Cassandra Marcussen

New York, NY 10027 • 203-219-9159 • cem2242@columbia.edu
https://www.linkedin.com/in/cassandra-marcussen-2b13b0142/ • Website: http://www.columbia.edu/~cem2242/

EDUCATION

Columbia University, Columbia College **New York, NY**
Majoring in Computer Science – Intelligent Systems, Minoring in Mathematics Expected graduation: May 2022
GPA: 3.88, Dean's List

Relevant Coursework:

- **Computer Science:** CS Theory, Fundamentals of CS, Undergraduate Projects in CS (CS Research), Machine Learning (self-study for research), Advanced (Systems) Programming in C/C++, Discrete Mathematics, Honors Object-Oriented Programming & Design Patterns in Java, Data Structures in Java
- **Mathematics:** Number Theory and Cryptography, Modern Algebra I, Honors Math A & B (multivariable calculus, linear algebra), Intro to Statistics, Probability Theory (Reading Group), Geometric Group Theory (Reading Group)
- **Next Semester:** Artificial Intelligence, Machine Learning, Measure Theory and Probability, Information Theory, Projects in CS

Greenwich High School **Greenwich, CT**
GPA: 4.96, ACT 35 Sep 2014 - Jun 2018

- National Merit Finalist, National AP Scholar, YWCA Brava "Next Generation" Award Recipient
- Co-Founder & Co-President of Girls Who Code Club, US All-Eastern Orchestra, Math Honor Society
- Relevant Coursework: AP Calculus B/C, Advanced Multivariable Calculus, AP Computer Science A

WORK & RESEARCH EXPERIENCE

Columbia Department of CS – *Machine Learning Research Assistant* **New York, NY**
Project: Running Predictor of Preterm Birth using Machine Learning Techniques January 2020 - Present

- Improve machine learning tools and conduct exploratory data analysis using unsupervised and supervised learning techniques for the interdisciplinary machine learning research project of PI Dr. Salleb-Aouissi (Senior Lecturer in Artificial Intelligence at Columbia). The project leverages advanced methods in machine learning and the large data set about preterm birth to study the causes and identifiers of preterm birth.
- Applied machine learning methods such as hdbscan, PCA and dimensionality reduction as part of EDA.
- Investigated the question: How can we use the genetic algorithm and clustering methods for the purpose of mining the *n* (1 to 10) top association rules in a dataset? Implemented the K-Means and G-Means unsupervised learning algorithms in QuantMiner, a Data Mining tool for quantitative association rules, to show multiple top rule clusters per association. Programming in Java.
- Summer 2020: EDA using linear regression techniques, data pre-processing

Microsoft Research – Real-World Reinforcement Learning – *Independent Developer, RL Open Source Fest* **Remote Work**
Project: Parallelized Parsing in C++ April – August 2020

- Contributing to Vowpal Wabbit (VW), an open source machine learning developed by Microsoft Research
- Extracted out the I/O processes and created a separate parallel process for input
- Multithreaded the parsing component. The VW user can select how many threads to use for the parsing component using a command-line option.
- 1 of 6 selected students out of a pool of over 200 undergraduate, masters, and PhD applicants (3 undergraduate, 3 graduate students accepted)

Google – *STEP Software Engineering Intern* **Virtual Internship**
Project: Video Vigilance May – August 2020

- Worked on Video Vigilance, which uses machine learning and computer vision techniques from the Google Cloud Vision API and Video Intelligence API to detect unsafe or negative content in video advertisements.
- Responsible for the workflow of parsing keyframe images, detecting negative content, and displaying results using html.
- Came up with the original idea for Video Vigilance, which the YouTube Ads – Formats team approved entirely. Wrote design docs and constructed visuals of the user flows and distribution of tasks.
- *Back-end:* Implemented RESTful Java servlets to post, get and delete blobs from DataStore and Google Cloud Storage. Focused on extensibility and edge-case handling in Java classes calling the Cloud Vision API to extract the effect of keyframe images from the video. *Front-end:* Implemented a streamlined, professional user interface using Bootstrap.

Amazon – *AFE Software Engineering Intern* **Seattle, WA**
Project: Issues Platform for the AmazonAPI Team May – August 2019

- Designed and implemented a full-stack web application to streamline the AmazonAPI governance body's API approval process. Programmed in JS, NodeJS, Python, HTML, CSS.
- The web application provides filters and a search bar to sort APIs by due date of revision, status, alias, or title. Page users can dynamically view and revise submitted APIs and post comments.
- The web application also automates user authentication and sends weekly email notifications.
- For back-end development, I created 3 APIs and 8 AWS Lambda functions, as well as a scheduled task runner and a Markdown-to-HTML converter. For front-end development, I implemented an intuitive, responsive user interface using the Bulma CSS framework.
- Wrote >100k lines of code over 12 weeks that were pushed to production.

Zaniac Learning – *Computer Science & STEM Instructor* **Greenwich, CT**
Summer Camp Counseling & Tutoring June - August 2018

- Instructed courses in:
    - Computer Science (Python, JavaScript, HTML, CSS, web development)
    - Robotics and Physics
- Taught classes ranging from pre-K to high school levels using a project-based curriculum. Divided class time between learning collectively and individual projects.

Under My Wing (Mobile Application) – *Co-Founder, Co-Creator & Project Manager* **Greenwich, CT**
National Award-Winning Mobile Application published on Google Play Store December 2018 – December 2020

- Under My Wing is a mobile application that seeks to equip women with resources to protect themselves from sexual assault. Features include self-defense tutorials, external emergency resources, and a 'fake phone call' emergency feature.
- Under My Wing won Best in Nation and $20k in the 2017 Verizon App Challenge
- MIT App Inventor 'Most Innovative' application (2017)
- Acorda Scientific Excellence Award winner for work on Under My Wing
- Responsibilities included directing team activities, promotional efforts, and app / website creation.
- Guest speaker or presenter for: the Technology Student Association's National Conference, Girls Who Code annual gala in NYC, Random Hacks of Kindness Junior Hackathon, Lisa Wexler Show.

TEACHING

- Student Ambassador (unpaid Teaching Assistant) for SCNC 1000 Frontiers of Science (Spring 2019)
- Computer Science tutor for college and K-12 students

AWARDS

College: John Jay Scholar – Columbia University Scholars Program; Columbia Oxbridge Scholar – Selected to study Math and CS at St. Anne's College, Oxford. *Cancelled due to COVID-19.* (2019); Semifinalist in Fordham Debate Tournament (2018); **Pre-Professional -** D. E. Shaw Nexus Fellowship (2020); McKinsey GLAM Undergraduate Leadership Summit (2019).

High School: YWCA Greenwich Brava "Next Generation" Award (2018); **Under My Wing** – Best in Nation and $20k - Verizon App Challenge (for Under My Wing, mobile application); App of the Month: Most Innovative - MIT App Inventor (Under My Wing); Acorda Scientific Excellence Award (Under My Wing); **Cello Performance**– Finalist in Marianne Liberatore Scholarship Competition (concerto competition); National All-Eastern Orchestra (acceptance, participation).

TALKS

Asymptotic Dimension – UMS Geometric Group Theory Seminar — Summer 2020

Proof of Central Limit Theorem for Simple Random Walks – AWM Probability Seminar — Summer 2020

Simple Random Walks: Counting Paths, Mirroring and the Ballot Problem – AWM Probability Seminar — Summer 2020

Continuous Random Variables, Expectation & Variance – AWM Probability Seminar — Summer 2020

Artificial Intelligence – An Overview, Ethics & Philosophy – Columbia Debate Society Lecture Series — Spring 2020

EXTRACURRICULAR ACTIVITIES

Columbia Association for Women in Mathematics (AWM) – *Co-Chair of Events* — January 2020 – Present

- Brainstorm and implement ideas for events and help secure speakers for events
- Create publicity material, reserve event spaces, and execute administrative work for events
- **Co-Leader of Probability Reading Group**, Summer 2020

Columbia Pops Orchestra – *Treasurer* — September 2018 – Present

- Also: Cello Section Leader, Former VP Social

Bwog (Student Newspaper) – *Technology Contributor & Web Developer* — April 2019 – Present

- Working on projects such as the website's Tip Submission page, Upvotes/Downvotes for articles' comments sections, and the visual layout of the website.

SKILLS & INTERESTS

Tools and Technologies: Java, C, C++, Python, JavaScript, HTML, CSS, R, Markdown, Ruby, jQuery, NodeJS, LaTeX, MIT App Inventor, RESTful APIs, AWS Lambda, AWS DynamoDB, AWS API Gateway, MongoDB, Git, QuantMiner (https://github.com/QuantMiner/QuantMiner), scikit-learn (ML in python)

Interests: Encouraging diversity in STEM, Artificial Intelligence and Machine Learning, philosophy and ethics of AI, web and mobile application development