

# Shivji Prasad Yadav, Ph.D.

Department of Mechanical Engineering  
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🔗 Google Scholar

## Education

- 2019 – 2024    📖 **Ph.D., Mechanical Engineering, IIT Bombay**, Maharashtra, India-400076, **CPI = 8.71**
- 2017 – 2019    📖 **M.Tech., Mechanical Engineering, IIT Guwahati**, Assam, India-781039, **CPI = 8.96**
- 2013 – 2017    📖 **B.Tech., Mechanical Engineering, GGU**, Bilaspur, Chhattisgarh, India-495009, **CPI = 9.06**

## Experience

- May 2025 – Present    📖 **Research Associate**, Mechanical Engineering, IIT Patna, Bihar
- Oct. 2024 – Apr. 2025    📖 **Post Doctoral Fellow**, Mechanical Engineering, IIT Bombay, Maharashtra
- July 2024 – Sept. 2024    📖 **Research Associate**, Mechanical Engineering, IIT Bombay, Maharashtra

## Academic Achievements

- HSSLC Examination    📖 **Secured 6th** position in order of merit in Higher Secondary School Leaving Certificate Examination, 2013 conducted by Nagaland Board of School Education.
- 📖 **Secured state highest in Mathematics** in HSSLC Examination, 2013 conducted by Nagaland Board of School Education.
- Quiz                      📖 **Runner Up** in University Annual Quiz organized on the occasion of Guru Ghasidas Jayanti at Guru Ghasidas University.

## Research Interest

- 📖 Microfluidics and Biomicrofluidic | Optimization of Microfluidic Systems | Biomedical Applications
- 📖 Point-of-care | On-chip biosensor | Micro-Electromechanical Systems (MEMS) | Lab-on-chip
- 📖 Computational Fluid Dynamics | Finite Volume Methods | Numerical Approach | Multiscale Simulation
- 📖 Non-Newtonian Flow | Two-phase Flow | Blood Flow Simulation | Biological System Modeling
- 📖 Fluid Dynamics | Heat Transfer

## Ph.D. Project

- Title                      📖 **A numerical modelling of blood flow in microchannel and blood plasma separation microdevice**
- Thesis advisor        📖 **Prof. Amit Agrawal** and **Prof. Atul Sharma**, IIT Bombay
- Project description    📖 *The project aims to develop a novel numerical framework for simulating blood flow in various complex microchannels. The project is especially useful given the current worldwide interest around developing blood-based point-of-care devices with different functionalities.*
- 📖 *The project is unique in several ways, and it also complements our group's existing experimental approach of developing novel blood-based microdevices. This project work will be particularly useful, as it will substantially reduce the number of blood-based experiments that will be required in the lab, and will reduce the cycle time for developing new and innovative bio-microdevices.*
- Key outcomes         📖 *The project's outcome is an indigenously developed novel numerical software for understanding the biophysics and biomechanics exhibited by blood flow in various complex microchannels and serve as a powerful tool for optimizing the geometry and dimensions of a microchannel, ultimately leading to the development of an innovative passive blood-based bio-microdevice.*

## M.Tech. Project

Title	Development of Coupled Solver for Steady Incompressible Flows
Thesis advisor	Prof. Amaresh Dalal and Prof. Ganesh Natarajan, IIT Guwahati
Project description	The project aims to develop a fully coupled implicit solver to solve steady-state incompressible fluid flow problems based on collocated finite volume formulations using unstructured grids. The developed solver accurately predicts the flow behaviour in less computational power and time.

## Skills

Programming	C++, Python, HTML, OpenFOAM, MATLAB
Simulation Packages	Ansys Fluent, COMSOL Multiphysics
Software	AutoCAD, SolidWorks, Creo/Pro-E, Gambit, Paraview, Tecplot, TenserFlow, $\text{\LaTeX}$ , Blender

## Research Publications

### Journal

- 1 H. Deswal, **S. P. Yadav**, S. G. Singh, and A. Agrawal, "Flow sensors for on-chip microfluidics: Promise and challenges," *Experiments in Fluids*, vol. 65, p. 173, 2024. [DOI: https://doi.org/10.1007/s00348-024-03918-6](https://doi.org/10.1007/s00348-024-03918-6).
- 2 **S. P. Yadav**, H. Deswal, A. Sharma, and A. Agrawal, "Two-fluid method-based three-dimensional simulation of blood plasma separation in a complex and elevated dimension microchannel," *Industrial & Engineering Chemistry Research*, vol. 63, no. 45, pp. 19 832–19 847, 2024. [DOI: https://doi.org/10.1021/acs.iecr.4c02407](https://doi.org/10.1021/acs.iecr.4c02407).
- 3 **S. P. Yadav**, A. Sharma, and A. Agrawal, "A continuum-based numerical simulation of blood plasma separation in a complex microdevice: Quantification of bifurcation law," *International Communications in Heat and Mass Transfer*, vol. 159, p. 107 967, 2024. [DOI: https://doi.org/10.1016/j.icheatmasstransfer.2024.107967](https://doi.org/10.1016/j.icheatmasstransfer.2024.107967).
- 4 **S. P. Yadav**, A. Sharma, and A. Agrawal, "Modelling of blood flow in a microchannel using a two-fluid approach," *Physics of Fluids*, vol. 36, p. 21 904, 2024. [DOI: https://doi.org/10.1063/5.0189178](https://doi.org/10.1063/5.0189178).
- 5 **S.P. Yadav**, A. Sharma, and A. Agrawal, "Accurate modeling of blood flow in a micro-channel as a non-homogeneous mixture using continuum approach-based diffusive flux model," *Physics of Fluids*, vol. 35, p. 041 905, 2023. [DOI: https://doi.org/10.1063/5.0144794](https://doi.org/10.1063/5.0144794).

### Conference

- 1 **S. P. Yadav**, A. Sharma, and A. Agrawal, "Numerical simulation of blood plasma separation in a bended-bifurcated microchannel," in *Proceedings of the 27th National and 5rd International ISHMT-ASTFE Heat and Mass Transfer Conference*, 2023. [DOI: https://doi.org/10.1615/IHMTC-2023.1310](https://doi.org/10.1615/IHMTC-2023.1310).

## Extra-curriculars

NSS	<b>National Service Scheme volunteer</b> from 2015-2017 at Guru Ghasidas University NSS unit, Bilaspur, Chhattisgarh, India. <b>Attended a 7-day National Service Scheme Special camp</b> organized at village-Khaira, Tehsil-Kota, Bilaspur, Chhattisgarh, India.
SATU SCM 2023	<b>Volunteered as an organizer</b> for the <b>2023 SATU Presidents' Forum Steering Committee Meeting</b> at IIT Bombay, coordinating event logistics, facilitating smooth communication between international delegates, and ensuring a successful gathering for academic leaders across Asia
Event Executive	<b>Event Executive</b> for Hydraulic Crane Event   Equilibrio 2k15, Technical Festival of GGU, Bilaspur.