# Prof. András Juhász

Professor of Mathematics

Mathematical Institute Radcliffe Observatory Quarter Woodstock Road Oxford, OX2 6GG, UK

#### EDUCATION

PhD Mathematics, Princeton University, 2008
Supervisor: Zoltán Szabó
Dissertation: Floer homology and surface decompositions
MSc (with Honours) Mathematics, Eötvös Loránd University of Budapest, 2004

# **Research interests**

Differential and low-dimensional topology, in particular Heegaard Floer homology, knot theory, contact and symplectic topology, global singularity theory, and TQFTs. Applications of machine learning to mathematics.

#### **PROFESSIONAL HISTORY**

2017 -	Full Professor
	Mathematical Institute, University of Oxford
2013-2017	Associate Professor and Royal Society University Research Fellow
	Mathematical Institute, University of Oxford
2013-	Tutorial Fellow
	Keble College, Oxford
2012-2013	Senior Lecturer and Royal Society University Research Fellow
	Department of Mathematics, Imperial College London
2011-2012	Royal Society University Research Fellow
	DPMMS, University of Cambridge
2008-2012	Non-Stipendiary Junior Research Fellow
	King's College, Cambridge
2008-2011	Herchel Smith Postdoctoral Research Fellow
	DPMMS, University of Cambridge

# Awards/scholarships

- 2008 Géza Grünwald Memorial Prize
- 2005 Pro Scientia Gold Medal

2002/03, 2003/04 Scholarship of the Republic of Hungary

- 2003 Kató Rényi Memorial Prize, First Category
- 2003 Outstanding Student of the Faculty of Science, Eötvös Loránd University of Budapest
- 2001 Third prize in the Schweitzer Mathematical Competition
- 1998 Metropolis Prize

#### FUNDING SECURED

2016–2021 ERC Starting Grant, 1.49 million Euros (PI)

(8 Postdoctoral Research Associates, 2 PhD students)

Website: http://people.maths.ox.ac.uk/juhasza

2016–2019 Royal Society University Research Fellowship Extension (PI), £360,854

2011–2016 Royal Society University Research Fellowship (PI), £534,206

2011–2014 EPSRC Postdoctoral Fellowship (PI), declined

2010–2015 Lendület Grant, Hungarian Academy of Sciences (co-applicant)

2010–2014 Hungarian Scientific Research Fund grant NK81203 (co-applicant)

2006–2010 Hungarian Scientific Research Fund grant T49449 (co-applicant)

2002–2006 Hungarian Scientific Research Fund grant T037735 (co-applicant)

#### PhD Students Supervised

- 2019– Zsombor Fehér
- 2017–2021 Peter Banks

2015–2019 Sungkyung Kang

2015–2016 Fyodor Gainullin (co-supervised by Dorothy Buck)

2013–2017 Marco Marengon

2010–2013 Irida Altman (co-supervised by Saul Schleimer)

## SERVICES

- 2020 **Organised workshop** "Low-dimensional Topology" in Oxford (funded by the Clay Mathematical Institute and the ERC)
- 2016–2019 Panel Member of the Royal Society International Exchanges Scheme
- 2014– Editor for the Proceedings (until 2019), Journal, Bulletin, and Transactions of the London Mathematical Society

## LIST OF PUBLICATIONS

 Advancing mathematics by guiding human intuition with AI (with A. Davies, P. Veličković, L. Buesing, S. Blackwell, D. Zheng, N. Tomašev, R. Tanbum, P. Battaglia, C. Blundell, M. Lackenby, G. Williamson, D. Hassabis, P. Kohli) *Nature* 600 (2021), 70–74.

 Naturality and mapping class groups in Heegaard Floer homology. (with D. Thurston and I. Zemke)
 Memoirs of the American Mathematical Society, 273 (2021), no. 1338, 174pp.

3. Transverse invariants and exotic surfaces in the 4-ball (with M. Miller and I. Zemke) Geometry and Topology **25** (2021), no. 6, 2963–3012.

4. Concordance surgery and the Ozsváth–Szabó 4-manifold invariant (with I. Zemke)
Preprint (2018), 37 pp.
To appear in *Journal of the European Mathematical Society*

5. Knot cobordisms, bridge index, and torsion in Floer homology. (with M. Miller and I. Zemke)

Journal of Topology 13 (2020), no. 4, 1701–1724.

6. Distinguishing slice disks using knot Floer homology (with I. Zemke)
Selecta Mathematica New Series 26 (2020), no. 5

 Contact handles, duality, and sutured Floer homology. (with I. Zemke)
 Geometry and Topology 24 (2020), no. 1, 179–307.

8. Functoriality of the EH class and the LOSS invariant under Lagrangian concordances. (with M. Golla) Algebraic and Geometric Topology **19** (2019), no. 7, 3683–3699.

9. Spectral order for contact manifolds with convex boundary. (with S. Kang)
Algebraic and Geometric Topology 18 (2018), no. 6, 3315–3338.

 Computing cobordism maps in link Floer homology and the reduced Khovanov TQFT. (with M. Marengon)
 Selecta Mathematica 24 (2018), no. 2, 1315–1390.

11. Defining and classifying TQFTs via surgery. *Quantum Topology*, **9** (2018), no. 2, 229–321.

12. "Appendix: Algorithmic detection of alternating links" in "Alternating links and definite surfaces" by J. Greene (with M. Lackenby) Duke Mathematical Journal **166** (2017), no. 11, 2133–2151.

 Concordance maps in knot Floer homology. (with M. Marengon)
 Geometry and Topology 20 (2016), 3623–3673.

14. Cobordisms of sutured manifolds and the functoriality of link Floer homology. Advances in Mathematics **299** (2016), 940–1038.

Sutured Floer homology, fibrations and taut depth one foliations.
 (with I. Altman and S. Friedl)
 Transactions of the American Mathematical Society 368 (2016), no. 9, 6363–6389.

16. A survey of Heegaard Floer homology. New Ideas in Low Dimensional Topology, World Scientific (2014), 237–296.

17. On sutured Floer homology and the equivalence of Seifert surfaces. (with M. Hedden and S. Sarkar) Algebraic and Geometric Topology **13** (2013), 505–548.

 Sutured Floer homology and hypergraphs. (with T. Kálmán and J. Rasmussen) Mathematical Research Letters 19 (2012), no. 6, 1309–1328.

19. The decategorification of sutured Floer homology. (with S. Friedl and J. Rasmussen) *Journal of Topology* **4** (2011), no. 2, 431–478.

20. Problems in sutured Floer homology. Intelligence of Low-Dimensional Topology, RIMS Kôkyûroku **1716** (2010), 136–137.

21. The sutured Floer homology polytope. Geometry and Topology 14 (2010), no. 3, 1303–1354.

22. Knot Floer homology and Seifert surfaces. Algebraic and Geometric Topology 8 (2008), no. 1, 603–608.

23. Floer homology and surface decompositions. *Geometry and Topology* **12** (2008), no. 1, 299–350.

24. Holomorphic discs and sutured manifolds. Algebraic and Geometric Topology 6 (2006), 1429–1457.

25. A geometric classification of immersions of 3-manifolds into 5-space. *Manuscripta Mathematica* **117** (2005), no. 1, 65–83.

26. Regular homotopy classes of singular maps. Proceedings of the London Mathematical Society **90** (2005), no. 3, 738–762.

27. Regular homotopy classes of locally generic mappings. *Topology and its Applications* **138** (2004), no. 1-3, 45–59.

#### Preprints

28. The signature and cusp geometry of hyperbolic knots (with A. Davies, M. Lackenby, and N. Tomašev) Preprint (2021), 26 pp., https://arxiv.org/abs/2111.15323

29. New Heegaard Floer slice genus and clasp number bounds (with I. Zemke) Preprint (2020), 28 pp., http://arxiv.org/abs/2007.07106

30. Stabilization distance bounds from link Floer homology (with I. Zemke)
Preprint (2018), 81 pp., http://arxiv.org/abs/1810.09158