

Navish Wadhwa, Ph.D.

✉ Navish.Wadhwa@asu.edu

🌐 <https://wadhwalab.com/>

☎ (602) 496-5456

Professional Experience and Education

- 2022 – **Assistant Professor**
Department of Physics and the Biodesign Center for Mechanisms of Evolution
Arizona State University
- 2016 – 2022 **Postdoctoral Fellow in Molecular and Cellular Biology**
Harvard University
Mentor: Howard C. Berg
- 2012 – 2015 **Ph.D. in Physics**
Technical University of Denmark
Mentors: Anders P. Andersen, Thomas Kjørboe, Tomas Bohr
- 2010 – 2012 **M.S. in Engineering Mechanics**
Virginia Polytechnic Institute and State University
Mentor: Sunghwan Jung
- 2008 – 2010 **Junior Research Fellowship**
National Centre for Biological Sciences
Mentor: Sanjay Sane
- 2004 – 2008 **B.Tech. in Mechanical Engineering**
Indian Institute of Technology Delhi

Awards and Honors

- 2021 **Intersections Science Fellows Symposium** Associate (2nd prize for short talk)
- 2019 **Meselson Prize for the most beautiful experiment of the year**, MCB Harvard
- 2017 Society of General Physiologists Scholar, Marine Biological Laboratory
- 2014 **Young Scientist Award**, European Mechanics Society
- 2010 **Milton Van Dyke Award**, American Physical Society Division of Fluid Dynamics
- 2009 Junior Research Fellowship, National Centre for Biological Sciences

Funding

- 2020 – 2025 **NIH K99/R00** Pathway to Independence, National Institute of General Medical Sciences
Identifying the mechanisms of mechanosensing by the bacterial flagellar motor
Total cost: \$936,640, Role: PI

Additional Training

- 2021 The Inclusive STEM Teaching Project (5 weeks)
“Lab Dynamics: Management Skills for Scientists”, by Dr. Carl M. Cohen (4 days)
- 2017 Physiology course, Marine Biological Laboratory (7 weeks)
Visiting Scientist with Dr. Jennifer Lippincott-Schwartz, Janelia Research Campus (2 weeks)

Additional Training (continued)

- 2016 Advanced Bacterial Genetics course, Cold Spring Harbor Laboratories (3 weeks)
2014 Particle Image Velocimetry course, German Aerospace Center (4 days)

Publications

#: corresponding author; †: equal contribution

1. Hu, H., Popp, P., Santiveri, M., Eguiara, A., Yan, Y., Liu, Z., ... Taylor, N. M. (2022). Mechanisms of ion selectivity and rotor coupling in the bacterial flagellar sodium-driven stator unit. *bioRxiv*, 2022.11.25.517900.
2. **Wadhwa, N.**^{#†}, & Berg, H. C.^{#†}. (2022). Bacterial motility: Machinery and mechanisms. *Nature Reviews Microbiology*, 20, 161–173.
3. **Wadhwa, N.**^{#†}, Sassi, A.[†], Berg, H. C., & Tu, Y.[#]. (2022). A multi-state dynamic process confers mechano-adaptation to a biological nanomachine. *Nature Communications*, 13, 5327.
4. Hu, H., Santiveri, M., **Wadhwa, N.**, Berg, H. C., Erhardt, M., & Taylor, N. M. (2021). Structural basis of torque generation in the bi-directional bacterial flagellar motor. *Trends in Biochemical Sciences*, 47(2), 160–172.
5. **Wadhwa, N.**[#], Tu, Y., & Berg, H. C. (2021). Mechanosensitive remodeling of the bacterial flagellar motor is independent of direction of rotation. *Proceedings of the National Academy of Sciences*, 118(15), e2024608118.
6. Santiveri, M., Roa-Eguiara, A., Kühne, C., **Wadhwa, N.**, Hu, H., Berg, H. C., ... Taylor, N. M. (2020). Structure and function of stator units of the bacterial flagellar motor. *Cell*, 183(1), 244–257.e16.
7. **Wadhwa, N.**[#], Phillips, R., & Berg, H. C. (2019). Torque-dependent remodeling of the bacterial flagellar motor. *Proceedings of the National Academy of Sciences*, 116(24), 11764–11769.
8. Andersen, K. H., Berge, T., Gonçalves, R. J., ..., **Wadhwa, N.**, & Kiørboe, T. (2016). Characteristic sizes of life in the oceans, from bacteria to whales. *Annual Review of Marine Science*, 8(1), 217–241.
9. Andersen, A., **Wadhwa, N.**, & Kiørboe, T. (2015). Quiet swimming at low reynolds number. *Physical Review E*, 91, 042712.
10. **Wadhwa, N.**^{#†}, Martens, E. A.^{#†}, Jacobsen, N. S., Lindemann, C., Andersen, K. H., & Visser, A. (2015). Size structures sensory hierarchy in ocean life. *Proceedings of the Royal Society B*, 282(1815), 20151346.
11. Kiørboe, T., Jiang, H., Gonçalves, R. J., Nielsen, L. T., & **Wadhwa, N.** (2014). Flow disturbances generated by feeding and swimming zooplankton. *Proceedings of the National Academy of Sciences*, 111(32), 11738–11743.
12. **Wadhwa, N.**[#], Andersen, A., & Kiørboe, T. (2014). Hydrodynamics and energetics of jumping copepod nauplii and copepodids. *Journal of Experimental Biology*, 217(17), 3085–3094.
13. **Wadhwa, N.**, Vlachos, P., & Jung, S. (2013). Noncoalescence in the oblique collision of fluid jets. *Physical Review Letters*, 110, 124502.
14. **Wadhwa, N.**, & Jung, S. (2011). Non-coalescence of jets. *Physics of Fluids*, 23(9), 091105.
15. **Wadhwa, N.**, Jain, V., Fowlkes, J. B., Bull, J. L., & Eshpuniyani, B. (2010). A boundary element model of multiple microcirculatory bubbles in cardiovascular. *International Journal of Emerging Multidisciplinary Fluid Sciences*, 2, 143–160.

Invited Talks

- 2023 Gordon Research Conference on Bioenergetics
- 2022 University of Utah, Department of Mechanical Engineering
Arizona State University, Center for Immunotherapy, Vaccines, and Virotherapy seminar series
Arizona State University, BII/CME Seminar Series on Mechanisms of Cellular Evolution
Arizona State University, Physics Colloquium
Arizona State University, Biodesign Graduate Program seminar series
9th World Congress of Biomechanics, Taipei City, Taiwan
Biological Physics & Physical Biology seminar series
Northeastern University, Department of Biology
Arizona State University, Department of Physics
Purdue University, Department of Physics and Astronomy
Northwestern University, Department of Molecular Biosciences
Johns Hopkins University, Thomas C. Jenkins Department of Biophysics
- 2021 University of California at Merced, Soft, Living, Active and Adaptive Matter seminar series
Harvard University, Kavli seminar series
École Polytechnique Fédérale de Lausanne, Physics of Living Systems seminar series
Microscale Ocean Biophysics seminar series
- 2020 Yale Quantitative Biology Institute (cancelled due to Covid-19)
- 2019 Princeton University, Center for the Physics of Biological Function
Brandeis University, Materials Research Science and Engineering Center
- 2018 Brown University, Division of Applied Mathematics Fluids and Thermal Sciences
- 2015 Cambridge Department of Applied Mathematics and Theoretical Physics
Max Planck Institute for Terrestrial Microbiology
- 2014 Harvard School of Engineering and Applied Sciences
- 2012 Jawaharlal Nehru Centre for Advanced Scientific Research

Conference presentations

- 2021 Gordon Research Conference - Stochastic Physics in Biology, Ventura, CA
American Physical Society March Meeting, virtual
Biophysical Society Meeting, virtual
- 2020 Physics of Living Matter 15, virtual
Gordon Research Conference - Sensory Transduction in Microorganisms, Ventura, CA
- 2019 American Society of Cell Biology Conference, Washington, DC
Bacterial Locomotion and Signal Transduction Conference, New Orleans, LA
- 2017 American Society of Cell Biology Conference, Philadelphia, PA
Bacterial Locomotion and Signal Transduction Conference, New Orleans, LA
- 2014 American Physical Society's Division of Fluid Dynamics Meeting, San Francisco, CA
European Fluid Mechanics Conference, Kgs. Lyngby, Denmark

Conference presentations (continued)

- Active Fluids Workshop, Mariehamn, Åland
- 2013 International workshop on Trait-based approaches to Ocean Life, Copenhagen, Denmark
Complex Motion in Fluids Summer School, Humlebæk, Denmark
Microscale interactions in aquatic environments, Les Houches, France
- 2012 American Physical Society's Division of Fluid Dynamics Meeting, San Diego, CA
- 2011 American Physical Society's Division of Fluid Dynamics Meeting, Baltimore, MD

Teaching

At Arizona State University

- 2022 PHY 121: University Physics I: Mechanics
EVO 501: Current Topics in Evolutionary Biology
PHY 191: Physics Frontiers at ASU (guest lecturer)
MIC 501: Foundations in Microbiology (1-week module)

Before Arizona State University

- 2014 Experimental Methods and Instrumentation in Physics (Teaching Assistant)
- 2012 Foundations of Physics Laboratory
- 2011 Mechanical Behavior of Materials
Dynamics (Teaching Assistant)
- 2010 Statics (Teaching Assistant)

Mentoring

Graduate students

Shabduli Sawant (Biological Design program)

Undergraduate students

Frances Fuguy (Microbiology)
David Vandian (Molecular Biosciences and Biotechnology, Physics, and Linguistics)
Rebecca Osar (Physics)
Eric Dudebout (Biochemistry)
Luis Meneses (Biological Sciences)

Before Arizona State University

- 2019 Jinming Yang (visiting student). After: Ph.D. student at Yale
Sophia Belser (visiting student). After: M.Phil. student at Cambridge
- 2018 Olenka Jain (undergraduate researcher). After: Ph.D. student at Princeton
Daozheng Gong (visiting student). After: Ph.D. student at U. Chicago
Siyu He (visiting student). After: Ph.D. student at Columbia

Mentoring (continued)

- 2017 Isabel Esain Garcia (visiting student). After: Ph.D. student at Cambridge
2016 Ying Zuo (visiting student). After: Ph.D. student at Hong Kong U. Sci. Tech.

Service and outreach

Service to Discipline/Profession

- 2021 Keynote Session Chair, Bacterial locomotion and signal transduction meeting
2014- *Ad hoc* reviewer: The American Naturalist; Biomolecules; Communications Biology; eLife; Frontiers in Marine Science; Journal of Experimental Biology; Journal of Experimental Marine Biology and Ecology; Journal of Physics D; mBio; National Science Foundation; Nature Communications; Physical Review E; Physical Review Letters; Physical Review X; PLOS One; Proceedings of the National Academy of Sciences

Committees

- 2022 Community task force on diversity, inclusion and belonging, MCB Harvard
Website and Public Relations Committee, MCB Harvard
2016 Finance committee, Harvard FAS postdoctoral association

Outreach

- 2021 American Physical Society DBIO tweetorial, "A bio-nanomachine that never ceases to amaze"
2020 Judge, ENVISION (proposal-writing competition for high-school girls, organized by Women in STEM)
2019 Social media contributor, Biophysical Journal
2017 Judge, Massachusetts State Science & Engineering Fair
Panelist, Harvard iGEM club, SynBio Research Panel
2014 Volunteer, Science in the City (science festival organized by EuroScience Open Forum)