Matthew vonAllmen

Northwestern University   (425) 281-8308
624 Hinman Ave   matthewvonallmen2026@u.northwestern.edu
Evanston, IL 60202

Education
Northwestern University
Computer Science PhD   **Expected May 2025**

The Claremont Colleges
Joint Math/CS Major through Harvey Mudd College   **May 2020**
Mathematical Economics Major through Pitzer College   **May 2020**

Research Areas of Interest

Mechanism Design	Mathematical Optimization	Statistical Machine Learning	Probability Theory and Statistics

Research Experience

Mechanism Design Systems   **2021-present**
Working with Adobe Research to improve how limited compute resources are allocated between teams.

Mechanism Design and Inequality   **2021-present**
Research with Professors Sam Taggart and Jamie Morgenstern to identify revenue and welfare optimal mechanisms with two payment methods, time and money, when agents have different values for each.

Clinic Project   **2019**
Predicting the effects of reflective microspheres when applied to young Arctic ice using sophisticated climate modelling techniques. Working with Ice911 Research and Climformatics to see if this is a viable form of geoengineering.

Knot Theory and Neural Networks   **2019**
Research with Professor David Bachman, a topologist at Pitzer College. Analyzing what kinds of knots can be reduced to the unknot via neural networks whose layers are restricted to varying dimensions.

Prediction Market Research   **2019**
Senior seminar project analyzing the extent to which prediction markets update their beliefs as though they were Bayesian agents. Uses kernel methods to determine whether price data is consistent with this hypothesis.

Hilbert Compression   **Fall 2017**
Developed an original image compression algorithm that outperforms standard JPEG compression for a wide class of images. Uses adaptive Hilbert curves to improve the locality of the discrete cosine transform. Example can be found here:
          https://github.com/SilasLock/Hilbert-Compression/wiki/Compression-Algorithm

Academic and Community Service
Northwestern University
Environment Working Group Organizer, Mechanism Design for Social Good   **2021-present**
Coordinates activities, speakers, and events for a group of researchers and students.

Harvey Mudd College
Neural Networks Tutor, Computer Science Department   **Fall 2018**
Provided guidance to students in a neural networks class, and worked with the professor to ensure they understood the material.

Pitzer College
Website Developer, Pitzer Outdoor Adventures   **2016-2018**
Developed a web service to help students coordinate hikes and long-distance trips. Used SQLAlchemy to protect users' data and to streamline the hiking gear check-out process. Collaborated with team via GitHub.

GM & Lore Writer, 5C RPG Association   **2017-present**
Wrote over 200 pages of lore and game materials for an original setting, modelled after events in Islamic history. Runs biweekly sessions for other members of the association.

Staff Reporter, Pitzer Peel   **Fall 2016**
Wrote weekly articles for Pitzer College's campus newspaper. Focused on current events, global politics, and the history of mathematics.

Work Experience
Okta
Software Intern, NXT Team   **Summer 2019**
Reworked the process of changing one's password in the company's web application, so that user inputs are immediately evaluated with each key press. Performed both front end and back end work.

Skills
Programming Languages
- Strongly proficient in Julia, C#, and Python, proficient with Numba
- Experienced in website development, very proficient in CSS and JavaScript
- Familiar with C++, Java, Racket

Statistical & Machine-learning Software
- Familiar with Stata, PyTorch, and Keras

References

Dr. Jason Hartline
Professor of Computer Science, Northwestern University
Address: 2233 Tech Drive, Computer Science McCormick School of Engineering, Northwestern University, Evanston, IL 60208
Tel: (847) 467-0280
Email: hartline@northwestern.edu

Atanu Sinha
Principal Scientist, Adobe Research
Email: atr@adobe.com