

## EDUCATION

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- **The Johns Hopkins University** Baltimore, MD  
*B.S. in Biomedical Engineering 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*

## ACADEMIC BIOGRAPHY

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Armaan is an undergraduate at the Johns Hopkins University studying Biomedical Engineering and Biophysics. He is an aspiring MD/PhD student interested in using computation to characterize molecular phenomena and to perform database analysis to find relevant oncological trends. With Dr. Yaojun Zhang at Johns Hopkins, he investigates what properties of a *de novo* protein lead it to undergo a non-classical crystallization pathway *in cellulo*. In collaboration with Elmhurst Hospital, he investigates both national trends in oncological outcome and in-house management practices.

## RESEARCH EXPERIENCE

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- **Yaojun Zhang Lab** Baltimore, MD  
*Student Researcher* *Apr 2023 - Present*
  - **Studying protein phase separation:** Using coarse-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  
*Associate 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 relevant probes against HIV-1 drug resistance using the novel SHERLOCK technology. Designed variant-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-variant HIV-1 amplification and sequencing:** Performed PCR amplification of patient HIV-1 samples and ran a subset of them through a Nanopore sequencer

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## PEER-REVIEWED PUBLICATIONS

1. **Ahmed, A.**, Whittington, J., & Shafae, 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

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## CONFERENCES AND WORKSHOPS

1. Esparham, A., **Ahmed, A.**, Shoar, S., & Shafae, 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., & Shafae, 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., & Shafae, 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., & Shafae, 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.
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.** & Shafae, 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>

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## RELEVANT COURSEWORK

(Unofficial transcript available [here](#))

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| • Single Molecule & Cell Biophysics (250.335; A) | A)                                    | (030.212; A+)                  |
| • Honors Multivariable Calculus (110.211; A+)    | • Honors Linear Algebra (110.212; A+) | • Biochemistry I (250.315; A+) |
| • Differential Equations (110.302; A)            | • General Physics II (171.102; A+)    | • Probability (553.620; A+)    |
| • Honors Organic Chemistry II                    |                                       |                                |

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## AWARDS

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| • <b>Dean's ASPIRE Award Recipient (\$2,250 Research Award)</b><br><i>The Johns Hopkins University</i>           | Baltimore, MD<br><i>Jan 2024</i>    |
| • <b>Dean's List (3x)</b><br><i>The Johns Hopkins University</i>   | Baltimore, MD<br><i>Jan 2023</i>    |
| • <b>1<sup>st</sup> Place for Outstanding High School Poster</b><br><i>Discovery Day 2021, Drexel University</i> | Philadelphia, NY<br><i>Oct 2021</i> |