

Abel Gurung

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Education

University of Southern Mississippi
Double major in *Mathematics* and *Biological Science*
Minor: *Computer Science*

Hattiesburg, MS
Expected Graduation: May 2024

Internship

Chan Zuckerberg Biohub, San Francisco
Theory + Data Science Intern

San Francisco, CA
May 2023 – Present

- Study the developmental trajectories of single cells using Single-cell RNA sequencing (scRNA-seq) and RNA velocity
- Develop and implement a novel method to find the probability distribution of developmental trajectories with defined initial and final state

Baylor College of Medicine
Research Assistant

Houston, TX
June 2022 - August 2022

- Studied how the Integrator complex regulates gene expression
- Compared the efficacy of CRISPR-based cytosine base editors (CBEs) to introduce stop codons within genes encoding Integrator subunits and analyzed effects on expression of Integrator regulated genes.
- Performed DNA extraction from E. coli, transfection of HEK293FT cells, total RNA extraction, cDNA preparation, qPCR, western blot, and KLD cloning

Research Experience

University of Southern Mississippi
Research Assistant

Hattiesburg, MS

Project: Modelling the Open Probability of Ion Channels on Cell/Organelle's Membrane

August 2022 – Present

- Built a deep neural network that models the open probability of ion channels as accurately as traditional ODE models with less information
- Improve the model's performance by fine-tuning the neural network architecture and hyperparameters

Project: Post-translational gene regulation through small regulatory RNAs

February 2022 – June 2022

- Collected genome data of organisms to study the role of RNAi in crop pests
- Developed an algorithm to identify adapter sequences in RNA data
- Preprocessed genome data for further analysis and interpretation
- Wrote Unix shell scripts to optimize workflow

Project: Global Gene Regulation of Virulence Staphylococcus Aureus

September 2021 - February 2022

- Studied the effects of antimicrobial agents in different media for Staphylococcus Aureus
- Performed RT-PCR, gel-electrophoresis, and preparation of growth media

Work Experience

Telenutrition Center
Full Stack Developer

Hattiesburg, MS
November 2021- May 2023

- Maintain and upgrade health application used by researchers to collect data from participants
- Built feature to create meetings between researchers and participants
- Developed feature to calculate the calories burned by participants based on the activity and their weight
- Reduced the size of the docker image of the backend by 23 percent

Presentation

Gurung, Abel; "Modelling the Open Probability of Ion Channels on Cell/Organelle's Membrane" (2023) Oral presentation presented at University of Southern Mississippi and University of Southern Alabama

Gurung, Abel; "Testing the efficacy of cytosine base editors for making targeted mutations in the Integrator complex" (2022) Oral presentation presented at Baylor College of Medicine Smart Program

Honors & Awards

- University of Southern Mississippi Undergraduate Research Symposium – 1st Place April 2023
- Title: “Modelling the Open Probability of Ion Channels on Cell/Organelle’s Membrane”
- 3rd Annual VJ Canizaro, MD Health Summit Research Abstract – 1st Place March 2023
- Cross-Scholar – Competitive Scholarship awarded to students doing research in Mathematics August 2022
- Academic Excellence Scholarship – Merit based scholarship that covers full-tuition August 2021

Personal Project

- Text Generator June 2020 - December 2020
- Used A.I based text generator, GPT-2, to train model to mimic literature authors

Skills & Interest

- | | | |
|--------------|--------------|-----------------|
| • Python | • TensorFlow | • Keras |
| • C++ | • Vue | • Docker |
| • JavaScript | • NumPy | • Pandas |
| • SQL | • React | • Ruby on Rails |