

Vivek N. Prakash, Ph.D.

Department of Physics
University of Miami
Knight Physics Building, Room 307
1320 Campo Sano Ave
Coral Gables, FL, USA 33146

Phone: +1 (305) 284-7121
Email: vprakash@miami.edu
Website: <http://www.vprakash.com>
Twitter: @Viveknprakash
Google scholar: <http://goo.gl/3DTmqp>

Academic Appointments

- **Assistant Professor** (January 2020 – present)
Department of Physics, University of Miami, FL, USA
Secondary Faculty (May 2020 – present)
Department of Biology, University of Miami, FL, USA
- **Postdoctoral Research Fellow** (2014 – 2019)
Department of Bioengineering, Stanford University, CA, USA
Advisor: Prof. Manu Prakash
Collaborator: Prof. Takashi Mikawa (University of California, San Francisco)

Education and Training

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

Research Interests

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

Publications

Total publications in leading peer-reviewed journals in different fields: 10

Physics: Nature Physics - 1, Physical Review Letters - 1, New Journal of Physics - 1

Mechanics: Journal of Fluid Mechanics- 3, Physics of Fluids - 1, Physical Review Fluids - 1

Engineering: Chemical Engineering Science - 1

Biology: Journal of Experimental Biology - 1

Postdoctoral Research: Organismal Biomechanics

14. **Vivek N. Prakash**, M. S. Bull and M. Prakash
Motility induced fracture reveals a ductile to brittle crossover in the epithelial tissues of a simple animal (2020)
(under review in **Nature Physics**)
(bioRxiv preprint: <https://www.biorxiv.org/content/10.1101/676866v1>)
13. **Vivek N. Prakash**, L. Maya-Ramos, R. Asai, T. Mikawa, M. Prakash
A novel microsphere-based cell tagging method for large-scale tissue flow mechanics in embryos and animals (2020) (under preparation)
12. R. Asai, **Vivek N. Prakash**, M. Prakash, and T. Mikawa
Mitotic coordination patterns the early midline gastrulation center in amniotes (2020)
(under preparation)
11. W. Gilpin, **Vivek N. Prakash**, and M. Prakash
Rapid behavioral transitions produce chaotic mixing by a planktonic microswimmer (2020)
(under review) (arXiv preprint: <https://arxiv.org/abs/1804.08773>)
10. W. Gilpin, **Vivek N. Prakash**, and M. Prakash
Dynamic vortex arrays created by starfish larvae
Physical Review Fluids, 2, 090501(2017)
9. 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)
- Cover of Journal of Experimental Biology (Volume 220, 2017)
8. 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)

Highlights and media attention:

- Highlighted in a **Nature Physics News & Views** article:

V. I. Fernandez & R. Stocker, Hydrodynamics: Modus vivendi, *Nature Physics*, 13, 326-327 (2017)

- Highlighted in a **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.

Also, see correspondence:

W. Gilpin, Vivek N. Prakash, and M. Prakash

Reply to 'Boundary effects on currents around ciliated larvae', *Nature Physics*, 13, 521-522 (2017)

Graduate Research: Experimental Fluid Mechanics

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)
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)
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)
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)
(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)
(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)
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)

Honors & Awards

- 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

Advanced Research Training Schools & Professional Courses

- 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 Advanced Study Institute*, 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)
- 2009, 2010 – *J.M.B.C. courses: Experimental Techniques* (UTwente), *PIV* (TUDelft), Netherlands (1 week)

Talks & Seminars

Invited Plenary Conference Talks:

Upcoming:

- 2020 — International Conference of the Developmental Biology of the Sea Urchin and Other Marine Invertebrates, Marine Biological Laboratory, Woods Hole, MA (October 18-22).

Invited Seminars:

- 2020 — Brandeis University, Materials Research Science and Engineering Center (virtual seminar)
- 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):

- 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

- *College Physics II, PHY 102 SCALE-UP** (Spring 2020)*
Integrated Lecture, Discussion and Lab. Electromagnetism, Optics, and Modern physics.
- *College Physics I, PHY 101 SCALE-UP** (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.

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

Mentoring Experience

Mentoring at Stanford University

- Matthew Storm Bull (Ph.D. student) (Sep 2014 - Dec 2019)
- William Gilpin (Ph.D. student) (Sep 2015 - July 2019)
(presently NSF-Simons Research Fellow, Harvard University)

Mentoring at the University of Twente

- Varghese Mathai (Ph.D. student) (June - Dec 2013)
(presently Postdoctoral Researcher, Brown University)
- Ernesto Mancilla (Ph.D. student) (visitor from UNAM, Mexico) (July - Dec 2012)
- Jon Brons (MSc. student) (Aug - Dec 2013)
- Tobias Foertsch (MSc. student) (Aug 2012 - Aug 2013)
- Huanshu Tan (MSc. student) (visitor from Shanghai University) (Jan - Apr 2013)

Service

- Peer-review — Referee for:
eLife (1)
Journal of Fluid Mechanics (6)
Physical Review Fluids (1)
Physics of Fluids (1)
International Journal of Multiphase Flow (1)
European Journal of Mechanics / B Fluids (1)
Journal of Theoretical Biology (1)
16th Asian Congress of Fluid Mechanics, India (abstract reviewer) (1)
- Outreach — Numerous lab demonstrations for a wide variety of audiences
- Volunteering — Student volunteer for *APS-DFD Meeting*, San Francisco, USA (2014)
- Session co-chair — ‘Dealing with Damage’ session, SICB Annual Meeting, Austin, USA (2020)
- Session co-chair — ‘Developmental Plasticity’ session, SICB Annual Meeting, Tampa, USA (2019)
- Judging — Judge for best student presentation awards in the Division of Invertebrate Zoology (DIZ) at the SICB Annual Meeting, San Francisco, USA (2018)
- Organization — Friday afternoon Shriram center basement seminar series - ‘Happy to talk science hour’ at Stanford University, funded by a VPGE SPICE grant (2014 - 2016)

Professional Memberships

- 2010 — present, American Physical Society (APS) - Division of Fluid Dynamics (DFD)
- 2010 — present, European Mechanics Society (Euromech)
- 2017 — present, Society of Integrative and Comparative Biology (SICB)
- 2017 — present, Biophysical Society (BPS), Mechanobiology subgroup
- 2017 — present, Society for Developmental Biology (SDB)
- 2018 — present, American Society of Cell Biology (ASCB)

Media coverage

- **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

(Last updated: May 16, 2020)