Haocheng (Edison) Gu

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INTERESTS

Machine Learning, Graph Representation Learning, Computational Biology, Single-Cell Data Analysis

EDUCATION

The Ohio State University — 2017 – 2021
- Bachelor of Science in Data Analytics (specializing in Machine Learning) — Columbus, OH
- Bachelor of Science in Actuarial Science — GPA: 3.64 / 4

RESEARCH EXPERIENCE

Bioinformatics and Mathematical Biosciences Lab (BMBL) | The Ohio State University — Columbus, OH
Student Researcher (Principal Investigator: Prof. Qin Ma) — May 2021 – October 2022
- Optimized a single-cell RNA-Seq data analysis framework (scGNN) to achieve cell-type clustering and gene expression imputation simultaneously and efficiently
- Improved the graph autoencoder in the scGNN framework with attention mechanisms and graph normalization, achieving better cell-type clustering accuracy than Seurat across eight benchmark datasets
- Prototyped and improved a bulk RNA-Seq data deconvolution algorithm based on an NSF proposal
- Formulated and evaluated new regularization terms using cell graph and cluster information
- Developed a UMAP-based visualization tool to view cell graph and embedding data
- Authored an application note on *Bioinformatics*

PUBLICATIONS

1. **Haocheng Gu**, Hao Cheng, Anjun Ma, Yang Li, Juexin Wang, Dong Xu, Qin Ma. 2022. scGNN 2.0: a graph neural network tool for imputation and clustering of single-cell RNA-Seq data. *Bioinformatics*. 2022

TEACHING AND MENTORING

Teaching Assistant (CSE 3244: Data Management in the Cloud) — 2021
- Tutored and graded assignment for a class of 50 students

Mentor for Hao Cheng (Undergraduate researcher at BMBL) — 2021 – 2022
- Tutored him through Seurat, MAGIC, scVI, and other single-cell data analysis framework
- Demonstrated software development best practices

HONORS AND AWARDS

Actuarial Science Department Scholarship	2020
Department of Mathematics Student Spotlight	2019
Dean's List	2018

INDUSTRY EXPERIENCE

Aon Consulting | Healthcare and Benefits Practice   Atlanta, GA
Data Analyst – Health Intelligence   May 2021 – Present
- Led data analyses for Aon in accordance with the Hospital Price Transparency Act; researched underlying healthcare pricing factors including geographical monopoly power, Medicare coverage, and procedure category
- Used regression analysis to weigh socioeconomic factors in relation to total cost of care; selected factors with low p-values and low multi-collinearity; informed clients on ways to improve employees' wellness
- Designed and implemented a database schema with Spark and Databricks for efficient querying and mapping of terabytes of healthcare price data
- Employed distributed storage designs and explicit query parallelization to allow quick exploratory data analysis

New York Life Insurance   New York, NY
Actuarial Intern – Risk Modeling   May 2020 – August 2020
- Detected and resolved issues in Prophet tax reserve calculation by aggregating seriatim level outputs using SQL
- Assessed the impact of new asset assumptions by performing cashflow testing

Nationwide Insurance   Columbus, OH
Actuarial Intern – Asset Adequacy   May 2019 – April 2020
- Programmed stochastic scenario models in MG-ALFA, projecting accumulated surplus over 30 years
- Created dynamic Tableau exhibits to help the chief actuary drill down changes in sources of profits

LEADERSHIP

President | Actuarial Club at the Ohio State   2019 – 2021
- Built a website with a collection of academic and career resources for international students
- Started a program-wide mentorship program with 80+ mentors and mentees
- Planned and initiated a women's alumni panel to share career tips and advice
- Hosted technical skills workshops and taught attendants how to run regression models in R

TECHNICAL SKILLS

- Python (PyTorch, TensorFlow, PySpark, etc.)
- R (glmnet, Bioconductor, Seurat, etc.)
- Slurm
- Bash
- C
- Java
- SQL
- JavaScript
- HTML
- Tableau

VOLUNTEERING EXPERIENCE

Orchid Specialist | Atlanta Botanical Garden   2022 – Present
Food Bank Volunteer | Hands on Atlanta   2021 – 2022
Member | Precious Plastic Group   2018 – 2021