Samuel Wiese

Curriculum Vitae

Wolfson College
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Education

10/2020 - 12/2024* **Computer Science (PhD)**, *University of Oxford*, UK
- Macroeconomic agent-based modelling: dynamics and forecasting
- Equilibrium convergence in random games
- Supervisors: Prof. J. Doyne Farmer, Dr. Anisoara Calinescu
- Average coursework grade: 81/100

10/2015 - 08/2020 **Mathematics (Diploma)**, *University of Leipzig*, Germany
Focus on optimization and game theory, top 3%

08/2017 - 04/2018 **Mathematics (Semesters abroad)**, *University of Toronto*, Canada
Focus on dynamical systems and algebraic geometry, top 3%

10/2015 - 08/2017 **German Law (Intermediate Diploma)**, *Leipzig University*, Germany
Focus on constitutional law, top 20%

Experience

06/2024 - 09/2024 **Summer Associate, Systematic Macro**, *Balyasny Asset Management*, UK
- Developing signals for intraday trading of futures, currencies, and ETFs
- Improvement of a large statistical model using modern optimization techniques

08/2022 - 02/2024 **Quantitative Risk Analyst Intern**, *Balyasny Asset Management*, UK
- Systematic and event-driven credit, full-time until 01/2023, part-time since then
- Development of a measure for PCA-based expected stress moves in natural gas futures
- Development of the full stack of factor model reporting for all credit strategies
- Development of a tool for understanding and prediction of macroeconomic regimes

10/2019 - 01/2020 **Derivatives Trading Intern**, *Allianz Global Investors*, Germany
- Development of a machine learning model for the automatic execution of exchange-traded derivatives in Python
- Development of a Transaction Cost Analysis (TCA) engine for real-time performance evaluation of traders in derivatives trading
- Sentiment analysis to evaluate market-sensitive Twitter tweets

08/2018 - 09/2018 **Research Intern**, *St. Petersburg State University, Chebyshev Laboratory*, Russia
- Topic: "Various Shadowing Properties of Dynamical Systems"
- Studied conditions for direct and inverse shadowing using Lyapunov functions
- Advisor: Prof. Sergei Yu. Pilyugin

05/2018 - 08/2018 **Research Intern**, *Cornell University, Department of Mathematics*, US
- Summer Program for Undergraduate Research
- Studied Laplace eigenvalues and eigenfunctions of fractals using FEM
- Advisor: Prof. Robert S. Strichartz

Skills

Languages German (native), English (fluent), Latin (Latinum)

IT Python (proficient); Sage, Mathematica (intermediate); SQL (novice)

*anticipated

Research

in preparation **Calibration of a Novel Large-Scale Economic Agent-based Model**
We build a global agent-based model covering individuals, households, firms, banks, governments, and central banks of 38 countries. We use public real-world data to describe its calibration and show its forecasting performance against benchmark models.

accepted **Best-response dynamics, playing sequences, and convergence to equilibrium in random games**, with Torsten Heinrich, Yoojin Jang, Luca Mungo, Marco Pangallo, Alex Scott, Bassel Tarbush, *International Journal of Game Theory* 52: 703–735, 2023
We analyze the performance of the best-response dynamic across all normal-form games using a random games approach. The playing sequence–the order in which players update their actions–is essentially irrelevant in determining whether the dynamic converges to a Nash equilibrium in certain classes of games (e.g. in potential games) but, when evaluated across all possible games, convergence to equilibrium depends on the playing sequence in an extreme way. Our main asymptotic result shows that the best-response dynamic converges to a pure Nash equilibrium in a vanishingly small fraction of all (large) games when players take turns according to a fixed cyclic order. (SSRN)

accepted **The Frequency of Convergent Games under Best-Response Dynamics**, with Torsten Heinrich, *Dynamic Games and Applications* 12: 689–700, 2022
We calculate the frequency of games with a unique pure strategy Nash equilibrium in the ensemble of n-player, m-strategy normal-form games. (DOI)

accepted **Spectrum of the Laplacian on Snowflake Domains and filled-in Julia sets**, with Robert S. Strichartz, *Experimental Mathematics* 31(3): 1014-1025, 2022
We compute the spectrum of the Laplacian on snowflake domains and chosen filled-in Julia sets, their box-counting dimension and area and investigate the eigenvalue counting function. (DOI)

accepted **Spectrum of the Laplacian on Regular Polyhedra**, with Evan Greif, Daniel Kaplan, Robert S. Strichartz, *Communications on Pure and Applied Analysis* 20(1): 193-214, 2021
We study eigenvalues and eigenfunctions of the Laplacian on the surfaces of four of the regular polyhedrons: tetrahedron, octahedron, icosahedron and cube. (DOI)

accepted **A Convex Surface with Fractal Curvature**, with Iancu Dima, Rachel Popp, Robert S. Strichartz, *Fractals* 28(4), 2020
We construct an example of a convex surface whose curvature is a fractal measure related to the Sierpinski Gasket. The construction produces the surface S as a limit of convex polyhedra P_n. The curvature of each P_n is a discrete measure supported on its vertices, and these discrete measures will converge to the fractal measure on S. (DOI)

Selected Honors

05/2020 Full Scholarship by the Dept. of Computer Science, Univ. of Oxford
06/2019 Erasmus Scholarship by the German Academic Exchange Service
08/2018 goEast Scholarship by the Germany Academic Exchange Service
07/2018 PROMOS Scholarship by the Germany Academic Exchange Service
05/2018 PIRIP Exchange Program Fellowship at Cornell University
02/2017 University of Toronto Full Tuition Fellowship
12/2016 Full-year Scholarship by the German Academic Exchange Service
10/2016 Scholarship by the Foundation of German Business