Leo Villani

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Research Interests

I am interested in the theory and methods of numerical analysis, time series, machine learning, high-dimensional statistics, and computational epidemiology.

Education

Cornell University *Aug 2025 – TBD*
Doctor of Philosophy in Statistics

University of California, Berkeley *Aug 2021 – May 2025*
BA Applied Mathematics and Computer Science

GPA: 3.96 / 4.00

Relevant Coursework:

- **Statistics:** Stochastic Processes (150), Time Series (153), Forecasting (165), Statistical Computing (243), Principles of Data (DATA 100)
- **Computer Science:** Computer Security (161), Algorithms (170), Computer Graphics (184), Intro to AI (188), Machine Learning (189), Decentralized Finance (194), Probability and Random Processes (126)
- **Mathematics:** Real Analysis (104), Linear Algebra (110), Abstract Algebra (113), Number Theory (115), Numerical Analysis (128A), Optimization (170), Complex Analysis (185), Numerical DEs, PDEs (228A,B)

Experience

Researcher *Berkeley, CA*
BLISS *Mar 2025 – Present*

- Designed and evaluated transformer models for associative recall in time series, showing emergent in-context learning of noisy Gauss–Markov processes and outperforming Kalman filter baselines.
- Building scalable NLP sequence models with backstory generation to reduce memorization.

Researcher *Berkeley, CA*
UC Berkeley, Department of Mathematics *Jun 2023 – Sep 2023*

- Given liquid crystal coefficients and some error tolerance on them we try to discretize the orientation and corresponding models of them using PDEs.
- Applied Monte Carlo integration to address high-dimensionality challenges.

Undergraduate GSI *Berkeley, CA*
UC Berkeley, Department of Mathematics *Jul 2023 – Jan 2025*

- Facilitated discussion sections, designed and graded exams, and maintained regular office hours to support student learning.
- Consistently earned a student rating of 6.7/7.0, significantly above the department average of 5.8/7.0.

Projects

CalHacks AI Hackathon

- Developed a scalable script using ChatGPT to classify and visualize tweets from monthly categorized folders. For CalHacks, analyzed COVID-19 tweet IDs, performing sentiment analysis after data cleaning.

Involved Class Projects

- Secure File Sharing System: Developed an end-to-end encrypted file sharing system using, featuring secure file storage, robust user authentication, and efficient file sharing with revocation capabilities.
- BYOW: Implemented an engine for generating explorable worlds. Extra Credit Presentation

Technologies

Languages: Python, Java, C, C++, MATLAB, R, SQL, HTML, Go, Bash, Squiggle, Latex

Packages: Pandas, Statsmodels, Scikit-learn, Matplotlib, Dask

Awards

Outstanding Graduate Student Instructor (OGSI) Award *UC Berkeley*
Mar 2024

Bronze Medal *MathCON*
Apr 2019