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## EDUCATION

University of Illinois at Urbana-Champaign, Urbana, IL, USA

M.C.S. in Computer Science, The Grainger College of Engineering

Sept 2026 – Present

B.S. in Computer Science, The Grainger College of Engineering

Sept 2021 – May 2026

B.S. in Mathematics, College of Liberal Arts & Sciences

Sept 2023 – May 2026

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## TECHNICAL SKILLS

**Programming Languages:** C/C++, Python, Java, Golang, Rust, LaTeX; SQL/MySQL, PostgreSQL, MongoDB, Neo4J; JavaScript, TypeScript; Assembly, Shell Script, Lua; MATLAB/Simulink, Mathematica; HTML, CSS

**Libraries & Frameworks:** GCP; NumPy, SciPy, Matplotlib, Pandas; Git, Docker, Kubernetes, React, Vue, Jira, Catch2, GoogleTest, Gradle, Valgrind

**Hardware Platforms:** OpenWrt; Arduino, Raspberry Pi, TX1 Jetson; NI CompactRIO

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## PROJECTS

### RNA Transcriptional Regulation via Hill Functions

Jan 2025 – May 2025

<https://github.com/wkxkevin/RNA-Transcriptional-Regulation-via-Hill-Functions>

- Extended the classical 2D RNA velocity ODE framework with Hill-function-based transcriptional regulation, modeling activator-driven, repressor-driven, and coupled 4D activator-repressor dynamical systems
- Derived closed-form steady states and performed discriminant and bifurcation analysis to characterize bistability in gene regulatory networks relevant to cancer cell-state transitions
- Implemented numerical steady-state solver in Python using SciPy to sweep biologically relevant parameter spaces across 10,000-point parameter grids

### Academic Integrity Detection System

Jun 2025 – Present

University of Illinois at Urbana-Champaign, Champaign, IL, USA

- Sole developer and maintainer of production plagiarism detection tool actively used each semester for CS411 (400+ students)
- Implemented multithreaded pairwise sequence alignment engine in C++ using pthreads, processing 1M+ query-pair comparisons per assignment across SQL, MySQL, MongoDB, and Neo4J submissions
- Applied statistical anomaly detection to flag suspicious submission timing patterns and high-similarity pairs

### Smogon/Pokémon Showdown — Open Source Contributor

Aug 2025 – Present

- Designed and implemented a TypeScript data extraction module for the monotype battle format, parsing in-battle team compositions to determine shared typing and generate matchup statistics
- Contribution merged into production codebase; output published monthly to [smogon.com/stats](https://smogon.com/stats); iterated from initial JavaScript prototype to TypeScript at maintainers' request

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## EXPERIENCE

### Cardiovascular Research Internship

Dec 2022 – Apr 2024

MedStar Washington Hospital Center, Washington, DC, USA

- Developed computational tools in C++ to support cardiovascular imaging research, processing DICOM ultrasound data across 1,000+ patient records to enable automated anatomical region detection
- Implemented a high-performance image segmentation pipeline modeling ultrasound data as terrain graphs, applying dynamic programming and graph-based extrema analysis to characterize anatomical structures
- Developed binary parsing layer for DICOM ultrasound files to support efficient backend storage of large-scale patient imaging datasets

### Course Assistant: Database Systems

Jun 2025 – Present

University of Illinois at Urbana-Champaign, Champaign, IL, USA

- Guide 400+ students through daily group activities and final app development projects covering relational and non-relational database design
- Hold office hours covering database indexing, normal forms, query optimization, and schema design across SQL, MySQL, MongoDB, and Neo4J
- Design supplemental problem sets and assessments to reinforce core database systems concepts

### Course Assistant: Introduction to Algorithms & Models of Computation

Aug 2023 – Dec 2023

University of Illinois at Urbana-Champaign, Champaign, IL, USA

- Supported 400+ students through weekly office hours and homework help sessions covering divide and conquer, dynamic programming, graph traversal, and models of computation
- Developed exam review materials and weekly homework guides to improve student performance
- Designed homework and exam problems to more accurately measure student concept mastery

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## COURSEWORK

**Computer Science:** Database Systems, Advanced Algorithms, Communication Networks, Systems Programming, Distributed Systems, Artificial Intelligence, Numerical Methods, Bioinformatics, Cancer Genomics

**Mathematics:** Graph Theory, Combinatorics, Probability Theory, Abstract Linear Algebra, Real Analysis

**Life Sciences:** Models in Mathematical Biology, Molecular Biology, Molecular Genetics, Organic Chemistry I & II