Emily Cairncross

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Goal-driven PhD candidate with extensive experience in mathematical computer science methods and drive to apply knowledge and problem-solving skills. Passionate about communicating technical ideas to audiences of all levels and working with teams to solve innovative problems effectively and efficiently.

SKILLS

Coding skills: Python (numpy, scipy, matplotlib, pandas, seaborn), C++, Java, Eclipse, Sage, Mathematica, LaTeX, Excel

Statistical skills: Principal Component Analysis (PCA), Markov Chain Monte Carlo, Stochastic Processes

Soft skills: Collaboration, Leadership, Organization, Conflict Resolution, Time Management

EXPERIENCE

Modeling & Analysis Intern | Carbon Solutions LLC | June – July 2023
- Analyzed data on sedimentary basins, carbon capture and storage, and multiple types of geothermal power generation to better understand different ways to reach national climate goals
- Presented findings to entire company and published in *Frontiers in Energy Research* as first author

Data Science Boot Camp | The Erdős Institute | May 2025 – August 2025
- Engaged with 20+ lectures and problem sets on Data Science topics such as Regression, Inference, Time Series, Classification, Ensemble Learning, and Neural Networks
- Worked with team to predict Chicago bus ridership recovery post-COVID using Triple Exponential Smoothing

Data Science Trainee | INMAS | October 2022 – February 2023
- Completed 40+ hrs of intensive training workshops in coding, statistical methods, and machine learning
- Built airplane boarding simulation in Python from scratch, ran on randomly generated inputs corresponding to standard boarding strategies, and presented results including practicality of implementation
- Collaborated with team of other PhD students to analyze and present housing datasets for Gary, Indiana using Python package pandas

Extremal Combinatorics Research Assistant | UIC | Chicago, IL | May 2022 – present
- Analyzed connections between local and global structure in networks working 20 hrs/wk
- Generalized results of previous paper to both colored and ordered analogs, corrected a significant error in a published paper, and published results in *SIAM Journal on Discrete Mathematics*
- Applications: coding theory, modern communications

LEADERSHIP

Graduate Student Organization Treasurer | UIC | Chicago, IL | May 2024 – January 2025
- Planned budgets, advised leadership team on financial responsibility, delivered 100+ prompt reimbursements for approved organizational spending, managed Quickbooks, and tracked receipts for annual financial review
- Facilitated efficient, productive, and positive meetings as member of leadership despite internal team discord

Mathematics Graduate Students Association Co-President | UIC | Chicago, IL | May 2022 – May 2023
- Acted as liaison between graduate students and department, organized weekly graduate student research seminar, and coordinated weekly Math Teas for graduate students, faculty, and staff to support department connection

EDUCATION

PhD in Mathematical Computer Science | University of Illinois at Chicago (UIC) | Chicago, IL | May 2026
- Related coursework: **Mathematical Theory of Artificial Intelligence, Mathematical Foundations of Data Science, Combinatorial Optimization**
- Teaching Assistant for: **Programming Tools and File Management** (Python), **Intro to Data Structures** (C++)

BA in Mathematics | Oberlin College | Oberlin, OH | May 2021
- GPA: 4.09/4.0, Minors: **Computer Science**, Linguistics, Hispanic Studies, Religious Studies