

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 Cloning, Western Blotting, Protein Purification, Immunofluorescence, Fluorescence Microscopy, DNA/RNA isolation, Yeast Genetics, Yeast/Mammalian Cell Culture, Affinity Purification
- **Programming:** Python, R, Bash, MATLAB, Perl
- **Computational:** Machine Learning, Deep Learning, Bulk and Single-Cell RNA-seq Analysis, Proteomic and Metabolomic Analysis,
- **Tools/Packages:** Seurat, Monocle, Tidyverse (R), PyTorch, scikit-learn, TensorFlow, Pymol, Chimera, Gromacs, VMD, Cytoscape, ImageJ, Colab, RStudio
- **Systems & Environment:** Unix/Linux (command-line, Bash scripting, HPC job scheduling with PBS), Git, Conda

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

Prof. Srinivasa Murty Srinivasula

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Major Project Supervisor

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Minor Project Supervisor