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: PRoperty-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) Aug 2013 - Jun 2014
Carnegie Mellon University – Drs. Fred Lanni, Aaron Mitchell, and Luisa Hiller *Pittsburgh, PA*

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

Undergraduate Student Researcher (Chemistry) Jan 2012 - Aug 2013
Carnegie Mellon University – Kevin Noonan lab *Pittsburgh, PA*

- Characterized pyrylium and pyridinium salts by modifying functional groups.

Student Researcher (Biology) Jun 2011 - Aug 2011
Carnegie Mellon University – 2011 Summer Research Institute *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

[**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

[**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

[**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

[**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

[**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

[**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

[**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

PRESENTATION

Posters

- **Kim, H.***, Kosakovsky Pond, S. L. (2023). PRSuite: PRoperty Informed Models of Evolution (PRIME), the Imputation (PREI), and the Visualization (PReC). Poster: The Society for Molecular Biology and Evolution 23 Conference, Ferrara, Italy.
- **Kim, H.***, Shank, S., Kosakovsky Pond, S. L. (2022). PRoperty Informed Models of Evolution (PRIME). Poster: The 31st KSEA Northeast Regional Conference, Virtual.
- 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.*** (2023). Data Analysis in Bioinformatics Research (in academia). Seminar: Philadelphia Developer Group, Virtual.
- **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

2023 Best Poster Award, 2nd Place (Computer and Information Sciences), The 36th US-Korea Conference

2022&2023 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

Co-Coordinator/Reflective Practicum Completion for THE Certificate May 2023 - July 2023
Temple University *Deep Learning for the Life Sciences Journal Club*

- Co-organized a summer journal club with Dr. Enzo Carnevale for researchers of various levels of expertise (undergraduate students, graduate students, postdocs, alumni, visitors, and professors). We met weekly to have stimulating discussions on cutting-edge research and theory of machine learning and artificial intelligence. We have built a unique inter-departmental community in the College of Science and Technology in the course of this journal club.
- Generated a plan that focuses on the member mastery of knowledge and improvement of presentation skills.
- Facilitated member engagement in the dynamically changing member demographic.
- Discussed teaching methods and reflections with Dr. Jay Lunden (the teaching mentor) for 7 weeks.
- Group size: 35.

Course Completion for Teaching in Higher Education (THE) Certificate 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.

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.
- Class size: 20 (x 2 sections) each.
  BIOL-1012 General Biology II, Spring 2020 was an introductory wet lab course for non-biology majors.
  BIOL-2112 Introduction to Cellular and Molecular Biology, Fall 2019 was a lab for biology majors.

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

Young Generation Director I May 2023 - present
KITEE

- Arranged monthly in-person/virtual KITEE meetings with other members as a team.
- Connected with graduate students in the northeast region in the US to promote KITEE events.

Secretary Feb 2023 - Apr 2023
2023 KITEE-FELIX Hackathon Committee

- Organized the hackathon in the weekly committee meeting.
- Reached out to universities and engineer communities in the Philadelphia region.

Philadelphia Young Generation Director Jan 2023 - Apr 2023
The 32nd KSEA Northeast Regional Conference (NRC) Committee

- Planned the conference in the bi-weekly committee meeting with PIs and staff from academia and industry.
- Operated as the public relations and promotion chief for the pre-networking event before the conference.
- Promoted networking (e.g. networking bingo) and facilitated the event flow onsite at the event of 104 registrants.

CST-GSO Board Member Dec 2021 - present
Temple University College of Science and Technology-Graduate Student Organization (CST-GSO)

- **DEI Representative, 12/2021-04/2023** Identified potential DEI topics within the organization and suggested appropriate strategies. I have facilitated the success of the yearly PhD/MS alumni panelist event involving all six departments within college for two years in a row.
- **Media Chair, 05/2023-present** Advertised the organization events on social media.

Student Representative Nov 2021 - Aug 2023
Temple University College of Science and Technology Diversity, Equity, and Inclusion (CST-DEI) 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 - Sep 2023
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. Generated databases for graduate student placements.
- Supported the on-boarding process for the prospective students in the department of biology.
- Planned and oversaw activities for the departmental retreat.

COMMUNITY INVOLVEMENT

Ad Hoc Reviewer

- Scientific Reports (2021 IF=4.996), *04/2023*
  - Commented as a reviewer using my experience in cancer, evolutionary biology and single-cell transcriptomics.
- Frontiers in Oncology (2021 IF=5.738), *06/2022*
  - Commented as a reviewer for an academic journal using my experience in cancer research and bioinformatics.

Science Fair Judge

- George Washington Carver Science Fair, *03/2022 & 03/2023*
  - Judged science fair projects done by students in grades 6 to 12 with a group of educators.

PROFESSIONAL MEMBERSHIPS

An Affiliate Member of Temple University Human-Computer Interaction (HCI) Lab, *03/2023-*
Korean American Society in Biotech annd 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

MicroMBA, University of California San Diego *08/2023*
Teaching in Higher Education Certificate, Temple University *08/2023*

MASSIVE OPEN ONLINE COURSE 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

HearU: Bridging the Gap in Korean-American Mental Health Care, Voted "Second Place" by the audience in the KITEE-FELIX Ideathon Pitch. Ideated by PhD students each from NJIT, Penn, and Temple, *04/2023*
Colorblindness Image Enhancer, "Most Technically Impressive" in OwlHacks 2023, *02/2023*

CODING LANGUAGES

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

Last Updated – 2023-08-29.