

# RITHWIK PREMOD NAMBIAR

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## Research Focus

- Biological Data Scientist applying machine learning and deep learning to decode complex cellular and molecular processes.
- Experienced in integrating single-cell transcriptomics, proteomics, and experimental data.
- Focused on uncovering mechanisms of mitochondrial function, protein localization, and cellular dynamics.

## Education

**Indian Institute of Science Education and Research (IISER), Tirupathi** 2024–2025  
*Professional Master's in Biological Data Science* CGPA: 9.7/10

**Indian Institute of Science Education and Research (IISER), Thiruvananthapuram** 2016–2021  
*BS-MS Dual Degree in Biological Sciences with Minor in Chemical Sciences* CGPA: 8.10/10

**Kendriya Vidyalaya East Hill, Kerala** 2015–2016  
*All India Senior School Certificate Examination* 93.8/100

## Research Experience

**Classifying Mitochondrial Dysregulation in Single Cells using ML** Mar 2025–May 2025  
*Supervisor: Dr. Rajashekar Varma* IISER Tirupati

- Built transcriptome-based machine learning models to classify mitochondrial health in single cells.
- Identified top genes contributing to dysfunction and analyzed associated pathways.
- **Techniques:** Seurat, scikit-learn, R, Python.

**Protein Subcellular Localisation Predictor** Feb 2025–May 2025  
*Supervisor: Dr. Debasish Koner* IISER Tirupati

- Developed a deep learning tool to predict protein subcellular localisation from amino acid sequences.
- Compared protein language models: ESM2, ProtBert, ProtT5 to select the best-performing model.
- **Techniques:** TensorFlow, scikit-learn, Python.

**Temporal Dynamics of OXPHOS Complex Assembly** Mar 2022–Jul 2023  
*Supervisor: Dr. Evgeny Onishchenko* University of Bergen, Norway

- Studied assembly dynamics of OXPHOS complexes in *Saccharomyces cerevisiae* using biochemical and imaging approaches.
- Served as Teaching Assistant for Structural Molecular Biology (MOL 310) and Lab Courses (MOL 222, MOL 300).
- **Techniques:** Yeast culture, yeast genetics, molecular cloning, Western blotting, affinity purification, microscopy, immunofluorescence, mammalian cell culture, image analysis.

**Role of CARP2 in Mitophagy** Aug 2020–May 2021  
*Supervisor: Prof. Srinivasa Murty Srinivasula* IISER TVM, Kerala

- Investigated CARP2, an endosome-associated E3 ubiquitin ligase, in the clearance of defective mitochondria from cells.
- Automated mitochondrial quantification using ImageJ macros under stress conditions (CCCP treatment).
- **Techniques:** Molecular cloning, PCR, Western blotting, immunofluorescence, microscopy, mammalian cell culture.

**Phase Separation of Tau Protein Repeat Sequences** Jan 2020–Jul 2020  
*Supervisor: Dr. Vinesh Vijayan* IISER TVM, Kerala

- Studied the propensity of different Tau repeat sequences to undergo liquid-liquid phase separation under varying biochemical conditions.
- Characterized the influence of ionic strength, pH, and protein concentration on phase separation, providing insights into aggregation-prone regions.
- **Techniques:** Protein expression and purification, in vitro phase separation assays, fluorescence microscopy, Western blotting.

**Characterization of RNF167 Isoforms** May 2019–Mar 2020  
*Supervisor: Prof. Srinivasa Murty Srinivasula* IISER TVM, Kerala

- Identified and characterized naturally occurring and tumor-associated isoforms of the E3 ubiquitin ligase RNF167.

- Analyzed isoform-specific effects on lysosomal exocytosis and plasma membrane repair, with findings published in *Journal of Cell Science*, 2020 (DOI).
- **Techniques:** Molecular cloning, PCR, Western blotting, microscopic image analysis, in vitro ubiquitination assays.

## Other Projects

2017–2018

- Literature review on Hematopoietic Stem Cells in Aorta-Gonad-Mesonephros region (Supervisor: Dr. Satish Khurana).
- Laser Physics lab assistance for undergraduate experiments (Supervisor: Dr. V K Unnikrishnan, MAHE, Karnataka).

## Skills

- **Experimental:** Molecular Biology (Molecular Cloning · DNA/RNA Isolation · Protein Purification · Western Blotting · Affinity Purification) · Microscopy and Imaging (Fluorescence Microscopy · Immunofluorescence) · Cell Biology (Yeast Genetics · Yeast/Mammalian Cell Culture)
- **Programming:** Python · R · Bash · MATLAB · Perl
- **Computational:** Machine Learning · Deep Learning · Bulk and Single-Cell RNA-seq Analysis · Proteomic and Metabolomic Analysis
- **Packages/Libraries:** Seurat · Monocle · Tidyverse (R) · PyTorch · scikit-learn · TensorFlow
- **Software/Platforms:** PyMOL · Chimera · Gromacs · VMD · Cytoscape · ImageJ · RStudio · Google Colab · Visual Studio Code · Blender
- **Systems & Environment:** Unix/Linux (command-line · Bash scripting) · HPC (PBS) · Git · Conda · Snakemake

## Honours and Awards

### INSPIRE Fellowship

2016–2021

*Department of Science and Technology (DST), India*

- Awarded by DST, India to top 1% students in senior secondary exams.

### CSIR NET Life Sciences

Dec 2020

*Council of Scientific and Industrial Research (CSIR)*

- Qualified for Lectureship/Assistant Professorship with All India Rank 29.

## Publications

### Journal of Cell Science

June 2020

DOI: 10.1242/jcs.239335

- Nair SV, Narendradev ND, **Nambiar RP**, Kumar R, Srinivasula SM. Naturally occurring and tumor-associated variants of RNF167 promote lysosomal exocytosis and plasma membrane resealing. *J Cell Sci.* 2020;133(11):jcs239335. PMID: 32409562.

## Workshops and Conferences

### Frontier Symposium 2020

Jan 2020

*IISER Thiruvananthapuram*

### 5th Asia Pacific Drosophila Research Conference

Jan 2020

*IISER Pune*

### Biostatistics: A User's Perspective

Jul 2019

*IISER Pune*

## Extracurricular

- Recipient of Sports Citation Award, IISER TVM; captained college football team.
- Head of Organisation for Annual Sports Meet 2018; active member of Science, Cultural, and Sports Councils.
- Won Silver in football at 6th Inter-IISER Sports Meet, Mohali, 2017.

## Referees

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**Prof. Srinivasa Murty Srinivasula**

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**Professor, IISER Thiruvananthapuram**

*Major Project Supervisor*

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**Associate Professor, IISER Thiruvananthapuram**

*Minor Project Supervisor*