

Jacobus M. M. Smit

jacobusmmsmit@gmail.com | [linkedin.com/in/jacobus-smit](https://www.linkedin.com/in/jacobus-smit) | github.com/jacobusmmsmit

EDUCATION

University of Oxford

MSc Mathematical Sciences

Oxford, UK

October 2021 – June 2022

- Supervisor: not yet allocated

University of Warwick

BSc Mathematics and Statistics (with Intercalated Year)

Coventry, UK

October 2017 – June 2021

- Honours: 1st class
- Took a study/work year abroad spending a term studying data science at ENSAI (Rennes, France) then worked for 6 months as a data scientist.

INDUSTRY EXPERIENCE

Data Scientist

January 2021 – April 2021

West Midlands Police, Warwick Manufacturing Group

Coventry, UK

- Worked in a team of three undergraduate students to analyse telematics data from the West Midlands Police's vehicle fleet to provide various insights into improving areas such as fleet efficiency, response times, and environmental impact.
- Provided novel findings into areas WMP was already focused on such as the activity of the fleet over time and identification of potentially inefficient driving.

Junior Data Scientist

February 2020 – August 2020

QuantCube Technology

Paris, France

- Collaborated with a team of data scientists creating production ready macroeconomic indicators in Python.
- Identified and optimised key data pipeline functions that were causing a bottleneck, providing a 3000% speedup.
- Independently researched and constructed an indicators to predict agricultural exports of various countries in South America.
- Presented key findings and progress reports in meetings using Jupyter and Powerpoint.
- Created documents explaining the practices and methodologies of my team intended for new hires in order to facilitate their arrival.

RESEARCH PROJECTS

Simulating convergence of Wasserstein distance estimates | *Tamás Papp*

(Current)

Embedded Games and the Homo-Equalis Principle | *Prof. Ann Nowé, Dr. Paolo Turrini*

(Current)

An Application of Agent-Based Models to an Evolutionary Game (Soon to be on arXiv)

(2021)

An Alternative Approach to Optimising for Delays in Maritime Transport | *Dr. Nursen Aydin*

(2019)

PROJECTS

TernaryPlots.jl | *Julia, Plots*

April 2021 - May 2021

- Creation of Julia package TernaryPlots.jl. The Julia ecosystem lacked a package for producing ternary diagrams that I required during my evolutionary game theory project so after building the plots from scratch I decided to contribute to the ecosystem along with some fixes to make it more general purpose.
- Current features: construction of ternary axes, heatmaps via functions or data, functions to aid in construction of vector field plots such as transformations between co-ordinate systems.

MEstimation.jl | *Julia, ForwardDiff, ReverseDiff*

January 2021 - Ongoing

- Development of Julia package MEstimation.jl, working on improving performance and memory usage by migrating the auto-differentiation backend to use reverse-mode. This migration constitutes a rewrite of a significant part of the package, but provides a ~15 times speedup and highly improved memory efficiency.

Automated Indicator Construction | *Julia, JuMP, Gurobi*

December 2020

- Automating the construction of maritime trade indicators by applying binary and convex optimisation methods in Julia (JuMP).
- This method provides an order of magnitude shift in efficiency and convergence time compared to Monte Carlo approaches or constructing the indicators by hand.

TECHNICAL SKILLS

Languages: R, Python, Julia, SQL

Tools: Git, VS Code, RMarkdown, Jupyter

Libraries: Tidyverse, data.table, pandas, NumPy, DataFrames.jl, ForwardDiff/ReverseDiff.jl, MEstimation.jl, Agents.jl

OTHER SKILLS

Languages: English (Native), French (B2), Spanish (B2). Additionally I have a keen interest in language history and intercultural communication.

Public Speaking: Producer and host of DataBasic podcast. Talks and presentations listed in separate section.

Teaching: I am a mentor for the society's R course, helping students understand material and supporting their coursework.

Music: Served as a musical director of Warwick Acappella Society for two years.

TALKS GIVEN

Democratising Differentiation | *WDSS Student Speaker Series*

October 2020

- An introduction to automatic differentiation for the layperson. Covering why differentiation is useful in optimisation cases, the problems with traditional methods, and how automatic differentiation addresses these problems.

The Terrors of Excel | *WDSS Data Horror Stories*

October 2020

- A (mostly) humorous talk on the dangers of using Excel (or indeed *any* spreadsheet software) in data science settings. Covering massive failures from banks losing millions to healthcare lawsuits all due to simple, yet avoidable errors exacerbated by the use of Excel in inappropriate places.

Comparing EGT and ABM for Population Dynamics | *ESSA Social Simulation Conference* **September 2021**

- Discussion of the theory and implementation of an agent-based model for a complex problem of population dynamics with multiple agent types.