

Dr. Richard Rowan-Robinson

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Links



Professional Summary

- PhD in experimental Physics with an additional 5.5 years postdoctoral research experience: h-index of 8 and 317 citations from 14 publications (6 as first author).
- Transitioned into data science, utilising machine learning to solve a range of problems.
- Experienced collaborator having worked for projects comprising of 10 international partners.

Employment

Morrisons, UK: Supply chain specialist - Data Science

April 2022 - present

Summary: Utilising data to improve processes within the supply chain and in store.

- Experience with big data stored within Google Cloud Platform and extraction using Google BigQuery SQL.
- Developing data science pipelines within a Jupyter notebook environment and working collaboratively with git version control.
- Developed a classification model for stock issues. Explored various algorithms and features, using ROC curves and precision/recall to evaluate them. Additionally, used reject inference to balance a biased training dataset. Deployed the optimal model via a cloud function for an in store trial.
- Experience using time-series cluster modelling (with tslearn) as well as time series forecasting with Prophet and NeuralProphet.

The University of Sheffield, UK: Research Associate

June 2019 - April 2022

Topic: New magnetic materials for transformers, motors, generators and sensors.

- Extensive application of Python for the development of software tools, including: scripts to calculate the alloy composition variation across a sample, modules for efficient data analysis, and a GUI for automated image stitching of microscope images.
- Realised the potential of machine learning and taught myself the fundamentals of data science, implementing a regression model in Python to assist in alloy design. This included data sourcing and sanitisation, data visualisation, feature engineering and cross-validation of the model.
- Excellent literacy skills: selected as 1 of 4 candidates from the Faculty of Engineering to apply for the Royal Academy of Engineering Research Fellowship, obtaining letters of support from two industry partners for this application. Obtained a development grant from the Sheffield Engineering Researcher Society and have published numerous papers in peer-reviewed journals over my career.

Uppsala University, Sweden: Research Associate

Jan 2017 - June 2019

Topic: New materials with potential applications for hard-disk magnetic recording media.

- Worked for a €3.7M EU funded project, consisting of 10 partners. Contributed to collaborative project reports and presented results at review meetings. Communicated patent potential results to non-experts within our industrial partner's organisation. My contributions were selected by the European Commission's Innovation Radar (<https://www.innoradar.eu/innovation/37456>)
- Wrote user facing software using Labview and extensive use of MATLAB for data analysis.

University of Nottingham, UK: Research Associate

June 2016 - Jan 2017

Project: Using strain to control magnetisation for new low power magnetic recording technologies.

- Project was in partnership with the University of Leeds, requiring good organisation when coordinating measurements and managing my time between both universities.
- Imaging the magnetisation in samples using optical microscopy and automating the image analysis using Python, pinpointing boundary regions of magnetic contrast. Included writing methods to threshold and normalise images as well as perform background subtraction and drift corrections.

Education

Durham University, UK: PhD degree

Sept 2012 - June 2016

Project: Investigating magnetism in nanometric thickness films and the role of layer interfaces.

Thesis: <http://etheses.dur.ac.uk/11692>

University of Leeds, UK: MPhys degree: *first-class* honours.

Sept 2008 - June 2012

Technical skills

Skill	Usage
Python, Matlab	Data analysis, modelling and visualisation, image analysis, machine learning.
Pandas, Scikit-learn	Used daily for data manipulation, visualisation and modelling.
Keras + Tensorflow	Completed a mini-course run by Research Software Engineering Sheffield.
SQL	Used daily within Google BigQuery
Arduino	Programming micro-controllers to drive components using the Arduino IDE.
L ^A T _E X	Professionally compiling and formatting documents.
Labview	Producing GUI software for communicating and controlling instruments.
Instrument design	Design of experimental systems exploiting physical phenomena to realise measurements to solve problems.
Experimental techniques and fabrication methods	Knowledge of sophisticated sample characterisation techniques, including X-ray scattering, electron microscopy and laser optics. Likewise, fabrication methods including nano-fabrication, thin-film and bulk metal-alloy fabrication.
Soldering and assembly	Electronics, building circuits, programming micro-controllers.

Additional skills and experience

- Presented my work at major conferences, including *Intermag* (Lyon 2021), *Materials Research Society* (Boston, 2018), *Joint European Magnetism Symposium* (Mainz, 2018), *Magnetism and Magnetic Materials* (Hawaii, 2014) and the *Institute of Physics: Magnetism conference series* (Sheffield 2016, Manchester 2021).
- November 2019: Invited talk at the European Synchrotron Research Facility (ESRF), X-ray Magnetic Scattering beamline (XMaS) user meeting.
- Developing proposals, including beamtime proposals and grant proposals based on my independent research ideas, including three fellowship applications.
- Networking skills, including forging new collaborations with the University of York and the University of Leeds to submit a White Rose collaboration fund application.
- I have played key roles in the supervision of a number of students ranging from undergraduate to PhD level. I also volunteered as a thesis mentor, receiving training for this and providing non-research specific guidance to PhD students as they write their thesis.

Publications

- I.-A. Chioar, C.Vantaraki, M. Pohlitz, **R. M. Rowan-Robinson**, E. Th. Papaioannou, B. Hjorvarsson, V. Kapaklis, Steering light with magnetic textures, *Appl. Phys. Lett.*, **120**, 032407 (2022).
- **R. M. Rowan-Robinson**[†], J. Hurst, A. Ciuciulkaite, I. A. Chioar, M. Pohlitz, M. Zapata, P. Vavassori, A. Dmitriev, P. M. Oppeneer, V. Kapaklis, Direction-sensitive magnetophotonic surface crystal, *Advanced Photonics Research*, **2**, 2170033, (2021). <https://doi.org/10.1002/adpr.202170033>
- J. Harris, Z. Leong, P. Gong, J. Cornide, C. Pughe, T. Hansen, A. Quintana-Nedelcos, **R. M. Rowan-Robinson**, U. Dahlborg, M. Calvo-Dahlborg, Investigation into the magnetic properties of CoFeNiCr_yCu_x alloys, *J. Phys. D: Appl. Phys.*, **54**, 395003, (2021). <https://doi.org/10.1088/1361-6463/ac1139>
- A. Ciuciulkaite, K. Mishra, M. V. Moro, I. A. Chioar, **R. M. Rowan-Robinson**, S. Parchenko, A. Kleibert, B. Lindgren, G. Andersson, C. S. Davies, A. Kimel, M. Berritta, P. M. Oppeneer, A. Kirilyuk, V. Kapaklis, Magnetic and all-optical switching of amorphous Tb_xCo_{1-x} alloys, *Phys. Rev. Mat.*, **4**, 10 (2020). <https://doi.org/10.1103/PhysRevMaterials.4.104418>
- A. Rushforth, **R. M. Rowan-Robinson**, J. Zemen, Deterministic magnetic domain wall motion induced by pulsed anisotropy energy, *J. Phys. D: Appl. Phys.*, **54**, 164001 (2019). <https://doi.org/10.1088/1361-6463/ab6cc7>
- O. Inyang, L. Bouchenoire, B. Nicholson, M. Tokaç, **R. M. Rowan-Robinson**, C. J. Kinane, and A. T. Hindmarch, Threshold interface magnetization required to induce magnetic proximity effect, *Phys. Rev. B*, **100**, 174418 (2019). <https://doi.org/10.1103/PhysRevB.100.174418>
- **R. M. Rowan-Robinson**, E. Melander, I.-A. Chioar, B. Caballero, A. García-Martín, E. Th. Papaioannou, V. Kapaklis, Thickness dependent enhancement of the polar Kerr rotation in Co magnetoplasmonic nanostructures, *AIP Advances* **9**, 025317 (2019). <https://doi.org/10.1063/1.5079713>
- **R. M. Rowan-Robinson**, A. T. Hindmarch, D. Atkinson, Efficient current-induced magnetization reversal by spin-orbit torque in Pt/Co/Pt, *J. Appl. Phys.*, **124**, 183901 (2018). <https://doi.org/10.1063/1.5046503>
- **R. M. Rowan-Robinson**, A. A. Stashkevich, Y. Roussigné, M. Belmeguenai, S.-M. Chérif, A. Thiaville, T. P. A. Hase, A. T. Hindmarch, D. Atkinson, The interfacial nature of proximity-induced magnetism and the Dzyaloshinskii-Moriya interaction at the Pt/Co interface, *Sci. Rep.*, **7**, 16835 (2017). <https://doi.org/10.1038/s41598-017-17137-z>
- S. Azzawi, A. Ganguly, M. Tokaç, **R. M. Rowan-Robinson**, J. Sinha, A. T. Hindmarch, A. Barman, D. Atkinson, Evolution of damping in ferromagnetic/nonmagnetic thin film bilayers as a function of nonmagnetic layer thickness, *Phys. Rev. B*, **93**, 054402 (2016). <https://doi.org/10.1103/PhysRevB.93.054402>
- A. Ganguly, S. Azzawi, S. Saha, J. A. King, **R. M. Rowan-Robinson**, A. T. Hindmarch, J. Sinha, D. Atkinson, A. Barman, Tunable magnetization dynamics in interfacially modified Ni₈₁Fe₁₉/Pt bilayer thin film microstructures, *Sci. Rep.*, **5**, 17596 (2015). <https://doi.org/10.1038/srep17596>
- C. W. Barton, T. J. A. Slater, **R. M. Rowan-Robinson**, S. J. Haigh, D. Atkinson, T. Thomson, Precise control of interface anisotropy during deposition of Co/Pd multilayers, *J. Appl. Phys.*, **116**, 203903 (2014). <https://doi.org/10.1063/1.4902826>
- A. Ganguly, **R. M. Rowan-Robinson**^{*}, A. Haldar, S. Jaiswal, J. Sinha, A. T. Hindmarch, D. Atkinson, A. Barman, Time-domain detection of current controlled magnetization damping in Pt/Ni₈₁Fe₁₉ bilayer and determination of Pt spin Hall angle, *Appl. Phys. Lett.*, **105**, 112409 (2014). <https://doi.org/10.1063/1.4896277>
- **R. M. Rowan-Robinson**, A. T. Hindmarch, D. Atkinson, Enhanced electron-magnon scattering in ferromagnetic thin films and the breakdown of the Mott two-current model, *Phys. Rev. B*, **90**, 104401 (2014). <https://doi.org/10.1103/PhysRevB.90.104401>

[†]Featured as the inside front cover article; ^{*}Joint first author