Sebastian Griego

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Summary

AI-for-math focused applied mathematics M.S. student working on Lean 4 statement autoformalization, learned selection and reranking, and equivalence-centric evaluation. Built research-grade pipelines for training/evaluating transformer-based selectors, reproducible Lean toolchains, and lightweight harnesses for judging statement fidelity.

Education

San Diego State University Expected May 2026
M.S. Applied Mathematics (HSF Scholar) *San Diego, CA*

Pepperdine University May 2024
B.S. Mathematics; Minors: Data Science, Classics (Regent's Scholar) *Malibu, CA*

Research Experience

Disease Modeling Lab, San Diego State University Aug 2024 to Present
Research Assistant *San Diego, CA*

- Built physics-informed neural networks for HIV viral dynamics, including coupled ODE solvers, biologically constrained training, and ablation studies.

Cajal 2026
Incoming Research Intern, Autoformalization (Lean 4) *Remote*

- Incoming internship focused on statement autoformalization and LLM-assisted verification in Lean 4.

Selected AI for Math Projects

NLVerifier 2025 to 2026
Natural language conditioned selection for Lean autoformalization candidates *Independent Project*

- Trained a cross-encoder verifier that scores (natural language statement, candidate Lean statement) pairs and selects the top-scoring candidate after type-check filtering.
- Improved ProofNetVerif top-1 selection accuracy from 84/178 (47.2%) to 111/178 (62.4%) on the original transductive test split.
- Built an ID-disjoint inductive evaluation split and improved top-1 accuracy from 17/55 (30.9%) to 27/55 (49.1%).

BEqCritic 2025 to 2026
Learned equivalence-based selection with clustering and reproducible pipelines *Independent Project*

- Implemented a learned alternative to Self-BLEU selection by scoring candidate-candidate equivalence with a cross-encoder, building a similarity graph, clustering, and selecting a representative.
- Built an end-to-end pipeline (train to candidates to select to eval to report) with Makefile-driven quickstart and single-GPU training support, plus optional multi-GPU DDP via `torchrun`.

SAF V0 2025
Statement Autoformalization Fidelity harness for Lean *Independent Project*

- Built a lightweight benchmark and harness to judge whether a candidate Lean statement matches a canonical statement without requiring a proof.
- Implemented tiers including type-check plus deterministic normalization, optional audited semantic rewrites, and optional proof-based equivalence checking when normalization fails.
- Pinned Lean and Mathlib versions for reproducible evaluation runs.

autoformalize 2025
Kimina-based autoformalization scripts with controlled decoding *Independent Project*

- Implemented scripts for running Kimina generations and evaluating outputs, plus a full pipeline with Lean well-typed and cycle-consistency potentials, posterior scoring, and summary reporting.

- Used a 7B generator and a 7B reference model to avoid dependence on very large checkpoints.

milean 2025
Probing and steering a Lean tactic generator *Independent Project*

- Built a minimal pipeline to probe and steer a Lean tactic generator (ByT5) on the binary behavior `intro` vs `apply` using teacher-forced scoring, layerwise probes, and activation addition interventions.
- Added a reproducible script that builds a balanced dataset and runs control and token-localized sweeps.

Publications and Presentations

- NLVerifier: Natural Language Conditioned Cross-Encoder Selection for Lean Autoformalization Candidates. Submitted to ICLR 2026 VerifAI Workshop (under review).
- Math model-informed neural networks for patient-specific HIV latent reservoir dynamics under ART. Contributed Talk, Joint Mathematics Meetings (JMM) 2026, Washington, D.C., Jan 2026.
- Mathematical modeling and machine learning to predict the dynamics of HIV latently infected cells under antiretroviral therapy. Poster, SoCal SysBio 2025, University of California, Riverside, May 2025.

Open-Source Software

- BetterFFTW: High-performance wrapper around `pyFFTW`, drop-in NumPy FFT replacement.
- PyContinuum: Numerical homotopy continuation for polynomial systems.
- Mazewright: Maze generation and manipulation toolkit.

Teaching and Mentoring

San Diego State University Aug 2024 to Present
Teaching Assistant (Calculus I to III) *San Diego, CA*
Euler Circle Jan 2025 to Present
Teaching Assistant (Abstract Algebra, Real Analysis) *Online*
Stanford University SUMaC Summers 2024 and 2025
Resident Counselor, Co-instructor (Abstract Algebra, Number Theory) *Stanford, CA*
Pepperdine University Aug 2021 to Apr 2024
Teaching Assistant and Grader (Linear Algebra, Probability) *Malibu, CA*

Honors

HSF Scholar 2024 to 2026
Regent's Scholar (Pepperdine) 2020 to 2024

Technical Skills

Programming: Python, Lean 4 (including metaprogramming), SQL, R
Core areas: transformer-based reranking and evaluation, reproducible experiment pipelines, Lean toolchains and automated checking
Tools: Git, Linux, LaTeX

Languages

English (Fluent), Spanish (Intermediate), Mandarin Chinese (Beginner)