Dr. Santosh S. Bagewadi

Assistant Professor | Mechanical Engineering | Additive Manufacturing, Auxetic Structures & Intelligent Engineering

Professional Profile

Dr. Santosh S. Bagewadi is an academician and researcher in Mechanical Engineering with interdisciplinary experience of more than 12 years spanning additive manufacturing, advanced materials, composite structures, auxetic and lattice architectures, automation, robotics, and engineering simulation. He is currently serving as an Assistant Professor in the Department of Mechanical Engineering, Dayananda Sagar University, Bengaluru, where he is engaged in teaching and research activities. His professional experience also includes teaching, laboratory and design/prototyping responsibilities, academic coordination, and technical event organization.

He completed his Ph.D. in Mechanical Engineering at Vellore Institute of Technology (VIT), Vellore, with doctoral research on “Structural Investigation of Additive Manufactured Gradient Polymer Matrix Composite.” His research work has focused strongly on the mechanical and structural performance of additively manufactured materials and architected structures, including gradient auxetic structures, hybrid auxetic structures, lattice structures, sandwich structures, and polymer-matrix composites.

Dr. Bagewadi has hands-on experience with solid-, liquid-, and powder-based additive manufacturing technologies, including FDM, SLA, SLS and SLM, and has worked with continuous-fiber composite 3D printing using an Anisoprint system and Aura slicer. His technical expertise also includes design for additive manufacturing, material testing and characterization, finite element analysis, and engineering design using CATIA, Creo, SolidWorks, Fusion 360, ANSYS Workbench and related tools.

His recent scholarly contributions include work on the state of the art in 3D printing of auxetic structures, mechanical characterization of hybrid metal matrix composites, out-of-plane behaviour of auxetic and hybrid auxetic structures, and gradient structures for energy absorption. He has also contributed to research on sandwich structures, composite joints, 3D-printed lap joints, and additive-manufactured materials. His work reflects an interdisciplinary approach combining experimental mechanics, computational modelling, advanced manufacturing and data-informed engineering analysis.

In alignment with emerging Industry 4.0 and intelligent manufacturing practices, Dr. Bagewadi's research interests can be positioned at the intersection of Additive Manufacturing, Digital Engineering, Computational Mechanics, Engineering Data Analytics, AI-assisted design and optimization, and intelligent manufacturing. His background in robotics and automation, simulation, CAD/CAE, 3D printing and advanced materials provides a strong foundation for integrating AI/ML methods into mechanical design, process optimization, material-property prediction and structural performance assessment. These AI-enabled directions represent an emerging extension of his established research expertise rather than a claim of completed AI certifications or projects.

Dr. Bagewadi has received the Raman Research Award for his publication on the mechanical properties of an additively manufactured hybrid auxetic structure and a Best Paper Award at the International Conference on Sustainable Industry 4.0. He has actively organized international conferences, faculty development programmes and technical workshops, including programmes on 3D printing, Industry 4.0 and robotics integration. His professional objective is to contribute to future-ready engineering education and research through advanced manufacturing, intelligent engineering systems, computational tools and interdisciplinary innovation.

Areas of Expertise and Research Interest

- Additive Manufacturing and 3D Printing
- Design for Additive Manufacturing (DfAM)
- Auxetic, Hybrid Auxetic and Lattice Structures
- Gradient Materials and Architected Structures
- Polymer Matrix and Composite Materials
- Advanced Materials and Mechanical Characterization
- Structural Mechanics and Finite Element Analysis (FEA)
- Energy Absorption and Impact-Resistant Structures
- Sandwich Structures and 3D-Printed Cores
- Continuous-Fiber Composite 3D Printing
- Mechanical Design, CAD/CAE and Digital Engineering
- Automation, Robotics and Intelligent Manufacturing
- AI/ML-assisted Engineering Design and Optimization
- Engineering Data Analytics and Predictive Modelling
- Industry 4.0, Digital Manufacturing and Smart Engineering
- Experimental Mechanics, Failure Analysis and Structural Performance

AI & Emerging Technology Focus

- AI/ML-assisted mechanical design and engineering optimization
- Data-driven prediction of mechanical and material properties
- Machine learning for additive manufacturing process–structure–property relationships
- AI-assisted design optimization of auxetic, lattice and gradient structures
- Engineering data analytics for additive manufacturing and advanced materials
- Predictive modelling of structural performance and energy absorption
- Intelligent manufacturing and Industry 4.0 applications
- AI-enabled integration of CAD/CAE, simulation and experimental data
- Digital engineering and computational intelligence for future-ready manufacturing
- Interdisciplinary integration of Mechanical Engineering, Robotics, Automation and AI