Curriculum Vitae
Marc Lackenby
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Age: 52

Principal Research Interests

Topology, geometry & group theory, particularly in dimension three.

Major Awards

- Smith Prize, University of Cambridge (1996)
- London Mathematical Society Whitehead Prize (2003)
- EPSRC Advanced Fellowship (2004 - 09)
- Philip Leverhulme Prize (2006)
- Invited Speaker, ICM 2010
- Invited Plenary Speaker, Clay Research Conference (2012)
- A Bourbaki seminar on my work was given in 2016.
- Featured on the front page of the New Scientist (February 2021)
- Interviewed on my work on the BBC World Service (February 2021)
- Featured on the front page of Nature (December 2021)
- Articles on my joint work appeared in the New Scientist, the Times, the Independent and many other news outlets (December 2021) and in Quanta Magazine (February 2022)
- EPSRC Open Fellowship (2024-2029)
- Frontiers of Science Award (2024)

Professional Experience

- 2006 - present, Professor, Oxford University and Tutorial Fellow, St. Catherine's College, Oxford
- 1999 - 2006, University Lecturer, Oxford University and Tutorial Fellow, St. Catherine's College, Oxford
- 1996 - 99, Research Fellow, Trinity College, Cambridge (on leave 1997 - 98)
- 1997 - 98, Miller Research Fellow, UC Berkeley

Education

- 1994 - 97, PhD, Cambridge (supervisor W.B.R. Lickorish)
- 1990 - 94, Cambridge Mathematics Tripos, Parts I, II and III

Services to the Mathematical Community

- I have been an Editor of six major journals:
  - *The Journal of Topology* (2007 - 2021, *Managing Editor* 2018 - 2021)
  - *The Journal of the London Mathematical Society* (*Managing Editor* 2008 - 2013)
  - *Groups, Geometry and Dynamics* (2007 - present)
  - *International Mathematical Research Notices* (2021 - present)
  - *Forum of Mathematics, Sigma and Pi* (2024 - present)
- Director of Graduate Studies in the Mathematical Institute (September 2020 - August 2023).
- Head of the Topology Research Group, Mathematical Institute (2020 - present).
- Member of the Royal Society's Research Appointment Panel from 2009-12.
- Member of the Research Policy Committee of the London Mathematical Society from 2009-12.
- Visiting Professor at the University of Paris VII in June 2009.
- Director of the graduate Taught Course Centre, based at Oxford, Warwick, Imperial, Bath and Bristol, in the set-up phase from March 2006 to March 2007.
- Member of the selection panel for EPSRC Advanced Research Fellows in 2004.
- An organiser for the following conferences:
  2004: Workshop in Oxford on the Geometry & Topology of 3-Manifolds.
  2007: Workshop in Oxford on 3-dimensional Geometry and Topology.
  2011: Durham Symposium on the Geometry and Arithmetic of Lattices.
  2013: Conference in Montreal on the Topology of 3-Manifolds.
  2017: Workshop in Warwick on Geometric Topology in Low Dimensions.
  2026: Oberwolfach meeting on Low-Dimensional Topology

Publications

1. The Whitney trick, **Topol. Appl.** 71 (1996) 115-118
2. Fox's congruence classes and the quantum-SU(2) invariants of links in 3-manifolds, **Comment. Math. Helv.** 71 (1996) 664-677
3. Surfaces, surgery and unknotting operations, **Math. Ann.** 308 (1997) 615-632
4. Dehn surgery on knots in 3-manifolds, **J. Amer. Math. Soc.** 10 (1997) 835-864
5. Upper bounds in the theory of unknotting operations, **Topology** 37 (1998) 63-73
6. (Joint with Daryl Cooper) Dehn surgery and negatively curved 3-manifolds, **J. Differential Geom.** 50 (1998) 591-624
7. Word hyperbolic Dehn surgery, **Invent. Math.** 140 (2000) 243–282
8. Taut ideal triangulations of 3-manifolds, **Geom. Top.** 4 (2000) 369–395
9. Attaching handlebodies to 3-manifolds, **Geom. Top.** 6 (2002) 889-904
10. Exceptional surgery curves in triangulated 3-manifolds, **Pacific J. Math.** 210 (2003) 101-163
11. The canonical decomposition of once-punctured torus bundles, **Comment. Math. Helv.** 78 (2003) 363-384
12. The volume of hyperbolic alternating link complements. **Proc. London Math. Soc.** 88 (2004) 204-224
13. The asymptotic behaviour of Heegaard genus, **Math. Res. Lett.** 11 (2004) 139-149

14. The Heegaard genus of amalgamated 3-manifolds, **Geom. Dedicata** 109 (2004) 139-145
15. A characterisation of large finitely presented groups, **J. Algebra** 287 (2005) 458-473
16. Expanders, rank and graphs of groups, **Israel J. Math.** 146 (2005) 357-370
17. Classification of alternating knots with tunnel number one, **Comm. Anal. Geom.** 13 (2005) 151-186
18. Heegaard splittings, the virtually Haken conjecture and Property (τ), **Invent. Math.** 164 (2006) 317-359
19. Covering spaces of 3-orbifolds, **Duke Math J.** 136 (2007) 181-203
20. Some 3-manifolds and 3-orbifolds with large fundamental group, **Proc. Amer. Math. Soc.** 135 (2007) 3393-3402
21. Adding high powered relations to large groups, **Math. Res. Lett.** 14 (2007) 983-993
22. (Joint with Darren Long and Alan Reid) Covering spaces of arithmetic 3-orbifolds, **Int. Math. Res. Not.** (2008)
23. An algorithm to determine the Heegaard genus of simple 3-manifolds with non-empty boundary, **Alg. Geom. Top.** 8 (2008) 911-934
24. (Joint with Darren Long and Alan Reid) LERF and the Lubotzky-Sarnak conjecture, **Geom. Topol.** 12 (2008) 2047-2056
25. New lower bounds on subgroup growth and homology growth, **Proc. London Math. Soc.** 98 (2009) 271-297.
26. Large groups, Property (τ) and the homology growth of subgroups, **Math. Proc. Camb. Phil. Soc.** 146 (2009) 625-648
27. Surface subgroups of Kleinian groups with torsion, **Invent. Math.** 179 (2010) 175-190
28. The crossing number of composite knots, **J. Topology** 2 (2009) 747-768
29. (Joint with Daryl Cooper and Jessica Purcell) The length of unknotting tunnels, **Alg. Geom. Top.** 10 (2010) 637-661
30. Spectral geometry, link complements and surgery diagrams, **Geom. Dedicata** 147 (2010) 191-206
31. Detecting large groups, **J. Algebra** 324 (2010) 2636-2657
32. (Joint with Alexander Coward) Unknotting genus one knots, **Comment. Math. Helv.** 86 (2011) 383-399
33. Finite covering spaces of 3-manifolds, **Proc. International Congress Math.** Volume II, 1042-1070, Hindustan Book Agency, New Delhi, 2010
34. (Joint with Rob Meyerhoff) The maximal number of exceptional Dehn surgeries, **Invent. Math** 191 (2013) 341-382
35. (Joint with Alexander Coward) An upper bound on Reidemeister moves, **Amer. J. Math** 136 (2014) 1023–1066.
36. Finding disjoint surfaces in 3-manifolds, **Geom. Dedicata** 170 (2014) 385–401.
37. Core curves of triangulated solid tori, **Trans. Amer. Math. Soc** 366 (2014) 6027–6050.
38. The crossing number of satellite knots, **Alg. Geom. Top** 14 (2014) 499–529.

39. (Joint with Jessica Purcell) Geodesics and compression bodies, **Exp. Math.** 23 (2014) 218–240.
40. A polynomial upper bound on Reidemeister moves, **Annals Math.** 182 (2015) 491–564.
41. (Joint with Jessica Purcell) Cusp volumes of alternating knots, **Geom. Topol.** 20 (2016) 2053–2078.
42. (Joint with Jessica Purcell) Essential twisted surfaces in alternating link complements, **Alg. Geom. Topol.** 16 (2016) 3209–3270.
43. Elementary knot theory, **Lectures on Geometry (Clay Lecture Notes)**, Oxford University Press (2017)
44. Some conditionally hard problems on links and 3-manifolds, **Discrete Comput. Geom.** 58 (2017) 580–595.
45. (Joint with Andras Juhasz) *Appendix to* Alternating links and definite surfaces (by Joshua Greene) **Duke Math J.** 166 (2017) 2133–2151.
46. Every knot has characterising slopes, **Math. Ann.** 374 (2019) 429–446.
47. The efficient certification of knottedness and Thurston norm, **Adv. Math.** 387 (2021) 107796.
48. Links with splitting number one, **Geom. Ded.** 214 (2021), 319–351.
49. (Joint with Agnese Barbensi, Dorothy Buck and Heather Harrington) Doubled branched covers of knotoids, **Comm. Anal. Geom.** 30 (2022) 1007–1057.
50. Algorithms in 3-manifold theory, **Surveys in Differential Geometry** 25 (2020),163–213.
51. (Joint with Alex Davies, Petar Velickovic, Lars Buesing, Sam Blackwell, Daniel Zheng, Nenad Tomasev, Richard Tanburn, Peter Battaglia, Charles Blundell, Andras Juhasz, Geordie Williamson, Demis Hassabis and Pushmeet Kohli) Advancing mathematics by guiding human intuition with AI, **Nature** 600 (2021) 70–74.
52. (Joint with Jessica Purcell) *The triangulation complexity of fibred 3-manifolds*, **Geom. Topol.** (accepted)
53. (Joint with Alex Davies, Andras Juhasz and Nenad Tomasev) *The signature and cusp geometry of hyperbolic knots*, **Geom. Topol.** (accepted)
54. (Joint with Mehdi Yazdi) *The computational complexity of determining knot genus in a fixed 3-manifold,* **Proc. London Math. Soc.** (accepted)
55. (Joint with Andreea Deac and Petar Velickovic) *Expander graph propagation,* **Proceedings of Machine Learning Research** (Learning on Graphs 2022)
56. (Joint with Patrick Callahan, Ilya Kapovich, Peter Shalen, and Robin Wilson) *Wolfgang Haken, 1928-2022,* **Notices Amer. Math. Soc.** 70 (2023) 1452-1467.
57. (Joint with Jessica Purcell) *The triangulation complexity of lens spaces and sol 3-manifolds*, **Math. Ann.** (accepted)
58. (Joint with Saul Schleimer) *Recognising elliptic 3-manifolds*, **Comment. Math. Helv.** (accepted)
59. (Joint with Alex Vitvitskyi, João G. M. Araújo, Petar Velickovic) *What makes a good feedforward computational graph?*, **International Conference on Machine Learning** (accepted)

Preprints

60. *Dehn surgery from a hyperbolic perspective*, 29 pages
61. (with Mehdi Yazdi) *Bounds for the number of moves between pants decompositions, and between triangulations*, 43 pages
62. *Some fast algorithms for curves in surfaces*, 44 pages
63. (with Taylor Applebaum, Sam Blackwell, Alex Davies, Thomas Edlich, Andras Juhasz, Nenad Tomaev, Daniel Zheng) *The unknotting number, hard unknot diagrams, and reinforcement learning*, 29 pages

Doctoral students (together with the papers arising from their thesis)

1. Stelios Koundouros (PhD 2003)
   Universal surgery bounds on hyperbolic 3-manifolds, Topology 43 (2004) 497–512.
2. Alex Mijatovic (PhD 2003)
   Simplifying triangulations of S^3. Pacific J. Math. 208 (2003) 291–324.
   Triangulations of Seifert fibred manifolds, Math. Ann. 330 (2004) 235–273.
   Triangulations of fibre-free Haken 3-manifolds, Pacific J. Math. 219 (2005) 139–186.
   Simplical structures of knot complements, Math. Res. Lett. 12 (2005) 843–856.
3. Vivien Easson (PhD 2005)
   Surface subgroups and handlebody attachment, Geom. Topol. 10 (2006) 557–591
4. Alexander Coward (PhD 2008)
   Ordering the Reidemeister moves of a classical knot, Algebr. Geom. Topol. 6 (2006) 659–671.
   Algorithmically detecting the bridge number of hyperbolic knots, Preprint.
5. Liam Wall (PhD 2010)
   Homology in finite index subgroups, Thesis
6. Karin Alcaraz (PhD 2012)
   The Alexander polynomial of closed 3-manifolds, Thesis
7. Jessica Banks (PhD 2012)
   On links with locally infinite Kakimizu complexes, Alg. Geom. Top. 11 (2011) 1445-1454.
   Homogeneous links, Seifert surfaces, digraphs and the reduced Alexander polynomial, Geom. Ded. 166 (2013) 67–98.
   Minimal Genus Seifert Surfaces for Alternating Links, Preprint
   The Kakimizu complex of a connected sum of links, Trans. A.M.S 365 (2013) 6017–6036.
8. Hemanth Saratchandaran (PhD 2015)
   Kirby diagrams and the Ratcliffe-Tschantz hyperbolic 4-manifolds, Topology Appl. 202 (2016), 301–317.
   A four dimensional hyperbolic link complement in a standard S^4, Preprint
   A four dimensional hyperbolic link complement in a standard $S^2 \times S^2$, Preprint
   Complements of tori in $\#_{2k} S^2 \times S^2$ that admit a hyperbolic structure, Preprint
9. Henry Bradford (PhD 2015)
   New Uniform Diameter Bounds in Pro-p Groups, Groups Geom. Dyn. 12 (2018) 803–836.

Expansion, Random Walks and Sieving in $SL_2(\mathbb{F}_p[t])$, Israel J. Math. 215 (2016) 559–582.

10. Antonio De Capua (PhD 2017)

    Hyperbolic volume estimates via train tracks, Thesis

11. Gareth Wilkes (PhD 2018)

    Profinite rigidity for Seifert fibre spaces. Geom. Dedicata 188 (2017) 141–163.

    Profinite properties of RAAGs and special groups. Bull. Lond. Math. Soc. 48 (2016) 1001–1007.

    Profinite rigidity of graph manifolds and JSJ decompositions of 3-manifolds. J. Algebra 502 (2018) 538–587.

    Virtual pro-p properties of 3-manifold groups. J. Group Theory 20 (2017) 999–1023.

    Relative cohomology theory for profinite groups. J. Pure and Applied Algebra 223 (2019) 1617–1688.

    Classification of pro-p PD^2 *pairs and the pro-p curve complex,* Preprint.

    Profinite rigidity of graph manifolds, II: knots and mapping classes, Israel J. Math. 233 (2019) 351–378.

    Profinite completions, cohomology and JSJ decompositions of compact 3-manifolds, New Zealand J. Math. 48 (2018) 101–113.

12. Simon Bergant (PhD 2019) *Random Irreducible Quadrangulations,* Thesis

13. Agnese Barbensi (PhD 2020)

    (Joint with Daniele Celoria) *The Reidemeister graph is a complete knot invariant*, Alg. Geom. Top. 20 (2020) 643–697.

    (Joint with Daniele Celoria, Heather Harrington, Andrzej Stasiak and Dorothy Buck) *Grid diagrams as tools to investigate knot spaces and topoisomerase-mediated simplification of DNA topology*, Science Advances

    (Joint with Dimos Goundaroulis) *f-distance of knotoids and protein structure,* Preprint

14. Joseph Scull (PhD 2022)

    Systole Length in Hyperbolic n-Manifolds, Preprint

    The Homeomorphism Problem For Hyperbolic Manifolds I, Preprint

15. Adele Jackson (started 2024)

    Minimal triangulation size of Seifert fibered spaces with boundary, Preprint

    Recognition of Seifert fibered spaces with boundary is in NP, Math. Ann. 391 (2025) 309–361.

16. Filippo Baroni (started 2021)

    Classification of genus-two surfaces in S^3, Preprint

    Uniformly polynomial-time classification of surface homeomorphisms, Preprint

17. Misha Schmalian (started 2022)

    Obstructing Anosov flows on cusped 3-manifolds, Preprint

    Cusp shape and fractional Dehn twists of fibred hyperbolic 3-manifolds, Preprint

    An algorithm for finding minimal volume hyperbolic links and the Dehn parental test, Preprint

Invited Lectures (∗ denotes plenary talk)

∗ 1. MSRI, Berkeley, Low-dimensional topology workshop (August 1996)
∗ 2. Newton Institute, Cambridge, 4-d geometry and quantum field theory (December 1996)
∗ 3. UC Santa Barbara, Southern California Topology Conference (February 1997)
∗ 4. Athens Georgia, Georgia Topology Conference (August 1997)
∗ 5. Tokyo Institute of Technology, Workshop on orbifolds (July 1998)
∗ 6. Oberwolfach, Topology meeting (September 1999)
∗ 7. Warwick, Low-dimensional topology meeting (January 2000)
∗ 8. Sheffield, British Topology meeting (April 2000)
∗ 9. Montreal, 3-manifolds meeting (June 2001)
10. Lyon, French-American Congress of Mathematics (July 2001)
∗ 11. Lyon, Conference on Property (τ) (May 2002)
∗ 12. Xi'an, Satellite conference of the ICM (August 2002)
∗ 13. Oberwolfach, Topology meeting (September 2002)
∗ 14. Oberwolfach, meeting on hyperbolic 3-manifolds (May 2003)
∗ 15. Oberwolfach, meeting on discrete groups and profinite groups (May 2003)
∗ 16. Newton Institute, Cambridge, conference on Kleinian groups (August 2003)
∗ 17. Banff International Research Station, 3-manifolds meeting (September 2003)
∗ 18. CIRGET, Montreal, conference on 3-manifold theory (May 2004)
19. Toulouse, Canada-France Congress of Mathematics (July 2004)
∗ 20. Oxford, Workshop on 3-dimensional geometry and topology (August 2004)
21. Liverpool, British Mathematics Colloquium, 'morning speaker' (April 2005)
∗ 22. Austin, Texas, meeting on 3-manifolds (May 2005)
∗ 23. ICTP, Trieste, conference on 3-manifold theory (June 2005)
∗ 24. Institute of Advanced Study, Princeton, workshop on Lie groups, representations and discrete mathematics (3 talks in November 2005, 1 talk in February 2006)
∗ 25. ICMS, Edinburgh, 3-manifolds conference (3 talks, March 2006)
∗ 26. Oberwolfach, Topology meeting (September 2006)
∗ 27. Oxford, launch meeting for the Journal of Topology (March 2007)
∗ 28. Princeton, Thurston's 60th birthday conference (July 2007)
∗ 29. Bristol, Heilbronn Annual Conference (September 2007)
∗ 30. Trinity College, Dublin, meeting on pro-p groups and low-dim'l topology (September 2007)
∗ 31. IPAM, UCLA, meeting on Expanders in Pure and Applied Mathematics (February 2008)
∗ 32. Public lecture on the Poincaré conjecture, Oxford (July 2008)
∗ 33. Göttingen, Autumn School on Geometric Invariants of Groups (4 talks, November 2008)
∗ 34. Oxford, 60th birthday conference for Fritz Grunewald (April 2009)
∗ 35. Warwick, conference on Dehn filling (May 2009)
∗ 36. Athens Georgia, Georgia Topology Conference (May 2009)
∗ 37. Imperial College, London, conference on rank gradient (June 2009)
∗ 38. UC Davis, Geometric topology in 3 and 4 dimensions (June 2009)

39. Cambridge, Young Researchers in Mathematics (March 2010)
∗ 40. St Andrew's, Edinburgh Mathematical Society meeting (May 2010)
41. Hyderabad, International Congress of Mathematics (August 2010)
∗ 42. Oxford, conference on the Geometry and Analysis of Groups (November 2010)
∗ 43. Pisa, conference on the Geometric Topology of Knots (May 2011)
∗ 44. London, centenary conference in honour of Poincaré (May 2012)
∗ 45. Oxford, Clay Research Conference (June 2012)
∗ 46. Schrödinger Institute, Vienna, workshop on rank gradient (3 talks, August 2012)
∗ 47. Cambridge, British Topology Meeting (September 2012)
∗ 48. Grenoble, Tripode seminaire (October 2012)
∗ 49. Scottish topology meeting (March 2013)
∗ 50. McGill, Montreal, XVI Colloque Panquéécois des Étudiants de l'ISM (May 2013)
∗ 51. Cortona, Conference on 3-manifolds in honour of Ricardo Benedetti (June 2013)
∗ 52. Columbia, Geometry and Topology in New York (August 2013)
∗ 53. York, North British Geometric Group Theory (June 2014)
∗ 54. IMPA, Rio, conference on Hyperbolic Geometry and Minimal Surfaces (January 2015)
∗ 55. Banff, conference on Computability, Analysis and Geometry (March 2015)
∗ 56. Berkeley, conference on Groups, Geometry and 3-Manifolds (May 2015)
∗ 57. Newton Institute, Cambridge, Homology Theories in Low Dimensional Topology (January 2017)
58. Barcelona, Foundations of Computational Mathematics (July 2017)
∗ 59. Montreal, Characters in low-dimensional topology (June 2018)
∗ 60. Berkeley, Topology in Dimensions 3, 3.5 and 4 (June 2018)
∗ 61. UCL, Brussels-London Geometry Seminar (September 2019)
∗ 61. Public lecture, Oxford (March 2019)
∗ 62. ICERM, Providence, Workshop on Dehn surgery (4 talks, July 2019)
∗ 63. Grenoble-Oxford conference (October 2019)
∗ 64. London, LMS Annual General Meeting (November 2019)
65. Symposium on Computational Geometry (June 2021)
∗ 66. Machine learning workshop, Insitute of Advanced Study, Princeton (March 2022)
67. British Mathematics Colloquium, Geometry section, King's London (June 2022)
∗ 68. Oberwolfach, Low-dimensional topology meeting (January 2023)
∗ 69. IPAM, UCLA, Meeting on machine-assisted mathematics (February 2023)
70. International Congress in Basic Science (July 2024)
∗ 71. Georgia International Topology Conference (May 2025)
∗ 72. Intelligence of Low-Dimensional Topology, RIMS, Kyoto (May 2025)

Seminars and colloquia (since 2007)

1. Colloquium, Edinburgh (January 2007)
2. Topology seminar, Edinburgh (January 2007)
3. Topology seminar, Oxford (January 2007, 3 talks)

4. Colloquium, Durham (March 2007)
5. Colloquium, Aberdeen (October 2007)
6. Topology seminar, Oxford (May 2008, 2 talks)
7. Pure maths seminar, Queen Mary's College, London (September 2008)
8. Lecture, the Chancellor's Court of Benefactors, Oxford (October 2008)
9. Topology seminar, Cambridge (October 2008)
10. Geometry, topology & dynamics seminar, Orsay (February 2009)
11. Topology seminar, Oxford (March 2009)
12. Operator algebras seminar, Paris VII (June 2009)
13. Analysis and geometry seminar, Paris VII (October 2009)
14. Analysis and geometry seminar, Paris VII (November 2009)
15. Pure maths seminar, Royal Holloway, London (May 2011)
16. Topology seminar, Cambridge (May 2012)
17. Geometry and topology seminar, Imperial College, London (May 2012)
18. Topology seminar, Oxford (June 2012)
19. Fellows' seminar, St Catherine's College, Oxford (October 2012)
20. Topology seminar, Oxford (November 2012)
21. Colloquium, Warwick (March 2013)
22. Topology seminar, Oxford (January 2014)
23. Colloquium, Durham (October 2014)
24. Topology seminar, Oxford (January 2015)
25. Geometry seminar, Imperial College (December 2015)
26. Topology seminar, Warwick (May 2017)
27. Low-dimensional topology and geometry seminar, Regensburg (July 2020)
28. Topology seminar, UC Davis (January 2021)
29. Topology seminar, Oxford (March 2021)
30. Combinatorics seminar, Jerusalam and Copenhagen (May 2021)
31. Princeton mathematics colloquium (December 2021)
32. Rutgers mathematics colloquium (February 2022)
33. Southampton mathematics colloquium (March 2022)
34. Topology seminar, Cambridge (March 2022)
35. Topology seminar, Princeton (March 2022)
36. Topological Quantum Field Theory seminar, Lisbon (June 2022)
37. Geotop-A seminar, online (November 2023)
38. Topology seminar, Bristol (November 2023)

Before 2007, I gave seminars at the following universities:

Oxford, Cambridge, Warwick, Imperial College (London), Queen Mary's College (London), King's College (London), University College (London), Edinburgh, Aberdeen, Leicester, Liverpool, Southampton, Newcastle, Sheffield, UC Berkeley, UC Davis, UC Santa Barbara, UC Irvine,

Stanford, U Texas at Austin, U Georgia at Athens, U Illinois at Chicago, Princeton, Cornell, Columbia, U Montreal.

Teaching

I organise regular advanced classes on a variety of topics for graduate students, post-docs and fellow faculty members. I have also designed the lecture course Topology & Groups.

In 2006, I was awarded an *Excellence in Teaching Award*, and in 2013, I was given a *Mathematical Institute Teaching Award*.

Undergraduate courses

MT 2000	Differential equations and discrete mathematics
HT 2001, 2002, 2003	Algebraic topology
MT 2001	Differential and difference equations
MT 2004, 2006, 2008	Topology & Groups
HT 2011	Algebraic topology
HT 2011, 2012, 2013, 2014	Topology
MT 2016, 2017, 2018, 2019	Topology & Groups
TT 2020	Graph theory

Graduate courses

1998 & 1999	Hyperbolic manifolds
2000	Three-dimensional manifolds
2015	Mapping class groups of surfaces

Advanced classes

2000	Teichmüller spaces	2001	$\mathbb{R}$-trees
2002	The Seifert fibre space theorems	2003	Isomorphism problem for hyperbolic groups
2006	Property (τ)	2007	Hyperbolicity of the curve complex
2008	Virtual fibering of 3-manifolds	2009	Cube complexes
2010	The Dehn function of $\mathrm{SL}(n, \mathbb{Z})$	2011	Quantum invariants and Property T
2012	Cube complexes	2013	Unknot recognition
2014	4-manifolds		

Administration

2020-present	Head of the Topology Research Group, Mathematical Institute
2020-23	Director of Graduate Studies (Teaching), Mathematical Institute
2021-23	Vice Master, St Catherine's College

Examining

Prelims	2000-03 (Chair 2003)	Prelims	2013-14 (Chair 2013)
Mods	2012	Part C & OMMS	2018-2019 (Chair 2019)

Departmental committees

2000-02	Teaching committee	2001-02	Course structure committee
2011-12	Syllabus review working party	2012-16	Departmental committee
2017-23	OMMS committee	2019-present	Research strategy group
2020-22	Executive committee	2020-23	Department committee
2020-23	Graduate studies committee	2020-22	Research committee
2020-23	Graduate admissions committee		

College committees

2001-04	Domestic committee	2002	Mastership committee
2002-04	Nominating committee	2002-08	Finance committee
2009-12	Academic policy committee	2012-13	Investment subcommittee
2013-16	Finance comittee	2014-18	Computing committee
2017-19	Academic policy committee	2021-23	Nominating committee
2024	Mastership committee (chair)		