PATRICK ALTMEYER

Researching Trustworthy Artificial Intelligence (AI) for Finance and Economics

I am an economist by background with an interest in cross-disciplinary research on the intersection of Trustworthy AI and Financial Economics. For my PhD in Trustworthy AI, I currently focus on Counterfactual Explanations and Probabilisitic Machine Learning under supervision of Cynthia Liem at Delft University of Technology.

EDUCATION

2025 | 2021

PhD in Computer Science
Delft University of Technology — Delft, Netherlands

Thesis topic: Counterfactual Reasoning and Probabilistic Methods for Trustworthy AI with Applications in Finance

2021

Master in Data Science
Barcelona School of Economics — Barcelona, Spain

Thesis: Deep Vector Autoregression for Macroeconomic Data

2018

Master in Finance
Barcelona School of Economics — Barcelona, Spain

Thesis: Option Pricing in the Heston Stochastic Volatility Model

2017

Master of Arts with Honours in Economics
University of Edinburgh — Edinburgh, United Kingdom

Thesis: Can misguided monetary policy explain the European housing bubble?

PROFESSIONAL EXPERIENCE

2021 | 2018

Economist
Bank of England — London, United Kingdom

- Co-author of two staff working papers (upcoming).
- Co-initiated and led app development.
- Briefing work for policy committees.

2017

Postgraduate Intern
Bank of England — London, United Kingdom

- Econometric analysis of transaction data set in R.
- Internal presentation of project results.

CONTACT INFO

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For more information, please contact me via email.

SKILLS

Experienced in Machine Learning, Finance, Economics and Monetary Policy.

Highly skilled in Julia, R, Python and Quarto.

Well-informed about the field of Explainable Artificial Intelligence.

Last updated on 2024-02-07.

TEACHING EXPERIENCE

2024 | 2023 **Master's Thesis Supervision**
Research co-supervisor of various Master's students — Delft, Netherlands

2023 **Software Project Supervision**
Project supervisor for two groups of students — Delft, Netherlands

- Proposal of two software projects related to Trustworthy AI in Julia.
- Supervision of two groups of five undergraduate students working on the project.

2022 **Bachelor's Thesis Supervision**
Research supervisor for group of students — Delft, Netherlands

- Proposal of final-year research project on Endogenous Dynamics in Algorithmic Recourse.
- Supervision of group of three undergraduate students working on the project.

2021 **Foundations of Data Science Summer School**
Teaching Assistant at Barcelona School of Economics — Barcelona, Spain

2020 | 2019 **Introduction course to R and Git**
Lead Trainer at Analytics Enablement Hub, Bank of England. — London, United Kingdom

2017 | 2016 **Honours Modules in Econometrics**
Teaching assistant at School of Economics, University of Edinburgh — Edinburgh, United Kingdom

SELECTED PUBLICATIONS

2023 **Faithful Model Explanations through Energy-Constrained Conformal Counterfactuals**
The 38th Annual AAAI Conference on Artificial Intelligence (upcoming): [pre-print] — Delft, Netherlands

2023 **Explaining Black-Box Model through Counterfactuals**
The Proceedings of the JuliaCon Conferences: [PDF] — Delft, Netherlands

2023 **Endogenous Macrodynamics in Algorithmic Recourse**
First IEEE Conference on Secure and Trustworthy Machine Learning: [PDF] — Delft, Netherlands
Altmeyer P., Angela G., Buszydlik A., Dobiczek K., van Deursen A., Liem C.C.S.

2023 **Yield Curve Sensitivity to Investor Positioning Around Economic Shocks**
Bank of England Staff Working Paper: [PDF] — London, United Kingdom
Altmeyer P., Boneva L., Kinston R., Saha S., Stoja E.

2021 **Deep Vector Autoregression for Macroeconomic Data**
Masters Thesis (selected for publication): [PDF], [GitHub] — Barcelona, Spain
Agustí M., **Altmeyer P.**, Vidal-Quadras Costa I.

2018 **Option Pricing in the Heston Stochastic Volatility Model: an Empirical Evaluation**
Masters Thesis (selected for publication): [PDF] — Barcelona, Spain
Altmeyer P., Grapendal J., Pravosud M., Quintana G.

SELECTED CONFERENCES, WORKSHOPS AND POSTERS

2024 **Navigating the Interplay of Explainability and Privacy in AI**
Presentation: Preview of Faithful Model Explanations through Energy-Based Conformal Counterfactuals
Delft, Netherlands

2023 **JuliaCon 2023**
Presentation: Predictive Uncertainty Quantification in Machine Learning — MIT in Boston, USA

2023 **First IEEE Conference on Secure and Trustworthy Machine Learning**
Presentation: Endogenous Macrodynamics in Algorithmic Recourse — Raleigh, North Carolina

2022 **New Methods Seminar at the Bank of England**
Presentation: Explaining Black-Box Models through Counterfactuals — London, United Kingdom

2022 **ING Data Science Community Conference 2022**
Presentation: Explaining Black-Box Models through Counterfactuals — Amsterdam, Netherlands

2022 **JuliaCon 2022**
Presented Julia packages I developed — Virtual
- Explaining Black-Box Models through Counterfactuals (main talk)
- Effortless Bayesian Deep Learning through Laplace Redux (lightening talk)
- Julia and Quarto: A Match Made in Heaven? (experience talk)

2022 **ProbAI 2022 Summer School**
Poster presentation "Explainable AI: Probabilistic Methods for Counterfactual Explanations": [poster]
Helsinki, Finland

2022 **TU Delft EEMCS PhD event**
Poster presentation "Counterfactual Explanations and Algorithmic Recourse": [poster] — Delft, Netherlands

2022 **De Nederlandse Bank Conference "Central Bankers Go Data Driven: Applications of AI and ML for Policy and Prudential Supervision"**
Poster presentation of Altmeyer, Agusti, and Vidal-Quadras Costa (2021). — Amsterdam, Netherlands

2022 **IFC and Bank of Italy workshop on "Data science in central banking"**
Presentation of Altmeyer, Agusti, and Vidal-Quadras Costa (2021): [event link], [YouTube] — Virtual

2021 **NeurIPS 2021 MLECON Workshop**
Poster presentation of Altmeyer, Agusti, and Vidal-Quadras Costa (2021): [event link] — Virtual

2021 **IFABS 2021 Oxford**
Presented our upcoming BoE Staff Working Paper on yield curve pricing [event link] — Virtual

2019 **Money markets and Central Bank Balance Sheets**
Presented research on demand for central bank reserves at ECB: [event link] — Frankfurt, Germany

SELECTED OPEN-SOURCE SOFTWARE

2022-2024 **`ConformalPrediction.jl`**
Julia package for Conformal Prediction: [docs], [GitHub]

2021-2024 **`CounterfactualExplanations.jl`**
Julia package for Counterfactual Explanations: [docs], [GitHub]

2021-2024 **`LaplaceRedux.jl`**
Julia package for effortless Bayesian Deep Learning: [docs], [GitHub]

2021-2022 **`deepvars`**
R package implementing Deep Vector Autoregression (Altmeyer, Agusti, and Vidal-Quadras Costa 2021): [GitHub]

OUTREACH AND VOLUNTEERING

2022 | 2021 **Personal blog**
Communication AI in an accessible, visual manner: [url]

2020 **Class representative**
Masters in Data Science — Barcelona, Spain

2016 **TEDx talk**
Held a TEDx talk about European Integration: [YouTube] — Edinburgh, United Kingdom

SCHOLARSHIPS AND AWARDS

2023 **Pluto Notebook Competition for JuliaCon2023**
2nd Price Winner — MIT in Boston, USA

2020 **Novartis Datathon**
3rd Price Winner of Datathon — Barcelona, Spain

2020 **Fee Waiver and Funding for Masters**
Full funding for Masters in Data Science through BSE and Bank of England — Barcelona, Spain

2017 **Fee waiver for Masters**
Total tuition fee waiver for Master in Finance through BSE — Barcelona, Spain

2017 **School of Economics Prize**
Edinburgh University School of Economics Joint Prize for the best performance in Economics — Edinburgh, United Kingdom

2015 **School of Economics Prize**
School of Economics Prize for academic excellence in Economics — Edinburgh, United Kingdom