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Date of birth: 2 January 1980
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Toby Gee

Employment

- 2013– **Professor**, *Imperial College London*.
- 2011–2013 **Senior Lecturer**, *Imperial College London*.
- 2010–2011 **Assistant Professor**, *Northwestern University*.
- 2008–2010 **Benjamin Peirce Lecturer**, *Harvard University*.
- 2007–2008 **Postdoctoral Researcher**, *Northwestern University*.
- 2004–2007 **EPSRC Postdoctoral Fellow**, *Imperial College London*.

Fellowships

- 2011–2013 **Sloan Fellowship**.
- 2007–2010 **Miller Fellowship**, *University of California, Berkeley* (declined).
- 2004–2007 **Title A Fellow**, *Trinity College, Cambridge*.

University education

- 2001–2004 **PhD**, *Imperial College London*.
(advisor: Prof. Kevin Buzzard)
- 2000–2001 **Certificate of Advanced Study in Mathematics (Part III)**, *Trinity College, Cambridge*, with distinction.
- 1997–2000 **BA in Mathematics**, *Trinity College, Cambridge*, First class in all three years.
Senior Wrangler (highest scoring student in the university)

Grants

- 2016–2021 **Royal Society Wolfson Research Merit Award (PI)**, £50,000.
- 2014–2019 **EPSRC grant (joint with Kevin Buzzard)**, £620,441.
- 2012–2017 **ERC starting grant (PI)**, €1,131,339.
- 2012–2016 **Marie Curie Career Integration Grant (PI)**, €100,000.
- 2011–2012 **NSF Standard Grant (PI) (modification of grant below)**, \$45,445.
- 2011–2014 **NSF Standard Grant (PI) (declined due to return to UK)**, \$242,160.
- 2011–2013 **Sloan Fellowship (PI) (declined due to return to UK)**, \$50,000.
- 2008–2011 **NSF Standard Grant (PI)**, \$97,856.
- 2004–2007 **EPSRC Postdoctoral Fellowship (PI)**, £105,602.

Awards, prizes and distinctions

- 2013 Fellow of the American Mathematical Society
- 2012 Leverhulme Prize
- 2012 Whitehead Prize (London Mathematical Society)

Visiting positions

- 01/2013 Visiting Professor, Paris 13

Doctoral students

- 2015–2019 Andrea Dotto
- 2011–2015 Jack Shotton
- 2011–2013 Christian Johansson (joint with Kevin Buzzard)

Postdocs mentored

- 2016–2019 Carl Wang-Erickson
- 2015–2017 Yiwen Ding
- 2014–2016 James Newton
- 2014–2017 Olivier Taïbi
- 2013–2019 Rebecca Bellovin

Conferences organised

- 2018 Scientific advisory board, special trimester on “Groupes algébriques et géométrisation du programme de Langlands”, ENS Lyon, France
- 2013 Summer Graduate Workshop on New Geometric Techniques in Number Theory, MSRI, Berkeley, USA
- 2013 Conference on Higher Rank Automorphic Forms and L-functions, Warwick, UK
- 2012 Conference on the p -adic Langlands program, Fields Institute, Toronto, Canada

Editorships

- 2015– Editorial board, Selecta Math
- 2013–2018 Editorial board, Math. Annalen
- 2013 Editorial Advisor for the Bulletin, Journal and Proceedings of the London Mathematical Society

Service

- 2014– Promotions committee (chair from 2019–), math department, Imperial College London
- 2013–2017 Research committee, math department, Imperial College London
- 2011– Organiser of number theory study groups and seminars, Imperial College London

Selected talks

- 03/2020 Arithmetic Algebraic Geometry, Darmstadt (Germany)
- 01/2020 International Colloquium on Arithmetic Geometry, Tata Institute, Mumbai
- 10/2019 London–Paris seminar in memory of Jean-Marc Fontaine and Jean-Pierre Wintenberger, Paris
- 07/2019 p -adic modular forms and Galois representations, Sheffield
- 06/2019 Opening Colloquium, Cluster of Excellence, University of Münster
- 03/2019 International conference on arithmetic geometry, Beijing
- 07/2018 p -adic Langlands Correspondence, Shimura Varieties and Perfectoids, CIRM Luminy
- 07/2017 Plenary talk, Journées Arithmétiques, Caen
- 06/2016 Geometric Methods in the mod p local Langlands Correspondence, Pisa (2 lectures)
- 06/2015 Arithmetic geometry, representation theory and applications, CIRM, Luminy, France
- 11/2014 Colloquium, Queen Mary University
- 05/2014 The cohomology of arithmetic groups and the Langlands program, Barbados
- 04/2014 Morning Speaker, British Mathematical Colloquium, QMC London
- 01/2014 Simons Symposium on Families of Automorphic Forms and the Trace Formula, Puerto Rico
- 01/2013 Variétés de Shimura et Formes modulaires p -adiques, Paris
- 09/2012 Rational points on curves: a p -adic and computational perspective, University of Oxford
- 07/2012 Torsion in the homology of arithmetic groups, Banff
- 04/2012 The p -adic Langlands program: recent developments and applications, Fields Institute, Toronto
- 03/2012 Cohomology of Shimura varieties: arithmetic aspects and the construction of Galois representations, Fields Institute, Toronto
- 01/2012 Paris–Tokyo Number Theory Seminar, IHES, Paris
- 07/2011 Automorphic forms and Galois representations, LMS Durham Symposium, 2011 (2 lectures)
- 06/2011 Double Affine Hecke Algebras, the Langlands Program, and theoretical physics, CIRM, Luminy, France
- 06/2011 Conference on Explicit p -adic Hodge Theory, Lyon, France
- 04/2011 Colloquium, Columbia University
- 04/2011 Oliver Atkin Memorial Workshop, University of Illinois Chicago
- 03/2011 Galois Representations and Automorphic Forms, Institute for Advanced Study, Princeton
- 01/2010 Fontaine Trimester, IHP, Paris (3 lectures)
- 12/2009 Colloquium, Northwestern University
- 12/2009 Colloquium, Boston College
- 11/2009 Workshop on Arithmetic, Kanazawa, Japan

- 07/2009 Automorphic Representations, Geometry, and Arithmetic, Taipei, Taiwan
- 11/2008 Shimura Varieties, Automorphic Representations and Related Topics, Kyoto
- 08/2008 The stable trace formula, automorphic forms, and Galois representations, Banff
- 11/2006 Hot Topics: Modularity for $GL(2)$ and Beyond, MSRI, Berkeley
- 11/2006 Joint London–Paris Number Theory seminar, Paris
- 07/2005 Galois representations, Strasbourg

Summer schools

- 09/2019 Hausdorff School on the Emerton–Gee stack and related topics, Bonn (5 lectures)
- 06/2018 Algebraic Groups and Geometrization of the Langlands Program, Lyon (4 lectures)
- 01/2018 UK-Japan Winter School on Number Theory, King’s College London (2 lectures)
- 07/2013 MSRI Summer School, Berkeley (4 lectures)
- 03/2013 Arizona Winter School, Tucson (4 lectures)
- 01/2011 Winter school on Serre’s Conjecture, POSTECH, South Korea (4 lectures)

Preprints

- 2019 A. Caraiani, M. Emerton, T. Gee, and D. Savitt. *Moduli stacks of two-dimensional Galois representations*. arXiv: 1908.07019 [math.NT].
M. Emerton and T. Gee. *Moduli stacks of étale (φ, Γ) -modules and the existence of crystalline lifts*. arXiv: 1908.07185 [math.NT].
- 2018 P. B. Allen, F. Calegari, A. Caraiani, T. Gee, D. Helm, B. V. Le Hung, J. Newton, P. Scholze, R. Taylor, and J. A. Thorne. *Potential automorphy over CM fields*. arXiv: 1812.09999 [math.NT].
G. Boxer, F. Calegari, T. Gee, and V. Pilloni. *Abelian Surfaces over totally real fields are Potentially Modular*. arXiv: 1812.09269 [math.NT].
F. Calegari, M. Emerton, and T. Gee. *Globally realizable components of local deformation rings*. arXiv: 1807.03529 [math.NT].
- 2016 T. Gee and J. Newton. *Patching and the completed homology of locally symmetric spaces*. arXiv: 1609.06965 [math.NT].

Publications

- 2019 R. Bellovin and T. Gee. “ G -valued local deformation rings and global lifts”. **Algebra & Number Theory** 13.2, pp. 333–378.
M. Emerton and T. Gee. ““Scheme-theoretic images” of morphisms of stacks”. **Algebraic Geometry (to appear)**.
T. Gee and O. Taïbi. “Arthur’s multiplicity formula for GSp_4 and restriction to Sp_4 ”. en. **Journal de l’École polytechnique — Mathématiques** 6, pp. 469–535.
- 2018 T. Barnet-Lamb, T. Gee, and D. Geraghty. “Serre weights for $U(n)$ ”. **Journal für die Reine und Angewandte Mathematik. [Crelle’s Journal]** 735, pp. 199–224.

- A. Caraiani, M. Emerton, T. Gee, D. Geraghty, V. Paškūnas, and S. W. Shin. “Patching and the p -adic Langlands program for $GL_2(\mathbb{Q}_p)$ ”. **Compositio Mathematica** 154.3, pp. 503–548.
- T. Gee, F. Herzig, and D. Savitt. “General Serre weight conjectures”. **Journal of the European Mathematical Society (JEMS)** 20.12, pp. 2859–2949.
- 2017 F. Calegari, M. Emerton, T. Gee, and L. Mavrides. “Explicit Serre weights for two-dimensional Galois representations”. **Compositio Mathematica** 153.9, pp. 1893–1907.
- T. Gee, F. Herzig, T. Liu, and D. Savitt. “Potentially crystalline lifts of certain prescribed types”. **Documenta Mathematica** 22, pp. 397–422.
- 2016 K. Buzzard and T. Gee. “Slopes of modular forms”. **Families of automorphic forms and the trace formula**. Simons Symp. Springer, [Cham], pp. 93–109.
- A. Caraiani, M. Emerton, T. Gee, D. Geraghty, V. Paškūnas, and S. W. Shin. “Patching and the p -adic local Langlands correspondence”. **Cambridge Journal of Mathematics** 4.2, pp. 197–287.
- 2015 L. Dieulefait and T. Gee. “Automorphy lifting for small l (appendix to: Automorphy of $Sym^5 GL(2)$ and base change)”. **Journal de Mathématiques Pures et Appliquées. Neuvième Série** 104.4, pp. 619–656.
- M. Emerton and T. Gee. “ p -adic Hodge-theoretic properties of étale cohomology with mod p coefficients, and the cohomology of Shimura varieties”. **Algebra & Number Theory** 9.5, pp. 1035–1088.
- M. Emerton, T. Gee, and D. Savitt. “Lattices in the cohomology of Shimura curves”. **Inventiones Mathematicae** 200.1, pp. 1–96.
- T. Gee and D. Geraghty. “The Breuil-Mézard conjecture for quaternion algebras”. **Université de Grenoble. Annales de l’Institut Fourier** 65.4, pp. 1557–1575.
- T. Gee, T. Liu, and D. Savitt. “The weight part of Serre’s conjecture for $GL(2)$ ”. **Forum of Mathematics. Pi** 3, e2, 52.
- 2014 T. Barnet-Lamb, T. Gee, D. Geraghty, and R. Taylor. “Local-global compatibility for $l = p, \ell$ ”. **Annales Scientifiques de l’École Normale Supérieure. Quatrième Série** 47.1, pp. 165–179.
- T. Barnet-Lamb, T. Gee, D. Geraghty, and R. Taylor. “Potential automorphy and change of weight”. **Annals of Mathematics. Second Series** 179.2, pp. 501–609.
- K. Buzzard and T. Gee. “The conjectural connections between automorphic representations and Galois representations”. **Automorphic forms and Galois representations. Vol. 1**. Vol. 414. London Math. Soc. Lecture Note Ser. Cambridge Univ. Press, Cambridge, pp. 135–187.
- M. Emerton and T. Gee. “A geometric perspective on the Breuil-Mézard conjecture”. **Journal of the Institute of Mathematics of Jussieu. JIMJ. Journal de l’Institut de Mathématiques de Jussieu** 13.1, pp. 183–223.
- T. Gee and M. Kisin. “The Breuil-Mézard conjecture for potentially Barsotti-Tate representations”. **Forum of Mathematics. Pi** 2, e1, 56.

- T. Gee, T. Liu, and D. Savitt. “The Buzzard-Diamond-Jarvis conjecture for unitary groups”. **Journal of the American Mathematical Society** 27.2, pp. 389–435.
- 2013 T. Barnet-Lamb, T. Gee, and D. Geraghty. “Congruences between Hilbert modular forms: constructing ordinary lifts, II”. **Mathematical Research Letters** 20.1, pp. 67–72.
- T. Barnet-Lamb, T. Gee, and D. Geraghty. “Serre weights for rank two unitary groups”. **Mathematische Annalen** 356.4, pp. 1551–1598.
- K. Buzzard and T. Gee. “Explicit reduction modulo p of certain 2-dimensional crystalline representations, II”. **Bulletin of the London Mathematical Society** 45.4, pp. 779–788.
- F. Calegari and T. Gee. “Irreducibility of automorphic Galois representations of $GL(n)$, n at most 5”. **Université de Grenoble. Annales de l’Institut Fourier** 63.5, pp. 1881–1912.
- M. Emerton, T. Gee, and F. Herzig. “Weight cycling and Serre-type conjectures for unitary groups”. **Duke Mathematical Journal** 162.9, pp. 1649–1722.
- T. Gee and P. Kassaei. “Companion forms in parallel weight one”. **Compositio Mathematica** 149.6, pp. 903–913.
- 2012 T. Barnet-Lamb, T. Gee, and D. Geraghty. “Congruences between Hilbert modular forms: constructing ordinary lifts”. **Duke Mathematical Journal** 161.8, pp. 1521–1580.
- T. Barnet-Lamb, T. Gee, D. Geraghty, and R. Taylor. “Local-global compatibility for $l = p$, I”. **Annales de la Faculté des Sciences de Toulouse. Mathématiques. Série 6** 21.1, pp. 57–92.
- T. Gee and D. Geraghty. “Companion forms for unitary and symplectic groups”. **Duke Mathematical Journal** 161.2, pp. 247–303.
- T. Gee, T. Liu, and D. Savitt. “Crystalline extensions and the weight part of Serre’s conjecture”. **Algebra & Number Theory** 6.7, pp. 1537–1559.
- 2011 T. Barnet-Lamb, T. Gee, and D. Geraghty. “The Sato-Tate conjecture for Hilbert modular forms”. **Journal of the American Mathematical Society** 24.2, pp. 411–469.
- T. Gee. “Automorphic lifts of prescribed types”. **Mathematische Annalen** 350.1, pp. 107–144.
- T. Gee. “On the weights of mod p Hilbert modular forms”. **Inventiones Mathematicae** 184.1, pp. 1–46.
- T. Gee and D. Savitt. “Serre weights for mod p Hilbert modular forms: the totally ramified case”. **Journal für die Reine und Angewandte Mathematik. [Crelle’s Journal]** 660, pp. 1–26.
- T. Gee and D. Savitt. “Serre weights for quaternion algebras”. **Compositio Mathematica** 147.4, pp. 1059–1086.
- 2009 K. Buzzard and T. Gee. “Explicit reduction modulo p of certain two-dimensional crystalline representations”. **International Mathematics Research Notices. IMRN** 12, pp. 2303–2317.

- T. Gee. "The Sato-Tate conjecture for modular forms of weight 3". **Documenta Mathematica** 14, pp. 771–800.
- 2008 T. Gee. "Companion forms over totally real fields". **Manuscripta Mathematica** 125.1, pp. 1–41.
- 2007 T. Gee. "Companion forms over totally real fields. II". **Duke Mathematical Journal** 136.2, pp. 275–284.
- 2006 T. Gee. "A modularity lifting theorem for weight two Hilbert modular forms". **Mathematical Research Letters** 13.5-6, pp. 805–811.