

# Haeun (Hannah) Hwangbo

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## HIGHLIGHTS

- Ph.D. candidate in computational biology and bioinformatics at UNC-Chapel Hill (Expected to graduate in May 2024)
- Interested in clinical and (reverse-)translational cancer research with 7-year research experience
- Experienced in analyzing clinical trials and multi-omics data in preclinical and clinical samples

## WORK EXPERIENCE

### Bristol Myers Squibb, Informatics and Predictive Sciences

San Diego, CA

*Computational Systems Biology Intern*

Jun 2023 – Aug 2023

- Predicted cell viability from perturbation transcriptomics by building a machine learning model; This approach is now integrated into compound selection strategy
- Utilized public resources to construct the model and validated on internal datasets
- Drove improvements in data processing and deposition from external collaborations

## RESEARCH EXPERIENCE

### The University of North Carolina at Chapel Hill, Adam Palmer Lab

Chapel Hill, NC

*Graduate Research Assistant*

Aug 2019 - Present

- Developed computational method to identify individual drug activity in clinical trials of cancer combination therapy; Identified combinations that will benefit most from patient selection; Analyzed 92 FDA-approved drug combinations in the past 25 years
- Modeled drug-drug interactions in clinical trials of cancer combination therapy
- Performed RNA-seq trajectory analysis to discover biomarkers for aging in intestinal stem cells (collaboration with Oxford university)

### Korea Advanced Institute of Science and Technology, Omics Laboratory

Daejeon, Korea

*Research Scientist*

Mar 2018 – Jun 2019

- Conceived and co-led project on discovering biomarkers for cancers with homologous recombination deficiency; Analyzed transcript isoforms and used machine learning to predict clinical outcomes
- Developed vectorized algorithm for predicting vulnerabilities in breast cancer; Significantly improved the simulation speed; Used Connectivity Map to validate simulation results
- Constructed RNA-seq pipeline for government-funded project (“Integrated Multi-genomics-based Precision Medicine in Colon Cancer.”); Performed pilot analysis on single-cell ATAC-seq

### Seoul National University, Laboratory of Evolutionary Bioinformatics

Seoul, Korea

*Undergraduate Research Assistant*

Jun 2016 – Jun 2017

- Designed and implemented autoencoder for dimensionality reduction of prokaryotic genome signatures; Clustered taxa based on low-dimensional projections
- Constructed pipeline predicting taxa of query sequences using tetranucleotide signatures

## TECHNICAL SKILLS

- **Programming:** Python (pandas, numpy, scikit-learn, matplotlib, seaborn, lifelines), R (bioconductor, ggplot2), bash, Linux CLI, C, MATLAB, Mathematica, SQL
- **Data Science/Cloud Computing:** Git, Docker, GNU make, snakemake, nextflow, HPC systems, AWS, web scraping
- **Bioinformatics/Omics analysis:** variant calling, peak calling, copy number variation, differential expression, differential splicing, trajectory analysis, methylation, CRISPR-KO, dose-response analysis
- **Data processing:** high-throughput sequencing, WGS, WES, RNA-seq, ATAC-seq, scATAC-seq, proteomics
- **Public Databases:** TCGA, GTEX, CCLE, Connectivity Map, GDSC, CTRPV2, COSMIC, DepMap
- **Machine Learning/Statistics:** regression analysis, generalized linear model, elastic net, xgboost, random forest, clustering, autoencoder, dimensionality reduction, classification, survival analysis, design & analysis of clinical trials

## EDUCATION

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**The University of North Carolina at Chapel Hill**  
*Ph.D. in Bioinformatics and Computational Biology*  
Big Data to Knowledge Certificate

Chapel Hill, NC  
Expected May 2024

**Seoul National University**  
*B.S. in Biological Sciences (summa cum laude); Minor in Computer Science and Engineering*

Seoul, Korea  
Feb 2018

## LEADERSHIP EXPERIENCE

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**Bioinformatics and Computational Biology Steering Committee, Student Representative**

- Advocated student perspectives and contributed to curriculum development
- Participated in search committees

Chapel Hill, NC  
Aug 2022 - Present

**UNC Computational Biosciences Club, Leadership, International Student Liaison**

- Assisted international students to navigate through career development
- Coordinated with departments to facilitate internships for international students

Chapel Hill, NC  
Nov 2021 - Present

**UNC How to Learn to Code, Course Instructor**

- Created curricula and taught introductory Python to biomedical researchers

Chapel Hill, NC  
July 2022

## PUBLICATIONS

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1. **Hwangbo, H.**, Patterson, S., Dai, A., Plana, D., & Palmer, A. C. (2023). Additivity predicts the efficacy of most approved combination therapies for advanced cancer. *Nature Cancer*, 1-12.
2. (Preprint) Chen, J., Merrick, K.A., ..., **Hwangbo, H.**, ..., & Yaffe, M. B. (2023) An RNA Damage Response Network Mediates the Lethality of 5-FU in Clinically Relevant Tumor Types. *bioRxiv*.
3. Palmer, A. C., Izar, B., **Hwangbo, H.**, & Sorger, P. K. (2022). Predictable Clinical Benefits without Evidence of Synergy in Trials of Combination Therapies with Immune-Checkpoint Inhibitors. *Clinical Cancer Research*, 28(2), 368-377.
4. Kang, H. G., **Hwangbo, H.**, Kim, M. J., Kim, S., Lee, E. J., Park, M. J., Kim, J., Kim, B., Cho, E., Chang, S., Lee, J., & Choi, J. K. (2021). Aberrant transcript usage is associated with homologous recombination deficiency and predicts therapeutic responses. *Cancer Research*, 82(1), 142-154.
5. Jang, K., Park, M. J., Park, J. S., **Hwangbo, H.**, Sung, M. K., Kim, S., Jung, J., Lee, J.W., Ahn, S.H., Chang, S. & Choi, J.K. (2020). Computational inference of cancer-specific vulnerabilities in clinical samples. *Genome biology*, 21(1), 1-24.

## HONORS & AWARDS

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- **Best Talk Award** (2023, UNC Genetics Department)
- **Korean Government Scholarship for Study Overseas** (2019-2021, ~50 scholars selected nationwide)
- **Study Abroad Applicant Scholarship** (2018, Korea Foundation for Advanced Studies)
- **Outstanding Peer Tutor 2<sup>nd</sup> Prize** (2017, Seoul National University)
- **DUO-Korea Fellowship** (2015, ASEM-DUO Fellowship Programme, supported study abroad in United Kingdom)
- **Dean's List** (2014, 2015, Seoul National University)
- **National Science & Technology Scholarship** (2013-2016, 4-year full scholarship)