Vivek N. Prakash, Ph.D.

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Faculty Appointments

- **Assistant Professor**, **University of Miami, FL** (tenure-track) (01/2020 – present)
  – Department of Physics, College of Arts & Sciences
- **Secondary Faculty**, **University of Miami, FL**
  – Department of Biology, College of Arts & Sciences
  – Department of Marine Biology & Ecology,
  Rosenstiel School of Marine, Atmospheric and Earth Science (RSMAES)
- **Faculty Member**, **University of Miami, FL**
  – Dr. John T. Macdonald Foundation Biomedical Nanotechnology Institute (BioNIUM)
  – Frost Institute for Data Science & Computing (IDSC)

Education and Training

- **Postdoctoral Research Fellow, Stanford University, CA** (2014 – 2019)
  Department of Bioengineering, Schools of Engineering & Medicine
  Advisor: Prof. Manu Prakash
- **Embryology course, Marine Biological Laboratory, MA** (2019)
  Embryology: Concepts & Techniques in Modern Developmental Biology
- **Ph.D. Applied Physics, University of Twente, The Netherlands** (2009 – 2013)
  Physics of Fluids group
  Advisors: Prof. Detlef Lohse & Prof. Chao Sun
  Ph.D. Thesis: "Light particles in turbulence" [web link]
- **M.S. Engineering Mechanics, JNCASR, India** (2007 – 2009)
  Summer Undergraduate Research Fellow, JNCASR, India (2005 – 2006)
  Engineering Mechanics Unit,
  Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, India
  Advisors: Prof. K. R. Sreenivas (JNCASR) & Prof. Jaywant H. Arakeri (Indian Institute of Science)
  M.S. Thesis: "An experimental study of mantle convection" [web link]
- **B.E. Mechanical Engineering, R.V. College of Engineering, India** (2003 – 2007)

Research Interests

- Biological fluid mechanics – low Reynolds number (*Re*) swimming & feeding in marine invertebrates
- Biomechanics – tissue to organism scale: cell rearrangements, morphogenesis, development
- Fluid mechanics – kitchen flows, particle-laden flows, turbulent flows, and soft active matter.

Publications

Key Metrics:

Total citations: >646
Total publications in leading peer-reviewed journals in different fields: 18

Physics, Multidisciplinary:
1 in Reviews of Modern Physics (Impact factor: 50.48; Rank: 1/86 - Physics, Multidisciplinary)
3 in Nature Physics (Impact factor: 19.68; Rank: 4/86 - Physics, Multidisciplinary)
1 in Physical Review Letters (Impact factor: 9.18; Rank: 8/86 - Physics, Multidisciplinary)
1 in New Journal of Physics (Impact factor: 3.71; Rank: 33/86 - Physics, Multidisciplinary)

Physics, Fluids & Plasmas:
3 in Journal of Fluid Mechanics (Impact factor: 4.24; Rank: 3/34 - Physics, Fluids & Plasmas)
2 in Physics of Fluids (Impact factor: 4.98; Rank: 2/34 - Physics, Fluids & Plasmas)
1 in Physical Review Fluids (Impact factor: 2.89; Rank: 14/34 - Physics, Fluids & Plasmas)

Engineering, Chemical:
1 in Chemical Engineering Science (Impact factor: 4.88; Rank: 41/143 - Engineering, Chemical)

Biology, Cell Biology, Zoology:
1 in Current Biology (Impact factor: 10.9; Rank: 3/94 - Biology)
1 in eLife (Impact factor: 7.7; Rank: 7/94 - Biology)
1 in Journal of Cell Science (Impact factor: 5.23; Rank: 87/195 - Cell Biology)
1 in Journal of Experimental Biology (Impact factor: 3.30; Rank: 38/94 - Biology)
1 in Integrative & Comparative Biology (Impact factor: 3.39; Rank: 10/176 - Zoology)

Faculty career at University of Miami, since 2020

Preprints under preparation/review:

20. R. Asai†, Shubham Sinha†⋆,**Vivek N. Prakash**#, and T. Mikawa#
Cellular flows initiate left-right laterality during early gastrulation in amniotes
(to be submitted shortly) (2024)
(bioRxiv preprint: `https://www.biorxiv.org/content/10.1101/2024.04.21.590437v1`)
⋆graduate mentee, †Equal contribution, #corresponding authors

Faculty career at University of Miami, since 2020

Published articles (peer-reviewed):

19. R. Asai, **Vivek N. Prakash**, Shubham Sinha⋆, M. Prakash, and T. Mikawa
Coupling and uncoupling of midline morphogenesis and cell flow in amniote gastrulation
eLife, 12:RP89948, (2023)
(https://doi.org/10.7554/eLife.89948.1)
⋆graduate mentee

18. Setareh Gooshvar⋆⋆, Gopika Madhu⋆, Melissa Ruszczyk†, and **Vivek N. Prakash#**
Non-bilaterians as Model Systems for Tissue Mechanics
Integrative and Comparative Biology, 63, 6, 1442-1454 (2023)
(https://doi.org/10.1093/icb/icad074)
⋆⋆undergraduate mentee, ⋆graduate mentee, †postdoc mentee
#corresponding author

17. A. J. M. Mathijssen#, M. Lacienski#, **Vivek N. Prakash#**, and E. Mossige#
Culinary fluid mechanics and other currents in food science
Reviews of Modern Physics, 95, 025004 (2023)
(https://doi.org/10.1103/RevModPhys.95.025004)
#corresponding authors

- Featured in **Physics**, Q&A: From Whiskey to Oreos (2023)
- One of 2023's most downloaded Rev. Mod. Phys. papers

16. Mia J. Konjikusic, Chanjae Lee, Yang Yue, Bikram D. Shrestha⋆⋆, Ange M. Nguimtsop, Amjad Horani, Steven Brody, **Vivek N. Prakash**, Ryan S. Gray, Kristen J. Verhey, John B. Wallingford
Kif9 is an active kinesin motor required for ciliary beating and proximodistal patterning of motile axonemes
Journal of Cell Science, 136 (5) (2023)
(https://doi.org/10.1242/jcs.259535)
⋆graduate mentee

Published editorials, commentaries, and other articles (not peer-reviewed)

15. Jenna Efrein, Carolyn (Jack) Delli-Santi⋆⋆, and **Vivek N. Prakash**
Glass, Marine Biology, & Physics (Lecture and Demo)
Glass Art Society Journal, Pages 49-51 (2023) **[Link to pdf copy]**
(https://issuu.com/glassartsociety/docs/2023_gas_journal)
⋆⋆undergraduate mentee

14. Patrick M. Kiel⋆, and **Vivek N. Prakash#**
Coral physiology: Going with the ciliary flow
Current Biology 32(19), pp.R998-R1000 (2022)
(https://doi.org/10.1016/j.cub.2022.08.049)
⋆graduate mentee
#corresponding author

13. Fuller, Gerald G., Maciej Lisicki, Arnold JTM Mathijssen, Endre JL Mossige, Rossana Pasquino, **Vivek N. Prakash**, and Laurence Ramos
Kitchen flows: Making science more accessible, affordable, and curiosity driven
Physics of Fluids, 34, no. 11: 110401 (2022)
(https://doi.org/10.1063/5.0131565)

Postdoctoral Research: Organismal Biophysics, before 2020

Published articles (peer-reviewed):

12. **Vivek N. Prakash**, M. S. Bull and M. Prakash
Motility-induced fracture reveals a ductile-to-brittle crossover in a simple animal's epithelia
Nature Physics, 17, 504–511 (2021)
(https://doi.org/10.1038/s41567-020-01134-7)

11. W. Gilpin, **Vivek N. Prakash**, and M. Prakash
Dynamic vortex arrays created by starfish larvae
Physical Review Fluids, 2, 090501 (2017)
(https://doi.org/10.1103/PhysRevFluids.2.090501)

10. W. Gilpin, **Vivek N. Prakash**, and M. Prakash
Flowtrace: a simple visualization tool for biological fluid flows
Journal of Experimental Biology, 220, 3411-3418 (2017)
(https://jeb.biologists.org/content/220/19/3411.short)

    - **Cover** of Journal of Experimental Biology (Volume 220, 2017)

9. W. Gilpin, **Vivek N. Prakash**, and M. Prakash
Vortex arrays and ciliary tangles underlie the feeding-swimming tradeoff in starfish larvae
Nature Physics, 13, 380-386 (2017)
(https://doi.org/10.1038/nphys3981)

    Highlights and media attention:
    - **Nature Physics News** & **Views**:
    V. I. Fernandez & R. Stocker, Hydrodynamics: Modus vivendi, Nature Physics, 13, 326-327 (2017)
    - **Nature Physics Editorial** article: A ton for Thompson's tome, Nature Physics 13, 315 (2017)
    - Featured in Principles of Systems Biology, No.15, **Cell Systems**, 4, 252-254 (2017)
    - Featured in **Physics Today** Magazine: 'Biological eigenstrokes', Physics Today 70, 3, 84 (2017)
    - APS/DFD 'Milton van Dyke Award' (Video) (2016)
    - 'First place', Nikon Small World in Motion Competition (2016)
    - 'Image of distinction', Nikon Small World Photomicrography Competition (2016)
    - 'Expert's Choice award', NSF "Vizzies" Visualization challenge (2017)
    - Featured in New York Times, Nature, CBS News, Scientific American, Popular Science and others (2016, 2017)

8. W. Gilpin, **Vivek N. Prakash**, and M. Prakash
Reply to 'Boundary effects on currents around ciliated larvae'
Nature Physics, 13, 521-522 (2017)
(https://doi.org/10.1038/nphys4166)

Graduate Research: Fluid Mechanics, Multi-phase Turbulent Flows

7. **Vivek N. Prakash**, J. M. Mercado, L. van Wijngaarden, E. Mancilla, Y. Tagawa, D. Lohse, and C. Sun
Energy spectra in turbulent bubbly flows
Journal of Fluid Mechanics, 791, 174-190 (2016)
(https://doi.org/10.1017/jfm.2016.49)

6. V. Mathai, **Vivek N. Prakash**, J. Brons, C. Sun and D. Lohse
Wake-driven dynamics of finite-sized buoyant spheres in turbulence
Physical Review Letters, 115, 124501 (2015)
(https://doi.org/10.1103/PhysRevLett.115.124501)

5. Y. Tagawa, I. Roghair, **Vivek N. Prakash**, M. van Sint Annaland, H. Kuipers, C. Sun, and D. Lohse
The clustering morphology of freely rising deformable bubbles
Journal of Fluid Mechanics, 721, R2 (2013)
(https://doi.org/10.1017/jfm.2013.100)

4. **Vivek N. Prakash**, Y. Tagawa, E. Calzavarini, J. M. Mercado, F. Toschi, D. Lohse, and C. Sun
How gravity and size affect the acceleration statistics of bubbles in turbulence
New Journal of Physics, 14, 105017, (2012)
(https://doi.org/10.1088/1367-2630/14/10/105017)
(co-corresponding author)
- Featured in New Journal of Physics 'Research Highlights' collection - 2012, 2013
- Part of New Journal of Physics focus issue on 'Dynamics of Particles in Turbulence' - 2013
- New Journal of Physics Video Abstract Prize - 2013

3. J. M. Mercado, **Vivek N. Prakash**, Y. Tagawa, C. Sun, and D. Lohse
Lagrangian statistics of light particles in Turbulence
Physics of Fluids, 24, 055106 (2012)
(https://doi.org/10.1063/1.4719148)
(co-corresponding author)

2. Y. Tagawa, J. M. Mercado, **Vivek N. Prakash**, E. Calzavarini, C. Sun, and D. Lohse
Three-dimensional Lagrangian Voronoi analysis for clustering of particles and bubbles in turbulence
Journal of Fluid Mechanics, 693, 201-215 (2012)
(https://doi.org/10.1017/jfm.2011.510)

1. **Vivek N. Prakash**, K. R. Sreenivas, and J. H. Arakeri
The role of viscosity contrast on plume structure in laboratory modeling of mantle convection
Chemical Engineering Science, 158, 245-256 (2017)
(https://doi.org/10.1016/j.ces.2016.10.012)

Research Funding

Total funding received: >$622k

External Funding: (Total: >$450k)

- 2023 — "REU Site: Championing Physics in Multicultural Miami: Dismantling barriers for new research perspectives", **National Science Foundation (NSF)**, Division of Mathematical and Physical Sciences, Research Experiences for Undergraduates (REU) program (2024 – 2026).
Total funding requested: $429,809
PI: Prof. Olga Korotkova (UM Physics)
Co-PI: Prakash

- 2022 — "Next generation Reef Engineering to Enhance Future Structures (X-REEFS)", **Defense Advanced Research Projects Agency (DARPA)**, Biological Technologies Office (BTO), 6/1/2022 - 31/5/2027.
A large 28-PI project led by UM Rosenstiel School for Marine, Atmospheric, and Earth Science (RSMAS), including partners from other Universities and Institutions nationwide: Penn State University, University of California Santa Cruz, SECORE, TNC, Johns Hopkins University/Applied Physics Laboratory, Texas A&M University, University of Florida, Smithsonian Marine Station, Florida Aquarium, and Florida International University.
Total funding requested: $24.2 Million, Prakash share: $450k
PI: Prof. Andrew Baker (UM RSMAS)
Co-PI: Prakash

Internal Funding (University of Miami): (Total: >$172k)

- 2023 — "Machine learning for prediction of microswimmer trajectories", Expanding the Use of Collaborative Data Science at UM, Frost Institute for Data Science and Computing (IDSC) (University of Miami, 1/1/2024 - 12/31/2024, $20,000).
  PI: Prakash, Co-PI: Prof. Ben Kirtman (UM RSMAES)

- 2023 — "Improving Coral Larval Recruitment using Engineering, Biophysics, and Generative AI", U-LINK (University of Miami - Laboratory for INtegrative Knowledge): Artificial Intelligence (AI) Request for Applications. (Collaborative inter-disciplinary proposal involving researchers across several schools at UM, 6/2024 – 5/2025)
  Total funding requested: $99,921, Prakash Share: $50,000
  PI: Prof. Prannoy Suraneni (UM Civil Engineering)
  Co-PI: Prakash

- 2023 — "Quantifying the fluid flows and alkalinity surrounding coral settlement", One-Time Funding Opportunity for Junior Faculty, Office of the Vice Provost for Research and Scholarship (OVPRS) (University of Miami, 5/2023, $5,000)
  PI: Prakash

- 2023 — Renewal of "Engineering Corals for Climate Change Resilience", U-LINK (University of Miami - Laboratory for INtegrative Knowledge) Resilience Challenge. (Collaborative inter-disciplinary proposal involving researchers across several schools at UM, 6/2023 – 5/2024)
  Total funding requested: $99,896, Prakash share: $40,000
  PI: Prof. Prannoy Suraneni (UM Civil Engineering)
  Co-PI: Prakash

- 2021 — "Engineering Corals for Climate Change Resilience", U-LINK (University of Miami - Laboratory for INtegrative Knowledge) Resilience Challenge. (Collaborative inter-disciplinary proposal involving researchers across several schools at UM, 1/1/2022 – 12/31/2022)
  Total funding requested: $99,160, Prakash share: $40,000
  PI: Prof. Prannoy Suraneni (UM Civil Engineering)
  Co-PI: Prakash

- 2021 — "Ciliary-driven flows during development in marine invertebrates", Provost's Research Award 2021 (University of Miami, 6/1/2021 – 5/31/2022, $17,000).
  PI: Prakash

Honors & Awards

- **2024** — Provost's Teaching Award for Collaborative Teaching, University of Miami
- **2024** — Finalist, James M. Tien Early Career Award and Grant, University of Miami
- **2024, 2023** — Finalist, Provost's Teaching Award for Discussion-based Learning, University of Miami
- **2022** — Choose Development! Mentor Award, Society of Developmental Biology (SDB)
- **2021** — Provost's Research Award, University of Miami
- **2019** — Max M. Burger Endowed Scholarship, Embryology course, Marine Biological Laboratory
- **2019** — Patricia A. Case Endowed Scholarship, Embryology course, Marine Biological Laboratory
- **2017** — Expert's Choice award, NSF 'Vizzies' Visualization Challenge for Photography
- **2016** — Milton van Dyke Award, American Physical Society, Division of Fluid Dynamics

- **2016** — First place, Nikon Small World in Motion Competition
- **2016** — Image of distinction, Nikon Small World Photomicrography Competition
- **2015** — Honorable mention, Nikon Small World in Motion Competition
- **2013** — New Journal of Physics 'Video Abstract Prize' (based on world-wide public voting)
- **2012, 2013** — New Journal of Physics 'Research Highlights' (Prakash, et al., New J. Phys, 2012)
- **2012** — Jury's Choice Poster Award, Hands-On Research in Complex Systems School, China
- **2008** — Marie Curie Scholarship (EU) award to attend Euromech Fluid Mechanics Conference, UK
- **2007-2009** — JNCASR graduate scholarship, Department of Science & Technology, Govt. of India
- **2007** — Attended the International Astronautical Congress (IAC) (ISRO National student selection)
- **2007** — Best Outgoing Student award in ME, RVCE (Cognizant Technology Solutions)
- **2006** — LG electronics scholarship, 'potential manager award' for the best student in ME, RVCE
- **2005, 2006** — JNCASR Summer Research Fellowship (Undergraduate)
- **2005** — Diploma in Space Sciences (Honors Course), Indian Space Research Organization (ISRO)
- **2003** — Youth Leadership Award, Global Young Leaders Conference, Washington D.C. & NY, USA
- **2002** — Finalist (National level), Intel Science Talent Discovery Fair (ISTDF)

Mentored Students' Honors & Awards

- **2024** — Dean's Summer Research Fellowship, College of Arts & Sciences, University of Miami
  Shubham Sinha, Graduate Student, University of Miami
- **2023** — Early Career Award, Frost Institute for Data Science & Computing, University of Miami
  Dr. Santhan Chandragiri, Postdoc, University of Miami
- **2023** — Graduate Research Fellowship Program (GRFP), National Science Foundation (NSF)
  Patrick Kiel, Graduate Student, University of Miami
- **2023** — Beyond the Books Scholarship, University of Miami
  Johnnie Xia, Undergraduate student, University of Miami
  Inge Brijker, Undergraduate student, University of Miami
- **2023** — Ernest F. Hollings Scholarship, National Oceanic and Atmospheric Administration (NOAA)
  Leah Henseler, Undergraduate student, University of Miami
- **2022 - 2023** — SDB Choose Development! Fellow Award, Society of Developmental Biology (SDB)
  Amaya Crichton, Undergraduate student, University of Miami
- **2021 - 2022** — FGLSAMP Scholar Award, Florida-Georgia Louis Stokes Alliance for Minority Participation, NSF funded undergraduate research program
  Christian D. Gibson, Undergraduate student, University of Miami
  Valentina Restrepo, Undergraduate student, University of Miami
- **2022** — Academic Enhancement Research Fellowship, University of Miami
  Samantha Levine, Undergraduate student, University of Miami

Advanced Research Training Schools & Professional Courses

- 2020 – APS-AAPT Workshop for New Physics and Astronomy Faculty (Online)
- 2020 – Society for Developmental Biology - 8th Boot Camp for New Faculty (online)

- 2019 – Embryology: Concepts & Techniques in Modern Developmental Biology, M.B.L. (6 weeks)
- 2018 – Cilia in Evolution, Development and Human Health, Stanford University (1 week)
- 2015 – Developmental Biology in the Ocean, Hopkins Marine Station, Stanford University (3 weeks)
- 2015 – Preparing for Faculty Careers, Stanford University (2 weeks)
- 2012 – Hands-On Research in Complex Systems School, Shanghai, China (2 weeks)
- 2012 – New Challenges in Turbulence Research II, Ecole de Physique, Les Houches, France (1 week)
- 2010 – Tutorial School on Fluid Dynamics: Topics in Turbulence, University of Maryland (2 weeks)
- 2010 – J.M.B.C. courses: *Experimental Techniques* (UTwente), *PIV* (TUDelft), Netherlands (1 week)

Field Experience

- 2021 — R/V Western Flyer, Monterey Bay Aquarium Research Institute (MBARI), Monterey, CA. Mid-water deep-sea expedition in the Pacific Ocean; combining Remotely Operated Vehicle (ROV) survey and imaging, invertebrate animal collection and flow field imaging (07/2021)
  PI: Dr. Kakani Katija, MBARI

Talks & Seminars

Invited Plenary Conference Talks:

- 2024 — "Fracture across fields: insights from materials science, biology, and geophysics", Princeton Center for Theoretical Sciences (PCTS) workshop, Princeton University (May 8-10, 2024).
- 2024 — American Physical Society (APS) March Meeting, Biological Fluid Dynamics session, Minneapolis, MN (March 14-18). (upcoming)
- 2023 — Association of Nepali Physicists in America (ANPA) Conference, Miami, FL (July 14-16).
- 2023 — Society for Experimental Mechanics (SEM) Annual Conference, 13th International Symposium on the Mechanics of Biological Systems & Materials, Orlando, FL (June 5-8).
- 2023 — Society for Integrative and Comparative Biology (SICB) Annual Meeting, Symposium on "Micro-scale life, large-scale influencers: Functional consequences of small-scale biophysical processes", Austin, TX (Jan 3-7).
- 2022 — International Conference of the Developmental Biology of the Sea Urchin and Other Marine Invertebrates, Marine Biological Laboratory, Woods Hole, MA (April 13-17).
- 2022 — American Physical Society (APS) March Meeting, Rheology of Tissues session, Chicago, IL (March 14-18).

Invited Seminars:

- 2024 — Big Quantum Biology Meeting Series (virtual seminar)
- 2024 — University of Leeds (U.K.), School of Mathematics, Leeds Institute for Fluid Dynamics (virtual seminar)
- 2023 — University of Wisconsin-Madison, Department of Mechanical Engineering (Group meeting presentation)
- 2023 — University of Oslo (Norway), Njord Seminar (virtual seminar)

- 2022 — Auburn University, Department of Biological Sciences (Fall 2022, in-person visit and colloquium)
- 2022 — University of Miami, Department of Civil and Architectural Engineering (virtual seminar)
- 2022 — University of Manchester (United Kingdom), Dept. of Mechanical, Aerospace and Civil Engineering (virtual seminar)
- 2022 — University of Miami, Department of Chemistry (in-person/virtual hybrid seminar)
- 2021 — Indian Institute of Science Education and Research (IISER), Career Center, Tirupati, India (virtual seminar)
- 2021 — Florida International University, Department of Physics (in-person colloquium)
- 2021 — University of Miami, Regeneration journal club, The Miami Project (virtual seminar)
- 2021 — University of Miami, Dr. John T. Macdonald Foundation Biomedical Nanotechnology Institute (BioNIUM) (virtual seminar)
- 2021 — University of Florida, Department of Physics (virtual colloquium)
- 2021 — Biological Physics & Physical Biology (BPPB) Seminar series online
- 2020 — Northeastern University, Department of Physics (virtual colloquium)
- 2020 — University of Miami, Department of Marine Biology & Ecology, RSMAS
- 2020 — Leibniz University Hannover (Germany), UC Berkeley, The Mechanics Discussions Online Seminar Series
- 2020 — University of Rostock (Germany), Aix Marseille University (France), Interdiscliplinary Online Seminar Series on Biolocomotion
- 2020 — Brandeis University, Materials Research Science and Engineering Center (virtual)
- 2020 — University of Miami, Department of Biology (virtual zoom seminar)
- 2020 — University of Miami, Invertebrate Neuroscience Meeting
- 2019 — Cornell University, Department of Biological and Environmental Engineering
- 2019 — Boston University, Departments of Physics and Biology
- 2019 — University of Miami, Department of Physics
- 2018 — Shriram center basement labs seminar, Prakash Lab, Stanford University, USA
- 2018 — Chan Zuckerberg Biohub Inter-lab Confab #3 (lightning talk, poster), UC San Francisco, USA
- 2013 — JMBC Multi-phase flow group meeting, TATA Steel Europe, The Netherlands
- 2013 — FOM-DROP Meeting, TU Delft, The Netherlands
- 2012 — Stanford University, Department of Bioengineering
- 2012 — University of California, Berkeley, Fluid Mechanics Seminar
- 2012 — University of California, San Diego, Department of Physics
- 2011 — JMBC Turbulence group meeting, TU Eindhoven, The Netherlands

Selected Conference Talks and Posters (contributed):

- 2024 — *Society for Experimental Mechanics (talk)*, Vancouver, USA
- 2024 — *American Physical Society, March Meeting (talks)*, Minneapolis, USA
- 2024 — *Ocean Sciences Meeting, AGU (e-posters)*, New Orleans, USA
- 2023 — *American Physical Society, DFD Meeting (talks)*, Washington D.C., USA
- 2023 — *International Conference of the Developmental Biology of the Sea Urchin and Other Marine Invertebrates (talk)*, Woods Hole, MA, USA
- 2023 — *Society for Developmental Biology (SDB) Annual Meeting (posters)*, Chicago, USA
- 2023 — *Glass Art Society Annual Conference (lecture)*, Detroit, USA
- 2023 — *Society of Integrative & Comparative Biology (SICB) Annual Meeting (posters)*, Austin, USA
- 2020 — *Society for Developmental Biology (SDB) Annual Meeting (short talk, poster)* (virtual)
- 2020 — *Society of Integrative & Comparative Biology (SICB) Annual Meeting (talk)*, Austin, USA
- 2019 — *American Physical Society, March Meeting (talk)*, Boston, USA
- 2019 — *Society of Integrative & Comparative Biology (SICB) Annual Meeting (talk)*, Tampa, USA
- 2018 — *American Society of Cell Biology (ASCB) - EMBO Meeting (talk)*, San Diego, USA
- 2018 — *American Physical Society, DFD Meeting (talk)*, Atlanta, USA
- 2018 — *Santa Cruz Developmental Biology Meeting (poster)*, Santa Cruz, USA
- 2018 — *American Physical Society, March Meeting (talk)*, Los Angeles, USA
- 2018 — *Mechanics of Morphogenesis Meeting (poster)*, Princeton University, USA
- 2018 — *Biophysical Society (BPS), 62nd Annual Meeting (poster)*, San Francisco, USA
- 2018 — *Society of Integrative & Comparative Biology (SICB) Annual Meeting (poster)*, San Francisco, USA
- 2015 — *Pan-American Society for Evolutionary Developmental Biology Meeting (poster)*, UC Berkeley, USA
- 2014 — *American Physical Society, 67th Annual Meeting - DFD*, San Francisco, USA
- 2014 — *Active Fluids: Bridging Complex Fluids and Biofluids (poster)*, Aspen, USA
- 2013 — *European Turbulence Conference (ETC) 14*, Lyon, France
- 2013 — *Particles in Turbulence Conference*, Eindhoven, The Netherlands
- 2012 — *American Physical Society, 65th Annual Meeting - DFD*, San Diego, USA
- 2012 — *9th Euromech Fluid Mechanics Conference*, University of Rome, Tor Vergata, Italy
- 2012 — *Particles in Turbulence workshop*, Lorentz Center, Leiden, The Netherlands
- 2011 — *American Physical Society, 64th Annual Meeting - DFD*, Baltimore, USA
- 2011 — *Particles in Turbulence Conference,* University of Potsdam, Germany
- 2010 — *American Physical Society, 63rd Annual Meeting - DFD*, Long Beach, USA
- 2010-2013 — *Physics@FOM Meeting (poster)*, Veldhoven, The Netherlands
- 2010-2013 — *JMBC Burgersdag (poster)*, The Netherlands
- 2008 — *7th Euromech Fluid Mechanics Conference,* Manchester, UK

Teaching Experience

Assistant Professor, Department of Physics, University of Miami

- *PHY 201, University Physics for the Sciences I, (Spring 2024)*
  Mechanics, Thermal phenomena, Fluids, Waves.
- *PHY 325 / PHY 625, Biological Physics I, (Fall 2022)*
  Energy and Order, Probability, Diffusion and Random Walks, Motion in Fluids, Entropy and Entropic Forces, Membrane Potentials and Nerve Impulses, Computer Simulations, Cellular Automata.
- *PHY 201 SCALE-UP**, University Physics for the Sciences I, (Spring 2022, Spring 2023)*
  Integrated Lecture, Discussion and Lab. Mechanics, Thermal phenomena, Fluids, Waves.
- *PHY 202 SCALE-UP**, University Physics for the Sciences II, (Fall 2021)*
  Integrated Lecture, Discussion and Lab. Electromagnetism, Optics, and Modern physics.
- *PHY 102 SCALE-UP**, College Physics II, (Spring 2020, Spring 2021)*
  Integrated Lecture, Discussion and Lab. Electromagnetism, Optics, and Modern physics.
- *PHY 101 SCALE-UP**, College Physics I, (Fall 2020)*
  Integrated Lecture, Discussion and Lab. Mechanics, Thermal phenomena, Fluids, Waves.

  **SCALE-UP stands for 'Student Centered Active Learning Environment with Upside Down Pedagogies' - a modern teaching technique that specifically promotes active and collaborative learning, and has been adopted in many institutions worldwide.

Guest Lectures:

- *Seminars in Research Problems*, BIL 299, Prof. Julia Dallman, Department of Biology, University of Miami, February 2024 (in-person)
- *Freshman Seminar: Physics: Biomolecular Nanomachines*, PHYS 190, Prof. S. Shekhar, Emory University, February 2023 (virtual)
- *Rho Rho Rho Marine and Atmospheric Undergraduate Honors Society*, University of Miami (February 2023) (in-person)
- *Model Class - Hands-On/Active-Learning of Introductory Physics*, for visiting parents and friends, University of Miami family weekend (October 2022) (in-person)
- *Life in Moving Fluids*, MSC364-G, Prof. Claire Paris-Limouzy, RSMAS, University of Miami, September 2021 (in-person)
- *Freshman Seminar: Physics: Biomolecular Nanomachines*, PHYS 190, Prof. S. Shekhar, Emory University, September 2020 (virtual)
- *Freshman Seminar: "Being a Scientist"*, FNS 190-P, Prof. V. Ramamurthy, University of Miami, October 2020 (virtual)

Previous Teaching Experience:

- Postdoc Teaching Certificate program, Stanford University (2016 – 2018)
  Teaching workshop for postdocs, Mentoring in research workshop
- Teaching assistant, University of Twente (2011 – 2013)
  Experimental Techniques in Physics of Fluids (graduate course), Instructor: Prof. Chao Sun
- Teaching assistant, University of Twente (2010)
  Physics of Fluids (undergraduate course), Instructor: Prof. Jacco Snoeijer

Research Mentoring Experience

At University of Miami

Postdoctoral Research Associates

- Dr. Melissa Ruszczyk, Department of Physics (09/2022 - present)
- Dr. Santhan Chandragiri, Department of Physics (09/2022 - present)

Graduate Students (Ph.D.)

- Bikram D. Shrestha, Ph.D. student, Physics (05/2020 - present)
- Shubham Sinha, Ph.D. student, Physics (08/2021 - present)
- Gopika Madhu, Ph.D. student, Physics (08/2022 - present)
- Patrick Kiel, Ph.D. student, Marine Biology & Ecology, RSMAS (01/2022 - present)
  co-advised by Prof. Diego Lirman (MBE, RSMAS)
  Prof. Prannoy Suraneni (UM Civil Engineering)
  Dr. Ian Enochs (CIMAS/NOAA)

Undergraduate Students

- Christian D. Gibson, B.S. Biomedical Engineering and Physics (12/2020 - 05/2023)
  (presently Graduate Student, Duke University)
- Valentina Restrepo, B.S. Biomedical Engineering (05/2021 - 08/2021)
- Nina Couture, B.S. Environmental Engineering (09/2021 - 08/2022)
- Samantha Levine, B.S. Marine Science and Biology, RSMAS (09/2021 - 09/2023)
  B.S. Honors Thesis: "Visualizing Suction Feeding Flow-fields in South Florida Coral Polyps"
- Amaya Crichton, B.S. Biology (09/2021 - 12/2023)
- Alexandra Redford, B.S. Marine Science and Physics, RSMAS (02/2022 - present)
- Jack Delli-Santi, B.S. Marine Science and Biology, RSMAS (05/2022 - 08/2023)
  B.S. Honors Thesis: "A Novel Study of Trichoplax adhaerens Tissue Strain using Hot and Kiln Formed Glass Processes"
- Leah Henseler, B.S. Marine Affairs and Fine Art (08/2022 - present)
  co-advised by: Prof. Prannoy Suraneni (UM Civil Engineering)
- Johnnie Xia, B.S. Marine Science and Biology, RSMAS (01/2023 - 07/2023)
- Owen Brown, B.S. Marine Science and Biology, RSMAS (05/2023 - present)
  B.S. Honors Thesis (in progress)
- Inge Brijker, B.S. Oceanography, RSMAS (05/2023 - present)
  B.S. Honors Thesis (in progress)
- Ivan Levkovsky , B.S. Chemistry (05/2023 - present)

High School Students

- Luis Flores, Young Scholars Program (YSP), University of Miami, Summer 2022

Graduate Dissertation Committee Membership

- Yi Zhang, Ph.D. student, Physics; Advisor: Prof. C. Song (05/2020 - present)
- Kunal Tamang, Ph.D. student, Physics; Advisor: Prof. C. Song (04/2021 - present)
- Mingyue Wu, Ph.D. student, Civil Engineering; Advisor: Prof. L. R. Pestana (12/2021 - present)
- Clara Haughey-Gramazio, M.S. student, Marine Biology and Ecology, RSMAS; Advisor: Prof. C. Langdon (12/2022 – present)
- Montale Tuen, Ph.D. student, Civil Engineering; Advisor: Prof. Prannoy Suraneni (08/2023 - present)
- Skylar Rodriguez, M.S. student, Marine Biology and Ecology, RSMAS; Advisor: Prof. C. Langdon (09/2023 – present)

Previous co-mentoring Experience:

- Matthew Storm Bull, Ph.D. student, Stanford University (Sep 2014 - Dec 2019)
  (presently Shanahan Foundation Fellow, Allen Institute and the University of Washington)
- William Gilpin, Ph.D. student, Stanford University (Sep 2015 - July 2019)
  (presently Assistant Professor, Department of Physics, University of Texas at Austin)
- Varghese Mathai, Ph.D. student, University of Twente (June - Dec 2013)
  (presently Assistant Professor, Department of Physics, University of Massachusetts, Amherst)
- Ernesto Mancilla, Ph.D. student, visitor from UNAM (Mexico) to Univ. Twente (July - Dec 2012)
- Jon Brons, MSc. student, University of Twente (Aug - Dec 2013)
- Tobias Foertsch, MSc. student, University of Twente (Aug 2012 - Aug 2013)
- Huanshu Tan, MSc. student, visitor from Shanghai University to Univ. Twente (Jan - Apr 2013)

Professional Service

External

- **Journal editorial (ad-hoc):**
  Guest Editor for Physics of Fluids, Special issue on "Kitchen Flows" (2024, 2021)
- **External Grant reviews (ad-hoc):**
  – National Science Foundation, DBIO, IOS, Physiological Mechanisms and Biomechanics Program (PMB) program (2021)
  – Graduate Women In Science (GWIS) Research awards (2022)
- **Scientific journal reviews (ad-hoc):**
  Nature (2)
  P. N. A. S. (1)
  eLife (1)
  Current Biology (3)
  Physical Review Letters (2)
  Physical Review X (1)
  Physical Review Applied (2)
  PLOS Computational Biology (2)
  Journal of the Royal Society Interface (2)
  Proceedings of the Royal Society B (1)
  Journal of Fluid Mechanics (11)
  Physical Review Fluids (2)

Physics of Fluids (2)
International Journal of Multiphase Flow (1)
European Journal of Mechanics / B Fluids (1)
Ecological Engineering (1)
Journal of Theoretical Biology (1)
16th Asian Congress of Fluid Mechanics, India (abstract reviewer) (1)

- **Conference Session chair/co-chair:**
  2024 – 'Cellular Force Generation and Mechanobiology' session, Society for Experimental Mechanics (SEM) Annual Meeting, Vancouver, WA (co-chair)

  2023 – 'Biofluids: Low Re Swimming III' session, American Physical Society, DFD Meeting (talks), Washington D.C. (chair)

  2023 – 'Development of specialized structures: cilia, neurons, biomineralization and skeletogenesis' session, Developemental Biology of Sea Urchin and Other Marine Invertebrates DBSUMI, M.B.L., Woods Hole, MA (chair)

  2021 – Plenary session, Physical Mechanisms in Development, SDB Annual Meeting (virtual) (co-chair)

  2020 – live poster presentations, SDB Annual Meeting (virtual) (chair)

  2020 – 'Dealing with Damage' session, SICB Annual Meeting, Austin, TX (co-chair)

  2019 – 'Developmental Plasticity' session, SICB Annual Meeting, Tampa, FL (co-chair)

- **Judge:**
  2023 – Best student poster presentation awards at the Society of Developmental Biology Annual Meeting, Chicago, IL

  2018 – Best student presentation awards in the Division of Invertebrate Zoology (DIZ) at the SICB Annual Meeting, San Francisco, CA

- **Invited Panelist**:
  2023 – American Physical Society, DFD Meeting, Fluids education luncheon, Washington D.C.

  2023 – Paul Allen Frontiers Group Ideas Session, panelist along with Prof. Raymond Goldstein (University of Cambridge), Dr. Devaki Bhaya (Carnegie Institute), Alba Diz-Munoz (EMBL) (virtual)

  2022 – Stanford University Postdoctoral Office Event on 'Negotiating Academic Job Offers for Postdocs' (virtual)

- **Seminar Organization:**
  2014-2016 – Friday afternoon Shriram center basement seminar series - 'Happy to talk science hour' at Stanford University, funded by a SPICE grant, Vice Provost for Graduate Education

At University of Miami

- Judge, Poster presentations at the Fifth Annual Graduate + Postdoctoral Research Symposium, University of Miami (2023)
- Reviewer, College of Arts and Sciences Graduate Student Summer Research Awards (2022)
- Reviewer, College of Arts and Sciences Academic Year Dissertation Awards (2022)
- Member, Contemporary Glass working group, UM Lowe Art Museum; 10/2021 - present
- Organizer, Department weekly coffee meet-ups, Department of Physics, University of Miami (2022 - 2024).

Professional Memberships

- 2010 — 2013, European Mechanics Society (Euromech)
- 2018 — 2019, American Society of Cell Biology (ASCB)
- 2017 — 2020, Biophysical Society (BPS), Mechanobiology subgroup
- 2010 — present, American Physical Society (APS) - Division of Fluid Dynamics (DFD)
- 2017 — present, Society of Integrative and Comparative Biology (SICB)
- 2020 — present, Society for Developmental Biology (SDB)
- 2023 — present, Society for Experimental Mechanics (SEM)
- 2024 — present, American Geophysical Union (AGU)

Scientific Outreach Activities

- Lab Demonstrations:
  I have organized several Lab visits and Demonstrations for a wide variety of audiences, including the public and high-school, undergraduate and graduate students, and researchers.
- Foldscope Training:
  At Stanford University, I participated in several outreach microscopy workshops to help train high school and undergraduate students to learn how to use "Foldscope", a popular 1$ paper microscope.
- Social Media Outreach:
  I post broad layman summaries as Twitter threads or 'Tweetorials' including several videos to promote and disseminate our research. These tweets have engaged a wide variety of users, including both scientists and the public (several thousands); our lab Twitter account has >4k followers.
- Student Outreach Workshops and Talks:
  - My lab members and I conducted a workshop on Physics/Biology/STEAM for Middle School students in Miami-Dade community (07/2023).
  - My lab members and I conducted a workshop on Physics/Biology for UM First Star Academy students (K-12) (12/2021). First Star Academy is a program to encourage and support high-school students in the foster care system to pursue College and STEM education.
  - I also delivered a virtual marine biology class for middle school (7th grade) STEAM students at Aventura Waterways Preparatory Academy, a local School in Miami.
- Connecting Science and Art:
  I am collaborating with Jenna Efrein, a senior lecturer in glass in the Department of Art and Art History at UM. We are currently working on a project to use glass as a medium to make connections between Physics, Marine Biology and Glass. We have planned several outreach events and Art and Science exhibitions in collaboration with the Lowe Art Museum at UM.

Media coverage

- **2023** — Connecting Science and Art:
  - **University of Miami News:** "Glass provides a window into science" [web link]

- **2023** — Culinary Fluid Mechanics publication in the Reviews of Modern Physics:
  - **University of Miami News:** "Illuminating physics in the kitchen" [web link]
  - **Physics:** "From Whiskey to Oreos" [web link]
  - Phys.org Q&A: "Illuminating physics in the kitchen" [web link]
  - EurekAlert!: "Science in the kitchen" [web link]
- **2023** — Interview on career transitions between Physics and Biology, Integrative and Comparative Biology journal blog [web link]
- **2022** — DARPA X-REEFs award:
  - **University of Miami News**: "Reef Revitalization" [web link]
- **2021** — Interview, BioNIUM Newsletter, University of Miami [web link]
- **2020** — Postdoc Research on Trichoplax [web link]
  - **The Atlantic:** — "The Search for the World's Simplest Animal" [web link]
- **2017** — 'Expert's Choice award', NSF "Vizzies" Visualization challenge [web link]
  - **Popular Science:** "The 10 best science images, videos, and visualizations of the year" [web link]
  - Stanford Medicine: "Stanford team's image of starfish larva wins top honor" [web link]
  - Science Node: "The winner takes it all" [web link]
- **2016** — Nature Physics publication [web link]
  - **New York Times:** "The Beauty of a Starfish Larva at Lunch " [web link]
  - **Nature News:** "Swimming starfish, a departing dinosaur, and a lot of ice" [web link]
  - **Stanford News:** "Starfish larvae create complex water whorls to eat and run" [web link]
  - **Scientific American:** "The Mesmerizing Motions of Starfish Larvae [Video]" [web link]
  - Stanford Magazine: "A Striking Look at Starfish Larvae" [web link]
  - Phys.org: "Starfish larvae create complex water whorls to eat and run" [web link]
  - Live Science: "Starfish Larvae Churn Whirlpools With 100,000 Tiny Hairs" [web link]
  - Science Daily: "Starfish larvae create complex water whorls to eat and run" [web link]
  - Bay Nature: "The Efficient Beauty of Starfish Larvae" [web link]
  - EurekAlert: "Starfish larvae create complex water whorls to eat and run" [web link]
  - Futurity: "Why baby starfish make these pretty whorls in water" [web link]
  - EarthSky: "The water whorls of baby starfish" [web link]
  - ACSH: "Revealing The Wonders Of How Starfish Survive And Grow" [web link]
  - SciGuru: "Starfish larvae create complex water whorls to eat and run" [web link]
- **2016** — First place, Nikon Small World in Motion Competition [video link]
  - Nikon: "Time-lapse revealing water patterns of starfish larva wins Nikon Small World in Motion Competition" [web link]
  - Popular Science: "The year's best videos starring really, really small things" [web link]
  - Business Insider: "These are the best videos recorded through a microscope this year, according to Nikon" [web link]
  - Daily mail: "Nikon reveals the best videos shot through a microscope" [web link]
  - CBS News: "Small world in motion: Nikon contest winners" [web link]
  - Smithsonian: "Prize-Winning Videos Capture Mesmerizing, Microscopic World" [web link]
  - Live Science: "Tiny Starfish Larva Mesmerizes in Award-Winning Video" [web link]
  - Seeker: "Hunting Starfish Larva Takes the Top Prize in Micro Video Competition" [web link]
  - BBC Focus Magazine: "Nikon Small World in Motion brings photomicrography to life" [web link]
- **2016** — APS/DFD Milton van Dyke Award (Video) [video link]
  - APS News: "Gallery of Fluid Motion Winners from the 2016 APS Division of Fluid Dynamics Meeting" [web link]

- Vox: "This is how a baby starfish eats. It involves vortexes of doom." [web link]
- FYFD: "Starfish larvae create beautiful vortices to help themselves catch food." [web link]

- **2015** — Honorable mention, Nikon Small World in Motion Competition [video link]
  - Huffington Post: "18 Award-Winning Videos: Hidden micro realm is beautiful" [web link]
  - The Atlantic Video: "Incredible Video Taken Through a Microscope" [web link]

- **2013** — New Journal of Physics 'Video Abstract Prize' [video link]
  - Featured on the front pages of New Journal of Physics and University of Twente
  - News coverage: University of Twente: "UT Researchers win NJP video competition" [web link]
  - Dutch media: RTV-OOST NL, Tubantia NL

References

(available on request)

(Last updated: June 2024)