Konrad Gomez-Haibach

PhD Student, Department of Statistics, University of Connecticut
konradgomezhaibach.org · ORCID: 0009-0000-5062-9665

RESEARCH INTERESTS

Statistical theory, spatio-temporal statistics, statistical computing, experimental design, applied probability, quantitative modeling

EDUCATION

University of Connecticut, Storrs, CT — 2025–Present
PhD Student, Department of Statistics

Worcester Polytechnic Institute, Worcester, MA — May 2025
B.S. Mathematics; Minor in Interactive Media and Game Design

University of Nebraska High School, Lincoln, NE — June 2021

AWARDS

Gottfried Noether Award, University of Connecticut — 2025–2026
For achieving the highest scholastic excellence, demonstrating profound logical rigor, and exhiting a superior understanding of mathematical statistics.

WPI Tuition Exchange Scholarship — 2021–2025
Tuition merit scholarship.

NSF Idea Machine Blue Ribbon Prize (Top 14 National Finalist) — 2019
Recognized for designing an open-world scientific simulation concept integrating human intelligence with computational modeling.

PUBLICATIONS

Gomez-Haibach, K., Nguyen, D., Sanseverino, M., & Gomez, M. A. (2026). *Graph-theoretic visualization of ion conduction pathways: Concepts and a tutorial. MRS Bulletin*, 51, 885–896. DOI: 10.1557/s43577-026-01109-8

Gomez-Haibach, K. (2025). *Toward Discrete, Incomplete Market Cost Efficiency.* Mathematical Finance Project 2024/25 : Worcester Polytechnic Institute. Digital WPI ID: d217qt77t

Gomez-Haibach, K., Ehrensperger, C., Amin, M., Kratman, A., & Malnicof, A. (2024). *Ham Radio as a Gateway for STEM Education.* Worcester Polytechnic Institute. Digital WPI ID: 3484zn197

Gomez-Haibach, K. S., & Gomez, M. A. (2023). *Revised centrality measures tell a robust story of ion conduction in solids. J. Phys. Chem. B*, 127(43), 9258–9266. DOI: 10.1021/acs.jpcb.3c03886

Patel, M., Zhong, J., Gomez-Haibach, K. S., Gomez, M. A., & King, G. (2020). *Low-energy $Sr_2MSbO_{5.5}$ structures show significant distortions near oxygen vacancies. Int. J. Quantum Chem.*, 120, e26356. DOI: 10.1002/qua.26356

COURSEWORK

Graduate Coursework by Sector

Theoretical Foundations & Core Models
Mathematical Statistics I & II; Linear Models I; Linear Models II (Planned Spring 2027)
Spatio-Temporal & Advanced Computing
Applied Spatio-Temporal Statistics; Statistical Computing; Time Series Analysis (Planned Spring 2027)
Biostatistics & Experimental Design
Epidemiology; Design of Experiments; Applied Statistics I & II

Undergraduate Coursework

Mathematics & Statistics
Calculus I–III; Vector and Tensor Calculus; Discrete Mathematics; Linear Algebra; ODEs; Probability Theory; Mathematical Methods in Decision Making; Modeling with ODEs; Statistical Learning; Probabilistic Methods of Operations Research; Mathematical Optimization; Design and Analysis of Experiments; Portfolio Valuation and Risk Management
Computing & Algorithms
Java Programming; Big Data Computing; Data Structures (Python); Modeling and Simulation; Algorithms
Interactive Media, Games & Systems
Interactive Media Studies; Game Development Process; Storytelling for Games; Data Analysis for Game Development; Narrative Design; System Dynamics Modeling; Games for Understanding Complexity

PROJECTS

Cost-Efficient Payoff Modeling in Incomplete Markets (2024–2025)
Generalized a 3-state cost-efficiency model to an n-state system, deriving convexified maximin/minimax structures for discrete incomplete markets.

Ham Radio as a Gateway for STEM Education (2023–2024)
Developed STEM-focused activities integrating amateur radio concepts with hands-on learning for primary and secondary students.

Fiction–Science Narrative Fusion (2024)
Created parallel chapters blending themes from *This Is How You Lose the Time War* and *The Order of Time*, exploring time, probability, and narrative structure.

Thermal–Electrical Modeling of Multilayer Materials (2023)
Used finite difference and transfer matrix methods to model electric fields and thermal response in multilayer materials to mitigate thermal runaway.

Computational Chemistry Research (2020–2022)
Generated candidate structures for perovskite oxides and developed centrality measures for ion conduction analysis.

Human vs. AI Game Concept (2018–2019)
Designed an open-world game concept enabling players to contribute human intelligence to scientific simulations; recognized in NSF's 2026 Idea Machine competition.

TECHNICAL SKILLS

Programming: R, Python, Java, C/C++, MATLAB, Mathematica, Linux
Tools: Overleaf (LaTeX), Microsoft Office, STELLA, Twine