Yamnesh Agrawal

University of Pittsburgh

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Education

Academic Qualifications

- **University of Pittsburgh**
  PhD, Mechanical Engineering, GPA 4.0 *2021–Ongoing*
- **Indian Institute of Technology Roorkee**
  Bachelor of Technology, Mechanical Engineering, CGPA 7.38/10 *2014–2018*

Relevant Courses

- **PhD coursework** Finite element method, AI Bio-Med Informatics, Bio-statistics, Finite elasticity of Soft tissue, Differential Equations, Linear & complex equations, Continuum mechanics, Theory of Continuous media, Modeling material behavior, Elasticity.
- **Bachelor coursework** Instrumentation & Experimental methods, Robotics and Control, Computer Aided Mechanism designing, Operation & Supply Chain management, Programming & Data Structures.

Work Experience

Research Experience

- **Modeling and failure prediction of Arterial wall tissue** *Aug 2021 - Current*
  Designation: *Graduate Student Researcher, University of Pittsburgh*
  Supervisors: *Dr. Spandan Maiti,* University of Pittsburgh **&** *Dr. James Thunes*, R&D, **ANSYS, Inc**
  - Developing a multiscale model of aneurysmal tissue using a in-house developed finite element method (FEM) code tailored to simulate discrete fibers embedded within matrix components, to capture the nuanced behavior of biological tissues.
  - Conducting mechanical failure analysis of various diseased arterial tissues using our FEM code, and iteratively refining our multiscale model of the diseased tissue to predict their failure.
- **Design development and characterization of a Dielectric elastomer based variable focal length mirror**
  Designation: *Research Assistant, Mechanical & Industrial Engineering, IIT Roorkee* *Jan 2019 - July 2021*
  Supervisor: Dr. Manish M. Joglekar (Associate Professor, IIT Roorkee)
  - Modeling and fabrication of dielectric elastomer actuator with hyper-viscoelastic properties in transverse electrical and mechanical loading for the development of a high-resolution variable focal length mirror.
  - Identifying the instability parameters of dielectric hyper-visco-elastomers under various electro-mechanical loadings.
- **Guided wave propagation through laminated composited plate with delamination defects (Bachelor Thesis)**
  Supervisor: Dr. D. M. Joglekar (Assistant Professor, IIT Roorkee) *Aug 2017 - May 2018*
  - Investigated Lamb wave propagation characteristics in composite materials with delamination fractures.
  - Utilized **ANSYS Mechanical** for numerical simulations to create a predictive model for non-destructive testing (NDT) any fracture development and its properties.
  - Fabrication of composite plates with and without delamination. Performed non-destructive testing of composite using high frequency wave propagation through piezoelectric transducer for experimental verification.
  - Established a protocol for detecting delamination defects in composite materials non-destructively.

Industry Experience

- **Automation in New Trade Architecture Process** *Jun 2018 - Jan 2019*
  Designation: *Project Engineer, Wipro Technologies Private Limited*
  - Automation testing using Machine learning tools at various stages of software development life cycle in trade

booking software for an international bank.
- Responsible for preparation and execution of Test cases. Worked on the development of an automation process in optimizing the number of test cases through the usage of statistical & machine learning tools.

- **Improvement in PO to payment process in MRO purchases** *Summer 2017*
  Jindal Stainless Hisar Limited
  - Analyzed the wrong user practices to decrease redundant consumption of resources using Statistical process control methodology (SPC) by tracking trend anomalies.
  - Formulated a bias-free mathematical formula for vendor classification on the basis of three categories;Life cycle, Cost, and Service rating.
  - Designed inventory models for the repetitive orders to reduce number of indents, the workload on MRO department and optimized the inventory carrying cost.

Technical skills

- **Programming Languages:** Proficient in: Python, MATLAB, Fortran, C++, Github, Arduino, Latex, SQL, VBA.
- **Software Skills:** ANSYS Mechanical (Classic & Workbench), Coreform Cubit, Meshmixer, Paraview, SPSS, FIJI, Slicer, SolidWorks.
- **Experimental skills:** Clinical experiments on soft tissue (Sample preparation, tissue fixation, Axioscans, Micro-CT); Laser doppler vibrometer; Composite fabrication.

Publications

- **Agrawal, Y.**, Fortunato, R. N., Asadbeygi, A., Hill, M. R., Robertson, A. M., & Maiti, S. (2025) "Effect of Collagen Fiber Tortuosity Distribution on the Mechanical Response of Arterial Tissues." *Journal of Biomechanical Engineering* 1-23. `https:/doi.org/10.1115/1.4067152`
- Kashyap, K., **Agrawal, Y.**, Kumar, A. & Joglekar, M. M. (2024) "An electromechanically driven dielectric elastomer based tunable reflector." *Smart Materials and Structures, 33(5),* 055055.
- Kumar, A., Khurana, A., Patra, A., **Agrawal, Y.** & Joglekar, M. M. (2023) "Electromechanical performance of dielectric elastomer composites: modeling and experimental characterization." *Composite Structures 320,* 117130.
- **Agrawal, Y.**, Gangwar, A. and Joglekar, D. M. (2022). "Localization of a breathing delamination using nonlinear lamb wave mixing." *Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems, 5(3)*, 031005
- Gangwar, A., **Agrawal, Y.**. and Joglekar, D.M. (2021). Nonlinear Interactions of Lamb Waves with a Delamination in Composite Laminates. *Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems, 4(3)*, 031008.

Scholastic Achievements

- Secured 1^{st} position in annual technical festival of IIT Roorkee (Cognizance'17) event of research paper presentation-Mechanical IDEAZ (B) (2017).
- Secured 1^{st} position in Real life application Robot, robotics competition at Srishti, IIT Roorkee (2015).
- Secured JEE rank 1911 among 1.4 million students across India (2014).
- Selected for B.Stats program at Indian Statistical Institute, Kolkata, with 100% scholarship (2014).
- Selected for KVPY fellowship (2012-13).