Geordie WILLIAMSON

g.williamson@sydney.edu.au

CAREER

Current
- **University of Sydney Mathematical Research Institute.** Director. 2018 – present.
- **University of Sydney.** Professor of Mathematics. 2017 – present.
- **DeepMind, Google.** Consultant in Pure Mathematics. 2020 – present.

Previous
- **Distinguished Visiting Professor.** Institute for Advanced Study, Princeton, 2020/21.
- **Hausdorff Centre for Mathematics.** Bonn Research Fellow (visiting position). 2017 – 2022.
- **Max Planck Institute for Mathematics.** Advanced Researcher (Research Professor). 2011 – 2016.
- **Mathematical Institute, University of Oxford.** Postdoctoral Research Fellow. 2008 – 2011.
- **St Peter's College, University of Oxford.** Junior Research Fellow. 2008 – 2011.

EDUCATION

- **PhD in Pure Math.** – Albert-Ludwigs-Universität Freiburg (2004-2008).
- **Honours in Pure Math. (First Class Honours and Univ. Medal)** – University of Sydney (2003).
- **Bachelor of Arts** – University of Sydney (2000 – 2002)

MAJOR PRIZES AND DISTINCTIONS

- **ARC Laureate Professorship** – University of Sydney, 2024–2029.
- **NSW Premier's Prize for Excellence** – November, 2022.
- **Distinguished Visiting Professor** – Institute for Advanced Study, Princeton, 2020/21.
- **Fellow of the Royal Society** – Elected 2018.
- **Fellow of the Australian Academy of Sciences** – Elected 2018.
- **Plenary Speaker** – International Congress of Mathematicians (ICM), Rio, August 2018.
- **Public Speaker** – International Congress of Mathematicians, July 2022.
- **Clay Research Award** – September 2016.
- **2017 New Horizons in Mathematics Prize** – (with Ben Elias), December 2016.
- **European Mathematical Society Prize** – July 2016.
- **Chevalley Prize of the American Mathematical Society** – January 2016.
- **"One case of very good wine"** – a 2009 bet with P. Fiebig on Lusztig's conjecture, March 2015.
- **Christopher Heyde Medal, Australian Academy of Science** – May 2019.
- **Australian Mathematical Society Medal** – December 2018.

PROFESSIONAL ACTIVITIES

- **Council Member, National Science and Technology Council 2018-2021** – Australia's peak science council. The Council is Chaired by the Prime Minister, with the Minister for Industry, Science and Technology as Deputy Chair. The council consists of the Chief Scientist, Chief Executive of CSIRO and six eminent scientists.
- **Editor for** – *Inventiones mathematicae* (2021–), *Annales scientifiques de l'ÉNS* (2017-2021), *Crelle's journal* (2018-2022), *Manuscripta Mathematica* (2017).
- **Referee for** – Abel Prize, Fields Medal, Breakthrough Prize, Chern Medal.
- **Comittees** – 2022 International Congress of Mathematicians Program, Chevalley Prize, MATRIX Scientific, George Szekeres Medal, AMSI winter school.

PUBLICATIONS

Overview
- Williamson has 37 published papers and 2 books.
  For a complete list of publications and preprints, please see:
  `https://www.maths.usyd.edu.au/u/geordie/papers.html`

Best Pubs
- Advancing mathematics by guiding human intuition with AI,
  (with A. Davies et al.), *Nature* 600.7887 (2021), 70-74.
- Smith-Treuann theory and the linkage principle,
  (with Simon Riche), *Publ. IHES* to appear, 2022.
- Koszul duality for Kac-Moody groups and characters of tilting modules,
  (with P. N. Achar, S. Makisumi and S. Riche), *J. Amer. Math. Soc.* 32 (2019), no. 1, 261–310.
- Schubert calculus and torsion explosion,
  (with an appendix by Alex Kontorovich, Peter McNamara and Geordie Williamson),
  J. Amer. Math. Soc. 30 (2017), no. 4, 1023–1046.
- The Hodge theory of Soergel bimodules,
  (with Ben Elias), *Ann. of Math.* (2) 180 (2014), no. 3, 1089–1136.
- Parity sheaves,
  (with Daniel Juteau and Carl Mautner), *J. Amer. Math. Soc.* 27 (2014), no. 4, 1169–1212.

BOOKS

- *Introduction to Soergel bimodules*,
  (with B. Elias, S.Makisumi, U. Thiel), vol. 5 RSME Springer Series, 572 pp, 2020.
- Tilting modules and the p-canonical basis,
  (with Simon Riche), *Astérisque* 2018, no. 397.

DISTINGUISHED LECTURES

- **Panorama of Mathematics** – Bonn, Germany. *A Panorama of Modular Representation Tneory*, (October 2023).
- **Current Developments in Mathematics** – Harvard, USA. *Parity sheaves and modular representations*, (November 2019).
- **Plenary Speaker, Clay Research Conference** – Oxford, UK. *Challenges in modular representation theory*, (Sept. 2019).

- **Heilbronn Distinguished Lecture Series** – Bristol, UK. *Representation theory and geometry*, (March 2018).
- **Distinguished Lecture Series** – Stanford, USA. *Algebraic representations and constructible sheaves*, (May 2017).
- **Takagi Lectures** – University of Tokyo, Japan. *On the representation theory of algebraic groups*, (November 2016).
- **Séminaire Bourbaki** – Paris, France. *The Hodge theory of the Decomposition Theorem (after de Cataldo and Migliorini)*, (March 2016).
- **Feit Memorial Lectures** – Yale, USA. *Modular representations of Chevalley groups and Lusztig's conjecture*, (two lecture series) (October 2014).
- **Colloquia.** Princeton, MIT, Harvard, ETH Zürich, ...

OUTREACH AND MEDIA

- **SXSW** – Discussion on "Math, AI and Intuition" with Adam Spencer .
- **Machine learning as a tool for the mathematician** – public lecture as part of the International Congress of Mathematicians, July 2022.
- **Deep Maths - machine learning and mathematics** – recorded talk for Oxford Mathematics Public Lectures. Over 150K views on youtube.
- **Math, AI and intuition** – public lecture at the University of Sydney (Sydney Ideas) in March 2022 and at the University of Queensland in June 2022.
- **Media around *Nature* paper** – at least 225 articles, published across ~30 countries and in ~15 different languages, including an article on page 4 of the UK's *The Times*.
- **Mathematical discoveries take intuition and creativity – and now a little help from AI** – article by Williamson in *The Conversation*. This article has over 20K reads and has been shared by 12 publishers
- **Life in 248 Dimensions** – appearance on Richard Fidler's *Conversations* podcast. This is Australia's most downloaded podcast, with over 7M downloads since release.
- **This Sounds like Science: Why Music is Math** – public lecture at the City Recital Hall in August 2019 and NSW Parliament in December 2019.
- **Other print media** – including a feature article by Tim Elliott in *Good Weekend* magazine ("Maths prodigy comes home to establish $5 million world-class maths centre"), appearance on the front page of Melbourne's *The Age* and a feature article in *The Autralian Magazine*.
- **Several radio appearances** – including Radio National Drive and Dr. Karl on Triple J.