

# HANNAH PARK-KAUFMANN

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Phone: +1 (845) 768-4460 | +43 (699) 1927-2383  
Email: hk9622@bard.edu | parkkaufmann@gmail.com  
Website: hakuupi.github.io

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

## Education

**B.A. in Mathematics**

**B.M. in Classical Piano Performance**

*Bard College*

Cumulative GPA: 3.83/4.00

2020-2024  
Annandale-on-Hudson, NY

## 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 (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

**Murthy Lab Research Intern**

2022

*Harvard University - Department of Molecular and Cellular Biology*

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 - Department of Mathematics, Scientific Computing Group*

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

## Outreach & Leadership

**Co-head 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:** 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)

## 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 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.