Samuel D. V. Stephens

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EDUCATION

Salem State University, Salem, MA 2026–
B.S. in Mathematics and Music; GPA 4.00 (current) *Expected 2029*
Graduate measure theory (directed study, Folland's *Real Analysis*). Earlier coursework for credit at Wabash College (2025; Honors and Dean's Scholar) and Kenyon College (2023–24): complex analysis, abstract algebra, symbolic logic. Audited Harvard's Math 55a and 55b (honors abstract algebra; honors real and complex analysis), 2025–26.

RESEARCH EXPERIENCE

Stanford University School of Medicine 2026–
Assistant Researcher, Department of Neurology *Remote*

- Extending CICADAS-II toward clinical use: personalized adaptive dosing thresholds from SOFA score and age, implemented against EEG and the MORGOTH large-scale ICU dataset.

Mass General Brigham 2026–
Assistant Research Intern, Department of Neurology *Boston, MA*

- Real-data phase (CICADAS-III) on large ICU EEG and clinical datasets; first run of the framework on real patient records in October 2026.

Beth Israel Deaconess Medical Center & Harvard Medical School 2025–26
Assistant Researcher, Department of Neurology, under Dr. M. Brandon Westover *Boston, MA*

- Built a Monte Carlo simulator of 1,000 ICU patients: latent seizure-rate dynamics, sparse Poisson observations, one-compartment pharmacokinetics with bolus dosing, Hill-curve drug response, and a daily logistic mortality hazard.
- Estimated each patient's hidden seizure rate in real time with an extended Kalman filter on the log rate, and recovered causal effects of dosing strategies with the parametric g-formula where a naive comparison got the sign of the effect wrong.
- Derived a dosing rule that minimizes instantaneous marginal harm; untuned, it matched the best tuned fixed dose when one harm dominated and beat every tuned alternative when both harms were high.
- Stress-tested the estimator under misspecification: false detections, missing dose records, saturating harm, and unmeasured confounding (E-values). Co-first author of the resulting paper.

PUBLICATIONS AND MANUSCRIPTS

- S. D. V. Stephens*, T. Westover*, S. F. Zafar, M. B. Westover. "CICADAS-II: Simulation-Based Causal Inference and Adaptive Dosing from Sparse Seizure Counts and Bolus Anti-Seizure Medication in the ICU." Under major revision, *Journal of Neural Engineering*. *Co-first authors.
- S. D. V. Stephens. *Studies in Algebra and Group Theory*. 519-page textbook for Harvard's Math 55a; Professor Joe Harris is offering it as supplementary material to his 2026–27 students.
- S. D. V. Stephens. "Monotone Arithmetic Progressions in the Gray Code and in Negabinary Enumerations of the Integers" (Erdős Problems 195 and 196). In preparation.

PROJECTS

- **cicadas2** (MATLAB; Python with NumPy, SciPy, pytest). Primary developer of the paper's reference implementation; Python port held to the MATLAB original by cross-implementation equivalence tests, and a harness that regenerates every reported number. Private until publication.
- **rmpp-stabilizer** (C++). `LD_PRELOAD` library that intercepts tablet pen input before the system UI and smooths it in real time (moving-average, Gaussian, string-pull and One Euro filters); Docker cross-compilation toolchain for ARM64.
- **acad-cli** (Python). Command-line coursework manager published on PyPI (`pipx install acad-cli`): LaTeX and Org document generation, Taskwarrior integration, plain-JSON records under Git.

SKILLS

Languages: Python (NumPy, SciPy, pytest), MATLAB, C++, R, Mathematica, LaTeX. **Tools:** Git, Linux and the Unix shell, Docker, Neovim. **Methods:** state-space models and Kalman filtering, Monte Carlo simulation, causal inference, survival and hazard models, PK/PD modeling.

OTHER

Private mathematics tutor (precalculus, AP Calculus BC, physics), 2025–. KEEP-STEM Scholar, Kenyon College program supported by the National Science Foundation (2023).