Nisha Shankhwar

Ph.D.

shankhwarnisha3july@gmail.com, nisha2023@jnu.ac.in +91 9027072909 Delhi, India

ORCID: 0000-0002-8371-5057
ResearchGate: https://www.researchgate.net/profile/Nisha-Shankhwar

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Professional Summary

As an accomplished Physics Researcher, I specialize in advanced materials for sustainable solutions and healthcare applications. Renowned for designing and executing sophisticated experiments, I excel in data analysis and delivering exceptional research outcomes. My expertise spans cutting-edge biomaterials for biomedical implants, bone tissue engineering, drug delivery systems, and cancer hyperthermia treatment, as well as advanced nanomaterials for electrical/magnetic applications, device fabrication, and environmental remediation. With proficiency in techniques like electrospinning, 3D bioprinting, and microfluidic lithography, I utilize advanced analytical methods. My work also includes developing 3D culture models and assessing biocompatibility through in vitro assays and antibacterial testing. Committed to advancing scientific knowledge, I ensure my research meets the highest ethical standards and practical applications.

Education

Doctor of Philosophy (Ph.D.) in Physics, June 2016
Indian Institute of Technology Guwahati (IITG), India

- **Thesis:** "Preparation and characterization of nanocomposites for biomedical applications"
- **Advisor:** Prof. Ananthakrishnan Srinivasan

Master of Science (M.Sc.) in Physics, July 2009
Chhatrapati Shahu Ji Maharaj University, Kanpur, India

- **Division: First [Total Marks:** 829/1200]

Bachelor of Science (B.Sc.) in Mathematics & Physics, June 2007
Chhatrapati Shahu Ji Maharaj University, Kanpur, India

- **Division: First [Total Marks:** 858/1350]

Professional Experience

Post-Doctoral Research Associate
Special Centre for Nanoscience, Jawaharlal Nehru University (JNU), New Delhi, India
2023 – Present

Fellowship: Received the prestigious DBT-RA Fellowship from the ***Department of Biotechnology, Ministry of Science & Technology, Government of India***.

Assistant Professor [July 2017 - July 2020**]**

Department of Applied Science, Siddhant College of Engineering, Pune, Maharashtra, India

Assistant Professor [November 2016 - July 2017**]**

Department of Applied Science, Galgotias University, Greater Noida, India

Teaching Assistant [July 2011 - July 2015**]**

Department of Physics, Indian Institute of Technology, Guwahati

Junior Research Fellow [July 2010 - July 2011**]**

Department of Physics, Indian Institute of Technology, Guwahati

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Research Interests

- **Biomaterials for Tissue Engineering:** Specializing in the development of bioactive and biodegradable composite scaffolds, aiming to revolutionize tissue engineering by enhancing the biocompatibility and functionality of implantable materials.
- **Electrospinning & Polymeric Nanofibers:** Innovating the design and composition of nanofibers, focusing on integrating bioactive components to create advanced materials for a wide range of applications.
- **3D/4D Bio-Printing:** Pioneering the field of tissue bio-patterning and the creation of functional organs using cutting-edge 3D and 4D bioprinting technologies, including the development of spheroids and organoids, contributing to the future of personalized medicine and organ regeneration.
- **Advanced Biomaterials:** Engaging in the synthesis, characterization, and validation of novel biomaterials designed to meet the specific demands of biomedical applications, ensuring improved patient outcomes.
- **Magnetics:** Investigating the evolution of magnetic properties in bioactive glass and glass ceramics, with implications for both medical and technological advancements.
- **Electroceramics:** Developing and applying electroceramics for use in renewable energy technologies, contributing to sustainable and efficient energy solutions.
- **Conductive Electronics:** Exploring the potential of inkjet printing (IJP) in fabricating conductive electronic components, with applications spanning flexible electronics, wearable devices, and biosensors.
- **Remediation and Sustainability Solutions:** Committed to creating plant-based solutions that address social and ecological sustainability, aiming to reduce environmental impact and promote green technology. Utilizing nanocomposites as intelligent materials for the photodegradation pollutants, addressing critical environmental challenges and advancing the field of environmental remediation.

Languages

- English: Proficient in reading and writing
- Hindi: Native speaker with skills in reading and writing

Technical Skills

Category	Instrumentation/Software
Characterization Techniques	SEM, FE-SEM, VSM, NEU, XRD, FT-IR, UV-visible, Fluorescence, Spin Coater, Lyophilizer, PE, Impedance Measurement Setups, EPR, DSC, Micro Mechanical Tester, Viscometer, TEM, PPMS, Dielectric Analyzer, Impedance Analyzer, Gas Sensing Technologies, Bioprinting Systems
Software	Windows & Linux, Origin, CwESR, Carine, Microsoft Office Suite, Adobe Suite, ImageJ, Gatan Microscopy Suite, AI/ML Tools

Other Skills

- ***Technical Writing and Oral Communication:*** Strong skills in technical writing and delivering effective presentations.
- ***Academic Research and Curriculum Development:*** Experienced in conducting high-quality academic research, developing curricula, and implementing educational programs.
- ***Interdisciplinary Team Collaboration:*** Proven ability to work effectively in team environments, fostering collaboration and achieving common goals.
- ***Lecture Preparation and Delivery:*** Skilled in preparing and delivering lectures, managing laboratory sessions, and motivating students.

Peer-Reviewed Publications

1. **Nisha Shankhwar**, S. Singh. "Preparation and Reprogrammable Recovery Characteristics of Thermoresponsive PU-PCL Shape-Memory Polymer Membranes using Spin Coating." ADV FUNCT MATER **2024** (Communicated).
2. P. Singh, **Nisha Shankhwar**, U. Kumar, S. Singh, C. Upadhyay. "A Comprehensive Review of Magnetic Relaxation and Memory Effects in Core-Shell Magnetic Nanoparticles: Innovations and Applications in Biomedicine." ACS Nano, **2024**, (Communicated).
3. A.N. Singh, U. Mishra, K.B. Jethwa, N. Yadav, **Nisha Shankhwar**, M.R. Ray. "Evaluation of Garbage Enzyme Treatment Impact on Water Quality and Physicochemical Parameters in Wastewater." Biocatalysis Agr. Biotechnol. **2024** (Communicated).
4. **Nisha Shankhwar**, S. Singh. "Influence of Thermal Processing on the Structural, Magnetic, and Biological Characteristics of Bioglass Containing Zinc with Iron Oxide Prepared via Sol-Gel Method." **2024** (Manuscript under preparation).
5. H. Murthy, N. Thakur, **Nisha Shankhwar**. "A Review on Nickel Based Conductive Inks for Flexible Electronics." J. Adv. Manuf. Syst. **2021**, 21, 3.
6. **Nisha Shankhwar**, R.K. Singh, A. Srinivasan. "Evolution of Magnetic and Bone Mineral Phases in Heat Treated Bioactive Glass Containing Zinc and Iron Oxides." Int. J. Appl. Glass Sci. **2017**, 1, 105-115.

7. **Nisha Shankhwar**, M. Kumar, B.B. Mandal, A. Srinivasan. "Novel Polyvinyl Alcohol-Bioglass 45S5 Based Composites Nanofibrous Membranes as Bone Scaffolds." Mater. Sci. Eng. C **2016**, 69, 1167-1174.
8. **Nisha Shankhwar**, A. Srinivasan. "Evolution of Sol-Gel Based Magnetic 45S5 Bioglass and Bioglass Ceramics Containing Iron Oxides." Mater. Sci. Eng. C **2016**, 62, 190-196.
9. **Nisha Shankhwar**, M. Kumar, B.B. Mandal, P. S. Robi, A. Srinivasan. "Electrospun Polyvinyl Alcohol-Polyvinyl Pyrrolidone Nanofibrous Membranes for Interactive Wound Dressing Applications." J. Biomater. Sci. Polym. Ed. **2015**, 27, 247-262.
10. P. Kumar, **Nisha Shankhwar**, A. Srinivasan, M. Kar. "Oxygen Octahedra Distortion Induced Structural and Magnetic Phase Transition in Bi1-XCaxFe1-XMnxO3." J. Appl. Phys. **2015**, 117, 194103-194115.
11. **Nisha Shankhwar**, G.P. Kothiyal, A. Srinivasan. "Influence of the Phosphate Precursor on the Structure, Crystallization Behaviour, and Bioactivity of Sol-Gel Derived 45S5 Bioglass." RSC Adv. **2015**, 5, 100762-100768.
12. **Nisha Shankhwar**, G.P. Kothiyal, A. Srinivasan. "Understanding the Magnetic Behaviour of Heat Treated CaO-P2O5-Na2O-Fe2O3-SiO2 Bioactive Glass Using Electron Paramagnetic Resonance Studies." Physica B: Condens. Matter **2014**, 448, 132-135.
13. **Nisha Shankhwar**, R.K. Singh, G.P. Kothiyal, A. Perumal, A. Srinivasan. "Evolution of Magnetic Properties of CaO-P2O5-Na2O3-Fe2O3-SiO2 Glass upon Heat Treatment." IEEE Trans. Magn. **2013**, 50, 4003504-4003509.

Book Chapters in International Books

1. **Nisha Shankhwar**, A. Unal, S. Singh. Nanomedicine in Patient-Specific Clinical Trend: Shape Memory Polymers for Emerging Biomedical Applications and Their Future Prospects. In Nanomedicine in Translational Research: Status and Future Challenges; ***Academic Press, Elsevier***, **2024**. ISBN: 978-0443222573.
2. **Nisha Shankhwar**, P. Singh, J. Thomas, S. Singh. Nanocomposites as Smart Nanomaterials for Photodegradation of Micro and Nano-plastics. In Emerging Materials for Photodegradation and Environmental Remediation of Micro- and Nano-Plastics, ***Springer Nature***, **2024**.
3. **Nisha Shankhwar**, P. Singh, J. Thomas, M. R. Ray, S. Singh. Emerging Strategies for Electroceramic Preparation: Contemporary Methods and Novel Techniques. In Defects Engineering in Electroceramics for Energy Applications; ***Springer Nature***, **2024**.
4. P. Singh, **Nisha Shankhwar**, S. Singh. Role of Electroceramics in Renewable Energy Technology. In Defects Engineering in Electroceramics for Energy Applications, ***Springer Nature***, **2024**.
5. **Nisha Shankhwar**, A. Unal. Advancing Mental Healthcare: AI-Driven Tools, Clinical Integration, Challenges, and Future Directions. In Artificial Intelligence and BCIs in Healthcare, ***Academic Press, Elsevier***, **2024**. ISBN: 978-0443264665.
6. **Nisha Shankhwar** P. Saha, M. Z. Mortka, S. Thomas, A. Unal. Tissue Engineered Products-Translational Avenues. In Tissue Engineering: Current Status and Challenges; ***Academic Press, Elsevier***, **2023**. ISBN: 978-0128240649.
7. **Nisha Shankhwar**, K. Sharma, G. P. Kothiyal, A. Srinivasan. Bioactive Glass Glass-Ceramics Containing Iron Oxide: Preparation and Properties. In Trends in Biomaterials; ***Pan Stanford Publishing***, **2016**. ISBN: 978-9814613996.

Conferences and Workshop Participation:

- "Symposium-cum-Workshop on 3D Bioprinting and its Biomedical Applications", in association with DST-AMITY & Cancer Research & Care Academy (CRCA) at the School of Life Sciences, Jawaharlal Nehru University, New Delhi, India, scheduled on 15th March 2024.
- "8th Hands-on Workshop for Handling and Care of Laboratory Animals" in association with Cancer Research & Care Academy (CRCA) at the School of Life Sciences, Jawaharlal Nehru University, New Delhi, India, scheduled from 28th Nov-2nd Dec 2023.
- Advanced Biomaterials and Characterization Techniques, Vijayawada, Andhra Pradesh, India (2017)
- International Conference of the Asian Union of Magnetic Societies, Haikou, China (2014)
- International Conference on Emerging Materials Characterization & Applications, Kolkata, West Bengal, India (2014)
- First Symposium on Advanced Sustainable Polymers, Guwahati, Assam, India (2014)
- International Conference on Materials Science, Agartala, Tripura, India (2013)
- Condensed Matter Days, Ranchi, Jharkhand, India (2012)

Awards and Honors:

- Invited Speaker on "Insight into Material Characterizations" at BIT Sindari, Jharkhand, India (2024)
- Invited Speaker at the 3rd International Conference on Data Science & Big Data Analysis (IDBA-ACMWIR-2023), held on 16-17 June 2023, organized by Sri Aurobindo Institute of Technology, in association with UNESCO Chairs Program, IEEE Computer Society, Indore Chapter.
- Department of Biotechnology Research Associate Post Doctoral Fellowship (DBT-RA) from the Ministry of Science and Technology, Government of India (2023)
- Keynote Speaker and Session Chair at the First International Conference on Women in Multifaceted Research (ICWMR) (2021).
- Invited speaker at the First International Conference for Women in Multifaceted Research (ICWMR) (2021).
- GATE Fellowship from the Ministry of Human Resource Development, Government of India (2010).
- Invited Speaker at Siddhant College of Engineering, Pune, Maharashtra, India (2017).
- Silver Medal, C S J M University Kanpur, India (June 2009).

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References

- **Prof. Ananthakrishnan Srinivasan**

  Director, Central Institute of Technology, Kokrajhar

  Address: Director, Central Institute of Technology, Kokrajhar, Rangalikhata, Dist: Kokrajhar BTAD, Assam - 783370, India

  Email (official): asrini@iitg.ernet.in

  Email (personal): asrini2007@gmail.com

  Broad Subject Area: Physical Sciences

- **Dr. Satyendra Singh**

  Professor and Chairperson, Special Centre for Nanoscience Country: India

  Address: Professor and Chairperson, Special Centre for Nanoscience, Jawaharlal Nehru University, New Delhi, Delhi - 110067, India

  Email (official): satyambd@gmail.com

  Email (personal): satyendra@mail.jnu.ac.in

  Broad Subject Area: Physical Sciences

- **Dr. Aynur Unal**

  Visiting Professor, Department of Mechanical Engineering, Indian Institute of Technology Guwahati, Assam, India

  Address: Visiting Professor, Department of Mechanical Engineering, Indian Institute of Technology Guwahati, Assam, India

  Member of the Executive Team, Stanford University, San-Francisco.

  https://www.digitalmonozukuri.net/

  Email: aynurunal@alumni.stanford.edu

  Phone: +1-650-847-5605