Yashraj Bhosale

Graduate Student, Mechanical Sciences

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Education

University of Illinois at Urbana-Champaign (UIUC), USA — **GPA: 4.0 / 4.0**
PhD, Mechanical Science and Engineering (MechSE) — *2020–present*
Concentration : Computational Science and Engineering
Graduate Minor : Statistics
MS, MechSE — *2017–2019*

Indian Institute of Technology Bombay (IITB), India — **GPA: 9.5 / 10.0**
BTech (Honors), MechSE — *2013–2017*

Positions

Graduate Research Assistant, MechSE, *UIUC* — *2018–present*
Graduate Teaching Assistant, MechSE, *UIUC* — *2017–2018*
Technical Intern, *Daikin Industries Ltd.*, Japan — *Summer 2016*
Research Intern, *National Sun Yat-sen University*, Taiwan — *Winter 2015*
Undergraduate Teaching Assistant, *IITB* — *2015-2016*

Honors, Awards & Fellowships

Research covered in *New York Times* — *2020*
Featured article in *Journal of Applied Physics* — *2020*
Research covered in *Advances in Engineering* — *2018*
UIUC Teacher Ranked as Excellent by Students — *2017-2018*
Honors in Mechanical Engineering, IITB — *2017*
Ranked among *top 3*, MechSE, IITB (*academic performance*) — *2013-2017*
Undergraduate Research Award, IITB (*exceptional research*) — *2016*
KVPY Fellowship, Department of Science and Technology, India — *2012*
National Talent Search Fellowship, NCERT, India — *2009*

Teaching

Graduate Teaching Assistant
ME330 : Engineering Materials (Mechanical Testing Lab), UIUC — *Fall 2017-Fall 2018*

- Recognized on the UIUC List of Teachers Ranked as Excellent by their students.
- Conducted material testing labs for 40+ students across 3 different lab sections.
- Instructed introductory lectures for students, held office hours and graded lab reports.

Undergraduate Teaching Assistant
BB101 : Biology, PH105 : Modern Physics, IITB — *Spring 2015-Fall 2016*

- Tutored 50+ freshmen via tutorial sessions in introductory biology and quantum physics.
- Instructed lectures for students, held office hours and graded homework assignments.

Outreach

Active dissemination of research via annual APS DFD meetings — *2018–2021*
Developer/Contributor of the open-source software *pyElastica* for assemblies of Cosserat rods. ($\sim$ 3000 downloads, $\sim$ 20,000 views, 10+ active user groups @ cosseratrods.org) — *2020*
Student Mentorship Program *(SMP)* IITB, mentored 12 freshmen to develop a holistic and motivated outlook towards campus life and guided them in academic, extra-curricular and social aspects. — *2015–2016*
Department Academic Mentorship Program *(DAMP)* IITB, mentored academically weak students to improve their performance and cope with non academic issues. — *2015–2017*

Peer-reviewed journal publications

1. Porat, Tekinalp, Bhosale , Gazzola, Meroz. On the mechanical origins of waving, coiling and skewing patterns in *Arabidopsis thaliana* roots. *Under review PNAS*.
2. Chan, Bhosale , Parthasarathy, Gazzola. Three-dimensional geometry and topology effects in viscous streaming. *Journal of Fluid Mechanics*, 2022.
3. Bhosale , Parthasarathy, Gazzola. Elastic streaming – flow rectification via soft boundaries. *Under review Physical Review Letters.*
4. Parthasarathy, Bhosale , Gazzola. A hyperelastic oscillatory Couette system. *Under review Journal of Fluid Mechanics.*
5. Bhosale , Weiner, Butler, Kim, Parthasarathy, Gazzola, King. Micromechanical origin of plasticity and hysteresis in nest-like packings. *Under review Physical Review Letters.*
6. Bhosale , Vishwanathan, Parthasarathy, Juarez, Gazzola. Multi-curvature viscous streaming: flow topology and particle manipulation. *Under review PNAS.*
7. Bhosale , Parthasarathy, Gazzola. A remeshed vortex method for mixed rigid/soft body fluid–structure interaction. *Journal of Computational Physics*, 2021.
8. Bhosale , Parthasarathy, Gazzola. Shape curvature effects in viscous streaming. *Journal of Fluid Mechanics*, 2020.
9. Bhosale , Esmaili, Bhar, Jung. Bending, twisting and flapping leaf upon raindrop impact. *Bioinspiration & Biomimetics*, 2020.
10. Bhosale , Weiner, Gazzola, King. Mechanics of randomly packed filaments–The "bird nest" as meta-material. *Journal of Applied Physics*, 2020.
11. Lin, Bhosale , Huang. 3D-CFD investigation into free convection flow above a heated horizontal cylinder: Comparisons with experimental data. *Applied Thermal Engineering*, 2017.

Conference presentations

1. Bhosale , Parthasarathy, Gazzola. Modulating rectified flows via elastohydrodynamic effects. *APS Division of Fluid Dynamics*, 2021.
2. Bhosale , Parthasarathy, Gazzola. Elasticity-induced viscous streaming phenomenon. *APS Division of Fluid Dynamics*, 2020.
3. Bhosale , Parthasarathy, Vishwanathan, Juarez, Gazzola. Flow topology and bifurcations in streaming lattices. *APS Division of Fluid Dynamics*, 2019.
4. Bhosale , Shaikh, Sharma. Sharp interface level set method based simulation and energy budget analysis of falling droplet breakup modes. *Proceedings of the 2nd World Congress on Momentum, Heat and Mass Transfer*, 2017.

Skills

Programming: Python, R, C, C++, MATLAB, Git, Bash
HPC: Intel TBB, OpenMP, MPI
Data & Design: Paraview, Adobe Illustrator
Markup: Latex, Markdown, HTML5, CSS
Machine Learning: Pytorch, Tensorflow
Libraries: numpy, scipy, matplotlib, Blaze, Pybind11
Languages: English, Hindi, Marathi, Japanese (basic)