

VISHWANATH RAVINDRAN

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RESEARCH INTERESTS

Structural mechanics, Compliant devices, Construction automation, Product and Instrument design

EDUCATION

Indian Institute of Science (IISc), Bengaluru 2024-2026*

M.Tech in Mechanical Engineering

CGPA: 9.82*/10

Indian Institute of Technology Tirupati (IITTp) 2020-2024

B.Tech in Civil Engineering

CGPA: 9.55/10

PUBLICATIONS AND PATENTS

Migration of particles suspended in yield stress fluids: Insights from numerical simulation of pipe flow of 3D printable concrete

Authors: *Vishwanath R.*, A. V. Rahul, Thiyagarajan R

Journal of Non-Newtonian Fluid Mechanics, Volume 332, 2024, [Link](#).

Indian design-patent application for an invention titled

“A multi-fluid dynamic inline mixer cum extrusion system” has been filed .

Inventors: Thiyagarajan R., A. V. Rahul, *Vishwanath R.*

Application id: 202541096238

CONFERENCE PUBLICATIONS/PRESENTATIONS

Revisiting the Mechanical Advantage of Compliant Mechanisms **iNaCoMM 2025**

Authors: *Vishwanath R.*, G. K. Ananthasuresh

Computing the Centre of Elasticity in Planar Frames **iNaCoMM 2025**

Authors: *Vishwanath R.*, G. K. Ananthasuresh

Cell-actuated Compliant Mechanisms **MARSS 2025**

Authors: *Vishwanath R.*, G. K. Ananthasuresh

Inline mixing of accelerator for concrete 3D printing application: Numerical simulation using computational fluid dynamics **CONSEC 2024**

Authors: *Vishwanath R.*, A. V. Rahul, Thiyagarajan R.

RESEARCH EXPERIENCE

Graduate researcher, IISc Bengaluru [May '25 -Jun '26*]

Supervisor: **Dr G. K. Ananthasuresh**, IISc, Bengaluru

Thesis title: ***Biohybrid Compliant Mechanisms***

- Devised a novel technique to analyse and decompose the mobility of real-world biological systems (including seahorse, stingrays) into a few energy-efficient deformation modes in order to replicate life-like animation.
- Extended the framework to allow for inverse analysis for optimal distribution of actuators in biohybrid machines.
- Compliant mechanisms tailored for actuation by tissue-engineered-muscle are designed and fabricated.
- Optimal trajectory planning of compliant manipulators to achieve controlled ‘soft-touch’ or ‘hard-contact’ interactions with workpiece.

Undergraduate researcher, IITTp

[August '23 - May '24]

Supervisor: **Dr A. V. Rahul** and **Dr Thiagarajan R.**, IIT Tirupati

Bachelor thesis title: *Numerical Modelling of Fresh Cementitious Materials - Application in Concrete 3D Printing*

- Multiphase CFD models equipped with suspension balance model were employed to study the pumping behaviour of high-yield stress cementitious mixtures in the interest of concrete 3D printing.
- In-house design and fabrication of a gantry-based concrete 3D printer was performed.

Summer (2023) Intern, Robotics Lab IITM

[May '23 - August '23]

Supervisor: **Dr Asokan Thondiyath**, Dept of Engineering Design, IIT Madras

Project topic: *Design and fabrication of a novel dynamic inline mixer system*

Summer (2024) Intern, Building Materials Lab IITTp

[May '24 - August '24]

Supervisor: **Dr A. V. Rahul**, Dept of Civil Engineering, IIT Tirupati

Project topic: *Study on inline mixing of admixtures during 3D printing of concrete through numerical and experimental means*

ACADEMIC PROJECTS

Control of stress-induced morphogenesis of epithelial cells through kinematic constraints

Term project for “**ME251: Biomechanics** (IISc)”

[Mar '25 - Apr '25]

- The significance of mechanical constraints on the epithelial morphogenesis is investigated, and the possibility of engineering certain targeted forms of epithelial deformations at specific sites by prescribing appropriate kinematic constraints is explored.

Energy Dissipation in Particle-based Impact Damper Systems: Investigation based on Elasto-plastic impact model

[Mar '24 - Apr '24]

Term project for the course “**ME701L: Non-linear dynamical systems** (IITTp)”

- The non-linear dynamics of the particle damper system subject to impact load are assessed by employing the elasto-plastic model, which is used to accurately predict energy losses during a collision.
- Energy dissipation and other system characteristics of a particle damper system are studied, and the damping performance of the system is evaluated.

More details about each project, along with other works, are provided on the personal webpage.

ACHIEVEMENTS

Received **Aarvee Associate Institute award** for securing the highest cumulative GPA in the 2024 graduating batch in the civil engineering discipline, awarded by the academic office, IIT Tirupati.

Attended the **International Symposium on Automation and Robotics in Construction (ISARC) 2023** conference as a sponsored student delegate from IIT Tirupati.

Received **Academic excellence awards** for 2nd and 3rd year of undergraduate studies in civil engineering, awarded by the academic office, IIT Tirupati.

Placed first in “**Design Different**” competition at **Civil Conclave 2022** (Inter IIT Civil engineering competition) organised by IIT Roorkee.

POSITIONS OF RESPONSIBILITY

Pupil Head of Devi Academy Senior Secondary School

[Jan '19 - March '20]

Elected as pupil head of Devi Academy Senior Secondary School with a student population of more than 1200.

Contingent Leader of IIT Tirupati for Civil Conclave 2022

[Dec '22]

Represented the students of civil engineering as their contingent leader in civil conclave.