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 to uncover 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*

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

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).

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**

Counsil 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 **Professor, IISER Thiruvananthapuram**

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