SOUMYA RANJAN PUJAHARI

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NMR based structural Biology, Department of Biosciences and Bioengineering

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Education

Program	Institution/Board	Marks(%)	Year
Ph.D. (Biomedical Engineering)	Indian Institute of Technology Bombay *Mumbai, Maharashtra*	**9/10**	2020-Present
Master of Science (Biotechnology)	Central University Of Hyderabad *Hyderabad, Telengana*	**84%**	2019
Bachelor of Science (Biotechnology)	Central University Of Rajasthan *Ajmer, Rajasthan*	**74%**	2017
Higher Secondary Education (Physics,Chemistry,Mathematics,Biology, English)	Jawahar Navodaya Vidyalaya *Boudh, Odisha*	**80%**	2013
Secondary Education	Jawahar Navodaya Vidyalaya *Boudh, Odisha*	**95%**	2011

Accomplished Ph.D Projects :supervisor;Prof.Ashutosh Kumar(IIT Bombay), co-supervisor; Dr.Navratna Vajpai(Biocon Biologics Limited, Bangalore)

1. ***Project 1***

Combined Liquid-State and Solid-State Nuclear Magnetic Resonance at Natural Abundance for Comparative Higher Order Structure Assessment in the Formulated-State of Biphasic Biopharmaceutics

A combination of 1D 1 H liquid NMR and 1D 13 C CP-MAS NMR experiments is an elegant tool to compare the Higher Order Structure and dynamics of the biphasic/microcrystalline drug in its formulated states. Followed by Principal Component Analysis and Mahalanobis distance can provide quantitative assessment.

2. ***Project 2***

Exploring Higher Order Structure and Conformational transitions of Insulin Microcrystalline Biopharmaceuticals by Proton-Detected Solid-State NMR spectroscopy in its formulated state

A novel selective excitation scheme using fast-magic angle spinning (MAS), proton detection, and non-uniform sampling (NUS) improves sensitivity and resolution in 2D NMR spectra of microcrystalline Biopharmaceuticals at natural abundance. This approach enables meticulous examination of biopharmaceutical suspensions in their native form, previously unachievable.

3. ***Project 3***

Pattern Recognition and NMR aided HOS analysis for Structural similarity of Biological Drugs

Nuclear Magnetic Resonance (NMR) reveals high-resolution structural details of biologic drugs, but increased molecular size and formulation complexity pose challenges for manual analysis. To address this, we employ a combined approach integrating NMR with image-based machine learning algorithms. This method enhances comparability of critical quality attributes for biological drugs, offering a robust solution to navigate the intricacies of complex NMR data.

Research Article/Patent

- Combined Liquid-State and Solid-State Nuclear Magnetic Resonance at Natural Abundance for Comparative Higher Order Structure Assessment in the Formulated-State of Biphasic Biopharmaceutics

Analytical Chemistry, *https://doi.org/10.1021/acs.analchem.2c05485* ***(Cover article)***

- Exploring Higher Order structure and conformational transitions in Insulin microcrystalline Biopharmaceuticals by proton-detected solid-state NMR

Analytical Chemistry, *https://doi.org/10.1021/acs.analchem.3c04040* ***(Cover article)***

- Structural Similarity of Biological Drugs using Statistical Signal Processing and Nuclear Magnetic Resonance Spectral Pattern Analysis

(Paper Submitted)

- ***(Indian Patent-applied)***-Pattern Recognition and NMR aided Higher Order Structure similarity analysis of Biological Drugs.

Undergrad Projects

1. *Project 1* **Jul 2018-Apr 2019**

(M.Sc / Faculty: Dr. N Prakash Prabhu) *University Of Hyderabad*

- **Ethylene Glycol Induced Conformational Changes in Proteins at Sub-Zero Temperature.**

Glycerol is a known Protein Stabilising co-solvent at both heat and freezing conditions. Ethylene glycol only having a functional group less than glycerol shows peculiar behaviour towards the protein stability. Unlike Glycerol it stabilises at sub-zero temperature and Destabilises at heating condition.

2. *Project 2* **May-July 2018**

(Summer Internship / Faculty: Dr. Muruga Poopathi Raja) *Madurai Kamaraj University*

- **solid phase peptide syntesis**

Temporin based peptide was synthesised by solid phase peptide synthesis and its properties were investigated

3. *Project 3* **Jan-May 2017**

(B.Sc/ Faculty: Dr. Pankaj Goyal) *Central University Of Rajasthan*

- **Sphingosine Kinase gene expression analysis in Ovis aries endometrial tissue.**

Sphingosine Kinase gene expression analysis in Ovis aries endometrial tissue

Relevant Courses

- Biochemistry Molecular Biology
- Immunology
- Structural Biology
- Quantum Chemistry
- Biostatistics
- Animal Physiology
- Nanotechnology
- Genetic Engineering
- Biotechnology
- Bioinformatics and Computational Biology
- Evolutionary Biology
- Thermodynamics and Electrochemistry
- Bio-entrepreneurship
- Microbiology
- Cell Biology
- Genetics
- Organic Chemistry
- Inorganic Chemistry
- Plant Physiology
- Endocrinology
- Developmental Biology
- Mathematical Methods For Chemists
- Enzymology
- Advanced Molecular Biology
- Immune Regulation

Experimental Techniques

- **Solution state NMR**
- Mass Spectrometer
- Analytical Ultracentrifugation
- UV-Vis Spectroscopy
- DNA Extraction and Amplification
- SDS-PAGE
- CD Spectroscopy
- Protein Crystallisation
- **Solid State NMR (1.9 mm probe, 3.2 mm probe)**
- HPLC
- Protein Purification
- DNA Gel Electrophoresis
- Microbial Culture Techniques
- Recombinant DNA Technology
- Fermentation

Technical Skills

- Basic Knowledge: LATEX
- Intermediate knowledge: MATLAB, AutoDock

Achievements/Awards

- Successfully qualified Science Olymiyad (2008-2009)
- Successfully qualified CSIR-JRF (DEC-2018), Rank-53
- Successfully qualified GATE (FEB-2019), Rank-219
- Received NMRS,India Travel Grant, 2022
- Presented Round Table Talk at Alpine Conference on Magnetic Resonance in Solids,Chamonix-France, 2022
- Best Research Poster Award at Biosimilar workshop, 2023 (2-3 feb, ICT Mumbai)
- Presented Poster at IITB Biopharma summit, 2023 (23-24 nov, IIT Bombay)
- Presented Oral talk at SCANMR, 2024 (2-5 feb, CBMR Lucknow)

International Conference/Workshop

- A hands-on workshop on "Solid-state NMR methods for pharmaceutical formulations": Date : 30 Aug-02 Sep 2022 | Venue : The École polytechnique fédérale de Lausanne is a public research university in Lausanne (EPFL), Switzerland.
- Alpine Conference on Magnetic Resonance in Solids: Date : 04-08 Sep 2022 | Venue : Chamonix-Mont-Blanc, France.

National Conference/Workshop

- Biosimilar Workshop, Date : 2-3 February 2023 | Venue : Novotel Goa Dona Sylvia Resort
- IITB Biopharma summit, Date : 23-24 November 2023 | Venue : VMCC, IIT Bombay, Powai
- SCANMR, Date : 2-5 February 2024 | Venue : CBMR, SGPGIMS campus, Lucknow

Others

- Hobbies: Travelling, Cricket, chess, Exploring new culture
- Languages: Oriya, Hindi, English,

Declaration

I do hereby declare that all the details furnished above are true to the best of my knowledge and belief.

Place: Mumbai, Maharashtra (India) (Soumya Ranjan Pujahari)
Date: 16th July, 2024

Note: Highlighted are link to proofs and validation (if required).