# 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 Simulational 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