

ERIC M SCHMID

ML/Quantitative Analytics Research Associate

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SUMMARY

I am a ML/Quantitative Analytics Research Associate with expertise in developing machine learning models for cryptocurrency forecasting, utilizing tools such as PyTorch and scikit-learn, while also being skilled in functional programming languages including Haskell and dependently typed languages like Agda, Coq, and Idris. My diverse background spans quantitative finance, software development, and academic research, with a particular focus on applying topological data analysis and category theory to financial markets while pursuing a PhD in Mathematical Sciences on applied algebraic topology and AI.

EDUCATION

<div>02/2025 - Present</div> <div>Dublin, Ireland</div>	<div>●</div> <div>PhD in Mathematical Sciences</div> <div>GCAS College</div> <div><div><div>• Topic: AI and Applied Algebraic Topology</div><div>• Title: "Sheaves for Decentralized Control"</div><div>• Completing remotely</div><div>• Co-advisors: Prof. Fernando Tohmé, Prof. Neil Ghani (Strathclyde), Dr. Toby St. Clere Smithe (Topos Institute)</div></div></div>
<div>09/2021 - 03/2025</div> <div>Chicago, IL</div>	<div>●</div> <div>MS in Applied Mathematics</div> <div>DePaul University</div> <div><div><div>• GPA: 4.0</div><div>• Effron Family Scholarship for Pure Mathematics</div><div>• The Joseph Sugre Endowed Graduate Scholarship in Mathematics</div><div>• Research Assistantship, Fall 2024</div><div>• Teaching Assistant for Linear Algebra</div></div></div>
<div>09/2023 - 12/2023</div> <div>Chicago, IL</div>	<div>●</div> <div>Graduate Coursework in Computer Science</div> <div>University of Chicago</div> <div><div><div>• Coursework: Introduction to Python Programming (GPA: 4.0)</div></div></div>
<div>09/2008 - 12/2013</div> <div>New York, NY</div>	<div>●</div> <div>BA in Individualized Study (Interdisciplinary Studies)</div> <div>New York University</div> <div><div><div>• Dean's List for Fall 2008 & Spring 2009</div><div>• Concentration: Continental Philosophy and Visual Art</div><div>• Minor: Mathematics</div><div>• GPA: 3.589</div></div></div>

EXPERIENCE

<div>10/2024 - Present</div> <div>Chicago, IL</div>	<div>●</div> <div>ML/Quantitative Analytics Research Associate</div> <div>Navier</div> <div><div><div>• Develop and implement machine learning models for cryptocurrency price forecasting using PyTorch and scikit-learn</div><div>• Design and optimize deep learning architectures for time series prediction</div><div>• Implement backtesting frameworks to evaluate model performance</div><div>• Conduct statistical analysis of market data using Python's data science stack</div><div>• Create automated data pipeline for real-time model updates and predictions</div></div></div>
<div>06/2023 - 10/2024</div> <div>Chicago, IL</div>	<div>●</div> <div>Co-founder</div> <div>Bourbaki Capital</div> <div><div><div>• Led a team of developers and analysts, setting team priorities</div><div>• Developed software using Python and interacted with Amazon AWS API</div><div>• Designed and implemented a websocket listener for market data</div><div>• Utilized Python library HFTbacktest for backtesting quantitative financial models</div></div></div>
<div>10/2016 - 06/2023</div> <div>Chicago, IL</div>	<div>●</div> <div>Professional Artist</div> <div></div> <div><div><div>• Exhibited at prestigious galleries and museums across Europe and North America, including Kunsthalle Zürich, Vilma Gold (London), Neue Alte Brücke (Frankfurt), Croy Nielsen (Berlin), Svetlana (New York), Centralbanken (Oslo), Emily Harvey Foundation (New York), M. LeBlanc (Chicago) and Galleria Federico Vavassori (Milan)</div></div></div>
<div>09/2016 - 10/2016</div> <div>Chicago, IL</div>	<div>●</div> <div>Temporary Web Development Consultant</div> <div>Chicago.com</div> <div><div><div>• Created a responsive navigation bar for website using HTML, CSS, Javascript, and JQuery</div><div>• Implemented improvements for social media integration and mobile experience</div></div></div>
<div>02/2016 - 08/2016</div> <div>Chicago, IL</div>	<div>●</div> <div>Software Engineering Intern</div> <div>Raise.com</div> <div><div><div>• Completed software engineering coursework in Java, UNIX and SQL</div><div>• Developed various applications including a hangman game, karaoke jukebox and random sentence generator</div></div></div>
<div>01/2014 - 10/2015</div> <div>New York, NY</div>	<div>●</div> <div>Production Manager</div> <div>Ben Schumacher Studio</div> <div></div>

EXPERIENCE

05/2013 - 08/2013 • Web Development Intern
Chicago, IL [Chicago Sun-Times](#)

SKILLS

AWS	CSS	Deep Learning	ECommerce	GitHub	Grunt	Haskell	HTML	Java	Java Spring	JavaScript
jQuery	Linear Algebra	Unix Shell Scripting	Numpy	Pandas	Python	PyTorch	Scikit-Learn	Scipy	SQL	
Time Series	XGBoost	PostgreSQL	Agda	Coq	Idris	OCaml	Azure	Functional Programming		

PROJECTS

Macroeconomic Effects on Bitcoin Price Using Topological Data Analysis and Distance-to-Default Metrics

📅 10/2024 - 12/2024 📍 Chicago, IL

Developed a machine learning model integrating topological data analysis, financial risk metrics, and macroeconomic indicators to predict Bitcoin price movements with performance exceeding random chance.

- Developed ML model predicting Bitcoin trends using Topological Data Analysis and Distance-to-Default metrics, achieving 21% better-than-random AUC (0.6089 in a three-category classification problem)
- Created novel validation approach using shifted 30-day moving averages to reduce volatility impact while avoiding look-ahead bias
- Built XGBoost classifier with time series cross-validation for 3 price categories, achieving 5.9% better accuracy than random chance
- Applied SHAP analysis to identify predictive features, combining TDA metrics with Treasury yields and federal debt data from Yahoo Finance and FRED API

The value of innovation: the economics of targeted drugs for cancer (PUBLISHED in Targeted Oncology)

📅 2007 📍 Chicago, IL

I analyzed the economic implications of targeted cancer drugs, examining their substantial costs (\$13,000-\$100,000 annually) relative to their clinical benefits and addressing concerns about healthcare resource allocation in an era of breakthrough but expensive oncology therapeutics.

- Co-authored research paper published in Targeted Oncology examining the economic considerations of 16 FDA-approved targeted cancer therapies
- Analyzed cost-effectiveness ratios and insurance reimbursement considerations for novel cancer drugs ranging from \$13,000-\$100,000 per patient annually
- Evaluated economic sustainability challenges of targeted therapies in oncology while acknowledging their breakthrough clinical value
- Recommended methodology improvements for cost-effectiveness studies to better inform healthcare resource allocation decisions
- Explored the complex relationship between drug pricing, patient access, and the value of medical innovation in cancer care

TypeLoopS1 – Educational Haskell Program Demonstrating Algebraic Topology

📅 03/2025 📍 Chicago, IL

TypeLoopS1 – A Haskell-based educational project illustrating algebraic topology concepts by modeling the fundamental group of a circle at the type level.

- Developed a Haskell-based educational tool illustrating the fundamental group of the circle $\pi_1(S^1)$, leveraging type-level programming to model algebraic topology concepts.
- Encoded mathematical properties using advanced type system features, providing compile-time verification and enhancing code reliability.
- Created a resource bridging functional programming and algebraic topology, facilitating intuitive understanding of abstract mathematical concepts through executable examples.

COURSES

[Introduction to Python Programming](#),
[Numerical Analysis I](#), [Real Analysis I](#),
[Finite-Dimensional Vector Spaces](#),
[Probability & Statistics I](#), [Abstract Algebra I & II](#), [Point-Set Topology](#),
[Mathematical Modeling](#), [Complex Analysis](#), [Group Theory](#), [Number Theory](#), [Commutative Algebra](#),
[Category Theory](#), [Mathematical Logic \(Model Theory\)](#), [Algebraic Topology](#),
[Calculus I-III](#), [Statistics](#), [Linear Algebra](#),
[Discrete Mathematics](#), [Non-Euclidean Geometry](#)

INTERESTS

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Machine Learning
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Type Theory
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Functional Programming
- 💎

Applied Algebraic Topology
- 💎

AI
- 💎

Category Theory
- 💎

Mathematical Logic