Hannah Park-Kaufmann

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

Education

B.A. in Mathematics
B.M. in Classical Piano Performance 2020-2024
Bard College Annandale-on-Hudson, NY
Cumulative GPA: 3.83/4.00

Experience

Math Tutor 2022 - present
Bard Prison Initiative (BPI)
Bard College Math Department Green Haven | Annandale-on-Hudson, NY

- Math tutor for BPI at Green Haven Correctional Facility
- TA-ed 'Proofs & Fundamentals', 'Time, Space & Infinity', Calculus 1 and 2 (MATH261,105,141,142)

Immersion Lab Research Intern 2023
Massachusetts Institute of Technology - Department of Mechanical Engineering Cambridge, MA

Analysing EKG signal and Recording Data Modalities of Human Movement

- Made comparative analysis of guitarists' heart and flow state data. Recorded motion capture, muscle, heart, acceleration, and force data for pilot studies. **Advisor:** Dr. Praneeth Namburi

Murthy Lab Research Intern 2022
Harvard University - Department of Molecular and Cellular Biology Cambridge, MA

Pianist Movement Efficiency and Ant Gait Analysis With Computational Ethology

- Did dimensionality reduction and modeling on 2D video data. **Advisor:** Dr. Souvik Mandal

Computational Mathematics for Data Science REU Researcher 2022
Emory University - Department of Mathematics, Scientific Computing Group Atlanta, GA

Data Assimilation for Geophysics Models

- Integrated Ensemble Kalman filter to improve simplified glacier model's predictions; coupled storm surge model to explore sea level rise impact on storm surges. **Advisor:** Prof. Talea Mayo

Numerical Semigroups and Polyhedra 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. **Advisor:** Prof. Christopher O'Neill

Outreach & Leadership

President of Association for Women in Mathematics (AWM) Club & Chapter 2022-present
Bard College Annandale-on-Hudson, NY

Volunteer biography writer for the Deck 2 AWM Playing Cards 2022
AWM (Virtual)

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

Scholarships, Grants and Awards

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

Relevant Coursework

Mathematics: Algebraic Topology, Differential Equations, Complex Analysis, Discrete and Computational Geometry, Math Methods of Physics I & II, 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, significant experience with Java, and 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. Recorded highest quality motion capture, muscle, heart, acceleration, and force datasets of various human movements.

Languages

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

Publications

[1] Ceyhun Elmacioglu, Kieran Hilmer, Christopher O'Neill, Melin Okandan, **Hannah Park-Kaufmann**. On the cardinality of minimal presentations of numerical semigroups. *Submitted to Algebraic Combinatorics*. arXiv:2211.16283 [math.CO] (2022).

[2] Emily Corcoran, Logan Knudsen, **Hannah Park-Kaufmann**. Ensemble Kalman Filtering for Glacier Models. *In review, SIAM Undergraduate Research Online(SURIO)*. arXiv:2210.02647 (2022).

Contributed Talks and Posters

[1] *Data Assimilation for Glacier Models*, presented at the Joint Mathematics Meetings (JMM) - AMS-SIAM Special Session on Research in Mathematics by Undergraduates, Boston, MA, January 2023.

[2] *Minimal Presentation Sizes of Numerical Semigroups*, presented at 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.