

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

University of California, Berkeley

Aug 2021 – May 2025

BA Applied Mathematics and Computer Science

GPA: 3.95 / 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

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.

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.

Research Intern

New York, NY

IBM

June 2020 – Aug 2020


- Developed a virus simulation tool and analyzed COVID-19 data to forecast outcomes and identify double-peaking patterns; delivered comprehensive findings to a research team.

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