Jacob Zimmerman

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WORK EXPERIENCE

Tufts CS Department **September 2023 – December 2023**
Teaching Assistant, Compilers CS107 *Medford, MA*
- Guided student groups on a semester-long project to design a language and compiler with LLVM
- Invited to TA based on a hobby compiler I taught myself to build

Lawrence Berkeley National Laboratory **Summer 2022, 2023**
Intern, Computing Sciences | June 2023 – August 2023 *Berkeley, CA*
- Built a GUI application to synthesize Python scripts for creating Neurodata Without Borders data schemas
- App will be used by hundreds of neuroscientists

Intern, NERSC, JGI | June 2022 – September 2022
- Profiled and analyzed bioinformatics workflows on supercomputer clusters
- Identified and addressed inefficient resource requests with a tool to browse performance histories of similar programs
- Developed an algorithm and library to detect semantically meaningless words within highly technical scientific papers
- Improved research impact analysis workflows at the large datasets of papers that cite JGI research

Simm's Art Taos **September 2020 – January 2021**
Galleried Artist *Taos, NM*
- Travelled alone to New Mexico to chase my dream of becoming a landscape painter

PERSONAL PROJECTS

Read more at jacobzim.com/#projects

Impcore Language JIT Compiler *Rust, LLVM* **2023**
- Impcore is a very slow language used at Tufts to teach formal language semantics and theory
- Taught myself to write a compiler and reimplemented the language with 14000x speedup
- Features lazy JIT compilation, and hygienic macro preprocessor
- Porting my C RISC-V emulator to Impcore so I can run a Linux kernel in the interpreter

Volumetric Atmosphere and Dynamic Water Playground *WebGL, GLSL* **2022**
- Voted best project in graphics class for independent final group projects, written with two partners
- Pure WebGL renderer from scratch, no 3D graphics libraries
- Physically based light scattering in volumetric atmosphere, procedural clouds, dynamic water simulation

Novel Algorithm for Generative Pixel Art *Rust* **2023**
Real-Time Ray-Traced Ocean *GLSL, WebGL* **2022**
Biologically Inspired Unsupervised Learning Algorithm for Spiking Neural Net *C* **2021**
Mutation-Based Evolution Simulation *C++* **2021**
Billsplit Receipt Splitter App *HTML, JS, CSS* **2021**

EDUCATION

Tufts University *B.S. Computer Science*, 3.69 GPA **Graduation February 2024**
- CS Courses: Computer Graphics, Parallel Computing, Machine Structures and Assembly, Programming Languages, Intro AI, Intro ML, Software Engineering, Internet-Scale Distributed Systems.
- Math Courses: Algorithms, Computation Theory, Statistics, Calculus, Mathematical Neuroscience, Discrete

Tufts Computer Science Side Projects Collaborative, *Founder*
- Started a club for passionate programmers to collaborate on projects and ideas
- Created a workshop series, I successfully led a beginner programmer workshop to write a ray tracer in C

Conspiracy Theories and the Epistemology of Belief, *Co-Teacher and Course Creator*
- Designed and taught a semester-long full-credit freshman seminar course to 14 students

SKILLS & INTERESTS

- **Skills:** compilers, OpenGL, WebGPU, low-level programming, systems design, HPC, data science, web frontend
- **Languages:** Rust, C, OCaml, C++, TS/JS, CSS, Python, Prolog, GLSL, CUDA, Chinese
- **Interests:** Anthropology of Technology, Soccer, Mountain Biking, Painting, Constructionist Learning Theory