Kalpana Kumari

Ph.D. (PRIME MINISTER'S RESEARCH FELLOW)
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Ever since I was a young girl, I've had a passion for science. I believe in power of science, whether that means formulation designs or process technology. I keep my passion for science and technology at front and center. I am on constant focus on to sharpen the scientific acumen, collaborate with experts in the field, and advance competently as a researcher contributing back to society.
My strengths are R&D, Bionanocatalysis, Supramolecular chemistry, Peptide chemistry, Hydrogels, Communication, Interpersonal and organizational skills.

Education

Indian Institute of Technology (IIT) Guwahati — *Guwahati, India*
July 2019 - Present

- Ph.D. research scholar in the Department of Biosciences and Bioengineering at Indian Institute of Technology (IIT) Guwahati with 9.0/10 CGPA. I am a recipient of the prestigious Prime Minister's ResearchFellowship (PMRF), awarded to the country's excellent doctoral candidates for pursuing their research. **I am expected to complete Ph.D. in July 2024.**
- My dissertation is structured around mimicry of enzyme active site.
- My work is focused on mimicking the active site of two catalytic systems, Human carbonic anhydrase II and Serine protease. We have designed peptides based on already established concepts of rational peptide design, supplemented by automated design tools. They are synthesized using Solid Phase Peptide Chemistry and characterized by High Performance Liquid Chromatography and Mass Spectrometry. In subsequent stage, the designed peptides will be experimentally tested for their efficacy and selectivity in catalyzing reactions of industrial significance, especially at different temperature and pH conditions. The construction of 'molecular mimics' for all two molecular model systems for two distinct reactions is the core objective of this study.

Indian Institute of Technology (IIT) Indore — *Indore, India*
July 2017 - July 2019

- Master's in the Department of Biosciences & Biomedical Engineering with 8.81/10 CPI.
- Dissertation research project on "Polypeptide based Nanoparticles for Photothermal Therapy of cancer".
- Completed Dissertation project with AA grade 10/10 CPI.
- Received Merit-cum-Means (MCM) scholarship (2017-2019).

Ranchi Women's College (Ranchi University) — *Ranchi, India*
July 2014 - July 2017

- Bachelor's in the Department of Biotechnology with 81.69%.
- Dissertation project on "Studies on In-vitro Regeneration and Callus induction in *Pisum sativum* and *Cajanus cajan*".
- Received prestigious Prime Minister Scholarship (PMSS) from Kendriya Sainik Board (2014-2017).

Research Interests

- Supramolecular Chemistry
- Peptide Chemistry
- Bio-nanotechnology
- Functional Biomaterials
- Hydrogels
- Enzyme mimicry
- Bio-nano catalysis
- Drug Design and Therapeutics
- Animal Diseases

Achievements

2020-Pres **Prime Minister's Research Fellow (PMRF)**, I have received the prestigious Prime Minister's Research Fellow honour, awarded to outstanding doctoral candidates of the country.

2019-2020 **IIT Guwahati MHRD Fellowship**, Department of higher education, Ministry of Human Resource Development (MHRD) awarded the scholarship to pursue high impact research.

2019 **AIR 340 in GATE**, secured AIR 340 in Graduate Aptitude Test in Engineering in Life Sciences (XL) subject.

2017-2019 **MCM Scholarship**, Received Merit-cum-Means scholarship for all the two years during MSc course at IIT Indore.

2019 **Best Poster Presentation Award**, received best poster presentation award (M.Sc.) in 1st In-house Symposium on Advances in Biosciences and Bioengineering at IIT Indore.

2017 **AIR 25 in IIT JAM**, secured AIR 25 in IIT-JAM (Joint Admission Test for M.Sc.) in Biotechnology (BT) subject.

2014-2017 **Gold Medalist in B.Sc.**, Received Gold Medal in Bachelor's for securing highest percentage in B.Sc. Biotechnology.

2014-2017 **PMSS Scholarship**, Received prestigious Prime Minster Scholarship from Kendriya Sainik Board for excellence performance for all the three years during B.Sc. course at Ranchi Women's College.

2011-2012 **2nd School Topper in 12th Standard**, secured 2nd rank (87.5%) in 12th standard in Science stream at Kendriya Vidyalaya Dipatoli Ranchi.

2009-2010 **2nd Topper in 10th Standard**, secured 2nd rank (9.4/10 CGPA)in 10th standard at Kendriya Vidyalaya Dipatoli Ranchi.

Workshop/Seminar/Conference

- Attended workshop on "Nuclear Magnetic Resonance: Techniques and its Applications" organized by North East Centre for Biological Sciences and Healthcare Engineering, IIT Guwahati. (August 23-24, 2021)
- Attended workshop on "Scanning Electron Microscopy: Techniques and its Applications" as part of Azadi ka Amrit Mahotsav organized by North East Centre for Biological Sciences and Healthcare Engineering, IIT Guwahati. (July 29-30, 2021)
- Attended workshop on "3D Printing: Techniques and their Application in Biomedical Devices" organized by North East Centre for Biological Sciences and Healthcare Engineering, IIT Guwahati. (July 15, 2021)
- Attended Young Scientist's Conference organized as a part of India International Science Festival-2020 by Ministry of Science and Technology, Ministry of Earth Sciences and Ministry of Health and Family Welfare, Govt. of India. (December 22-24, 2020)
- Attended Science leadership workshop organized by Central University of Punjab, Bathinda. (June 22-28, 2020)
- Volunteered 6 days active learning course on "Tools and Techniques in Drug Design, Discovery and Delivery". (March 4-9, 2019)
- Poster presented in 1st In-house Symposium on Advances in Biosciences and Bioengineering at IIT Indore. (February 23, 2019)
- Attended Seminar on Zika virus replication and pathogenesis by Dr. Asit K. Pattnaik from the University of Nebraska Lincoln, USA. (July 6, 2018)
- Volunteered in Symposium on "Water: Resources, challenges, and Sustainability (WRCS)" at IIT Indore by Prof. Eric D. van Hullebusch, IHE-Delft Institute for Water Education, Netherlands. (March 10, 2018)
- Volunteered in International symposium on "Emerging areas in Biosciences and Biomedical Technologies (eBBT) at IIT Indore. (January 5-6, 2018)

Teaching

TEACHING ASSISTANT

2021 **Monsoon semester: Jul-Dec 2021**, BT 501 Biotechniques

2021 **Winter semester: Jan- May 2021**, BT 601 Analytical Biotechnology

2020 **Monsoon semester: July- Dec 2020**, BT 305 Computational Biology

Publications

- Sasidharan, S., Sreedhar, R., Ghosh, S., Kumari, K., Thota, S., & Ramakrishnan, V. (2021). Anisotropic Ferromagnetic Organic Nanoflowers. *ACS Applied Nano Materials*. (Under review)
- Kumari, K., & Ramakrishnan, V. Synthesis and Conformational Characterization: Solid phase peptide synthesis, CD spectroscopy, FTIR. *Springer protocol.* (Under preparation)
- **RSC Advances**, Anshu Kumari, **Kalpana Kumari** and Sharad Gupta **(2019)**
  Kumari, A., Kumari, K., & Gupta, S. (2019). The effect of nanoencapsulation of ICG on two-photon bioimaging. *RSC advances*, 9(32), 18703-18712.
- **Scientific Reports**, Anshu Kumari, **Kalpana Kumari** and Sharad Gupta **(2019)**
  Kumari, A., Kumari, K., & Gupta, S. (2019). Protease Responsive essential Amino-acid Based nanocarriers for near-infrared imaging. Scientific Reports, 9(1), 1-12.

Technical Skills

- Atomic Force Microscopy
- Field Emission Scanning Electron Microscopy
- High Performance Liquid Chromatography
- Fourier Transform Infrared Spectroscopy

- Mass Spectrometry
- Solid Phase Peptide Synthesis
- UV-vis Spectroscopy
- Fluorescence Spectroscopy
- Electron Paramagnetic Resonance Spectroscopy

Soft Skills

- Perseverance
- Critical Thinking
- Problem Solving
- Teamwork

Personal Information

- **Date of Birth :** 28 February 1995
- **Gender :** Female
- **Nationality :** Indian
- **Language :** Hindi, English