Navish Wadhwa, Ph.D.

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Current position

2020 – **Principal Investigator** of NIH K99/R00 Award (NIGMS K99GM134124)

2016 – Postdoctoral fellow, Harvard University
Advisors: Dr. Howard Berg and Dr. Ethan Garner

Education

2012 – 2015 Ph.D., Physics, Technical University of Denmark
Thesis: *Zooplankton hydrodynamics – An investigation into the physics of aquatic interactions*
Advisors: Dr. Anders Andersen, Dr. Thomas Kiørboe, Dr. Tomas Bohr

2010 – 2012 M.S., Engineering Mechanics, Virginia Tech
Thesis: *Non-coalescence of jets*
Advisor: Dr. Sunghwan Jung

2004 – 2008 B.Tech., Mechanical Engineering, Indian Institute of Technology Delhi
Thesis: *Boundary element method (BEM) modeling of cardiovascular bubble dynamics*
Advisor: Dr. Brijesh Eshpuniyani

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
Direct cost: $950,000, Role: PI

Select awards and honors

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

2013 Best Poster Award, Department of Physics, Technical University of Denmark

2010 **Milton Van Dyke Award**, American Physical Society Division of Fluid Dynamics

2009 Junior Research Fellowship, National Centre for Biological Sciences

Additional training and coursework

2021 The Inclusive STEM Teaching Project
"Lab Dynamics: Management Skills for Scientists" (a 4-day workshop led by Dr. Carl M. Cohen)

2017 Physiology course, Marine Biological Laboratory
Visiting Scientist with Dr. Jennifer Lippincott-Schwartz, Janelia Research Campus

2016 Advanced Bacterial Genetics course, Cold Spring Harbor Laboratories

2014 Particle Image Velocimetry course, German Aerospace Center (DLR)

2008-2010 Junior Research Fellow with Dr. Sanjay Sane, National Centre for Biological Sciences

Publications

‡corresponding author, *equal contribution

13 Hu, H., Santiveri, M., **Wadhwa**, **N.**, Berg, H. C., Erhardt, M., & Taylor, N. M. (in press). Structural basis of torque generation in the bi-directional bacterial flagellar motor. *Trends in Biochemical Sciences*. doi:10.1016/j.tibs.2021.06.005

12 **Wadhwa, N.***, & Berg, H. C.*. (in press). Bacterial motility: Machinery and mechanisms. *Nature Reviews Microbiology*.

11 **Wadhwa, N.**‡, Tu, Y., & Berg, H. C. (2021). Mechanosensitive remodeling of the bacterial flagellar motor is independent of direction of rotation. *Proc. Natl. Acad. Sci.*, *118*(15). doi:10.1073/pnas.2024608118

10 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. doi:10.1016/j.cell.2020.08.016

9 **Wadhwa, N.**‡, Phillips, R., & Berg, H. C. (2019). Torque-dependent remodeling of the bacterial flagellar motor. *Proc. Natl. Acad. Sci.*, *116*(24), 11764–11769. doi:10.1073/pnas.1904577116

8 Andersen, K. H., Berge, T., Gonçalves, R. J., …(13 authors), **Wadhwa**, **N.**, & Kiørboe, T. (2016). Characteristic sizes of life in the oceans, from bacteria to whales. *Annu. Rev. Mar. Sci.*, *8*(1), 217–241. doi:10.1146/annurev-marine-122414-034144

7 Andersen, A., **Wadhwa**, **N.**, & Kiørboe, T. (2015). Quiet swimming at low reynolds number. *Phys. Rev. E*, *91*, 042712. doi:10.1103/PhysRevE.91.042712

6 Martens, E. A.*‡, **Wadhwa, N.***‡, Jacobsen, N. S., Lindemann, C., Andersen, K. H., & Visser, A. (2015). Size structures sensory hierarchy in ocean life. *Proc. R. Soc. B*, *282*(1815), 20151346. doi:10.1098/rspb.2015.1346

5 Kiørboe, T., Jiang, H., Gonçalves, R. J., Nielsen, L. T., & **Wadhwa**, **N.** (2014). Flow disturbances generated by feeding and swimming zooplankton. *Proc. Natl. Acad. Sci.*, *111*(32), 11738–11743. doi:10.1073/pnas.1405260111

4 **Wadhwa, N.**‡, Andersen, A., & Kiørboe, T. (2014). Hydrodynamics and energetics of jumping copepod nauplii and copepodids. *J. Exp. Biol*, *217*(17), 3085–3094. doi:10.1242/jeb.105676

3 **Wadhwa**, **N.**, Vlachos, P., & Jung, S. (2013). Noncoalescence in the oblique collision of fluid jets. *Phys. Rev. Lett.*, *110*, 124502. doi:10.1103/PhysRevLett.110.124502

2 **Wadhwa**, **N.**, & Jung, S. (2011). Non-coalescence of jets. *Phys. Fluids*, *23*(9), 091105. doi:10.1063/1.3640005

1 **Wadhwa**, **N.**, Jain, V., Fowlkes, J. B., Bull, J. L., & Eshpuniyani, B. (2010). A boundary element model of multiple microcirculatory bubbles in cardiovasculature. *Int. J. Emerg. Multidiscip. Fluid Sci.*, *2*, 143–160.

Invited talks

2021	École polytechnique fédérale de Lausanne, Physics of Living Systems Seminar
	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

Invited talks (continued)

2012 Jawaharlal Nehru Centre for Advanced Scientific Research

Conference presentations

2021 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
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

Service

Institution:

2021-2022 Community task force on diversity, inclusion and belonging, MCB Harvard
2016 Finance committee, Harvard FAS postdoctoral association

Profession:

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

Teaching

2020 Guest lecturer, *Freshman Seminars*: *Physics*, Emory University
2014 Instructor, "Consulting project", Technical University of Denmark
Teaching Assistant, *Experimental Methods and Instrumentation in Physics*, Technical University of Denmark
2013 Guest lecturer, *Introduction to Biophysics*, Technical University of Denmark
Guest lecturer, *Physical Oceanography*, Technical University of Denmark
2012 Instructor, *Foundations of Physics Laboratory*, Virginia Tech
2011 Instructor, *Mechanical Behavior of Materials*, Virginia Tech

Teaching (continued)

Teaching Assistant, *Dynamics*, Virginia Tech

2010 Teaching Assistant, *Statics*, Virginia Tech

Mentoring

2019 Jinming Yang (visiting student). After: Ph.D. student at Yale U., Physics

Sophia Belser (visiting student). After: M.Phil. student at U. Cambridge, Biotechnology

2018 Olenka Jain (undergraduate researcher). After: Undergrad at Harvard U.

Daozheng Gong (visiting student). After: Ph.D. student at U. Chicago, Biophysics

Siyu He (visiting student). After: Ph.D. student at Columbia U., Biomedical Engineering

2017 Isabel Esain Garcia (visiting student). After: Ph.D. student at U. Cambridge, Chemistry

2016 Ying Zuo (visiting student). After: Ph.D. student at Ph.D. student at Hong Kong U. Sci. Tech.

Outreach

2021 APS DBIO tweetorial, "A bio-nanomachine that never ceases to amaze"

2020 Judge, ENVISION (proposal-writing competition 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)