Hannah Park-Kaufmann

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30 Campus Road
Annandale-on-Hudson
NY 12504, USA

Education

B.A. in Mathematics 2020-2024

B.M. in Classical Piano Performance 2020-2025

Bard College Annandale-on-Hudson, NY

Cumulative GPA: 3.83/4.00

Scholarships, Grants and Awards

Conservatory Scholarship
Distinguished Scientist Scholar Award (DSS)
DSS independent summer research grant
Sustainability Track at hackMIT 2022, winning project
International piano competition "Piano Talents", first prize
Austrian national piano competition "Prima la Musica", first prize

Experience

Murthy Lab Research Intern 2022

Harvard University Cambridge, MA

Pianist Movement Efficiency Analysis through methods of computational ethology

- Quantifying the efficiency of types of movements at the piano, finally aiming to create a faithful artificial intelligence based posture analysis algorithm which can give real-time correcting feedback to pianists. (In progress) **Advisor:** Dr. Souvik Mandal

Computational Mathematics for Data Science REU Researcher 2022

Emory University Atlanta, GA

Data Assimilation for Geophysics Models

- Implemented ensemble kalman filters on simplified glacier model to demonstrate improved predictions of glacier melt with data, and fed into complex storm surge model to explore sea level rise and climate change impacts on hurricane storm surges. **Advisor:** Professor Talea Mayo

Research Experience for Undergraduates(REU) Researcher 2021

Polymath Jr. REU (Virtual)

Minimal Presentation Sizes of Numerical Semigroups

- Introduced a combinatorial approach involving posets to determine the attainable minimal presentation sizes given a fixed multiplicity, which has been a long-standing open problem in the field. **Advisor:** Professor Christopher O'Neill

Math Tutor 2022-present

Bard Prison Initiative (BPI)
Bard Math Department Green Haven | Annandale-on-Hudson, NY

- Math tutor for BPI at Green Haven Correctional Facility
- TA (dedicated course tutor) for Proofs and Fundamentals (MATH261), Time, Space and Infinity (MATH105), and one of the course tutors for Calculus 1 and 2 (MATH141 and Math142) at Bard

Relevant Coursework

Mathematics: Complex Analysis, Discrete and Computational Geometry, Math Methods of Physics I, Abstract Algebra, Linear Algebra, Proofs and Fundamentals, Calculus II
Programming: Machine Learning, Data Structures, Object Oriented Programming
Other: To Overthrow the World, Translating Tact

Skills

Programming

Extensive experience coding with Python, and significant experience with Java. Functionally proficient with MATLAB, Mathematica, C++, and R. Comfortable with LaTeX, excel, and HTML/CSS.

Data collection, modelling and analysis

Turned physics-based model into python code. Generated realistic synthetic data sets for physical phenomena to run twin experiments on. Performed linear and nonlinear data assimilation on time series models and data. Ran large-scale mathematical calculations with sage. Implemented machine learning algorithms and dimensionality reduction for data analysis.

Languages

English (native), German (native), Chinese (fluent), Korean (proficient), French (beginner)

Outreach & Leadership

Co-head of Association for Women in Mathematics Club 2022
Bard College Annandale-on-Hudson, NY

Member of Outreach Committee 2022
Emory University Computational Mathematics for Data Science REU+RET Atlanta, GA

– Maximizing the broader impact of the site with dissemination of the site's activities and results beyond the REU+RET

Volunteer biography writer for the Deck 2 AWM Playing Cards 2022
Association for Women in Mathematics(AWM)

Publications

[1] Ceyhun Elmacioglu, Kieran Hilmer, Christopher O'Neill, Melin Okandan, **Hannah Park-Kaufmann**. On the cardinality of minimal presentations of numerical semigroups with fixed multiplicity. *In preparation for Journal of Algebraic Combinatorics*.

[2] Emily Corcoran, Logan Knudsen, **Hannah Park-Kaufmann**. Ensemble Kalman Filtering for Glacier Models. *Submitted to SURIO*. arXiv:2210.02647 (2022)

Contributed Talks and Posters

[1] *Data Assimilation for Glacier Models*, presented at Emory Math Department Poster Presentations, Atlanta, GA, July 2022.

[2] *Minimal Presentation Sizes of Numerical Semigroups*, presented at the Joint Mathematics Meetings (JMM) - American Mathematical Society and Pi Mu Epsilon (AMS-PME) Poster Session, (virtual), April 2022.

[3] *Minimal Presentation Sizes of Numerical Semigroups*, presented at The Women in Mathematics in New England (WIMIN) at Smith College, Northampton, MA (virtual), October 2021.