

Athena Chen

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Summary

PhD candidate in biostatistics developing methods for analyzing proteomic and genomic data to better understand, diagnose, and treat disease. Data scientist experienced in R, Bayesian analyses, immunology, and working with high-throughput biological data.

Education

Johns Hopkins Bloomberg School of Public Health

Baltimore, MD

PHD, BIostatistics | GPA: 3.74/4.00

August 2017 – February 2022

- Advisor: Ingo Ruczinski, PhD
- Thesis: *Statistical Methods for Analyzing Phage-ImmunoPrecipitation Sequencing Data*
- Relevant coursework: Bayesian Methods, Advanced Data Science, Introductory Molecular Immunology, Statistical Machine Learning

Johns Hopkins University

Baltimore, MD

BACHELOR OF ARTS, BIOPHYSICS AND APPLIED MATHEMATICS AND STATISTICS | GPA: 3.92/4.00

August 2014 – May 2017

- Thesis advisor: Margaret Johnson, PhD
- Honors thesis: *Evaluation and Application of Spatial Cell Modeling Methodologies*
- Graduated with general and departmental honors

Skills

Computing R, Git, Github, \LaTeX , Python, MATLAB, JAGS, Stan, Microsoft Office, Java, Mathematica, Pymol

Languages Native: English

Intermediate: Spanish

Conversational: Mandarin Chinese

Professional Experience

ImmuneID

Boston, MA

CONSULTANT

September 2021 - February 2022

- Established framework for computational pipeline for processing data.
- Developed quality control metrics for PhIP-Seq data

ConfluenceStat, LLC

CONSULTANT

August 2020

- Constructed a model for a Bayesian adaptive clinical trial with negative binomial outcome.
- Estimated power of the clinical trial given various effect sizes and efficacy/non-inferiority cutoffs.

Research Experience

Graduate Research Assistant

Baltimore, MD

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH | PI: INGO RUCZINSKI, PHD

August 2017 - PRESENT

- Developed a classifier for identifying recent HIV infections, improving the accuracy of cross-sectional estimates of incidence.
- Characterize human immune responses to various antigens derived from bacteriophage in the gut microbiome and human viruses.
- Construct a Bayesian model for proteomics data to identify enriched antibody responses. This model has been applied to data from HIV-infected individuals and COVID patients.

Undergraduate Research Assistant

Baltimore, MD

JOHNS HOPKINS UNIVERSITY, DEPARTMENT OF BIOPHYSICS | PI: MARGARET JOHNSON, PHD

December 2015 - August 2017

- Analyzed and assessed challenges facing current single-particle modeling methods of biochemical systems.
- Studied spatial and stochastic effects on protein dynamics.
- Mentored a student in the Biophysics Research for Baltimore Teens program.

Software

beer: Bayesian Enrichment in R (R package)

📄 BIOCONDUCTOR | 📄 ATHCHEN/BEER

- R package for quantifying antibody responses from phage-immunoprecipitation sequencing data.
- Implements BEER and edgeR for identifying enriched antibody responses.
- BEER is more sensitive for detecting peptides with smaller fold-changes with fewer false positives.

PhIPData (R package)

📄 BIOCONDUCTOR | 📄 ATHCHEN/PHIPDATA

- R package for organizing data from phage-immunoprecipitation sequencing (PhIP-seq) experiments.
- Includes specialized methods to subset and identify negative control samples, filter by viral species, and use existing libraries to populate object parameters.

Publications

Journal Articles (peer reviewed)

1. **Chen, A.**, Laeyendecker, O., Eshleman, S. H., Monaco, D. R., Kammers, K., Larman, H. B. & Ruczinski, I. **A top scoring pairs classifier for recent HIV infections.** *Statistics in Medicine*. doi: [10.1002/sim.8920](https://doi.org/10.1002/sim.8920) (Mar. 2021).
2. Johnson, M. E., **Chen, A.**, Faeder, J. R., Henning, P., Moraru, I. I., Meier-Schellersheim, M., Murphy, R. F., Prustel, T., Theriot, J. A. & Uhrmacher, A. M. **Quantifying the roles of space and stochasticity in computer simulations for cell biology and cellular biochemistry.** *Molecular Biology of the Cell* **32**. PMID: 33237849, 186–210. doi: [10.1091/mbc.E20-08-0530](https://doi.org/10.1091/mbc.E20-08-0530) (Jan. 2021).
3. Kammers, K., **Chen, A.**, Monaco, D. R., Hudelson, S. E., Grant-McAuley, W., Moore, R. D., Alter, G., Deeks, S. G., Morrison, C. S., Eller, L. A., Blankson, J. N., Laeyendecker, O., Ruczinski, I., Eshleman, S. H. & Larman, H. B. **HIV Antibody Profiles in HIV Controllers and Persons With Treatment-Induced Viral Suppression.** *Frontiers in Immunology* **12**, 3459. doi: [10.3389/fimmu.2021.740395](https://doi.org/10.3389/fimmu.2021.740395) (Aug. 2021).
4. Peng, R., **Chen, A.**, Bridgeford, E., Leek, J. T. & Hicks, S. C. **Diagnosing Data Analytic Problems in the Classroom.** *Journal of Statistics and Data Science Education*. doi: [10.1080/26939169.2021.1971586](https://doi.org/10.1080/26939169.2021.1971586) (Aug. 2021).
5. R., M. W., Henson, S. N., Monaco, D. R., **Chen, A.**, Littlefield, K., Bloch, E. M., Fujimura, E., Ruczinski, I., Crowley, A. R., Harini, N., Butler, S. E., Weiner, J. A., Li, M. Z., Bonny, T. S., Benner, S. E., Balagopal, A., Sullivan, D., Shoham, S., Quinn, T. C., Eshleman, S., Casadevall, A., Redd, A. D., Laeyendecker, O., Ackerman, M. E., Andrew, P., Elledge, S. J., Robinson, M. L., Tobian, A. A. R. & Larman, H. B. **Antibody responses to endemic coronaviruses modulate COVID-19 convalescent plasma functionality.** *The Journal of Clinical Investigation*. doi: [10.1172/JCI146927](https://doi.org/10.1172/JCI146927) (Feb. 2021).
6. Eshleman, S. H., Laeyendecker, O., Kammers, K., **Chen, A.**, Sivay, M. V., Kottapalli, S., Sie, B. M., Yuan, T., Monaco, D. R., Mohan, D., Wansley, D., Kula, T., Morrison, C., Elledge, S. J., Brookmeyer, R., Ruczinski, I. & Larman, H. B. **Comprehensive profiling of HIV antibody evolution.** *Cell Reports* **27**, 1422–1433. doi: [10.1016/j.celrep.2019.03.097](https://doi.org/10.1016/j.celrep.2019.03.097) (Apr. 2019).

Preprints (not peer reviewed)

* INDICATES EQUAL CONTRIBUTIONS

7. **Chen, A.**, Kammers, K., Larman, H. B., Scharpf, R. B. & Ruczinski, I. **Detecting Antibody Reactivities in Phage ImmunoPrecipitation Sequencing Data.** *bioRxiv*. doi: [10.1101/2022.01.19.476926](https://doi.org/10.1101/2022.01.19.476926) (2022).
8. Angkeow, J. W. *, Monaco, D. R. *, **Chen, A. ***, Venkataraman, T., Jayaraman, S., Valencia, C., Sie, B. M., Liechti, T., Farhadi, P. N., Funez-dePagnier, G., Sherman-Baust, C. A., Wong, M. Q., Sears, C. L., Simner, P. J., Round, J. L., Duggal, P., Laserson, U., Steiner, T. S., Sen, R., Lloyd, T. E., Roederer, M., Mammen, A. L., Longman, R. S., Rider, L. G. & Larman, H. B. **Prevalence, persistence, and genetics of antibody responses to protein toxins and virulence factors.** *bioRxiv*. doi: [10.1101/2021.10.01.462481](https://doi.org/10.1101/2021.10.01.462481) (2021).

In Preparation

9. **Chen, A.**, Kammers, K., Larman, H. B., Scharpf, R. B. & Ruczinski, I. **Detecting and quantifying antibody reactivity in PhIP-Seq data with BEER.** *Under review at Bioinformatics*.

Posters and Presentations

Jan 2022	Quantifying antibody responses with BEER JHU SOM Division of Biostatistics and Bioinformatics Seminar Invited Talk	Virtual
Mar 2021	Antibody Profiling Identifies Antibody Targets Associated with Natural HIV Control Conference on Retroviruses and Opportunistic Infections Science Spotlight Presentation	Virtual
April 2020	Top Scoring Pairs Classifier for Identifying Recent HIV Infection Johns Hopkins Biostatistics Seminar Lightning Talk	Baltimore, MD
Mar 2020	Improving Classification for Recent HIV Infection Using Top Scoring Pairs Conference on Retroviruses and Opportunistic Infections Poster	Boston, MA
Nov 2016	Spatial Cell Modeling: Application and Evaluation of Methodologies Lectures in Computational Biophysics at Johns Hopkins University Invited Talk	Baltimore, MD

Honors & Awards

2021	The Margaret Merrell Award , Johns Hopkins Department of Biostatistics New Investigator Scholarship , Conference on Retroviruses and Opportunistic Infections
2020	The June B. Culley Award , Johns Hopkins Department of Biostatistics The Jane and Steve Dykacz Award , Johns Hopkins Department of Biostatistics New Investigator Scholarship , Conference on Retroviruses and Opportunistic Infections
2018	Wolfe Street Competition , Maryland Genetics, Epidemiology, and Medicine (MD-GEM) Training Program and Burroughs-Wellcome Fund
2017	Phi Beta Kappa , Johns Hopkins University Hartline Research Award in Biophysics , Johns Hopkins University Department of Biophysics Naddor Prize , Johns Hopkins University Department of Applied Math and Statistics
2015–2016	Michael S. Applestein Scholarship , Johns Hopkins University Aronson Family Scholarship , Johns Hopkins University
2014–2017	Dean's List , Johns Hopkins University

Teaching

Guest Lecturer

Fall 2019	Advanced Data Science , <i>Evaluating Data Analyses with Examples</i> taught by Stephanie Hicks, PhD and Roger Peng, PhD
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Graduate Teaching Assistant

- Guided students through lab exercises and discussions of course material.
- Provided feedback on assignments to facilitate a better understanding of course concepts.

Spring 2022	Statistical Methods in Public Health III , taught by Marie Diener-West, PhD and Leah Jager, PhD
Fall 2021	Statistical Methods in Public Health II , taught by Marie Diener-West, PhD and Karen Bandeen-Roche, PhD Statistical Computing , taught by Stephanie Hicks, PhD
Spring 2021	Bayesian Methods I and II , taught by Gary Rosner, PhD and Robert Scharpf, PhD
Fall 2019/2020	Advanced Data Science , taught by Jeff Leek, PhD; Stephanie Hicks, PhD; and Roger Peng, PhD
Summer 2020	Data Wrangling with R , taught by Andrew Jaffe, PhD and John Muschelli, PhD Introduction to R for Public Health Researchers , taught by Andrew Jaffe, PhD and John Muschelli, PhD
Spring 2020	Statistics for Laboratory Scientists I and II , taught by Ingo Ruczinski, PhD
Spring 2019	Statistical Methods in Public Health III and IV , taught by Marie Diener-West, PhD; Leah Jager, PhD; James Tonascia, PhD
Fall 2018	Methods in Biostatistics I and II , taught by Ciprian Crainiceanu, PhD

Undergraduate Teaching Assistant

- Developed computer lab exercises on bioinformatic techniques to analyze omic data sets.
- Assisted students with homework and computing lab assignments.
- Led review sessions to reinforce topics introduced in lecture.

Spring 2017 **Introduction to Bioinformatics**, taught by Patrick Fleming, PhD

Fall 2016 **Biochemistry I**, taught by Patrick Fleming, PhD

Summer 2016 **Discrete Mathematics**, taught by Fred Torcaso, PhD

Service

Biostatistics Student Organization Co-founder and President

Baltimore, MD

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF BIOSTATISTICS

August 2020 – Present

- Established a student organization to facilitate student-to-student and student-to-faculty communication in the department and advocate for student needs.
- Organized monthly meetings to discuss student concerns, activities, and other initiatives.

PhD Student Mentoring Committee Chair

Baltimore, MD

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF BIOSTATISTICS

August 2019 – Present

- Established mentoring program to enable students to collaboratively enhance skills, share knowledge, and experience growth through peer mentoring.
- Organized training sessions regarding mental health awareness, prevention, and treatment for mentors as well as mentor resources.

PhD Student Event Committee Chair

Baltimore, MD

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF BIOSTATISTICS

August 2019 – Present

- Organized luncheons discussing student well-being, concerns, and career opportunities.

Graduate Program Recruiting Committee

Baltimore, MD

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF BIOSTATISTICS

February 2018 – Present

- Assisted with recruitment weekend events and interviews.
- Met with prospective and admitted students.