ELLIE KIM

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EDUCATION

AUG 2021-
MAY 2025

The University of Texas at Austin
B.S. in Neuroscience | B.A. in Government
- Certificate in Scientific Computation and Data Sciences
- Certificate in Elements of Computing
- Certificate in Computational Science and Engineering
- Minor in Philosophy of Law

GPA 3.97

Relevant Coursework: Genetics, Neural Computation, Neural Systems I, II, Neural Systems III: Quantitative Tools, Elements of Statistics, Elements of Data Science, Elements of Computers and Programming

SKILLS

Programming Languages: Proficient in Python, R, Familiar with Bash, Exposed to C++, HTML
Technical Skills: bioinformatics, genomic data analysis, data visualization, cluster computing, certified MRI Level 1 user
Languages: Fluent in Korean

RESEARCH EXPERIENCE

OCT 2022-
present

Department of Neuroscience at The University of Texas at Austin
Research Assistant, Advisor: Michael D. Mauk
- Conducted research on neural computation using a conductance-based spiking network model
- Managed a project analyzing the efficacy of synaptic plasticity models for network performance
- Led a comparative project on cerebellar cell learning rates in a computational simulation
- Developed scripts to visualize neuron spike activity in raster plots and PSTHs

JUN 2023-
AUG 2023

Department of Neurosurgery at MD Anderson Cancer Center
Summer Research Trainee, Advisor: Kadir C. Akdemir
- Developed a novel algorithm to detect recurrently associated cancer genes in chromatin loop dataset
- Conducted bioinformatic analysis to classify molecular subtypes of brain tumor samples based on gene expression
- Proficiently handled large-scale genomic data on cluster computing environment
- Actively contributed to lab activities through journal club presentations and mentoring

AUG 2022-
OCT 2022

Dell Medical School at The University of Texas at Austin
Research Assistant, Advisor: Joseph E. Dunsmoor
- Conducted MRI scans on patients with PTSD while adhering to established safety protocols
- Analyzed data through efficient cleaning and manipulation using Python's pandas and NumPy libraries

NOV 2021-
OCT 2022

Department of Psychology at The University of Texas at Austin
Research Assistant, Advisor: Alissa Mrazek
- Developed a web scraping technique to prospect potential clients
- Designed a data collection strategy that leveraged a federal freedom of information law
- Created visualizations using Python scripts to effectively present findings and insights
- Presented a comprehensive overview of web scraping and HTML parsing

MAY 2022-
JULY 2022

Department of Neurosurgery at MD Anderson Cancer Center
Summer Research Trainee, Advisor: Kadir C. Akdemir

- Developed genomic analysis scripts to study mutational patterns in cancer
- Built an efficient pipeline for identifying significant variants in large-scale genomic data
- Leveraged advanced computational tools to visualize and quantify tumor progression
- Contributed as co-author in lab's manuscript for journal submission

TEACHING & MENTORING

AUG 2023-
present

Teaching Assistant
Genetics (BIO 325), The University of Texas at Austin

AUG 2023-
present

Teaching Assistant
Neural Systems III: Quantitative Tools (NEU 340), The University of Texas at Austin

APR 2022-
AUG 2023

International Orientation Advisor
International Student and Scholar Services, The University of Texas at Austin

- Served as a mentor and student panelist at the orientation for incoming international students
- Delivered engaging virtual information sessions, presenting insights on student life and answering questions from a 300+ audience

JUL 2019-
SEP 2020

Private Tutor
Self-Employed

- Tutored 2 students in High School Mathematics, including Algebra, Calculus, and Statistics

JUN 2019-
DEC 2019

Academic Instructor
Patrick Language Institute

- Provided individualized instruction to 50+ students preparing for the TOEFL

WORK EXPERIENCE

AUG 2021-
DEC 2022

Customer Service Associate
International Student and Scholar Services, The University of Texas at Austin

- Managed and addressed inquiries from prospective and current international students
- Implemented proactive approaches to resolve complex immigration-related issues for students
- Provided administrative support to 30+ office personnel, ensuring efficient workflow

FEB 2021-
MAY 2021

Content Editor
CJ E&M Entertainment Div., International Business Department

- Edited 100+ video clips of television programs and published with designed thumbnails
- Leveraged data mining tools to track consumer engagement and analyzed user data to drive strategic decisions
- Collaborated to develop marketing tactics, resulting in a significant boost in viewership

PROJECTS

JAN 2023-
present

Investigating the Efficacy of the Cascade Model of Synaptic Plasticity in a Biologically Constrained Simulation

JUN 2023-
AUG 2023

Structural Disruptions of 3D Genomic Architecture in Human Brain Tumors

- Utilized computational tools to analyze brain tumor sequencing data and investigate the effects of structural alterations on 3D chromatin conformation
- Generated and investigated a hypothesis on whether cancer genes linked to structural disruptions exhibit altered expression levels
- Applied dimensionality reduction, hierarchical clustering, and diverse statistical techniques to effectively address the research question

FEB 2023-APR 2023 **Investigating Cell Differentiation in the Brain with a Computational Model of Delta-Notch Signaling and Dynamical System Analysis**

- Conducted extensive literature review on Delta-Notch signaling and cell differentiation to inform the development of the computational model
- Developed a Python-based simulation model that utilizes differential equations and mathematical functions to visualize and analyze the neural development process over time
- Designed an algorithm inspired by the random walk process to generate an agent-based cell network that simulates the interactions between neighboring embryonic stem cells in the brain
- Utilized the ligand-receptor binding mechanism and other biological processes to create a mathematical model that accurately simulates the Delta-Notch signaling system

FEB 2023-MAR 2023 **Comparative Analysis of Single Nucleotide Polymorphism (SNP) Genomic Data in Patients with Anxiety Disorder (AD) and Major Depressive Disorder (MDD)**

- Acquired genomic data from publicly available sources and curated the datasets for analysis
- Conducted exploratory data analysis using dplyr and tidyr packages in R
- Analyzed differences in single nucleotide mutation profiles between patients with AD and MDD
- Created visualizations with ggplot to answer research questions

NOV 2022-DEC 2022 **Simulation Analysis of Neuron Firing Activity in Cerebellar Cells for Learning and Extinction Evaluation**

- Performed in-depth analysis of neuron firing activity to investigate learning and extinction rates in classical conditioning trials
- Employed statistical analysis techniques to confirm the accuracy and reliability of the outcomes
- Delivered a presentation on results to classmates and lab members

MAY 2022-JULY 2022 **Computational Investigation of Single Nucleotide Driver Mutations and Tumor Evolution Using Chromatin Conformation Data**

- Leveraged 3D genome sequencing techniques to gain novel insights into the evolution and underlying drivers of tumors
- Conducted mutational signature analysis to understand the mechanisms of tumor development
- Utilized public genomic databases to accurately detect and compare mutations in tumor samples

POSTER PRESENTATIONS

AUG 2023 Summer Research Program Poster Competition, MD Anderson Cancer Center
- Winner of the 2023 Poster Competition

APR 2023 College of Natural Sciences Undergraduate Research Forum, The University of Texas at Austin

APR 2023 Longhorn Research Poster Session, The University of Texas at Austin

HONORS & AWARDS

University Honors, The University of Texas at Austin
Fall 2021, Spring 2022, Fall 2022, Spring 2023

Dean's Honor List, College of Liberal Arts, The University of Texas at Austin
Fall 2022 (Summa Cum Laude), Spring 2023 (Summa Cum Laude)

JUN 2023	Government Department Scholarship, College of Liberal Arts, The University of Texas at Austin
JUN 2023	Mensa Foundation Scholarship, Mensa Education & Research Foundation
MAY 2023	CPRIT Research Training Award, Cancer Prevention & Research Institute of Texas (CPRIT)
MAY 2023	International Education Fee (IEF) Scholarship, The University of Texas at Austin
APR 2023	Second Year Excellence Award, College of Natural Sciences, The University of Texas at Austin
APR 2023	College Scholar, University Honors Day, The University of Texas at Austin
MAY 2022	International Education Fee (IEF) Scholarship, The University of Texas at Austin
MAR 2022	Research or Conference Travel Scholarship, The University of Texas at Austin
JAN 2022	Alpha Lambda Delta Honor Society, The University of Texas at Austin