

ANTONY KIRAN KOLARIKKAL DAVID

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Education

- Aug 2018 – May 2023** **BS-MS Dual Degree (Specialized in Biology)**
INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH IISER PUNE, INDIA
- Introductory courses in all basic and applied disciplines of Biology, Chemistry, Physics, Mathematics, Earth and Climate Sciences, Humanities and Computation. During the first two years.
 - Advanced courses in Biochemistry, Developmental Biology, Structural biology, Advanced immunology, Scientific literature Review, Mathematical and Computational Biology, Evolution and Biology of Disease during my 3rd and 4th year
 - A yearlong master's thesis during the 5th year entitled “Visually guided behaviours in Zebrafish larvae and the role of Fmn2b” at the Neuronal Connectivity Laboratory, IISER Pune.
 - CGPA: 7.5 / 10
- Jun 2015 - Mar 2017** **HIGHER SECONDARY SCHOOLING-INTEGRATED SCIENCES STREAM (TECHNICAL)**
MODEL TECHNICAL HIGHER SECONDARY SCHOOL
- Board of Higher Secondary Examinations, Government of Kerala
 - Score: 95.2% (Percentage)
- Jun 2014 – Mar 2015** **SECONDARY SCHOOL LEAVING CERTIFICATE (SSLC)**
ST. PHILOMINA'S HSS
- General Education Department, Government of Kerala
 - Score: 98.8% (Grade point percentage)

Research Experience

- June 2023 – April 2024** **Project Assistant: IISER Pune**
Project: **Elucidating the mechanisms of neuronal homeostasis**
Supervisor: Prof. **Aurnab Ghose**, Division of Biology, IISER Pune
Understanding the role of microtubule post-translational modifications at the onset of chemotherapy-induced peripheral neuropathy (CIPN).
Designing and standardizing behavioural assays to probe neuronal developmental disorders in larval zebrafish and developing a computer-vision-based tracker for the analysis
- Outcomes:**
- Cloned murine alpha-tubulin and its $\Delta 2$ modified form in the pTRIP_CAG vector
 - Quantified mRNA levels of enzymes involved in microtubule PTMs
 - A custom setup to study behaviour and fear conditioning in larval zebrafish
 - fTracker: a computer-vision-based tool to track animal behaviour
 - A package for helping with manual tracking of animal behaviour
- May 2022 – May 2023** **Master's Thesis Student: Neuronal Connectivity Laboratory**
Project Title: **Visually guided behaviours in Zebrafish larvae and the role of Fmn2b**
Supervisor: Prof. **Aurnab Ghose**, Division of Biology, IISER Pune
- Outcomes:**
- StimUNO: a platform for automatic stimulation and behaviour recording for zebrafish larvae
 - A deep-learning-based model on SLEAP to track larval zebrafish movements
 - A flexible pipeline for larval zebrafish tracking and their analysis
 - Baseline analysis of various visually guided behaviours as a proof of concept of StimUNO
- Jan 2022 - Apr 2022** **Semester Project Student: Neuronal Connectivity Laboratory**
Project Title: **Modelling Neurodevelopmental disorders in zebrafish**
Supervisor: Prof. **Aurnab Ghose**, Division of Biology, IISER Pune
Involved in characterization of zKPTN protein in Zebrafish neural development by generating **conditional knockout** of kaptin using **CRISPR-Cas9 gene editing system**.

Aug 2021 – Feb 2022	<p>R&D intern: Curem Biotech LLP (Part-time)</p> <p>Project Title: In-Silico designing and optimizing Aptamers against bio markers for <i>Plasmodium falciparum</i> malaria</p> <p>Mentor: Prof. Saikrishnan Kayarat, Division of Biology, IISER Pune</p> <p>Outcomes:</p> <ul style="list-style-type: none"> • An in-silico pipeline for designing and optimizing aptamers (ssDNA/RNA) • An inventory of potential biomarkers against <i>P. falciparum</i> malaria • Involved in the initial phase of the R&D work for finding new leads for the project.
Aug 2021 – Jan 2022	<p>Semester Project Student: Computational Neurobiology Laboratory</p> <p>Project Title: Simulate computational models for Astrocyte-Neuron interaction</p> <p>Supervisor: Dr. Suhita Nadkarni, Division of Biology, IISER Pune</p> <p>Outcomes:</p> <ul style="list-style-type: none"> • Replicated a detailed biophysical model for calcium-dependent gliotransmitter release at a tripartite synapse which was developed in the lab (Pillai and Nadkarni, 2022).
May 2021 – June 2021	<p>Summer Intern: Weather, Climate and People</p> <p>Project Title: BharatSim for compartmentalized epidemiological modelling</p> <p>Supervisor: Dr. Joy Merwin Monteiro, Division of Earth, and Climate Science, IISER Pune</p> <p>A short-term project to learn about epidemiological modelling using BharatSim, a collaborative project between Ashoka University (Haryana, India) and Thoughtworks, funded by the Bill & Melinda Gates Foundation.</p> <p>Outcomes:</p> <ul style="list-style-type: none"> • Documented a tutorial for epidemiological modelling using BharatSim
Nov 2019 – Nov 2020	<p>Core Team member: iGEM IISER-Pune-India 2020</p> <p>Project title: Anopheles: The Half Blood Princess</p> <p>Advisor: Prof. Sanjeev Galande, Division of Biology, IISER Pune (currently on lien to Shiv Nadar University, Uttar Pradesh, India)</p> <p>Represented IISER Pune at the Giant Jamboree of the iGEM 2020 competition. Was part of the Dry Lab team and developed computational models of Novel peptides against Plasmodium falciparum malaria.</p> <p>Outcomes:</p> <ul style="list-style-type: none"> • A web scraper for mining the PDB database • Scripts for computational saturated mutagenesis, scoring of peptide interaction and analyzing MD simulations data • A method for homology-based modelling of circular peptides on MODELLER package • Documenting the project on the team wiki and GitHub; writing grant proposals
Dec 2019 – Feb 2020	<p>Winter Intern: Neuronal Connectivity Laboratory</p> <p>Supervisor: Prof. Aurnab Ghose, Division of Biology, IISER Pune</p> <p>A short internship to get familiarized with basic laboratory techniques and zebrafish handling for research purposes</p>

Awards & Fellowships

Mar 2022, National	<p>CSIR-Junior Research Fellowship (CSIR-JRF)</p> <p>Qualified in the National level entrance examination of Council of Scientific and Industrial Research (CSIR) for the Junior Research Fellowship (JRF) with all India Rank 183 for eligibility for lectureship and funded PhD and projects in Indian Universities.</p>
Mar 2022, National	<p>Graduate Aptitude Test in Engineering (GATE) – Life Science Stream</p> <p>Qualified in the National Level aptitude test in Engineering conducted jointly by the seven Indian Institute of Technology (IIT) and Indian Institute of Science (IISc), Bengaluru with all India Rank 1098 for eligibility into various master's and PhD programs in India and Recruitment into public sector companies.</p>
Nov 2020, International	<p>Gold Medal at the iGEM Competition 2020</p> <p>Represented IISER Pune at the International Genetically Engineered Machines (iGEM) competition, a synthetic biology expo organized by the iGEM foundation, and our team bagged the gold medal for satisfying the prescribed medal criteria.</p>
Nov 2020, International	<p>iGEMer's Award 2020</p> <p>Represented IISER Pune at the International Genetically Engineered Machines (iGEM) competition, a synthetic biology expo organized by the iGEM foundation and our team's project was voted the best project by all other competing teams.</p>

Conferences and Workshops

Feb 2023, <i>National</i>	No-Garland Neuroscience 2023 (NGN 2023) Attended this 3-day conference on Neuroscience.
Sep 2022, <i>National</i>	Indian Zebrafish Investigators Meeting 2022 (IZIM 2022) Attended this 3-day IZIM 2020 conference and was also part of the organizing committee.
Nov 2021, <i>National</i>	iGEM Indian Jamboree Meetup 2021 Attended this 2-day meetup at Goa and celebrated synthetic biology.
Nov 2020, <i>International</i>	iGEM Giant Jamboree 2020 Attended and presented the team project and won the gold medal for the project and iGEMer's award at this 10-day virtual event focused on synthetic biology along with an entrepreneur angle.
Jul 2020, <i>National</i>	All India iGEM Meet 2020 Attended this 2-day virtual meeting and presented our iGEM project.
Oct 2019, <i>National</i>	Robotics Workshop, IISER Pune Attended this 2-day workshop and learned the basics on using Arduino microcontroller.

Skills

Molecular Biology: RT-qPCR, Western Blot, Molecular Cloning

Primary Neuronal culture: Adult mouse DRG, Drug treatments, Immunofluorescence

Zebrafish handling: Embryo microinjection, Natural breeding, Maintenance of different transgenic and wild type lines, Genotyping, Restrained larval behavioural experiments, Free swimming larval behavioural experiments

Mouse Handling: DRG and Sciatic nerve dissection, Cardiac Perfusion, Euthanasia, Intra-peritoneal, sub-cutaneous and intra-muscular injections, Oral gavage

Bioinformatics: Homology-based 3D structure prediction of proteins, Computational saturated mutagenesis, Motif identification and inhibitor designing, Molecular dynamic simulations

Theoretical modelling: Numerical computation involving stochastic differential equations, Compartmental models, Epidemiological models, Spiking neuron models

Data science: Computer Vision for video analysis, Data handling (HDF5, CSV), Data visualization, Statistical analysis, Web scrapping

Programming languages: Python, C++, R, Scala, MATLAB, Arduino, Bash

Microscopy: Widefield epifluorescence microscopy, Confocal microscopy

Other computational skills: Experience with SLURM based supercomputing clusters, Knowledge of basic computer hardware, Parallelization of codes on supercomputing clusters, Automation of routine tasks, GitHub

Other technical skills: Soldering, Basic Electronic circuits

Soft Skills: Presentations, Scientific writing, Digital Illustration, Ability to work in a team, Project management, Familiarity with most online communication platforms

Professional Memberships

Dec 2021 - Present	Project Encephalon (PE) (International) Project Encephalon (PE) is an international, trainee-led non-profit, organization for neuroscience enthusiasts and conducts various academic and non-academic neuroscience-related activities
Dec 2020 – Present	iGEM community (International) iGEM Community has individuals who have gone through the iGEM Competition and more who have contributed to or participated in the efforts of iGEM.

Extra-curricular experience

Designer: Designed posters for various events in IISER Pune including TEDxIISERPune.

Hospitality volunteer: Volunteered for guest management during IISER Pune's Annual Fest.

Teaching volunteer: Actively volunteered to teach socio-economically disadvantaged children near the campus through the Abhyasika program. Involved in teaching basic Math and Science for them.

References

Prof. Aurnab Ghose, PhD

Professor
Division of Biology,
Indian Institute of Science
Education and Research (IISER)
Pune, India

Relationship: Master's Thesis
Supervisor and course coordinator
Email: aurnab@iiserpune.ac.in

Dr. Suhita Nadkarni, PhD

Associate Professor
Division of Biology,
Indian Institute of Science
Education and Research (IISER)
Pune, India

Relationship: Project Supervisor
and course coordinator
Email: suhita@iiserpune.ac.in

Dr. Nixon M Abraham, PhD

Assistant Professor
Division of Biology,
Indian Institute of Science
Education and Research (IISER)
Pune, India

Relationship: Thesis Advisory Committee
Member and course coordinator
Email: nabraham@iiserpune.ac.in

Links to Projects and Reports

Description	Link
fTracker	https://github.com/antonykiran10/habitutaion_test
StimUNO	https://github.com/antonykiran10/StimUNO
<i>Masters Thesis</i> : Visually guided behaviours in Zebrafish larvae and the role of Fmn2b	http://dr.iiserpune.ac.in:8080/xmlui/handle/123456789/7890
<i>Project Report</i> : Models of astrocyte-neuron interaction	http://dr.iiserpune.ac.in:8080/xmlui/handle/123456789/6624
<i>Project Report</i> : Host-parasite interaction proteins in case of <i>P. falciparum</i> mediated malaria and in-silico prediction of peptide-based inhibitors for crucial interactions	http://dr.iiserpune.ac.in:8080/xmlui/handle/123456789/6053
iGEM team Wiki	https://2020.igem.org/Team:IISER-Pune-India
Neuronal Models	https://github.com/antonykiran10/CompNeuroLab
BharatSim Tutorial	https://github.com/antonykiran10/bharatsim-tutorial
Codes for generating Visual Stimulus	https://github.com/antonykiran10/Visual-Stimulus
iGEM competition Github repository	https://github.com/igemsoftware2020/IISER-Pune-India

Some of the GitHub Repositories are just a way of backing up my projects and are works in progress, hence not properly documented. I am happy to explain in more detail if you find them interesting.