

HANNAH KIM, M.S.

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WHO AM I?

- A passionate bioinformatician with 3+ experience in evolutionary genomics and 3+ experience in cancer research.
- Initiated and facilitated interdisciplinary collaborations with hospitals and cancer centers.
- Interested in the interface of computational biology and medicine: method development and evolutionary genomics.
- An avid learner and open-source enthusiast.

EDUCATION

PhD in Bioinformatics, Temple University 2019 - present

Advisor: Dr. Sergei L Kosakovsky Pond

Dissertation Topic: PProperty-Informed Models of Evolution (PRIME) and their applications

MS in Computational Biology, Carnegie Mellon University 2015 - 2016

Relevant Coursework: Computational Genomics, Machine Learning, and Algorithms & Advanced Data Structures

BS in Chemistry, Carnegie Mellon University 2010 - 2013

Relevant Coursework: Principles of Computing, and Modern Analytical Instructions

PROFESSIONAL EXPERIENCE

Bioinformatics Engineer Oct 2021 - Jan 2022

Lifetime Omics

Remote

- Automated cutting-edge methods and analyzed COVID-19 metagenomics data in the Google Cloud environment.
- Developed detailed standard operating procedure for reproducibility.
- Took initiatives to solve problems and demonstrated dedication for the project in the startup environment.

Bioinformatics Analyst/Software Engineer Jul 2017 - Jun 2019

Children's Hospital of Philadelphia – Kai Tan lab

Philadelphia, PA

- Investigated RNA-Seq and microarray data from B-Cell Acute Lymphoblastic Leukemia subtypes using differential gene expression analysis, Gene Ontology enrichment analysis, and other relevant bioinformatics methods.
- Identified cancer-specific genetic interactions that led to publications in high-impact journals.
- Facilitated communication in the interdisciplinary environment of doctors and wet-lab and dry-lab researchers.

Research Programmer Feb 2017 - Jun 2017

Carnegie Mellon University – Russell Schwartz lab

Pittsburgh, PA

- Investigated clinical and genomic data to create a cancer progression analysis pipeline using machine learning.

MS Graduate Researcher Jan 2016 - Dec 2016

Carnegie Mellon University – Ziv Bar-Joseph lab

Pittsburgh, PA

- Curated and analyzed single-cell gene expression data.

Post-Baccalaureate Researcher (Chemistry/Biology)

Carnegie Mellon University – Drs. Fred Lanni, Aaron Mitchell, and Luisa Hiller

Aug 2013 - Jun 2014

Pittsburgh, PA

- Tested various polymer surface coatings for the prevention and destruction of biofilms using red/NIR light.

Undergraduate Student Researcher (Chemistry)

Carnegie Mellon University – Kevin Noonan lab

Jan 2012 - Aug 2013

Pittsburgh, PA

- Characterized pyrylium and pyridinium salts by modifying functional groups.

Student Researcher (Biology)

Carnegie Mellon University – 2011 Summer Research Institute

Jun 2011 - Aug 2011

Pittsburgh, PA

- Analyzed interactions among three ribosomal assembly factors in *Saccharomyces cerevisiae*.
- 1 of 12 student researchers selected for the program.

PUBLICATION

[7] Huzar, J., **Kim, H.**, Kumar, S., Miura, S. (2022). MOCA for integrated analysis of gene expression and genetic variation in single cells. *Frontiers in Genetics*, 13:831040. doi:[10.3389/fgene.2022.831040](https://doi.org/10.3389/fgene.2022.831040)

[6] Ding, Y., **Kim, H.**, Madden, K., Loftus, J., Chen, G., Allen, D., Zhang, R., Xu, J., Chen, C., Xu, Y., Tasian, S., Tan, K. (2021). Network Analysis Reveals Synergistic Genetic Dependencies for Rational Combination Therapy in Philadelphia Chromosome-like Acute Lymphoblastic Leukemia. *Clinical Cancer Research*, 27(18). doi:[10.1158/1078-0432.CCR-21-0553](https://doi.org/10.1158/1078-0432.CCR-21-0553)

[5] Tarca, A. L., Pataki, B. Á., Romero, R., Sirota, M., Guan, Y., Kutum, R., Gomez-Lopez, N., Done, B., Bhatti, G., Yu, T., Andreoletti, G., Chaiworapongsa, T., **The DREAM Preterm Birth Prediction Challenge Consortium**, Hassan, S. S., Hsu, C., Aghaeepour, N., Stolovitzky, G., Csabai, I., Costello, J. C. (2021). Crowdsourcing assessment of maternal blood multi-omics for predicting gestational age and preterm birth. *Cell Reports Medicine*, 2(6). doi:[10.1016/j.xcrm.2021.100323](https://doi.org/10.1016/j.xcrm.2021.100323)

[4] Ichikawa, Y., Bruno, V. M., Woolford, C. A., **Kim, H.**, Do, E., Brewer, G., Mitchell, A. P. (2021). Environmentally contingent control of *Candida albicans* cell wall integrity by transcriptional regulator Cup9. *Genetics*, 218 (3). doi:[10.1093/genetics/iyab075](https://doi.org/10.1093/genetics/iyab075)

[3] Tao, Y., Rajaraman, A., Cui, X., Cui, Z., Chen, H., Zhao, Y., Eaton, J., **Kim, H.**, Ma, J., Schwartz, R. (2021). Assessing the Contribution of Tumor Mutational Phenotypes to Cancer Progression Risk. *PLOS Computational Biology*, 17(3). doi:[10.1371/journal.pcbi.1008777](https://doi.org/10.1371/journal.pcbi.1008777)

[2] He, B., Gao, P., Ding, Y., Chen, C., Chen, G., Chen, C., **Kim, H.**, Tasian, S. K., Hunger, S. P., Tan, K. (2020). Diverse noncoding mutations contribute to deregulation of cis-regulatory landscape in pediatric cancers. *Science Advances*, 6(30). doi:[10.1126/sciadv.aba3064](https://doi.org/10.1126/sciadv.aba3064)

[In preprint] Tao, Y., Rajaraman, A., Cui, X., Cui, Z., Eaton, J., **Kim, H.**, Ma, J., Schwartz, R. (2019). Improving personalized prediction of cancer prognoses with clonal evolution models. *bioRxiv*. doi:[10.1101/761510](https://doi.org/10.1101/761510)

[1] Lin, C., Jain, S., **Kim, H.**, Bar-Joseph, Z. (2017). Using neural networks for reducing the dimensions of single-cell RNA-Seq data. *Nucleic Acids Research*, 45(17). doi:[10.1093/nar/gkx681](https://doi.org/10.1093/nar/gkx681)

PRESENTATION

Posters

- **Kim, H.***, Shank, S., Kosakovsky Pond, S. L. (2022). PRoperty Informed Models of Evolution (PRIME). Poster: The 31st KSEA Northeast Regional Conference, Hybrid.
- Hu, Y., Chen, C., Ding, Y.*, **Kim, H.**, Tan, K. (2019). Synergistic Control Genes in Cancer Gene Networks as Targets for Combination Therapy. Poster: Children's Hospital of Philadelphia Research Poster day and Scientific Symposium, Philadelphia, PA.

Talks

- **Kim, H.***, Kosakovsky Pond, S. L. (2022). PRIME Evolutionary Imputation (PREI). Flash Talk: International Conference on Intelligent Biology and Medicine, Philadelphia, PA.

AWARDS, FELLOWSHIPS, & GRANTS

2022 Selected Attendee Support, Scientists and Engineers Early Career Development Workshop

2022 KSEA Excellent Poster Award, The 31st KSEA Northeast Regional Conference

2022 CST Three-Minute Thesis Competition 2nd Place Award, Temple University (College-level)

2015 Departmental Merit Fellowship, Carnegie Mellon University

2013 Mellon College of Science Research Honors, Carnegie Mellon University

2012 Summer Undergraduate Research Fellowship, Carnegie Mellon University

TEACHING EXPERIENCE

Course Completion

Aug 2022 - Dec 2022

Temple University

Teaching in Higher Education (EPSY-8985)

- Developed syllabi, assignments, and assessments using the principles of integrated course design.
- Applied the current theories of teaching in different contexts.
- Used a variety of effective teaching methods to address learners universally.
- Discussed a reflective and purposeful approach to teaching with other instructors.
- This course is a pre-requisite to obtaining *Teaching in Higher Education Certificate for Graduate Students*.

Teaching Assistant

Aug 2020 - Dec 2020

Temple University

Genomics in Medicine (BIOL-3111/5111)

- Generated formative and summative assessment materials and provided timely feedback ([Youtube/Introduction](#)).
- Class size: 150.

Teaching Assistant

Aug 2019 - May 2020

Temple University

Wet Lab Courses (BIOL-2112 and BIOL-1012)

- Gave a short lecture in the beginning of every lab, monitored student performance, and provided guidance.
- Graded lab reports and generated quizzes.
- **[Spring 2020]** BIOL-1012 General Biology II was an introductory course for non-biology majors.
- **[Fall 2019]** BIOL-2112 Introduction to Cellular and Molecular Biology was a lab course for biology majors.
- Class size: 20 (x 2 sections).

Course Developer

Feb 2016 - Aug 2016

Carnegie Mellon University

Programming for Scientists (02201/02601)

- Generated open-source course materials (codes and instructions) with Drs. Phillip Compeau and Carl Kingsford for Go-lang beginners.

LEADERSHIP EXPERIENCE

Secretary

Feb 2023 - Apr 2023

2023 KITEE-KSEA FELIX Hackathon

- Organized the hackathon in the committee meeting held regularly.
- Outreached to universities and engineer communities in the Philadelphia region.

Philadelphia Young Generation Director

Jan 2023 - Apr 2023

The 32nd KSEA Northeast Regional Conference

- Planned the conference in the bi-weekly committee meeting with PIs from academia and industry.
- Operated as the public relations and promotion chief for the pre-networking event before the conference.

DEI Representative

Dec 2021 - present

Temple University College of Science and Technology-Graduate Student Organization (CST-GSO)

- Identified potential DEI topics within the organization and suggested appropriate strategies.
- Facilitated the success of the yearly PhD/MS alumni panelist event involving all six departments within college for two years in a row.

Student Representative

Nov 2021 - present

Temple University College of Science and Technology Diversity, Equity, and Inclusion Committee

- Discussed the promotion of DEI within college at the bi-weekly committee meetings.
- Provided feedback for a wide array of DEI topics and addressed current issues with other members.

Vice President

Sep 2021 - present

Temple University Biology Graduate Student Society (BGSS)

- Facilitated communication between the department and the graduate school.
- Led action plans to address diverse career needs within the department of biology and organized regular meetings with the graduate school directors.
- Planned and oversaw activities for departmental retreat.

COMMUNITY INVOLVEMENT

Frontiers in Oncology (2021 IF=5.738), Ad Hoc Reviewer (1x/year), 06/2022

- Commented as a reviewer for an academic journal using my experience in cancer research and bioinformatics.

George Washington Carver Science Fair, Science Fair Judge, 03/2022 & 03/2023

- Judged science fair projects done by students in grades 6 to 12.

PROFESSIONAL MEMBERSHIPS

An Affiliated Member of Temple University Human Computer Interaction Lab, 03/2023-
Korean American Society in Biotech and Pharmaceuticals (KASBP), 10/2022-
Korean-American Innovative Technology Engineers and Entrepreneurs (KITEE), 04/2022-
Society for the Study of Evolution (SSE), 04/2022-
AnitaB.org, 09/2021-
Society for Molecular Biology and Evolution (SMBE), 01/2021-
– SMBE IDEA (Inclusion, Diversity, Equity and Access) Working Group, 11/2022-
Korean-American Scientists and Engineers Association (KSEA), 02/2020-
Philadelphia Korean Scholars Association (PKSA), 06/2019-

DOCTORAL COURSEWORK

Fall 2020 **Genomics and Infectious Disease Dynamics** *BIOL-5128*
Fall 2020 **Seminar: "Ecoevo discuss"** *BIOL-8210*
Fall 2020 **Applied Statistics and Data Science** *STAT-8109*
Spring 2020 **Genomics and Evolutionary Biology of Parasites** *BIOL-5241*
Spring 2020 **Data-Intensive and Cloud Computing** *CIS-5517*
Spring 2020 **Knowledge Discovery and Data Mining** *CIS-5523*
Fall 2019 **Genomics in Medicine** *BIOL-5111*
Fall 2019 **Topics in Bioinformatics** *BIOL-5466*
Fall 2019 **Seminar Biol 8210 at Center for Computational Genetics and Genomics** *BIOL-8210*

CERTIFICATES

The Inclusive STEM Teaching Project, InCLU1x 11/2022
Business Foundations, UBCx 10/2022
Cancer Biology Specialization (Introduction to the Biology of Cancer, Understanding Cancer Metastasis & Understanding Prostate Cancer), Coursera 09/2022
Matrix Algebra for Engineers, Coursera 03/2022
Viruses & How to Beat Them: Cells, Immunity, Vaccines, IsraelX 02/2022

PERSONAL PROJECTS

[Colorblindness Image Enhancer](#), "Most Technically Impressive" in OwlHacks 2023, 02/2023

CODING LANGUAGES

python, R, MATLAB, bash, JavaScript, Go-lang