024

5. 2018 National Science Foundation (NSF) Extreme Science and Engineering Discovery Environment (XSEDE) computation renewal (Co-PI)
   Name: Numerical Simulations of Shock Waves, Interfacial Instabilities, and Compressible Turbulence
   Equivalent amount: $42,141.47
   Start date: 09/01/2018
   End date: 09/01/2019

4. 2018 NSF Blue Waters Great Lakes Consortium for Petascale Computation allocation (Co-PI)
   Name: Inertial Collapse of Individual Bubbles near Solid/Free Boundaries
   Amount: 350,000 node-hours
   Start date: 06/01/2018
   End date: 06/01/2019

3. 2018 NSF Blue Waters Broadening Participation Computational allocation (Co-PI)
   Name: Numerical Simulations of a Collapsing Cavitation Bubble near an Elastically Deformable Object
   Amount: 300,000 node-hours
   Start date: 09/01/2018
   End date: 09/01/2019

2. 2017 NSF XSEDE computational renewal (Co-PI)
   Name: Numerical Simulations of Shock Waves, Interfacial Instabilities, and Compressible Turbulence
   Amount: $204,685.40
   Start date: 06/01/2017
   End date: 06/01/2018

1. 2017 NSF Blue Waters Great Lakes Consortium for Petascale Computation allocation (Co-PI)
   Name: Numerical Simulations of Collapsing Bubbles near Rigid and Compliant Surfaces
   Amount: 880,000 node-hours
   Start date: 09/01/2017
   End date: 09/01/2018

Summer Research Programs

Program: Stanford University, Center for Turbulence Research, 2024 Summer Program
Date: June-July 2024
Amount: $10,000 (travel and lodging stipend)

Teaching & Advising

Research Adviser

Program: Fluid & Thermal Sciences

1. *Hibbit Postdoctoral Research Fellow*: Xuning Zhao, PhD
2. *PhD Student*: Avery Trevino, *Projected graduation*: Spring 2027
3. *PhD Student*: Sawyer Remillard, *Projected graduation*: Spring 2028
4. *PhD Student*: Mirelys Carcana Barbosa, *Projected graduation*: Spring 2028
5. *PhD Student*: Victor Sanchez, *Projected graduation*: Spring 2028

Graduates

1. *Undergraduate Student*: Nazarii Koval, *Graduated with Honors*: Spring 2025
   Honor thesis: On shock-induced instabilities near soft elastic materials with applications to traumatic blast lung injury
   Outcome: Mechanical Engineering PhD student at Caltech

Research Mentor

Program: Brown's Undergraduate Teaching and Research Awards (UTRA)

1. *Student*: Sophia Yim (Mechanical Engineering), Summer 2025
   Project: Simulations of ultrasound-wave interaction with a soft tissue-air lung simulant interface
2. *Student*: Lauren Duncan (Applied Math, Biology), Summer 2025
   Project: Bubbles in trees
3. *Student*: Jerry Sun (Math and Computer Science), Summer 2025
   Project: Simulations of ultrasound-wave interaction with a soft tissue-air lung simulant interface
4. *Student*: Nazarii Koval (Mechanical Engineering), Spring and Summer 2024, Spring 2025
   Project: Simulations of ultrasound-wave interaction with a soft tissue-air lung simulant interface
   Conference APS DFD 2024 talk: "Numerical simulations of a diagnostic ultrasound-induced interface deformation of a lung tissue-alveolar sac interface"
5. *Student*: Emma Slaght (Mechanical Engineering), Spring and Summer 2024
   Project: Simulations of ultrasound-wave interaction with a soft tissue-air lung simulant interface
   Conference APS DFD 2024 poster: "The role of the diagnostic ultrasound intensity on pulmonary alveolus deformation"

6. *Student*: Lana Yang-Maccini (Computer Science), Summer 2023, Fall and Summer 2024
   Project: Data-driven simulations for potential flow modeling of non-spherical bubble collapses
7. *Student*: Stephanie Samaha (Electrical Engineering), Summer 2023
   Project: On the fluid dynamics of cerebrospinal fluid flow
8. *Student*: Alexey Izmailov (Applied math), Spring and Summer 2022
   Project: An inertial microcavitation bubble dynamics solver for soft tissue characterization
9. *Student*: Matthew Meeker (Applied math), Spring and Summer 2022
   Project: An inertial microcavitation bubble dynamics solver for soft tissue characterization
10. *Student*: Sudatta Hor (Computer science), Spring and Summer 2022
    Project: Microbubble surface oscillations for targeted drug delivery
11. *Student*: Hanna Stein (Applied math), Spring 2022
    Project: Numerically simulating thin-film rupture and merger in slow motion

Program: The Leadership Alliance Summer Program, 06-08/2022

1. *Student*: Katherine Alcazar (Arizona State University), *Project*: Ultrasound-Induced Microbubble Perturbations in a Non-Newtonian Fluid
2. *Student*: Morgan Jones (Howard University), *Project*: Theoretical microbubble growth dynamics from a liquid-solid interface
3. *Student*: Sira Morales (University of Puerto Rico), *Project*: A numerical model of coupled arterial blood flow and cerebrospinal fluid transport

Teaching

Brown University, Providence, Rhode Island
School of Engineering – Fluid and Thermal Sciences

7. Spring 2022, ENGN 1840 Numerical Methods for Engineers (Enrollment: 10)
6. Fall 2022, ENGN 2830 Compressible Fluid Dynamics (Enrollment: 6)
5. Spring 2023, ENGN 1840 Numerical Methods for Engineers (Enrollment: 3)
4. Fall 2023, ENGN 2810 Fluid Mechanics (Enrollment: 15)
3. Spring 2024, ENGN 1700 High Reynolds number Flows (Enrollment: 24)
2. Fall 2024, ENGN 2810 Fluid Mechanics (Enrollment: 15)
1. Fall 2025, ENGN 2810 Fluid Mechanics (Enrollment: TBD)

Service

Reviewer

Grants: National Science Foundation 2022 Fluids Dynamics Panel Reviewer

Journals: Journal of Fluid Mechanics, Journal of Computational Physics, Physical Review Fluids, Physical Review E, Physical Review Applied, Ultrasonics - Sonochemistry, Physics in Medicine and Biology, Physics of Fluids, Fluids

Research conferences

1. American Physical Society (APS) Division of Fluid Dynamics (DFD)
   (a) Session chair, 2019-2023

(b) Faces of Fluids panelist, 2021
(c) Underrepresented Minorities Breakfast panelist, poster session judge, 2022
(d) Applying for Post Doc & Faculty Positions panel, 2023

2. American Society of Mechanical Engineers (ASME)

   (a) Multiphase Flow Technical Committee member

   (b) Fluid Engineering Division Summer Meeting Session co-chair, 2024-2025.

3. Society of Engineering Science (SES)

   (a) "Cavitation and Bubble Dynamics", mini-symposium organizer, 2025

4. United States National Congress of Theoretical and Applied Mechanics (USNCTAM)

   (a) "Cavitation Dynamics", mini-symposium organizer, 2026

School of Engineering outreach and development
Brown University - School of Engineering
School of Engineering outreach and development

Lead PI Hazeltine Innovation award (09/2023-09/2024) - nuSTEM program for the workforce development of graduate students and postdocs in the School of Engineering

Brown University's Institute for Computational and Experimental Research in Mathematics - Go Get Math program (August 2022-Present) in collaboration with Daniel Harris

Student chapter advisor - Society of Hispanic Professional Engineers (2022-Present)

Committees

Brown University - School of Engineering

- Honors Committee member (2021-2022), co-chair (2022-2023), chair (2023-2025)
- Center for Fluid Mechanics Seminar, chair (2023-Present)
- Selection Committee member for Brown's Postdoctoral Excellence Awards (2022-2024)
  - Annually work and meet with four Brown faculty members and the Postdoctoral Affairs office to select top faculty-nominated postdoctoral research fellows to receive excellence awards

Organization Memberships

American Society of Engineering Education (ASEE), since 2015

American Physical Society (APS), since 2013

Edward A. Bouchet Graduate Honor Society, since 2015

Society for Advancing Hispanics/Chicanos and Native Americans in Science (SACNAS), since 2009

Society for Industrial and Applied Mathematics (SIAM), since 2015

United States Association for Computational Mechanics, since 2025