Bikram Dhoj Shrestha

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CAREER OBJECTIVE

As a Physics PhD candidate focusing on biological fluid dynamics, I am seeking a challenging position in the industry where I can leverage my expertise in experiments, computational modeling and data analysis to drive innovative solutions in fluid mechanics, biomechanics, and related fields. I aim to contribute to cutting-edge projects and collaborate with interdisciplinary teams to enhance product development and optimize performance in a dynamic industrial environment.

EDUCATION

- **University of Miami (UM), FL, U.S.A.** ***December 2024 (expected)***
  Ph.D. in Physics, Thesis: Biophysics and Fluid Dynamics
- **Tribhuvan University (TU), Nepal**
  M.Sc. in Physics, Thesis: Computational Astrophysics ***July 2017***
  B.Sc. in Physics, Minor: Mathematics ***May 2013***

GRADUATE RESEARCH AND TEACHING EXPERIENCE

Graduate researcher, Prakash Lab, Department of Physics, University of Miami **Aug 2019- Now**

- Project 1: **Boundary Effects on Flow Fields:** Investigated the influence of squeeze confinement on flow fields generated by complex-shaped larvae, focusing on sea star and sea urchin larvae.
- Project 2: **Effect on Flow Patterns due to Confined Gap:** Analyzed changes in flow fields due to confinement between parallel plates, focusing on circular-shaped sea star and sea urchin larvae.
- Project 3: **Ciliary Beating Quantification:** Quantified ciliary-driven flows in genetically perturbed *Xenopus* using high-precision microscopy and image analysis techniques.
- Project 4: **Chemical Impact on Larval Flow:** Conducted flow field analysis on sea urchin larvae treated with PFOA, Nickel, and GenX, comparing results with control groups.
- Project 5: **Low-cost Microscope Design:** Built a customized microscope dedicated to marine larval imaging.
- Project 6: **3D Swimming Behavior:** Researched and modeled 3D swimming behaviors of sea star larvae to understand their locomotion mechanisms.

Teaching Assistant, Department of Physics, University of Miami **Aug 2019- Now**

- Taught all the Undergraduate Physics Laboratory Courses offered by the Department of Physics

Lecturer, High School Science and Mathematics, Nepal **Apr 2016- Mar 2018**

RESEARCH SKILLS *(5+ years experience)*

- Computational Fluid Dynamics (CFD): ANSYS Fluent and COMSOL Multiphysics
- Programming Languages: Python, MATLAB
- Data Analysis: R, JMP Pro, and Excel
- Microscopy: Brightfield, Darkfield, Phase Contrast, Fluorescence Microscopy
- Image Analysis Software: FIJI, MATLAB Image Processing Toolbox, Photoshop
- AutoCAD
- Live Imaging of larvae
- Algae Culturing
- Microfluidics
- High-speed Imaging and Analysis
- General maintenance and troubleshooting (Zeiss AXIO Imager M1 and Inverted Microscope) and Zeiss ZEN Software
- Particle Image Velocimetry
- DaVis
- Design and Fabrication of experimental setups
- 3D printing
- Lab management: Group briefing, Safety in-charge, Waste management (EHS guidelines), General lab maintenance (lab instruments, safety, and cleanliness)
- Analytical instruments, and Computational tools
- DLTdv digitizing tool

PUBLICATIONS (Peer-Reviewed)

- M. J. Konjikusic, C. Lee, **Shrestha B D**, et al., "Kif9 is an active kinesin motor required for ciliary beating and proximodistal patterning of motile axonemes," Journal of Cell Science, 2023. ***(Link)***
- T. Curtright, Z. Cao, A. Peca, D. Sarker, and **B. D. Shrestha**, "Lie groups and propagators exemplified", Bulg. J. Phys. vol.51 no.1 (2024), pp. 109-116. ***(Link)***
- T. Curtright, Z. Cao, A. Peca, D. Sarker, and **B. D. Shrestha**, "Yet Another Paper on the Oscillator Propagator", Researchgate, 2021. ***(Link)***
- **Shrestha B D***, Chandragiri S*, Prakash V N, et al., "Confinement induced vortex generation in marine larvae", (2024) Manuscript in preparation for *Nature Physics*.
- Chandragiri S*, **Shrestha B D***, Prakash V N, et al., "Boundary effect on fluid flow created by spherical shaped sea star and sea urchin larvae", (2024) In preparation for *Phys. Rev. Fluids*.
- Descoteaux A, Chandragiri S, **Shrestha B D**, Prakash V N, Bradham C, et al., "Developmental and Biophysical Effects of Alizarin on sea urchin larvae", (2024) In preparation for *Development*.
- Lion A, Chandragiri S, **Shrestha B D**, Prakash V N, Bradham C, et al., "Developmental and Biophysical Effects of PFOA, GenX on sea urchin larvae", (2024) In preparation for *Development*.

*Equal contribution

RESEARCH PRESENTAITONS

Talks

- **APS Division of Fluid Dynamics Annual Meeting, Washington, D.C., 2023**, "Effects of squeeze-confinement on flow fields around morphologically complex ciliated larvae."
- **Neuroscience Seminar, UM, 2022**, "Ciliary-driven flows in marine invertebrates."
- **Nepalese Association of Florida (NAF), 2022**, "Ciliary driven flow in starfish larvae."
- **Physics Departmental Seminar, UM, 2021**, "Ciliary Driven Flows in Marine Organisms."

Posters

- **University of Miami, 2024,** "Flow fields of spherical and non-spherical ciliated marine larvae under squeeze-confinement."
- **SICB conference, Austin, TX, 2023,** "Boundary effects on the fluid flow around sea star larvae."
- **University of Miami, 2023**, "Boundary effects on the fluid flow around sea star larvae."
- **APS-DFD Gallery of Fluid Motion, 2023**, ***(Link).***
- **Basic Research Art of Science Showcase, AFRL, 2023**, ***(Link).***

STUDENT MENTORING EXPERIENCE

- Christian D. Gibson, B.S. Biomedical Engineering and Physics, UM (12/2020 - 05/2023)
- Valentina Restrepo, B.S. Biomedical Engineering (05/2021 - 08/2021)
- Nina Couture, B.S. Environmental Engineering (09/2021 - 08/2022)
- Amaya Crichton, B.S. Biology (09/2021 - 12/2023)
- Katie Alvarez, B.S. Biology (05/2024 – 07/2024)

AWARDS AND EXTRACURRICULAR ACTIVITIES

- GAFAC (*Graduate Activity Fee Allocation Committee*), Travel Award, UM 2023
- BP Koirala Memorial Board for Astronomy & Space Science Thesis Award, TU 2017
- Nepal Federation of Indigenous Nationalities Scholarship, 2012-2104
- Mahatma Gandhi Scholarship Scheme 2009-10, Embassy of India, Kathmandu, Nepal
- FIDE chess player (Won many national and international category competitions)
- Student Member, American Physical Society (APS)
- Senator 2021-2024, Graduate Student Association (GSA), UM
- Graduate Activity Fee Allocation Committee Member, UM 2024

REFERENCES

Dr. Vivek N Prakash, Assistant Professor, UM, vprakash@miami.edu, (305)-284-7121
Dr. Sheyum Syed, Associate Professor, UM, s.syed@miami.edu, (305)-284-7122