

ANANYA ARAVIND

2nd Year PhD Student

Life Science, IMCBio PhD Fellowship

University of Strasbourg, France

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Education

- **BS-MS Dual Degree | CGPA - 8.34 | 2019 - 2024**
IISER Thiruvananthapuram
- **Senior Secondary (Class XII) | Percentage - 94.4% | 2018 - 2019**
Chettinad Hari Shree Vidyalayam ISC School, Chennai

Research Experiences

Decoding the function of the enigmatic proteins C19ORF12 and Nazo in organelle biology and virus control - PhD 2024-2027

Guide - Fabien ALPY, Carine MEIGNIN, IISER TVM

- C19ORF12 and Nazo are evolutionarily conserved proteins that have been identified independently by unbiased genetic approaches for their roles in a neurodegenerative disease in humans and in antiviral immunity in the model organism Drosophila.
- Nazo has been identified as antiviral effector in Drosophila against Drosophila C virus (DCV) infection. Absence of Nazo results in higher viral RNA levels and increased production of infectious DCV particles.
- Conversely in humans, the homolog of Nazo, C19ORF12 is a small, ubiquitously expressed protein that localizes to mitochondria and endoplasmic reticulum (ER) membrane. Loss-of-function mutations in the C19ORF12 gene are known to cause a clinical subtype of neurodegeneration with brain iron accumulation (NBIA), characterized by brain iron deposits in basal ganglia, called mitochondrial membrane protein associated neurodegeneration (MPAN).
- Studies in both Drosophila and mammalian cells suggest that these proteins are involved in lipid metabolism. The goal of my project is to unite the findings made in flies and humans and to provide explanations for the connection of C19ORF12 and Nazo proteins to seemingly unrelated physiological functions.

Role of CARPs in Peroxisome Dynamics | Master Project | 2023 - Present

Guide - Prof. S Murty Srinivasula, LICB Lab, IISER TVM

- Use Live Cell Imaging to study the effect of CARPs' overexpression on morphology and the number of peroxisomes in HEK 293T and Hela Cells.
- Generated domain deletion constructs of CARP1 Variant 2 gene using the Overlap Extension PCR method.

Dynamics and organelles interplay in neuronal physiology | Master Project | 2023 - Present

Guide - Dr. Jean-Pierre Mothet, LuMIn Lab, ENS Paris-Saclay

- Used fixed cell immunostaining to study the changes in the positioning of peroxisomes and mitochondria in differentiated N2a cells and different pathological conditions of neurons such as mitochondrial damage by FCCP and reduced synaptic activity by neurotransmitter inhibitors.
- Hands-on expertise in cell culture and differentiation of N2a cells, fixed cell double immunostaining using the respective organelle markers and performing confocal microscopy.
- Analysis of quantitative and qualitative image data using ImageJ software.

Degradation of Carbon Nano-Onions by Human Myeloperoxidase and

Photo-Fenton Reaction | Minor Project | 2023

Guide - Dr. Rajendra Kurapati, Biomaterials Lab, IISER TVM

- Investigated the degradation of pristine CNO and oxidized CNO by human myeloperoxidase in the presence of hydrogen peroxide and using the Photo-Fenton reaction.
- Gained experience in using tools for the characterization of nanomaterials, such as High-resolution transmission Electron Microscope (HR TEM) imaging, Raman spectroscopy and High-Resolution Mass Spectrometry (HRMS).
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Duonco: A novel drug delivery System | iGEM Project | 2021-2022

iGEM (International Genetically Engineered Machine) 2022 Competition

- Contributed to ideating the project to express recombinant affinity proteins and incorporate them into outer membrane vesicles of *E. coli*, which can target cancer cells, thus creating a novel dual nanovesicle drug delivery system using bacterial outer membrane vesicles.
- Gained experience in scientific writing skills and effective science communication.

Publications

- Daniel, N. H., **Aravind, A.**, & Thakur, P. (2021). Are ion channels potential therapeutic targets for parkinson's disease? *NeuroToxicology*, 87, 243–257. <https://doi.org/10.1016/j.neuro.2021.10.008>
- K, S., Camisasca, A., Bartkowski, M., Garhwal, A., K, P., **Aravind, A.**, Giordani, S., & Kurapati, Dr. R. (2023). Biodegradability of Carbon Nano-Onions by Human Myeloperoxidase and the Photo-Fenton Reaction. <https://doi.org/10.26434/chemrxiv-2023-jqmbg> (Working Paper) K, S.,
- Lakavathu M, Sai Prasanth KRS, PR S., **Aravind, A.**, Parida, S., Divakaran, D., Easa, N., Mayilaadumveettil, N., Kurapati, R. Genetically Modified and Ultra-Processed Foods: Public concerns, Safety, Risks and Ethical analysis | Book : Sensor Technologies for Food Quality and Safety

Laboratory Experience

- **Molecular Biology Techniques:** Bacterial and mammalian cell culture, preparation of competent *E. coli* cells, Cloning of domain deletion constructs, Transfection of cells, Differentiation of N2a cells, Immunohistochemistry, Western Blotting, Viral Infection, Generation of stable cell lines

- **Cell Biology Techniques:**

Fixation and Immunostaining of N2a cells, Operating SP8 Leica Confocal microscope and Spling Disk for imaging and ImageJ for analysis of quantitative and qualitative image data

- **Chemistry:**

Familiar with High Resolution -Transmission Electron Microscope imaging, Raman Spectroscopy and High-Resolution Mass Spectrometry

Presentation

- Gave iGEM 2022 Project Presentation to public in Village Presentation in Grand Jamboree, Paris, France.
- Poster Presentation on PhD project at GERLI 20th LIPID MEETING “lipid in cell structures & metabolism”, Strasbourg, France

Academic Achievements

- Selected for ENS-IISER partnership programme for funded Master 2 Internship in ENS Paris-Saclay, France.
- Won Best Experimental Project with iGEM project Duonco in Global Open Genetic Engineering Competition (GOGEC) 2022.
- Nominated among top few teams (out of 355 teams) for Best Therapeutic project, Safety, Education and Inclusivity in iGEM 2022 competition.
- Secured 96.56 percentile and 202 AIR rank in Life science - CSIR NET exam and qualified for Junior Research Fellowship (JRF) and Eligible for Assistant Professorship in India.
- Secured Trichy District Topper in Class X ICSE Examination in 2017.

Extracurricular activities

- Speaker at “Career Paths and Success stories” Webinar at Alumni School Chettinad Hari Shree Vidyalayam conducted by Univariety.
- In-Person Judge for iGEM Giant Jamboree 2025
- Part of organizing team of the 2nd and 3rd Edition of the Annual Frontier Symposium in Biology 2022 and 2023, IISER Thiruvananthapuram, India.

Guided students for Vidyarthi Vigyan Manthan (VVM) camp in IISER TVM. As Education and outreach head of iGEM IISER TVM 2022 Team, conducted science camps, interviewed entrepreneurs, created synthetic biology related educational materials such as board game and informative booklets.

Wrote articles for Exhibit A, science monthly magazine of IISER TVM.

Participated in debate competitions as well as Model United Nations (MUN).

Personal Interests

- Scientific illustrator (Canva, BioRender, Sketchbook, Procreate) and practice different art forms such as face portraits and mandala.
- Design and Content creator for event social media handles.
- Interested in singing, dancing and a good carrom player

Language

- Proficient in English (TOEFL iBT Score: 103, 15.11.2023)
- Proficient in Hindi
- Conversant in Tamil (Native)
- Conversant in Malayalam

References

- **Dr. Fabien ALPY**
IGBMC, Strasbourg
Email : falpy@igbmc.fr
- **Dr. Jean-Pierre Mothet**
CNRS, ENS Paris-Saclay
Email : jean-pierre.mothet@universite-paris-saclay.fr
- **Dr. Carine MEIGNIN**
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