Jacob A. Rasmussen
Curriculum Vitae

Address: Department of Pure Mathematics
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Personal: Born April, 1976, in Providence, RI, USA.
U.S. and U.K. Citizen.

Education:

Harvard University: Ph.D. in Mathematics, 2003.
Advisor: Peter Kronheimer.
Thesis title: *Floer homology and knot complements.*

Princeton University: A.B. in Mathematics, *summa cum laude*, 1998.
Class of 1998 Latin Salutatorian.

Employment:

2021 Minerva Visiting Professor, Princeton University
2020-1 Member, Institute for Advanced Study
2018– Professor of Mathematics, University of Cambridge
2018 Simons Visiting Professor, CRM, Montreal
2010-11 Visiting Professor, Simons Center for Geometry and Physics.
2007–8 Visiting Associate Professor, Princeton University.
2007–18 Reader in Geometry, University of Cambridge.
2005–7 Assistant Professor, Princeton University.
2003–5 Veblen Research Instructor, Princeton University/IAS

Research Interests:

Knot theory and low dimensional topology. Gauge theory and Heegaard Floer homology. Categorification and Khovanov homology.

Fellowships and Grants:

EPSRC grant EP/M000648/1, 2014–2016.
NSF grant DMS-0603940, 2006–2009.
Sloan Fellowship, 2007–2008.

Publications and Preprints:

with N. Dunfield, A unified Casson-Lin invariant for the real forms of $SL(2)$, `arXiv:2209.03382` (submitted).

Floer homology for 3-manifolds with torus boundary, to appear in *ICM Proceedings 2022*.

Knots, polynomials, and categorification, in *Quantum Field Theory and Manifold Invariants*, edited by Daniel S. Freed *et. al*, IAS PCMI Series 28, AMS, 2021.

with J. Hanselman and L. Watson, Heegaard Floer homology for manifolds with torus boundary: properties and examples, to appear in *Proc. LMS,* `arXiv:1810.10355`.

with J. Hanselman and L. Watson, Bordered Floer homology for manifolds with torus boundary via immersed curves, `arXiv:1604.03466 v2` (submitted).

with E. Gorsky and A. Negut, Flag Hilbert schemes, colored projectors and Khovanov-Rozansky homology, *Adv. Math.* **378** (2021).

with J. Hanselman, S. D. Rasmussen, and L. Watson, Taut foliations on graph manifolds, *Compos. Math.*, **156** (2020), 604–12.

with S. D. Rasmussen, Floer simple manifolds and L-space intervals, *Adv. Math.*, **322** (2017) 738-805.

with A. Oblomkov and V. Shende, The Hilbert scheme of a plane curve singularity and the HOMFLY homology of its link, *Geom. Topol.* **22** (2018), 645–91.

Some differentials on Khovanov-Rozansky homology, *Geom. Topol.* **19** (2015), no. 6, 3031–3104

with E. Gorsky, A. Oblomkov, and V. Shende, Torus knots and the rational DAHA, *Duke Math. J.* 163 (2014) no. 14, 2709–2794

with E. Gorsky and A. Oblomkov, On stable Khovanov homology of torus knots, *Experimental Mathematics* **22** (2013), 265–281

with A. Juhász and T. Kalmán, Sutured Floer homology and hypergraphs, *Math. Res. Lett.* **19** (2012), no. 6, 1309–1328

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

with P. Ozsváth and Z. Szabó, Odd Khovanov homology, *Alg. Geom. Top.* **13** (2013) no. 3, 1465–1488

Khovanov homology and the slice genus, *Invent. Math.* **182** (2010) no. 2, 419–447

Khovanov-Rozansky homology of two-bridge knots and links, *Duke Math. J.,* **136** (2007), no. 3, 551–583

with N. Dunfield and S. Gukov, The superpolynomial for knot homologies, *Experimental Mathematics* **15** (2006), 129–161

Knot homologies, in *Geometry and Topology of Manifolds* (Boden *et al.* eds.), Fields Institute Communications **47** (2005), 261–280. Providence: AMS

Lens space surgeries and a conjecture of Goda and Teragaito, *Geom. Top.* **8** (2004), 1013–1031

Floer homology and knot complements, Harvard University PhD thesis, 2003.

Floer homology of surgeries on two-bridge knots, *Alg. Geom. Top.* **2** (2002), 757–89

Editorial Work:

Journal of Topology, Editor, 2020–

Quantum Topology, Editor, 2018–
Managing Editor 2021–

Mathematical Proceedings of the Cambridge Philosophical Society, Contributing Editor, 2015–17

Selected Invited Talks/Lecture Series:

2022 ICM Sectional speaker, Topology
Minerva Lectures, Spring 2021, Princeton University
PCMI 2019, Graduate Summer School
2017 Essén Lectures, Uppsala University
WARTHOG 2016 (University of Oregon)
9th William Rowan Hamilton Workshop

Organizing:

2023 (upcoming) CMI 1-week workshop, "Gauge theory and topology: in celebration of Peter Kronheimer's 60th birthday," Co-organizer.

2021 SCGP 1-week workshop, "Floer homology in low-dimensional topology," Co-organizer (online, rescheduled from spring 2020).

2017 Newton Institute 6-month program, "Homology theories in low-dimensional topology," Co-organizer.

2012 British Topology Meeting, Cambridge, Co-organizer.

2012 Simons Symposium, "Knots and BPS States," Co-organizer.

Departmental Positions:

Director, Summer Research and Placements, 2017–22

Research Students:

Fan Ye	2019–22	PhD spring 2022
Adam Baranowski	2017–	
Adam Goucher	2016–20	PhD autumn 2020
Tom Brown	2014–18	PhD spring 2018
Claudius Zibrowius	2013–17	PhD spring 2017
Tom Gillespie	2012–16	PhD spring 2016
Paul Wedrich	2012–15	PhD spring 2015
Marco Golla	2009–12	PhD spring 2012

References:

Mikhail Khovanov, Columbia University, khovanov@math.columbia.edu
Peter Kronheimer, Harvard University, kronheim@math.harvard.edu
Peter Ozsváth, Princeton University, petero@math.princeton.edu