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Employment:

2020–: Warwick Zeeman Lecturer. University of Warwick, UK.

2018–2020: Postdoctoral Research Assistant. University of Göttingen, Germany. Mentor: Prof Jörg Brüdern.

2016–2018: Research Associate. University College London, UK. Mentor: Prof Andrew Granville.

Feb–Jun 2017: Postdoctoral Fellow. Thematic Program on Unlikely Intersections, Heights, and Efficient Congruencing at the Fields Institute, Toronto, Canada.

Education:

2012–16: DPhil in Mathematics. Oriel College, University of Oxford, UK. Supervisor: Prof Roger Heath-Brown.

2008–12: MMath at Wadham College, University of Oxford. First Class final award, with First Class grades in Moderations (first year examinations), BA course and Masters course.

Research interests:

Number theory, especially in connection with rational points on varieties. Applications to Strichartz estimates and dispersive PDEs. Analytic methods including the circle method and decoupling inequalities, as well as the geometry of numbers.

Awards, grants and prizes:

Sep 2020-Oct 2023: Leverhulme Early Career Fellowship. Project title: From Diophantine equations to dispersive PDEs. Award value: £93,000.

May–Jun 2019: Visitor in residence at the special trimester "Reinventing Rational Points" of the Institut Henri Poincaré, Paris. Award value: €2,000.

Sep 2018: Postdoctoral fellowship at Max Planck Institute for Mathematics, Bonn. Award value: €2,300.

2016–2018: EPSRC Doctoral Prize Fellowship from University College London, "New applications of the circle method to Diophantine problems." Award value: £90,802.

2015: Postgraduate Research Conference Grant (Scheme 8) from the London Mathematical Society for the Young Researchers in Mathematics 2015 conference. N.B. grant in name of and awarded to Dr Kobi Kremnizer on behalf of the organising committee; I managed the conference's finances and all communication with the London Mathematical Society. Award value: £5,800.

2012–16: EPSRC studentship; **Burton Scholarship** from Oriel College, University of Oxford.

2009–12: Gibbs Prize from University of Oxford Mathematical Institute for joint best performance in year in BA course. **College Scholarship** from Wadham College, University of Oxford. **College Prizewinner** 2009 and 2011.

Publications:

Systems of forms in many variables. (arXiv:1709.08917, 15pp, improved version in preparation, see my HCM lecture series for details: slides, videos 1-3, video 4)

Additive problems with almost prime squares. With Blomer, V.; Grimmelt, L.; and Li, J. (arxiv:2111.01601, 38pp, improved version in preparation)

The elliptic sieve and Brauer groups. With Bhakta, S; Loughran, D.; and Nakahara, M. (arxiv:2109.03746, 31pp, submitted)

Bounds for spectral projectors on the Euclidean cylinder. With Germain, P. Comptes Rendus Math., pub. Elsevier of behalf of the French Academy of Sciences. (arxiv:2203.08273, 5pp, in press)

Strichartz estimates for the Schroedinger equation on non-rectangular two-dimensional tori. With Deng, Y.; Germain, P.; and Guth, L. Amer. J. Math., pub. Johns Hopkins University Press. (arXiv:1810.05630, 31pp, in press)

Bounds for spectral projectors on tori. With Germain, P. Forum of Mathematics, Sigma, 10:e24, pub. Cambridge University Press. (doi:10.1017/fms.2022.18, 14pp, 2022)

Quadratic forms and systems of forms in many variables. Invent. math., 213:205-235, pub. Springer-Verlag. (doi:10.1007/s00222-018-0789-x, 36pp, 2018)

Systems of cubic forms in many variables. J. Reine Agnew. Math. (Crelles Journal), 757(2019):309-328, pub. De Gruyter. (doi:10.1515/crelle-2017-0040, 29pp, 2017)

Systems of many forms. DPhil thesis, University of Oxford.
(uuid:a9932e90-4784-466a-a694-d387c1228533, 120pp, 2016)

Real and rational systems of forms. In Oberwolfach Reports, 13(4):3013-14, pub. EMS Press. (doi:10.4171/OWR/2016/53, 2pp, 2016)

Graduate supervision:

2020–: PhD supervision of Nuno Arala Santos (Mathematics).

Other teaching:

2018–: Lecturer (module leader), University of Warwick
Link to course

Teaching and examining a ten-week course at third-year undersgraduate level for ca. 115 students. Topics covered: algebraic number fields, rings of integers, the unit group, prime ideal factorisation. Responsibilities included delivering 30 hours of online lectures (20h live, 10h recorded), setting a final exam as well as coursework in the form of problem sheets, and supervising the teaching assistants who worked with me to grade the coursework.

2019–20: Lecturer (eigenverantwortlicher Lehrer), Universität Göttingen
Teaching and assessing a 14-week soft-skills course (Schlüsselkompetenz) on mathematical research presentation skills, open to Bachelor's, Master's and PhD students.

2018: Lecturer, University College London
Teaching and examining a ten-week course for all first-year computer scientists at University College London. Topics covered: first concepts in set theory, group theory, number theory and linear algebra. Responsibilities included delivering 30 hours of lectures, setting a final exam as well as coursework in the form of weekly problem sheets, and supervising the teaching assistants who worked with me to grade the coursework and exam.

2016: Tutor in analytic number theory, Williams-Exeter Programme
Tutoring a student from Williams College, MA visiting Exeter College, University of Oxford. Responsible for setting, teaching and assessing an eight-week course in analytic number theory for an undergraduate taking a Masters-level course.

2013–14: Teaching assistant, Mathematical Institute, University of Oxford
Marking work and demonstrating solutions for courses at undergraduate and Masters level. Courses: Modular Forms, autumn term 2014. Galois Theory, autumn term 2014, autumn term 2013. Algebraic Number Theory, two sets of classes in spring term 2013.

Invited talks and external seminars:

Additive problems with almost prime squares
Purdue Analytic Number Theory and Harmonic Analysis Seminar, Purdue University (online talk), 21 April 2022.

Warwick-Oxbridge-Manchester-Bristol-London (WOMBL) 1-day LMS meeting @ Oxford, 4 April 2022.

Arithmetic Study Group, Durham University, 15 March 2022.

Conic fibrations over elliptic curves and the elliptic sieve
Algebra and Number Theory Seminar, School of Mathematics and Statistics, University of Glasgow, 10 November 2021.

Boundedness of spectral projectors on Riemannian manifolds
Virtual Maxwell Analysis Seminar, University of Edinburgh / Heriot-Watt University, 15 October 2021.

Fibrations over elliptic curves, Brauer groups and the elliptic sieve
Workshop on "Arithmetic Statistics and Local-Global Principles", Erwin Schrödinger Institute for Mathematics and Physics, Vienna, September 20 - 24, 2021.

Repulsion: a how-to guide (lecture series)
Summer school "The Circle Method: Entering its Second Century", Hausdorff Center for Mathematics, Universität Bonn, May 2021.

Forms in many variables: p-adic repulsion
Quebec-Vermont Number Theory Seminar, 1 April 2021.

Spectral projectors via analytic number theory
Montreal analytic number theory seminar, 16 April 2020.

Spectral theory of tori, via analytic number theory
Number Theory Lunch Seminar, MPIM, Bonn, Germany, 9 Oct 2019.

The ideal theorem, and Dedekind zeta functions on the critical line
ZetaValue2019, RIKEN, Wako, Japan, 21-27 Mar 2019 (poster presentation).

Analytic Number Theory Seminar, IST Austria, Vienna, 7 Mar 2019.

Groups, Arithmetic & Algebraic Geometry Seminar, EPFL, Lausanne, Switzerland, 31 Oct 2018.

New directions for forms in many variables
Geometric and Analytic Number Theory, Universität Göttingen, 19–23 Nov 2018.

Diophantine approximation with the determinant method
Number Theory Lunch Seminar, MPIM, Bonn, Germany, 12 Sep 2018.

Real and rational systems of forms
Number Theory Seminar, University of Illinois, Urbana-Champaign, USA, 7 Dec 2017.

Number Theory Seminar, York University, Toronto, Canada, 9 Nov 2017.

Pure Mathematics Colloquium, Durham University, UK, 12 Dec 2016.

$\mathbb{N}$-cube days V, Chalmers University of Technology and University of Gothenburg, Sweden, 25–26 Nov 2016.

Heilbronn Seminar, University of Bristol, UK, 27 Apr 2016.

Number Theory Seminar, Royal Holloway, University of London, UK, 10 Apr 2016.

A primer on the circle method for forms in many variables.
Graduate student number theory seminar, University of Illinois, Urbana-Champaign, IL, 7 Dec 2017.

Forms in many variables: an iterative approach
Number Theory Seminar, University of Waterloo, Canada, 30 Nov 2017.

Number Theory Seminar, University of Toronto, Canada, 29 Nov 2017.

Linfoot Seminar, University of Bristol, UK, 18 Oct 2017.

Diophantine inequalities in many variables
Number Theory Seminar, Brigham Young University, Provo, Utah, USA, 4 Apr 2017.

Cubic Diophantine equations and inequalities
Analytic Number Theory workshop, Mathematisches Forschungsinstitut Oberwolfach, Germany, 6–12 Nov 2016.

Systems of many forms.
Number Theory Seminar, University of Warwick, UK, 23 May 2016.

Systems of forms of the same degree.
Number Theory Seminar, University of Cambridge, UK, 3 May 2016.

Rational points near varieties.
Number Theory Study Group, University of York, UK, 9 Feb 2016.

Moat lemmas and diophantine inequalities.
Exciting New Faces in Analytic Number Theory (ENFANT), Haudorff Centre for Mathematics, Universität Bonn, Germany, 11 Jul 2014.

Membership of learned or professional societies:

From 2016. Ordinary member, London Mathematical Society.

From 2016. Individual member, European Mathematical Society.

Other experience:

2020–: Organising committee, ZORP
I am one of 4 organisers for the ZORP international online seminar on rational points; we have organizers from IST Austria, Université Paris-Saclay and the University of Glasgow. In 2020/21 the seminar typically had one pair of talks each month with coffee breaks between and after the talks, and attendance was typically 30-40, rising to 90+ for high-profile speakers, with regular attendees mostly based in Europe, India, the USA and Japan.

2013–15: Organising committee, Young Researchers in Mathematics 2015
This student-run conference with a turnover of over £37,000 and 178 participants brought together early-career mathematicians from 17 countries and featured a successful public lecture attended by local school groups. I took the lead in managing the budget and worked to invite speakers, maintain a website, book catering and accommodation, schedule talks and publicise the event. I was the main point of contact with the London Mathematical Society, one of the major funders.

References:

Mentor:
Samir Siksek
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Postdoctoral mentor:

Jörg Brüdern
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DPhil supervisor:

Roger Heath-Brown
Professor of Pure Mathematics (Retired)
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