

# Curriculum Vitae

## Mr. Suman Mishra

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## Research Profile

PhD researcher specializing in advanced biomaterials for biomedical and acoustic applications, with a strong focus on developing cost-effective, DIY experimental platforms to enable accessible and innovative research. Expertise includes polymer-based biomaterials, electrospinning, additive manufacturing (3D printing), mechanical characterization, and acoustic transmission analysis, with emphasis on non-load-bearing biomedical systems and structure–property–performance relationships. Experienced in precision fabrication using lathe, CNC machining, and laser processing, along with device and experimental system design using SolidWorks and COMSOL Multiphysics. Research interests lie at the interface of materials science, chemistry, and biology, with the aim of developing functional, translational biomaterial systems for clinically relevant, scalable healthcare applications.

## Research Interests

- Biomaterials for tissue engineering and medical devices
- Polymer and biopolymer composites
- Acoustic properties and sound transmission loss in biomaterials
- Electrospun nanofibrous scaffolds
- 3D printing
- Customization of implants through machining
- Structure–property relationships in biomaterials
- Bioactive ceramics

## Education

- PhD in Biomaterials and Tissue Engineering, IIT Kharagpur (2021 – Present), Supervisor: *Prof. Santanu Dhara and Dr. Soumendranath Ray*
- M.Sc. in Nuclear Medicine, IIT Kharagpur, Year 2019-2021, 2<sup>nd</sup> Rank holder
- B.Sc. in Chemistry, Krishnanagar Govt. College, Kalyani University, Year 2015-2018, 1<sup>st</sup> class

## PhD Research Work

- Developed biopolymer-based materials in a cost-effective route for middle-ear prosthesis and tissue engineering applications
- Fabricated electrospun nanofibrous mats and analyzed morphology
- Development of a 3D printed scaffold for biomedical applications
- Development of an implant using precision fabrication using Lathe, CNC, and Laser machining.
- Designed and synthesized bio-ceramic materials from environmentally threatening waste resources, promoting sustainable material conversion for biomedical applications.
- Performed physicochemical characterization of translational biomaterial for healthcare application
- Conducted acoustic testing using the impedance tube and the four-microphone method
- Studied structure–property relationships for non-load-bearing biomedical materials
- Designed and executed in vitro, ex vivo, and in vivo studies to investigate biocompatibility, safety, and therapeutic potential for biomedical applications.

## Publications

1. Biswas A, Dogra N, Rajasekaran R, Biswas B, Vaidya PV, Biswas S, Ojha AK, Mukherjee S, Roy T, **Mishra S**, Chakraborty K. Mechanically compliant Catla catla scales gelatin hydrogels promote myogenic differentiation and skeletal muscle loss regeneration. *International Journal of Biological Macromolecules*. 2025 Nov 6:148771.
2. Biswas A, Vaidya PV, Rajasekaran R, Biswas S, Mukherjee S, Ojha AK, **Mishra S**, Nagalakshmi UN, Dogra N, Manchikanti P, Dhara S. 3D-Printed Fish Gelatin–Xanthan Gum Hydrogel with Myogenic Differentiation toward Skeletal Muscle Loss Repair. *ACS Applied Bio Materials*. 2025 Dec 20;9(1):264-86.
3. Mukherjee S, Pandey AK, **Mishra S**, Das P, Singh UK, Chakraborty K, Bhattacharya S, Pal S, Dhara S. Sodium-Entrapped Carbon Nanodots from Silk Wastewater for Combating Multidrug-Resistant Bacteria in Healthcare Settings. *ACS Applied Bio Materials*. 2025 Jun 12;8(7):5788-804.

## Patent

1. “A biogenic amine doped machinable poly carbohydrate monoliths and method thereof.” Patent Application No. 202431046372 (**Published**)
2. “Textile industry wastewater-derived Carbon-nanodot composition for surface disinfection and sanitization.” Patent Application No. 202431049834 A (**Published**)

## Conference

1. “Bioactive cellulose scaffolds fabrication by extrusion-based 3D printing for bone tissue engineering application”, **Suman Mishra**, Asmita Biswas, Pravin Vaidya, Saikat Biswas, Santanu Dhara. School of Medical Science and Technology (SMST), IIT Kharagpur, West Bengal, India, at TERMIS-EU 2025, Freiburg, Germany

## Technical Skills

- Electrospinning and scaffold fabrication
- 3D printing
- Mechanical testing (compression, UTM)
- Machining (Lathe, CNC, Laser)
- Acoustic testing (Impedance tube, transmission loss)
- CAM and Hemolysis
- Basic cell culture
- OriginPro, MATLAB (basic), ImageJ, GraphPad Prism
- SolidWorks, COMSOL (acoustics – learning)

## Awards and Fellowships

- Institute Fellowship, IIT Kharagpur (2021–Present)
- GATE Qualified, Year 2021
- Scholarship from TATA trust for excellence in Academic performance of MSc II, III, IV semester (2020-2021)
- JAM Qualified, Year 2019
- JAM Qualified, Year 2018
- Swami Vivekananda Merit-cum-Means Scholarship (2015-2018)

## References

- Prof. Santanu Dhara, IIT Kharagpur  
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- Dr. Soumendranath Ray  
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