Yashraj Rajendra Bhosale

CONTACT INFORMATION

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RESEARCH INTERESTS

Computational Fluid Dynamics and Heat Transfer; Multiphase Flows; Soft Matter Phsics; Bio-locomotion; Interfacial Dynamics

EDUCATION

University of Illinois at Urbana Champaign, Urbana-Champaign, IL
Master of Science in Mechanical Science and Engineering [July' 17 - May' 19]

- CGPA **4.0/4.0**

Indian Institute of Technology Bombay , Mumbai India
Bachelor of Technology in Mechanical Engineering [July' 13 - May' 17]

- CGPA **9.5/10**

PUBLICATIONS

- Lin, K. C., Bhosale, Y., Huang, C. Y. Z. (2017). 3D-CFD investigation into free convection flow above a heated horizontal cylinder: Comparisons with experimental data. **Applied Thermal Engineering**, 120, 277-288
- Yashraj Bhosale, Javed Shaikh, Atul 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 (MHMT17)

GRADUATE RESEARCH

Granular Mechanics of the Artificial Bird Nest [Sept' 17- Present]

Guide: Prof M. Gazzola, Department of Mechanical Science Engineering, UIUC

- Investigating the granular physics of packed slender flexible filaments which mimic a bird's nest using the software framework based on Cosserat beam theory.
- Obtained the stress strain response of the artificial granular system along with validating the packing fraction and aspect ratio for a constant strain process
- Investigating currently the coordination number, the distribution of contact points and bending stresses to understand the physics behind stress distribution in nest type granular systems

Limbless Locomotion on Curved Surfaces [Sept' 17- Present]

Guide: Prof M. Gazzola, Department of Mechanical Science Engineering, UIUC

- Analysed the limbless locomotion of a snake on a curved sphere using the the software framework developed for soft filaments based on the Cosserat beam theory
- Optimized the travelling gait of the locomotion pattern as a function of muscle torque factor, curvature and gravity preventing detachment from the surface

RESEARCH INTERNSHIP

National Sun Yat-Sen University, Kaohsiung, Taiwan [Dec' 15]

3D-CFD Transient Analysis of Convective Flow over a Heated Cylinder

Guide: Prof K.C. Lin, Multiscale Thermofluid Engineering Lab, NSYSYU, Taiwan

- Developed a 3-D computational fluid dynamics (CFD) model to predict the experimental data collected from the flow above a heated horizontal cylinder.
- Analysed the correlation among the near-cylinder flow features, boundary layer thickness and swaying motion of plume formation region
- Established a correlation between the oscillation frequency of the plume swaying and heat transfer characteristics for different Rayleigh numbers

UNDER GRADUATE THESIS

Analysis of Falling Droplet and Breakup Modes [Jan' 16- Present]

Guide: Prof A. Sharma, Department of Mechanical Engineering, IIT Bombay

- Validated sharp interface level set method for falling droplet problem
- Analysed the variation of falling droplet break up modes, from shear to bag type failures modes and the effect of viscosity and surface tension on them
- Obtained the energy budget analysis and regime map for the different break up modes to present the effect of variation of surface tension and viscosity on energy

INDUSTRY EXPERIENCE

Daikin Industries, Osaka, Japan [May' 16-July' 16]

Validation of Cross Flow Fan Models and Adjoint Flow Optimization

- Validated models for a cross flow fan using STAR CCM+ simulation software
- Implemented adjoint flow, a unique combination of Lagrangian multiplier and mesh deformation based optimization for industrial design based optimization
- Achieved **27% pressure loss reduction** from the new generated designs and improved the performance of indoor unit section and propeller fan blades

ACADEMIC PROJECTS

CFD Analysis of Natural Circulation Boiler Channel [May' 15-July' 15]

Guide: Prof R.P. Vedula, Department of Mechanical Engineering, IIT Bombay

- Developed a mathematical model of two phase instability regarding a non linear analysis of a natural circulation boiler channel
- Developed a non linear thermal hydraulic stability code using finite difference method in MATLAB for steady as well unsteady flows

Analysis of Inverse Heat Conduction Problem [Dec' 14]

Guide: Prof R.P Vedula, Department of Mechanical Engineering, IIT Bombay

- Developed an analytical method for solving inverse heat conduction problem using Laplace Transform technique in MATLAB for finite and semi-infinite bodies
- Verified The solution obtained using Crank Nicholson finite difference method

TECHNICAL SKILLS

- Programming Languages - C/C++, Python, Java
- Computational Packages - Numpy, MATLAB, Ansys, STAR-CCM
- Visualization Packages - POV-Ray, Tecplot
- Miscellaeous - SolidWorks, AutoCAD, Latex

RELEVANT COURSES

Computational Fluid Dynamics and Heat Transfer; Fundamentals of Gas Dynamics; Finite Element Analysis; Viscous Flow; Fluid Instabilities; Computational Multiphase Flow; Numerical Analysis; Non-linear Dynamics

WORK EXPERIENCE

Gradaute Teaching Assistant | UIUC [August 17'-present]

- One amongst 8 graduates chosen as a teaching assistant for Engineering Material Mechanical Testing Lab for junior and senior students
- Actively tutored 40+ students in 3 different lab sections and used networking to even provide help after hours to foster learning

MENTORSHIP ROLES

ISMP Mentor | IIT Bombay [April 15'-present]

- One amongst 82 students **selected** from **368** applicants based on an all round performance and peer reviews
- Mentored 12 freshmen to develop a holistic and motivated outlook towards campus life and guiding them in academic extra-curricular and social aspects

EXTRA-CURRICULAR ACTIVITIES

- Completed 100 hours basic training in Japanese and German language courses
- Trekking enthusiast, treks include reaching the summit of Mt. Fuji, tallest mountain of Japan