Aaron Colon

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Summary

Undergraduate researcher in Biostatistics & Health Data Science with experience in computational epidemiology, bioinformatics, and DNA computation. I am interested in data-driven public health forecasting and outbreak simulation.

Education

Lehigh University, Bethlehem, PA   Graduation: May 2027
Biostatistics & Health Data Science, Pre-medicine | GPA: 3.77 |
Easton High School, Easton, PA   Graduation: June 2023 Honors:
AP Scholar with Honors, High Honor Roll, Top 1% Graduating Class

Technical Skills:

- **Programming & Data Science:** Python, R, GitHub
- **Modeling & Analytics:** Epidemiological modeling (SIR), Simulation design, Feature engineering
- **Bioinformatics Tools:** HHPred, Phamerator, DNA Master, PhagesDB, GeneMarkS, DeepTMHMM, SOSUI
- **Data Visualization:** Matplotlib, ggplot2

Research Involvement

Forecasting Disease Outbreaks using Temporal Networks in Congregate Settings   2024-Current
- **Hypothesis**: Epidemic outbreaks in congregate settings can be predicted and mitigated through network-based modeling of temporal interactions.
- **Results**: Built temporal contact network models using real-world conference data; simulations showed that targeted interventions at high-degree or high-betweenness nodes significantly reduced outbreak magnitude.
- **Skills learned and applied**: Network analysis (Python: pandas, networkx, matplotlib), SIR simulation modeling, data visualization, public health informatics, and mathematical modeling of infection dynamics.

DNA Sticker Computation via Electrowetting   2023-Current
- **Hypothesis**: DNA strands can be used as programmable "stickers" in a microfluidic environment to perform combinatorial computations through electrowetting-on-dielectric (EWOD) control.
- **Results**: Demonstrated droplet-based manipulation of DNA "sticker" sequences on EWOD chips, validating the feasibility of bio-inspired logical operations and contributing to an upcoming manuscript.
- **Skills learned and applied**: EWOD operation, DNA computation principles, lab instrumentation, and research writing

Sea-Phages/Sea-Genes   2023-2024
- **Hypothesis:** The genomic structure and coding potential of Mycobacterium smegmatis phage *Hanako* could reveal unique gene functions contributing to host-phage interactions.
- **Results:** Successfully annotated and submitted *Hanako*'s genome to NCBI GenBank, identifying hypothetical proteins and refining gene start/stop predictions through comparative analysis using Starterator, GeneMarkS, and BLASTp.
- **Skills learned and applied:** Genome annotation, bioinformatics tools (DNA Master, PhagesDB, HHPred, DeepTMHMM, SOSUI, Phamerator), comparative genomics, GenBank formatting and submission.

Presentations:

- **Aaron Colon**, Cheyenne Desmond, Thomas McAndrew, Forecasting Disease Outbreaks using Temporal Networks in Congregate Settings
  - Lehigh University, Bethlehem, PA. *Lehigh College of Health Research Expo*, 2025.
  - Lehigh University, Bethlehem, PA. *Lehigh Summer Research Expo*, 2025.
- **Aaron Colon**. et. al, DNA Sticker Computation via Electrowetting
  - Lehigh University, Bethlehem, PA. *Lehigh Summer Research Expo*, 2024.
  - John Hopkins University, Baltimore, MD. *30th International Conference on DNA Computing and Molecular Programming (DNA30),* 2024.

Awards

- Dean's List (4x)
- Best Research Award (DNA Sticker Computation via Electrowetting)
- Tri-Alpha Inductee
- Lehigh Trustee Scholar