Armaan Ahmed

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EDUCATION

- **The Johns Hopkins University** — Baltimore, MD
  B.S. in Applied Math & Statistics and B.A. in Biophysics; Sophomore; 4.00 GPA — *Aug. 2022 – June 2026*

- **Scarsdale High School** — Scarsdale, NY
  High School Diploma; 4.00 (4.15/4.30) GPA — *Aug. 2018 – July. 2022*

SKILL SET

- **Programming:** Python, Java, Bash, Javascript, HTML, CSS
- **Typesetting:** LaTeX, Markdown, Microsoft Office, LibreOffice
- **Research:** Probability, Bioinformatics, Molecular Dynamics, Monte Carlo Simulations, Wet-lab techniques

EXPERIENCE

- **Teaching Assistant/Tutoring** — Baltimore, MD
  The Johns Hopkins University — *Sept 2024 - Present*
  - **Probability Teacher Assistant (Fall, 2024):** Lead discussion sections, grade assignments, and proctor exams.
  - **Intro to Computing Teacher Assistant (Spring, 2024):** Hold office hours for students, grade assignments, and assist in class.
  - **Physics II Learning Assistant (Spring, 2024):** Assist students during discussion section on problem sets.
  - **Learning Den Personalized Tutor (Fall, 2023):** Tutor students on subjects ranging from Organic Chemistry to Honors Linear Algebra.

- **Noble Lab** — London, England
  Student Researcher — *Feb 2024 - Present*
  - **Investigating properties of a universal tree balance index** Performing analytical work to investigate expected values of the J_1 index, along with minimal values in a special class of trees.
  - **Investigating extinction therapy:** Used simulations and analytical work to understand the theoretical merits of a two-sequence cancer therapy, where the second drug is applied whilst the tumor is still undetectable.

- **Yaojun Zhang Lab** — Baltimore, MD
  Student Researcher — *Apr 2023 - Present*
  - **Studying protein phase separation:** Using course-grain molecular dynamics simulations (LAMMPS) to understand the two-step path a *de novo* protein undertakes during crystallization. Relevant modeling parameters are informed from experimental data, docking, and atomistic simulations.

- **Taekjip Ha Lab** — Baltimore, MD
  Student Researcher — *Oct 2022 - May 2023*
  - **Rational protein engineering:** Worked with graduate student Jimin Kang to computationally design thermostable DNMT1 methyltransferase variants. Generated in silico mutation libraries and selected top candidates by using metal cofactor, DNA, and SAM binding screens. Performed MD simulations to verify thermostability using NAMD
  - **Maintaining methylation markers during amplification:** Designed candidate target and primers to verify above results in vitro. Performed and optimized 37 °C SHARP amplification, an in-house method to isothermally amplify DNA. Performed protein purification.

- **Elmhurst Hospital Intern** — Queens, NY
  Student Researcher and Intern — *May 2022 - Present*

- ○ **2023 Summer Hospital Volunteer:** Performed clinical work, shadowing, and research. Called on patients, asked questions, and delivered relevant paperwork. Watched surgeries in the operating rooms, including open, laparoscopic, and robotic. Additionally, shadowed the surgical technology team. Aided in different database analyses.
- ○ **SEER cancer database exploratory analysis:** Performed database and survival analysis on SEER cancer cases. Analyzed survival difference depending on hospital accreditation status. Conducted all statistical analyses, wrote a manuscript on the results, and submitted poster to the International Conference on Surgical Cancer Care
- ○ **Analysis of referral, management, and treatment patterns for appendiceal neoplasms:** Performed an in-house retrospective chart review of all appendiceal neoplasms. Investigated patterns of presentation, referral, and management.

- **Wigdahl Lab**   Philadelphia, PA
  Student Researcher   *Mar 2020 - Jun 2022*
  - ○ **Computational design of robust diagnostic tool:** Conducted bioinformatic research under Dr. Will Dampier at the Wigdahl Laboratory developing clinically relavent probes against HIV-1 drug resistance using the novel SHERLOCK technology. Designed varient-resistant LAMP primers and gRNAs.
  - ○ **In vitro validation:** Conducted in vitro research throughout the 2021 summer and six weeks from May to June, 2022 (40+ hrs/week). Performed Cas12b activity analysis and PCR and LAMP amplification. Wrote first-author manuscript (unpublished) and presented at multiple conferences and competitions
  - ○ **Patient-varient HIV-1 amplification and sequencing:** Performed PCR amplification of patient HIV-1 samples and ran a subset of them through a Nanopore sequencer

MANUSCRIPTS

1. Manojlović, V.*, **Ahmed, A.***, Viossat, Y., Noble, R. (2024). Expected and minimal values of a universal tree balance index. *In preparation.*
2. Patil, S., **Ahmed, A.**, Viossat, Y., & Noble, R. (2024). Preventing Evolutionary Rescue In Cancer. *biorxiv.* doi:10.1101/2023.11.22.568336. *(Currently Submitting)*
3. **Ahmed, A.**, Whittington, J., & Shafaee, Z. (2023). Impact of Commission on Cancer Accreditation on Cancer Survival: A SEER Database Analysis. *Annals of Surgical Oncology.* doi:10.1245/s10434-023-14709-4

CONFERENCES AND WORKSHOPS

1. Esparham, A., **Ahmed, A.**, Shoar, S., & Shafaee, Z. (2024). Impact of Obesity on In-Hospital Outcomes Following Hepatic Resection: A Propensity Score Matched Analysis of the US National Inpatient Sample. Advanced Cancer Therapies, Puerto Rico.
2. **Ahmed, A.**, Whittington, J., & Shafaee, Z. (2024). Patterns of presentation and delivery of care of appendiceal neoplasms in the municipal safety-net setting. Society of Surgical Oncology Annual Meeting, Atlanta.
3. Esparham, A., **Ahmed, A.**, Shoar, S., & Shafaee, Z. (2024). National Trends, Complications, and In-hospital Outcomes for Patients Undergoing Immediate Implant-based versus autologous-based Breast Reconstruction: A Propensity Score Matched Analysis. Society of Surgical Oncology Annual Meeting, Atlanta.
4. **Ahmed, A.**, Whittington, J., & Shafaee, Z. (2024). Patterns of presentation and delivery of care of appendiceal neoplasms in the largest municipal health care delivery system in the United States. ASCO Gastrointestinal Cancers Symposium, San Francisco. doi:10.1200/JCO.2024.42.3_suppl.14
5. Kang, J., Momčilo, G., Urteaga, R. M., **Ahmed, A.**, & Ha, T. (2023). Engineered Helicase Replaces Thermocycler in DNA Amplification. The UKC.
6. **Ahmed, A**. & Shafaee, Z. (2023). Impact of Commission on Cancer Accreditation on Cancer Survival: A SEER Database Analysis. International Conference on Surgical Cancer Care, Boston. doi:10.1245/s10434-023-13332-7
7. Berman, R., Dampier, W.,... **Ahmed, A.**, Szep, Z., Nonnemacher, M., & Wigdahl, B. (2022). PP 6.5-00205 Utilization of high-throughput assays and deep-learning for selection of CRISPR/Cas9-gRNA pairs used in an HIV-1 cure strategy. Tenth International Workshop on HIV Persistence during Therapy, Miami. doi:10.1016/j.jve.2022.100258
8. **Ahmed, A.**, De Souza, D. R., Link, R. W., Nonnemacher, M. R., Wigdahl, B., & Dampier, W. (2021). Design of a SHERLOCK-based low resource screening assay for HIV-1 drug resistance. Discovery Day 2021, Philadelphia, PA, USA. Zenodo, https://doi.org/10.5281/zenodo.5719853

*These authors contributed equally to the work.

9. **Ahmed, A.**, De Souza, D. R., Link, R. W., Nonnemacher, M. R., Wigdahl, B., & Dampier, W. (2021). In silico design of a SHERLOCK-based point-of-care diagnostic for HIV-1 drug resistance. 17th International Symposium on NeuroVirology (ISNV), Virtual. Zenodo, https://doi.org/10.5281/zenodo.5719377

10. **Ahmed, A.**, Link, R. W., Nonnemacher, M. R., Wigdahl, B., & Dampier, W. (2020). Design of a low resource screening technology for HIV drug resistance using SHERLOCK. Discovery Day 2020, Virtual. Zenodo. https://doi.org/10.5281/zenodo.5719

PROJECTS (CLICKABLE)

- **Website:** Designed a personal portfolio using the Django Python framework.
- **Hospital Accreditation Comparison:** Comparison of survival rates between hospitals with and without CoC accreditation.
- **Variability Analyzer:** Tool to analyze variability and entropy of genomic sequences
- **LAMP primer design for quasispecies amplification:** Designed a system to generate sensitive LAMP primers, able to overcome target variability.
- **ReactionMechanizer:** Created a program to simulate chemical reactions and analyze kinetics.

RELEVANT COURSEWORK

(Unofficial transcript available here)

- Honors Multivariable Calculus (110.211; A+)
- Differential Equations (110.302; A)
- Honors Linear Algebra (110.212; A+)
- General Physics II (171.102; A+)
- Honors Organic Chemistry II (030.212; A+)
- Biochemistry I (250.315; A+)
- Probability (553.620; A+)
- Honors Mathematical Statistics (553.431; A)

AWARDS

- **Dean's ASPIRE Award Recipient ($2,250 Research Award)** — Baltimore, MD
  The Johns Hopkins University — *Jan 2024*

- **Dean's List (3x)** — Baltimore, MD
  The Johns Hopkins University — *Jan 2023*

- **Regeneron STS Semifinalist** — Washington D.C.
  Society For Science — *Jan 2022*

EXTRACURRICULAR ACTIVITIES

- **The Johns Hopkins News-Letter** — Baltimore, MD
  Writer — *Jan 2023 - Sep 2023*
  - **Volunteer writer for the SciTech column:** I generally write articles weekly about different scientific topics. Duties include researching topics, interviewing scientists, and writing articles.