

# Navish Wadhwa, Ph.D.

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## Current position

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- 2020 – **Principal Investigator** of NIH K99/R00 Award (NIGMS K99GM134124)
- 2016 – Postdoctoral fellow, Harvard University  
Advisors: Dr. Howard Berg and Dr. Ethan Garner

## Education

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- 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

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- 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

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- 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

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- 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

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‡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-Eguirara, 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.**, & Kjørboe, 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.**, & Kjørboe, 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 Kjørboe, 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., & Kjørboe, 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 cardiovascular. *Int. J. Emerg. Multidiscip. Fluid Sci.*, 2, 143–160.

## Invited talks

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| 2021 | École polytechnique fédérale de Lausanne, Physics of Living Systems Seminar<br>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<br>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<br>Max Planck Institute for Terrestrial Microbiology                      |
| 2014 | Harvard School of Engineering and Applied Sciences  |

## Invited talks (continued)

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2012      Jawaharlal Nehru Centre for Advanced Scientific Research

## Conference presentations

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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

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### Institution:

2021-2022      Community task force on diversity, inclusion and belonging, Harvard department of molecular and cellular biology

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

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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

## Teaching (continued)

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- 2011      Instructor, *Mechanical Behavior of Materials*, Virginia Tech  
            Teaching Assistant, *Dynamics*, Virginia Tech
- 2010      Teaching Assistant, *Statics*, Virginia Tech

## Mentoring

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- 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

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- 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)