

# ELLIE RAHM KIM

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## RESEARCH INTERESTS

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My research interest focuses on integrating computing/engineering methodologies to solve problems in biomedical sciences. I am driven to contribute to the advancement of precision medicine in cancer through the development of novel computational tools that unravel the complexities of the cancer genome.

## EDUCATION

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<b>The University of Texas at Austin</b>	2021 - 2025
<b>B.S. in Neuroscience</b>	GPA 3.97
<ul style="list-style-type: none"><li>• Minor in Computer Science</li><li>• Minor in Computational Engineering</li><li>• Minor in Scientific Computation and Data Sciences</li><li>• Minor in Applied Statistical Modeling</li></ul>	
<b>B.A. in Government</b>	
<ul style="list-style-type: none"><li>• Minor in Philosophy of Law</li><li>• Minor in Social and Behavioral Sciences</li></ul>	

## RESEARCH EXPERIENCE

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<b>Harvard Medical School (Beroukhim Lab)</b> <i>Summer Research Trainee</i>	Summer 2024
<b>Dell Medical School of The University of Texas at Austin (Yi Lab)</b> <i>Research Assistant</i>	2024 - Present
<ul style="list-style-type: none"><li>• Employ single-cell RNA sequencing data to detect somatic mutations in tumor samples</li><li>• Independently create genomic data processing pipeline that includes mapping, indexing, and variant calling</li><li>• Investigate patterns of tumor evolution and metastasis through phylogenetic tree construction</li></ul>	
<b>The University of Texas at Austin (Mauk Lab)</b> <i>Research Assistant</i>	2022 - 2023
<ul style="list-style-type: none"><li>• Conducted research on neural computation using a conductance-based spiking network model</li><li>• Managed a project analyzing the efficacy of synaptic plasticity models for network performance</li><li>• Led a comparative project on cerebellar cell learning rates in a computational simulation</li><li>• Developed Python scripts to visualize neuron spike activity in raster plots and PSTHs</li></ul>	
<b>MD Anderson Cancer Center (Akdemir Lab)</b> <i>Summer Research Trainee</i>	Summer 2023
<ul style="list-style-type: none"><li>• Utilized computational tools to analyze 3D chromatin conformation data from tumor samples</li><li>• Developed an algorithm to detect recurrent cancer genes from chromatin loop dataset</li><li>• Investigated a hypothesis on whether 3D chromosomal rearrangements alter gene expression levels</li><li>• Applied diverse statistical methods to effectively address research questions</li><li>• Proficiently handled large-scale genomic data on cluster computing environment</li><li>• Actively contributed to lab activities through journal club presentations and mentoring</li></ul>	
<b>Dell Medical School of The University of Texas at Austin (Dunsmoor Lab)</b> <i>Research Assistant</i>	2022

- 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

### **The University of Texas at Austin (Mrazek Lab)**

2021 - 2022

#### *Research Assistant*

- 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

### **MD Anderson Cancer Center (Akdemir Lab)**

Summer 2022

#### *Summer Research Trainee*

- 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
- Utilized public genomic databases to accurately detect and compare mutations in tumor samples

## **TEACHING EXPERIENCE**

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### **Peer STEM Tutor**

2024 - Present

#### *College of Natural Sciences, The University of Texas at Austin*

- Tutor undergraduate students in Biology, Chemistry, Neuroscience, and Genetics

### **Teaching Assistant**

2023 - Present

#### *Genetics (BIO 325), The University of Texas at Austin*

- Design lesson plans and led weekly discussion sessions for 30+ students
- Offer personalized assistance during office hours and exam review sessions
- Manage course-related responsibilities, including grading and attending lectures

### **Teaching Assistant**

2023

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

- Provided tailored support for students learning coding for scientific research purposes
- Effectively managed administrative tasks alongside a substantial grading workload

### **Private Tutor**

2019 - 2020

#### *Self-Employed*

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

### **Academic Instructor**

2019

#### *Patrick Language Institute*

- Instructed 50+ students in preparing for the Test of English as a Foreign Language (TOEFL)

## **INDEPENDENT PROJECTS**

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### **Cell Differentiation Modeling**

2023

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

- Conducted extensive literature review to inform the development of the computational model
- Developed a Python-based mathematical model to simulate neural development process over time
- Designed an algorithm inspired by the random walk process to generate a cell network that simulates the interactions between neighboring embryonic stem cells in the brain

### **Patient Genome Analysis**

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

## **Neural Activity Simulation Study**

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

## **WORK EXPERIENCE**

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### **Customer Service Associate**

2021 - 2022

#### *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

### **Content Editor**

2021

#### *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

## **VOLUNTEER WORK**

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### **Advising Fellow**

2023 - Present

#### *Matriculate*

- Mentor high school students from low-income backgrounds on college admissions
- Engage in thorough training, workshops, and skill evaluations to enhance advising proficiency

### **International Orientation Advisor**

2022 - 2023

#### *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

## **PRESENTATIONS**

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SEP 2023	Fall Undergraduate Research Symposium, The University of Texas at Austin
AUG 2023	Summer Research Program Poster Competition, MD Anderson Cancer Center <ul style="list-style-type: none"><li>• Winner of the 2023 Poster Competition</li></ul>
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**

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**University Honors**, The University of Texas at Austin

*Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 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), Fall 2023 (Magna Cum Laude)*

**College Scholar**, University Honors Day, The University of Texas at Austin  
*Academic Year 2022-23, Academic Year 2023-24*

MAR 2024	Pediatric Oncology Student Training (POST) Grant, Alex's Lemonade Stand Foundation
SEP 2023	Central Texas Mensa Scholarship, Mensa Education & Research Foundation
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
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

## SKILLS

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