



About Me

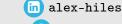
A passionate applied mathematician with a keen interest in solving complex problems using mathematical tools.



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alexhiles



Alex Hiles (Scholar)

Areas of Expertise

- **Applied Mathematics**
- Scientific Computing
- Numerical Optimization and Inverse **Problems**
- Designing algorithms (from Theory to Practice)

Programming Skills

Proficiency

Python, MATLAB, C++, bash, LATE Intermediate R, Java, FORTRAN

Personal Interests

- Running (ran Manchester Marathon 2019, multiple 10km events).
- Financial Investing (maintaining personal portfolio)
- Reading (mainly non-fiction: economics, business, science and history).

EXPERIENCE

2016-present

Ph.D. in Mathematics

- · The University of Manchester, UK ♥
 - Thesis titled "Novel algorithms for magnetic induction tomography with applications in security screening"
 - Industrially sponsored by Atomic Weapons Establishment (AWE) with direct responsibility to help solve a real business problem.
 - Developed software package in Python which includes numerical methods to solve electromagnetic imaging problems. The software will become available soon on my GitHub profile.
 - 4 years experience with many libraries in Python. Some of these include: NumPy, SciPy, matplotlib, TensorFlow, Keras, flask, pandas.
 - Experience using machine learning algorithms such as Support Vector Machines, Artificial Neural Networks, Decision Trees, k-Nearest Neighbors, for image classification task in PhD thesis.
 - Extensive experience using Python, MATLAB, C++ for data visualization purposes.
 - Managed relationships with key stakeholders at AWE.
 - Experience working with and querying large data sets using SQL.
 - Algorithms designed for PhD project are state-of-the-art and are published (listed below).
 - Developed strong communication and presentation skills by giving talks at high profile conferences (listed below).
 - Strong synthesizing and written skills (see publications listed below)
 - Attended countless talks about inverse problems, statistics, fluids, data science, and many other disciplines.

2017-present

Graduate Teaching Assistant

- · The University of Manchester, UK 9
 - Lead role teaching undergraduate engineering students degree level mathematics, including: vector calculus, complex analysis, numerical methods and probability (30-40 students).
 - Assistant role teaching undergraduate mathematics students programming languages MATLAB and Python (40-50 students).

2017-present

Exam Invigilator and Marker

- The University of Manchester, UK ♥
 - Lead role supervising multiple examinations for undergraduate mathematics and engineering students.
 - Marked multiple undergraduate exam papers (300-400 scripts at a time).

EDUCATION

2015-2016

Applied Mathematics - Distinction (Average: 78%)

MSc · The University of Manchester in

- Top of class in Scientific Computing (C++ programming course).
- Transferable skills for Applied Mathematicians module honed presentation and communication skills
- MSc thesis titled "Sensitivity analysis of 3D magnetic induction tomography for threat detection'
- Obtained MSc Academic Excellence Award 2015.

• Obtained industrial sponsor through academic merit.

• Notable Modules: Numerical Linear Algebra, Scientific Computing, Approximation Theory and Finite Element Analysis, Numerical Optimization and Inverse Problems, Mathematical Methods, Transferable Skills for Applied Mathematicians.

2011-2015

Mathematics - First Class Honours (Average: 78%)

BSc · Northumbria University in

- Dissertation titled "The Aldrin Earth-Mars cycler" which focused on using numerical methods to solve equations related to geometry of paths to Mars.
- Completed project in Financial Mathematics module designing algorithms, using Ito calculus, to predict stock prices of London Stock Exchange Group and presented our results for a 30-day period.
- Completed project in Applied Modelling module focusing on optimizing routes for a formula one car around a formula one track.
- Notable Modules: Financial Mathematics, Algebraic Codes and Cryptography, Applied Modelling, Applied Statistical Methods, Computational Mathematics, Further Computational Mathematics, Vector Calculus and Partial Differential Equations.

PUBLICATIONS

'Novel algorithms for magnetic induction tomography with applications in security screening', PhD Thesis.
'Sparsity and level set regularization for near-field electromagnetic imaging in 3D', Inverse Problems.
'A level set method for magnetic induction tomography of 3D boxes and containers', In D.Lesselier and C.Reboud, editors, Electromagnetic Non-Destructive Evaluation (XXI), pages 33-40. IOS Press, Netherlands.

TALKS

Sep. 2019	Colour Level Set Regularization for the 3D Electromagnetic imaging of
	Shielded Boxes", at: <i>2nd IMA Conference</i> in London, UK.
Jul. 2019	"Sparsity and level set regularization for the 3D electromagnetic imaging of
	shielded containers", at: Applied Inverse Problems Conference in Grenoble,
	France.
Apr. 2018	Invited talk at Atomic Weapons Establishment, in Aldermaston, UK.
Sep. 2017	"A Level Set Technique for 3D Magnetic Induction Tomography at Different
-	Scales", at: Electromagnetic Nondestructive Evaluation Conference in Paris,
	France. (80-100 people)
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Son 2019 | "Colour Loyal Set Degularization for the 2D Electromagnetic Imaging of