


# Sumit Mehta


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## EDUCATION

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**Indian Institute of Technology Hyderabad**

*Ph.D. in Mechanics & Design*

**Hyderabad, India**

*Expected Graduation: January 2023*

**Thapar Institute of Engineering & Technology**

*Masters in Mechanical Engineering*

**Patiala, India**

*July 2015 - July 2017*

**Punjabi University**

*Bachelor of Technology (Mechanical Engineering)*

**Patiala, India**

*July 2011 - July 2015*

## RESEARCH EXPERIENCE

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**Indian Institute of Technology Hyderabad**

*Research associate*

**Hyderabad, India**

*Sept. 2022 - Present*

- Developing computational models on growing biological tissues and advanced soft (auxetic) materials

**Indian Institute of Technology Hyderabad**

*Ph.D. Research Fellow*

**Hyderabad, India**

*July 2017 - Present*

- Dissertation title: “A Study of Elastic Instabilities in Hyperelastic Solids”.
- Research interests include soft solid mechanics, biomechanics, constitutive modelling of soft materials, and numerical analysis of ODEs/PDEs.
- Developed computational framework for growth-induced instabilities in thin hyperelastic structures.
- Studied pattern-formation in thick walled pressurized compressible cylindrical structures that are useful in designing microfluidic devices.
- Work relevance is in developing mathematical models that mimic the behaviour of soft biological tissues such as skin, plants, blood vessels and also in designing engineered smart materials for soft robotics, metamaterial, and biomedical implants that are useful in health care sector.

I have carried this work with **Dr. Gangadharan Raju** (IITH) and **Dr. Prashant Saxena** (Uni. of Glasgow).

**Thapar University**

*Master's research*

**Patiala, India**

*July 2015 - July 2017*

Worked on “Architectural Acoustics: A numerical analysis on the reverberation time in an enclosed room”. I have carried this work with **Dr. Ashish Purohit** (Thapar University)

## INTERESTS and SKILLS

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### Research topics

Continuum Mechanics, Soft Solid Mechanics, Biomechanics, Constitutive Modelling of Soft Materials, Numerical Methods for ODEs/PDEs, and Bifurcation Analysis.

### Programming/Software

MATLAB, MAPLE, Python, Pro-E/Solidworks, Mathematica.

### Documentation

L<sup>A</sup>T<sub>E</sub>X, Inkscape, Microsoft office (Word, Excel, Powerpoint).

## RELEVANT COURSES

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**Mechanics:** Solid Mechanics, Continuum Mechanics, Non-linear/Finite Elasticity, Numerical Methods, Stability analysis.

**Computation:** Numerical analysis, Finite Difference Method, Finite Element Method.

**Mathematics:** Algebra, PDE/ODE, Variational Calculus, Differential Geometry.

## POSITIONS of RESPONSIBILITY

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### Teaching Assistant at IITH

Applied Elasticity, Continuum Mechanics, Numerical Methods, Solid mechanics, Calculus of Variation.

### Supervision

Mentoring and supervising post graduate and PhD students.

### Additional

- Coordinator in organising workshop, Global Initiative of Academic Networks (GIAN) (2019)
- Represented IIT Hyderabad in Inter IIT Sports Meet

## SCHOLASTIC ACHIEVEMENTS

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### National Exam

Graduate Aptitude Test in Engineering (Mechanical Engineering).

Awarded a 5 year fellowship by Ministry of Education (India) for Ph.D.

Awarded a 2 years fellowship by All India Council for Technical Education (India) for Masters.

## REFERENCES

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**Dr. Prashant Saxena** [Prashant.Saxena@glasgow.ac.uk](mailto:Prashant.Saxena@glasgow.ac.uk)

James Watt School of Engineering, University of Glasgow, U.K.

**Dr. Gangadharan Raju** [gangadharanr@mae.iith.ac.in](mailto:gangadharanr@mae.iith.ac.in)

Indian Institute of Technology Hyderabad, India.

**Dr. Viswanath Chintapenta** [viswanath@mae.iith.ac.in](mailto:viswanath@mae.iith.ac.in)

Indian Institute of Technology Hyderabad, India.

## JOURNAL PUBLICATIONS

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1. **Sumit Mehta**, Gangadharan Raju, & Prashant Saxena, “Wrinkling as a mechanical instability in growing annular hyperelastic plates”. *Int. J. Mechanical Sciences* (2022). (DOI – [10.1016/j.ijmecsci.2022.107481](https://doi.org/10.1016/j.ijmecsci.2022.107481)).
2. **Sumit Mehta**, Gangadharan Raju, Shanmugam Kumar, & Prashant Saxena, “Instabilities in a compressible hyperelastic cylindrical channel due to internal pressure and external constraints”, (*Int. J. Nonlin. Mech.*), (2022). DOI – [10.1016/j.ijnonlinmec.2022.104031](https://doi.org/10.1016/j.ijnonlinmec.2022.104031).
3. **Sumit Mehta**, Gangadharan Raju, & Prashant Saxena, “Growth induced instabilities in a circular hyperelastic plate”, *Int. J. Solids Struct.*, (2021). DOI – [10.1016/j.ijsolstr.2021.03.013](https://doi.org/10.1016/j.ijsolstr.2021.03.013).
4. **Sumit Mehta**, & Ashish Purohit, “Experimental and numerical study of reverberation time of an enclosed room”, *ISME J. Mech. and Design*, (2018). DOI – [10.1016/j.ismidesign.2018.10.018](https://doi.org/10.1016/j.ismidesign.2018.10.018)

## JOURNAL PUBLICATIONS (under preparation)

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1. **Sumit Mehta**, Gangadharan Raju, & Prashant Saxena, “Influence of differential growth on the stability of growing hyperelastic plates”

## CONFERENCES/WORKSHOPS

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1. **Sumit Mehta**, Gangadharan Raju, Prashant Saxena. On the stability of a growing nonlinear elastic plate, 11<sup>th</sup> European Solid Mechanics Conference (ESMC), 06/2022, held at NUI Galway, Ireland – (Oral presentation).

2. **Sumit Mehta**, Gangadharan Raju, Prashant Saxena. Wrinkling instability in growing hyperelastic plates, *5<sup>th</sup> SoftMech Soft Tissue Workshop*, 06/2021, Organised by University of Glasgow – (Oral presentation).
3. **Sumit Mehta**, Gangadharan Raju, Prashant Saxena. Wrinkling in growing annular hyperelastic plates, *Bulletin of American Physical Society*, 03/2021 – (Oral presentation)
4. **Sumit Mehta**, Gangadharan Raju, Prashant Saxena. Growth induced instability in hyperelastic plate, *4<sup>th</sup> Indian Conference on Applied Mechanics*, 07/2019 held at IISc Bangalore – (Oral presentation).
5. **Sumit Mehta**, Gangadharan Raju, Prashant Saxena. Buckling of hyperelastic circular plate induced due to growth, *British Mathematical colloquium/British Applied Mathematics Colloquium*, Glasgow, 04/2021 – (Poster presentation).
6. **Sumit Mehta**, Gangadharan Raju, Prashant Saxena. Instabilities in a compressible hyperelastic cylindrical channel due to internal pressure and external constraints, *Society of Engineering Science*, 10/2021 – (Poster presentation).