

Dr Matthew John Towers, FHEA

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Work

University College London — Lecturer (Teaching)

2017 —

Module leader for:

- MATH0011 *Methods 2*. Introductory Python course taught using [Jupyter notebooks](#) and the [CoCalc online teaching platform](#). Core 1st year course, 250-325 students.
- MATH0005 *Algebra 1*. Basic set theory, logic, linear algebra. E-assessment using [STACK](#). Core 1st year course, 250-325 students.
- MATH0043 *Mathematics for Physics and Astronomy*. Calculus of variations, group theory. Taught jointly with Dr Lauri Oksanen.
- MATH6401 *Mathematics for Students of Economics, Statistics, and Related Disciplines 1*. Derivatives and integrals, sequences and series, basic linear algebra.
- MATH6501 *Mathematics for Engineers 1*. Calculus, 2D and 3D geometry, basic probability, regression, numerical methods for integration and root finding).
- [MATH0007](#) *Algebra for Joint Honours Students*. Basic set theory, group theory, abstract theory of vector spaces, linear algebra. E-assessment in [NUMBAS](#).

Departmental teaching prize 2020/21. Deputy chair of the UG Mathematics exam board, chair of the UG Mathematics and Statistical Science and Mathematics and Physics boards. Project supervision: Candy crush simulation using Markov chain methods, [RSK](#), category theory and functional programming, mathematics of the Enigma machine.

University of Leicester — Teaching fellow in mathematics and statistics

2016-2017

Module leader for:

- [MA1202](#) *Introductory Statistics*. Estimation, maximum likelihood, confidence intervals, hypothesis testing, [basic R](#).
- [MA1104](#) *Elements of Number Theory*. Induction, well-ordering, fundamental theory of arithmetic, modular arithmetic, the [RSA cryptosystem](#).
- [MA7303](#) *Statistics* ([CT3](#) Actuarial Science MSc course). Linear regression, estimation, probability, hypothesis testing including ANOVA.

Project supervision: computational number theory and cryptography including [Pollard's Rho](#) and variants, RSA, [GNFS](#), the current state-of-the-art factoring algorithm.

Imperial College London — Teaching fellow in pure mathematics

2014 – 2016

First year tutor with pastoral responsibility for all first year maths students ([enhanced DBS check](#)). Student-nominated for a [Student Academic Choice Award](#). Module leader for:

- [M3P12](#) *Group Representation Theory*. Representations and modules, tensor products, Maschke's Theorem, character tables.
- [M1J1](#) and [M1J2](#). Linear algebra, group theory, and real analysis for students of mathematics and computer science.

Project supervision: [non-standard analysis](#), [RSK](#), [\$A_\infty\$ -algebras](#).

University of Kent — Postdoctoral research associate; Lecturer

2011-2014

Research in quantum algebras, on [Stéphane Launois' EPSRC First Grant EP/I018549/1](#). Outreach sessions for schoolchildren on combinatorics and polytopes, including University of Kent masterclasses, [UKMT Summer School for Girls 2013](#), [UKMT Senior Mentoring Scheme](#). Module leader for:

- [MA576](#) *Groups and Representations*. Representations, modules, Maschke's theorem, character tables.
- [MA024](#) *Additional Mathematics*. Complex numbers, matrices, proof by induction.

Project supervision: [quantum calculus](#), [game theory](#), [regular solids in four dimensions](#).

St Hugh's College, University of Oxford — Stipendiary lecturer

2007 – 2011

Tutorial and class teaching for undergraduate maths students, in subjects including real and complex analysis, multivariable calculus, topology, group theory, Lie algebras, Lebesgue integration, geometry, field theory.

Publications

1. *Hochschild cohomology of $U(\mathfrak{sl}_2(k))$* , in *Communications in Algebra* 47 issue 4 pp.1408-1422, 2019.
 2. *Singular blocks of restricted \mathfrak{sl}_3* , in *Journal of Algebra* 471 (2017), pp.176-192.
 3. *Poisson and Hochschild cohomology and the semiclassical limit*, in *Journal of Noncommutative Geometry* vol. 9, issue 3, pp. 665-696, 2015.
 4. *Cohomology of products and coproducts of augmented algebras*, in *Algebras and Representation Theory* February 2013, vol. 16, issue 1, pp. 251–274
 5. *Rank varieties for Hopf algebras*, with Sarah Scherotzke, in *Journal of Pure and Applied Algebra* vol. 215 issue 5, pp. 829–838, 2011.
 6. *Endomorphism algebras of transitive permutation modules for p -groups*, in *Archiv der Mathematik* vol. 92 no. 3, pp. 215–227, 2009.
 7. *Periodic modules of dimension p* , in *The Quarterly Journal of Mathematics* vol. 61 no. 3, pp. 381–399, 2010.
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Education and Professional Qualifications

University of Oxford

DPhil — doctorate in pure mathematics, funded by an EPSRC award. 2002 – 2006

Supervised by Karin Erdmann.

MMath — First class undergraduate masters degree in mathematics. 1998 – 2002

Fellow of the Higher Education Academy, PR114014 2016

Computer Skills

Python: good all-round knowledge of the language, experience in the `numpy`, `sympy`, and `pyplot` packages for scientific computing and data analysis.

References

On request.