DR MADALINA I SAS, PhD, MEng, ACGI

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SKILLS

- **Statistics**: Hypothesis Testing, Regression & Multilevel (Hierarchical) Modelling, Stochastic Modelling, Fat-Tailed Statistics
- **Time Series & Multiscale Data Analysis**: Information Theory, Wavelet Methods, Network Analysis, Complex Data Visualisation
- **Complex Systems**: Agent-Based Modelling, Complex Networks, Non-linear Dynamical Systems, Statistical Mechanics Methods
- **Interpretable Machine Learning**: Linear Regression, Bayesian Methods, Ensemble Learning, Optimisation, Clustering, AI Fairness
- **Languages:** Python (Pandas, Scikit-Learn, NetworkX, Matplotlib, Seaborn), SQL, R, Perl, JavaScript, Haskell, C#, C++, Java, Scala, Nix

EDUCATION

2020 - 2024 | **Imperial College London** — Complexity Science PhD *(pass with no corrections)*
- Created **multi-agent simulations** in **Python, Javascript and Haskell**, enhancing modelling accuracy or reproducibility
- Developed methods using **information theory**, **wavelet analysis** & **network science** to analyse complex time series data (random walks, human ECG and EEG data, animal and crowd movement, artificial life simulations) with the aim of **detecting emergent behaviour**
- Designed, built and operated an experimental framework which revealed collective intelligence & prosocial outcomes in human groups
- Produced complex **social network visualisations** to improve interpretability of behavioural trends and polarisation in user activity
- Collaborated with scientists and artists and presented my work in multiple journals & conferences, amplifying research visibility and impact

2013 - 2017 | **Imperial College London** — Computing MEng — Artificial Intelligence *(first class, distinction)*
- Completed many practical technical modules like compilers, computer architecture, operating systems, web development, databases, cryptography engineering, software reliability & machine learning
- Worked in agile student teams to develop full-stack software projects covering the above, & present them to industry partners
- Developed a security and privacy tool for Windows which was trialled in industry & awarded a distinction

WORK & RESEARCH EXPERIENCE

2024 - 2025 | **FairOnChain Consortium** — *Postdoctoral Research Assistant*
- Developing an open-source data infrastructure for open-science blockchain research by fetching, indexing, analysing and visualising large volumes of cross-chain data with applications in finance and transaction forensics

2017 - 2020 | **Netcraft** — *Internet Services Developer*
- Automated content filtering and countermeasures against phishing & malware which resulted in the removal of thousands of threats, serving thousands of customers & tens of thousands of users
- Collected internet statistics, manipulating & filtering huge unstructured datasets of millions of websites to provide customer insights
- Worked in an agile team with a flat structure valuing initiative and adaptability

2014 - 2020 | **Freelance** — *Software / Web / Data Consultant*
- Undertook security auditing & research focused on Windows devices detecting & mitigating malware & backdoor threats
- Designed and developed custom websites for small businesses, boosting online outreach & customer conversion rates
- Analysed data & optimized data pipelines, improving data flow efficiency & supporting informed decision-making

2014 - 2016 | **King's College London Clinical Trials Unit** — *Junior Clinical Software Analyst*
- Full-stack development of bespoke systems for data collection in clinical trials in .NET which were used in hundreds of clinical trials
- Performed medical-grade data validation, wrote documentation & medical SOPs, ensuring reproducibility & research integrity
- Gained experience with trial design & research ethics, completed Good Clinical Practice training

2015 | **Imperial College London** — *Undergraduate Researcher*
- Used formal logic to verify & prove correctness of concurrent data structures implemented in Haskell

2014 | **Google** — *Software Engineering Intern*
- Developed a front-end in Material Design & a back-end in Java for an user settings panel

RELEVANT PROJECTS

2024 | **FairOnChain** — *Open Science Framework for Blockchain Data Analysis* — https://faironchain.org
- Developed a unified relational data model for heterogenous blockchain transaction data
- Collaborating to design & build a modular analysis pipeline in Python, with SQL/graph backends & visualisations in D3.js/Grafana

2022 | **ClimateTwitter** — *Visualisation Platform for Twitter User Networks* — https://cop26.mis.pm
- Produced custom data visualisations in D3.js with a focus on network analysis of social networks
- Contributed to scientific publication gaining traction in global discussions of climate policy & polarisation

2020 | **ECG XGBoost** — *Interpretable Heart Disease Diagnosis* (Computing in Cardiology)
- Devised an interpretable, supervised ensemble decision forest learning algorithm to predict heart disease from ECG time series
- Used spectral and information-theoretic methods & performed entropy analysis on the ensemble model

2017 | **SnowWall** — *A Visual Firewall for the Surveillance Society* (MEng project) — https://snowwall.tech
- Created a privacy tool on Windows to block outbound data leaks by high-level policies based on IP geolocation/ownership
- Supported with custom visualisations including a map view & data flows created in C# .NET
- The MVP was trialled in industry & the project was awarded a distinction & was finalist in cyber-security incubator HutZero

2016 | **Seek** — *Natural Language Processing Information Retrieval Tool - Group project*
- Used Python (Pandas, SciPy, Scikit-learn, Nltk) for statistical natural language processing of Wikipedia data
- Extracted topics, named entities & summaries from unstructured text into Neo4j knowledge graph

AWARDS & GRANTS

2022 | **Synch.Live** — *Great Exhibition Road Festival science communication grant*
2020 | **Splunk Scholar** — *PhD Scholarship*
2018 | **HutZero** — *Finalist in HutZero Cyber-Security Incubator with SnowWall*
2017 | **InterAce Cybersecurity Challenge 2017** — *Capture the flag competition*
2013 | **Computational Morality** — *Imperial Corporate Partnership Prize for group project*

TEACHING

2025 - 2025 | **Imperial College London** — *Guest Lecturer*
- Preparing interactive tutorials, delivering lectures & assessment on Cryptography Engineering to MSc students
2021 - 2023 | **Imperial College London** — *Teaching Assistant*
- Supported students, delivered tutorials, and performed assessment for courses in the departments of Physics and Computing: *Statistical Information Theory; Ethics, Privacy; AI in Society; Complexity & Networks; Cryptography Engineering; Net & Web Security*

VOLUNTEERING & OUTREACH

2023 - 2023 | **St Paul's Girls School** — *Volunteer Computer Science Teacher*
2022 - 2025 | **SwarmDance** — *Scientific Advisor & Science Communicator*
2021 - 2025 | **Synch.Live** — *Scientific Advisor, Research Engineer & System Architect*