Dan Zimmerman

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EDUCATION

M.S. in Mathematics | Loyola University Chicago *Spring 2025*

Selected Coursework: *Convex Analysis (Goebel); Functional Analysis (Bachman); Topology (Munkres); Real Analysis II (Rosenlicht); Optimization (Guenin); Game Theory (Barron); Automata & Formal Languages (Sipser)*
GPA: 3.89/4.0

B.S. in Theoretical Physics, Mathematics | Loyola University Chicago *Spring 2015*

Selected coursework: *Quantum Mechanics (Griffiths); E&M (Griffiths); Mechanics (Thornton & Marion); PDEs (Strauss); Complex Analysis (Saff & Snider); Real Analysis I (Mattuck; Rudin); Indepdendent Study Functional Analysis & PDEs (Brezis)*
Major GPA: 3.76/4.0

RESEARCH

Asymptotic Limits of Nonlocal Curvature for Curves | LUC (B. Seguin) *2023 - Present*

- Recovered classical curvature under appropriate limit of nonlocal curvature for circles in $\mathbb{R}^n$.
- Investigating recovering classical curvature under similar limit for arbitrary, sufficiently regular curves in $\mathbb{R}^n$.
- *Work in progress manuscript.*

Supernova Photometric Contamination Studies | ANL (S. Kuhlmann, J. Cunningham) *2013 - 2015*

- Reduced false-positive Type Ia identifications by approximately 50% by leveraging novel statistical software (SNCosmo) which allowed us to more granularly classify lightcurves.
- Investigated contamination of photometrically-selected Type Ia supernova samples by core-collapse supernovae using SNANA simulations and SALT2 parameter-space selection. Identified misclassified SNcc events and applied SNCosmo template-fitting with various characteristic lightcurves (code).

PRESENTATIONS

Computing the limit of the Nonlocal Curvature | AMS Fall Eastern Sectional Meeting *2024*

Oral presentation exploring computing the limit of nonlocal curvature of curves in $\mathbb{R}^n$, discussing current results and the conjecture we're actively working on relating classical and nonlocal notions of curvature.

IODI: Instruction offset Debug Information | Facebook *2019*

Oral presentation on a compiler optimization that compresses data. Presentation demonstrated the source of low entropy, described how to increase entropy, contained reduction measurements and discussed the project plan from conception to implementation.

Quantum Turing Machines and Shor's Algorithm | Loyola University of Chicago *2016*

Final oral presentation for Automata and Formal Languages course. The slides were paired with derivations on the board.

Photometric Classification of Supernovae | American Astronomical Society 225th Meeting *2015*
| Chicago Area Undergraduate Research Symposium *2015*
| National Conference on Undergraduate Research *2014*

Poster presentation showing approximately 50% total reduction of incorrect identification of Type Ia Supernovae light curves via using novel statistical software (SNCosmo) and introducing better cuts.

Dirichlet's principle | IAS Undergraduate Summer School at PCMI *2014*

Oral presentation where it was shown that minimizing the Dirichlet energy $\int \|\nabla u\|^2 - fu$ and solving Poisson's equation $-\Delta u = f$ is equivalent.

AWARDS & DISTINCTIONS

Father Gerst Memorial Award Excellence in Physics | LUC *2015*

Award established in 1965 in honor of Fr. Francis J. Gerst, S.J., former Chair of Mathematics and Dean of the Graduate School; presented to students in the physics program for **outstanding academic excellence in physics**.

Interdisciplinary Honors Program | LUC *2012 - 2015*

Completed Loyola's Interdisciplinary Honors Program, a **selective, competitive, intensive curriculum emphasizing analytical and communication skills**, international and interdisciplinary perspectives, and high academic performance (including additional honors coursework and GPA requirements).

IAS Undergraduate Summer School | PCMI *2014*

Competitively selected participant in the IAS/PCMI Undergraduate Summer School, an intensive program featuring advanced mathematical lectures by leading researchers. The program culminated in the presentation mentioned above.

APPLIED RESEARCH IN INDUSTRY

Android Binary Size Investigations | Facebook *2019*
Identified low-entropy regions in Android binaries, implemented compiler optimizations to reduce binary size (IODI).

Javascript Startup Execution Analysis | Facebook *2018*
Identified I/O inefficiencies due to metadata with low entropy, improved via string interning in Hermes.

iOS Startup Execution Analysis | Facebook *2018*
Used profilers to trace and identify inefficient memory-faulting patterns. Research culminated in internal technical report detailing measurements, the source of the bad code from the compiler and including steps for reproduction.

INDUSTRY

My work focuses on applying programming-language & information-theoretic analysis to optimization problems.

Meta | Software Engineer | AI Software Platform *Jan 2024 - Present*
- Scaled MI300 GPUs across Meta's fleet by updating algorithms to match Nvidia-class performance and accuracy.
- Improved Triton kernel performance on MI300 hardware by exploiting architecture-specific features.
- Expanded and stabilized Triton's frontend to simplify GPU kernel authoring.

Adyen | Staff Software Engineer | Mobile + POS Terminals *May 2023 - Dec 2023*
- Founding engineer in Adyen's first U.S. office; strengthened the site's engineering influence.
- Drove org-wide best practices, unified Mobile & POS Terminals via shared APIs, and established strong product–engineering communication workflows.

Spotify | Senior Software Engineer | iOS Performance *Apr 2022 - Jan 2023*
- Enhanced iOS startup instrumentation and system-level diagnostics, improving observability and app reliability.
- Developed Early Quality Tests to identify subtle and hard-to-detect performance regressions.

Snap | Senior Software Engineer | iOS Performance, CI Infrastructure *May 2020 - Feb 2022*
- Built local and production performance instrumentation adopted by dozens of teams.
- Improved app startup time by 5–10% through targeted I/O optimizations.
- Designed and implemented Python-based CI infrastructure to improve testing, reliability and debuggability.

Facebook | Senior Software Engineer | iOS + Android Performance *May 2017 - May 2020*
- Delivered 5-40% CPU, I/O, and startup performance improvements across large-scale mobile systems through profiling-guided optimizations, bytecode analysis, and AOSP on-device PGO.
- Designed and implemented Objective-C and Android bytecode compiler optimizations, including Obj-C++ codegen fixes (D41050, D59873) and debug-info reductions that cut binaries by 4–20%.
- Built large-scale performance modeling frameworks (clustering + regression) to analyze system behavior and guide engineering decisions.

Arity | Application Developer | iOS *Jul 2016 - May 2017*
- Used PLT techniques to enable experimentation of algorithms in driving-behavior app used by tens of thousands of users.

Project Vision | Tutor | Volunteer *Apr 2016 - Jul 2016*
- Worked with students from 7th grade through highschool on Mathematics, Physics and Computer Science.

StageBloc / Fullscreen | Mobile Developer | iOS *Jul 2016 - May 2017*
- Built and maintained production iOS social, shopping, and SVOD applications serving thousands of users.

Google | Software Engineer | iOS *Aug 2015 – Jan 2016*
- Implemented flight and sports cards for the iOS Google Now feature team, used by hundreds of thousands of users.

BEYOND

Skills
Python (NumPy, SciPy, Matplotlib, PyTorch, Triton); C/C++; CUDA / GPU Programming; HPC profiling & performance modeling; Mathematica; LaTeX; differential-geometric & variational techniques; asymptotic and measure-theoretic methods.

Interests
CAD modeling; 3D printing; mechanical mechanisms; neuroscience, philosophy, math, physics literature; kickboxing; rock climbing; coffee; contemporary art; book club.