

Samuel Wiley

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EDUCATION

Georgia Institute of Technology

Atlanta, Georgia

Bachelor of Science in Physics, GPA: 3.42

May 2021

Minor in **Chemistry**

Zell Miller Scholar, Leddy Family Scholar

Certification in Data Science through CDC's Data Science Upskilling program

July 2024

EXPERIENCE

Centers for Disease Control and Prevention (CDC)

July 2023 - Present

ORISE Fellow, Influenza Division Bioinformatics

- Collaborated with the Office of the Director Bioinformatics Team in the Influenza Division National Center for Immunization and Respiratory Diseases
- Contributed to codebases and pipelines to support CDC's influenza surveillance and vaccine recommendations

Georgia Institute of Technology, CHAOS Lab

2016 - 2020

Research Assistant, NSF Frontiers Grant, President's Undergraduate Research Award

- Designed and conducted electrophysiology experiments to study heart arrhythmias and heart attacks
- Received grant for researching cardiac dynamics of regenerated zebrafish heart tissue
- Assisted in upkeep of lab equipment and materials

Georgia Tech School of Physics

2016 - 2019

Teaching Assistant

- Led lab and recitation sessions for two introductory physics courses and physics freshman seminar
- Graded assignments for Stellar Astrophysics, introductory classes, and physics freshman seminar

Paper (Tutoring Company)

February 2022 - July 2023

Tutor, Level 3

- Provide structured academic support in math and sciences to over 4200 students in grades 1 - 12
- Perform quality assurance reviews on peer tutors' sessions
- Mentor peers in more effectively helping students and progressing the company's mission

PROJECTS

UDF-bioutils: Bioinformatics related user-defined functions for Cloudera Impala Ongoing

Open-source repository as of July 2024

- Developed and optimized custom user-defined functions in C++ for influenza SQL databases
- Collaborated with users to create database functions including allele sorting, Tamura-Nei pairwise distance calculation, and amino acid substitution site sorting

IRMA-Core: Iterative Refinement Meta-Assembler

Ongoing

Open-sourcing in progress

- Collaborated with a team of four and stakeholders to re-write core components of the IRMA data pipeline in Rust for efficiency and accuracy
- Optimized algorithm for efficient primer and barcode trimming from DNA sequence reads and handled user command-line arguments

SSWSort2: Simple virus genome classification via Smith-Waterman

Ongoing

Open-sourcing in progress

- Collaborated on a team of three to re-write a package in Rust for sorting and classifying viral DNA segments using the Striped Smith-Waterman algorithm
- Designed configuration files and configuration parser to store and implement user preferences

Visualizing Influenza Evolutionary Trajectories in Fitness Landscapes Sep. 2023 - Jul. 2024

CDC Data Science Upskilling program, 2024 Cohort

- Collaborated with a team of four to create a data pipeline for analyzing trends between genomic, proteomic, and antigenic characteristics of influenza viral strains
- Designed and created an interactive data visualization dashboard in Plotly/Dash for communicating findings with Influenza Division leadership
- Presented on findings and results at the 2024 Data Science Upskilling Symposium

Zoe: A Rust Bioinformatics Library

Ongoing

Open-sourcing in progress

- Collaborated with other open-source developers on a Rust crate for handling common bioinformatics functions and files
- Created and optimized module for calculating nucleotide substitution distances including Jukes-Cantor, Felsenstein, Tamura-Nei, and General Time-Reversible (in progress) models

Computational Compost: A Simulation Approach to Compost Thermodynamics 2018

The University Physics Competition, Silver Medal

- Developed a cellular diffusion model; created a computational framework to simulate a compost pile in Python with visualizations in Matplotlib
- Worked in team to research, design and conduct simulation, and write a paper within 48 hr time limit

SKILLS

Languages, Scripting, and Mark-up: Rust, Python, C++, Scala, R, Perl, BASH, SQL, LaTeX

Software/Frameworks: MATLAB, Linux, Git, Plotly/Dash, pandas, Fusion360

Bioinformatics: Sequence alignment, nucleotide substitution models, primer trimming

Computer Science: Algorithm development, fuzz testing, unit testing, benchmarking, data analytics

Physics: Computational Methods, Linear/Nonlinear Oscillations, Reaction-Diffusion Mechanisms,

Equipment/Tools: Electronics/Circuits, Microelectrode, Optical Mapping, Wood shop tools

Chemistry: Computational Methods, Density Functional Theory, Molecular Dynamics

LEADERSHIP AND ACTIVITIES

Bagpipes: *Pipe Sergeant, Member at Large*, and *instructor* of the Atlanta Pipe Band

Played at the 2024 Grade 1 World Championships with the City of Dunedin Pipe Band

GT Society of Physics Students: *Secretary*, Outreach Committee Member

Singing: *Section Leader* of GT Glee Club; *Staff Singer* and soloist at All Saints Episcopal Church