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Department of Plastic Technology
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Educational Details

- **P.h.D. (Materials Science and Engineering), IIT Kanpur- 2026**
Effect of Carbonaceous Nanofiller Morphology and Functionalisation on Mechanical, Tribological, and Biological Performance of Ultra High Molecular Weight Polyethylene.
- **M.Tech (Materials Science and Engineering), IIT Kanpur- 2019**
Effect of Carbon Nanotubes and Graphene Reinforcement on Spark Plasma Sintered Hydroxyapatite-Based Biocomposites.
- **B.Tech (Plastic Technology), Central Institute of Plastic Engineering and Technology, Lucknow-2016**

Publications

1. **P. Rani**, I. Singh, D. Khare, and K. Balani, “Carbon nanotube functionalization supports mechanical, tribological, and biological response of freeze-dried ultra-high molecular weight polyethylene-based bio-composites,” *J Appl Polym Sci*, vol. 141, no. 42, Nov. 2024, doi: 10.1002/APP.56096.
2. I.Singh, K.Shakya, P.Gupta, **P.Rani**, K. Balani “Multifunctional 58S Bioactive Glass/Silver/Cerium Oxide-Based Biocomposites with Effective Antibacterial, Cytocompatibility, and Mechanical Properties,” *ACS Appl Mater Interfaces*, vol. 16, no. 15, pp. 18327–18343, Apr. 2024, doi: 10.1021/ACSAMI.3C17400.
3. R. Maurya, P. K. Katiyar, P. C. Yadav, and **P. Rani**, “Influence of pulse frequency on microstructure, mechanical properties, and corrosion resistance of electrodeposited Ni-SiC composite coatings,” *Mater Today Commun*, vol. 40, Aug. 2024, doi: 10.1016/j.mtcomm.2024.109977.

4. S. Ariharan, M. Parcoviansky, P. Singh, **P. Rani**, “Hot Corrosion Behavior of La₂Ce₂O₇-Based Plasma-Sprayed Coating,” *High Temperature Corrosion of Materials*, vol. 101, no. 4, pp. 779–788, Aug. 2024, doi: 10.1007/S11085-024-10244-Z.
5. D. Phogat, **P. Rani**, A. Biswas, K. Balani, and S. Awasthi, “Architecturally Refined Cerium-Integrated Hydroxyapatite/CNT Nanocomposite Coatings: Enhanced Mechanics and Biofunction for Orthopaedic Implantation,” *Macromol Biosci*, Dec. 2025, doi: 10.1002/MABI.202500384.
6. D. Phogat, **P. Rani**, A. Biswas, K. Balani, and S. Awasthi, “Engineering double-layered hydroxyapatite/polyvinyl alcohol-ceria composite coatings for potential orthopaedic applications,” *Int J Biol Macromol*, vol. 332, Dec. 2025, doi: 10.1016/j.ijbiomac.2025.148629.
7. S. P. Singh, **P. Rani**, and K. Patra, “Bioinspired micro-texturing of Ti-6Al-4V for enhanced tribological, cytocompatibility, and antibacterial performances,” *J Mater Sci*, Dec. 2025, doi: 10.1007/S10853-025-11958-4.

Book Chapter

Mistri, M., Gour, S., Bhadauria, A., Vijay, K., Ariharan, S., Hassan, R., **Pooja Rani**, Tiwari, A., Keshri, A. K., Balani, K. *Fundamentals of Thermal Spraying. Case Study*. CRC Press, Taylor & Francis, November 2022. ISBN: 9781032344003.

Conferences

International Conferences

1. **Pooja Rani**, Deepak Khare, Kantesh Balani “Long and short Carbon nanotube induced cytocompatibility and mechanical behaviour of Ultra High Molecular Weight Polyethylene” in *TMS Annual Meeting & Exhibition at Las Vegas, Nevada, USA, March. 23-27, 2025*.
2. **Pooja Rani**, Priya Singh, Kantesh Balani “Impact of adding carbonaceous reinforcement (1D-CNT and 2D-graphene) on UHMWPE's tribological and cytocompatible characteristics” *GLOW, Global Conference for Women Leaders and Emerging Researchers in Materials Science, Nanyang Technical University, Singapore, 29 Sept-1 Oct, 2025*.

National Conferences

3. **Pooja Rani**, Kantesh Balani, “Influence of Carbon Nanotube Length on the Tribological Properties and Cytocompatibility of Ultra-High Molecular Weight Polyethylene” in *Bioheal-2025, IIT Roorkee, India, Oct. 27-30, 2025*.
4. **Pooja Rani**, Kantesh Balani, “Effect of Carbon nanotube and Graphene Addition on Mechanical and Tribological Properties of Ultra High Molecular Weight Polyethylene” in *India-Trib, Kolkata, India, Dec. 19-21, 2024*.
5. **Pooja Rani**, Indrajeet Singh, Deepak Khare, Kantesh Balani, “Effect of Carbon Nanotubes Functionalization on Mechanical, Tribological, and Biological Response of Ultra-High Molecular Weight Polyethylene-based Bio-Composites” in *International Conference on Polymer for Advanced Technology, Jaipur, India, Oct.16-18, 2024*.
6. **Pooja Rani**, Kantesh Balani “Spark Plasma Sintered Hydroxyapatite Carbon Nanotubes based Composites: Effect of Carbon Nanotubes Length and Functionalisation on Improved Mechanical Properties and Protein Adsorption” in *NSRS, 2024 at Indian Institute of Technology Kanpur, Kanpur, India, March. 9-10, 2024*.
7. **Pooja Rani**, Kantesh Balani “Effect of Carbon Nanotubes and Graphene Reinforcement on Spark Plasma Sintered Hydroxyapatite based Biocomposites” at *ATM-NMD 2022, Ramoji Film City, Hyderabad, India, Nov.14-16, 2022*.

Awards / Scholarships /Achievements

- **MHRD Fellowship** (5 consecutive years, Ph.D.)
- **GATE 2017:** AIR 117 (XE – Engineering Sciences)
- Awarded with the most prestigious travel fund by “**ANRF International Travel Support (2025)**” –for oral presentation of research at **The Minerals, Metals & Materials Society (TMS) Annual Meeting 2025**, Las Vegas, USA.
- The research work has been featured as the front cover of the **Wiley journal Macromolecular Bioscience** (Issue 12/2025)
<https://onlinelibrary.wiley.com/toc/16165195/2025/25/12>.

Academic and Professional Service

- **Book Chapter Reviewer, Taylor & Francis** — “*Point-of-Care Quantum Dots-Based Immunosensing*” (2024)
- **Evaluator, Regional Level 30th (2022) and 31st (2023) National Children’s Science Congress (NCSC)** (KVS Lucknow Region), KV IIT Kanpur, India (2022)

Technical Expertise

- **Processing:** Compression Molding, Hydraulic Press
- **Characterisation:** FESEM, DSC, XRD, Contact Angle, 3D Optical Profilometry
- **Spectroscopy:** Raman, & FTIR Spectroscopy
- **Biological:** Cell Culture and Bacteria Culture
- **Mechanical and Tribological Property Evaluation**
- **Software:** OriginPro, SPSS, ImageJ, Xpert Highscore.

I hereby declare that the details stated above are true and correct to the best of my knowledge.

Rooja.