Curriculum Vitae | Anand Deopurkar

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Positions

2021– Senior lecturer
Australian National University, Canberra, Australia.

2018–2020 Lecturer
Australian National University, Canberra, Australia.

2016–2017 Assistant professor (limited term)
University of Georgia, Athens, Georgia, USA.

2012–2016 J. F. Ritt assistant professor
Columbia University, New York City, New York, USA.

2008 Summer intern
Microsoft Research, Bangalore, India.

Education

2012 Ph.D.
Harvard University, Cambridge, Massachusetts, USA.
Alternate compactifications of Hurwitz spaces, advisor: Joseph Harris.

2008 Bachelor of Science (S.B.)
Massachusetts Institute of Technology, Cambridge, Massachusetts, USA.
Mathematics with computer science.

Grants and awards

2018 Discovery early career researcher award (DECRA), Australian Research Council.

2016 AMS-Simons travel grant, American Mathematical Society and Simons Foundation.

2016 Workshop funding, American Institute of Mathematics.

2014 Award for excellence in teaching, Columbia University, Mathematics department.

2006 Jon A. Bucsela prize for the top undergraduate, Massachusetts Institute of Technology, Mathematics department.

2006 Rogers family prize for undergraduate summer research, Massachusetts Institute of Technology, Mathematics department.

2007, **2005**, **2004** Honorable mention (2004) , honorable mention (2005), rank 16–25 (2004), William Lowell Putnam competition.

2004, **2003** Silver medal (2004), bronze medal (2003), International mathematical olympiad.

Publications

2022 Mathematische Zeitschrift (accepted).
Spherical objects and stability conditions on CY2 quiver categories, with Asilata Bapat, Anthony Licata.

— Forum of Mathematics, Sigma (accepted).
Vector bundles and finite covers, with Anand Patel.

2021 Transactions of the Americal Mathematical Society 374, No. 1, 589-641 (2021).
Stable log surfaces, admissible covers, and canonical curves of genus 4, with Changho Han.

2020 Documenta Mathematica 25, 1917–1952 (2020).
Ramification divisors of general projections, with Eduard Duryev, Anand Patel.

2019 Transactions of the Americal Mathematical Society, 371, 549–588 (2019).
Covers of stacky curves and limits of plane quintics.

2018 Contemporary Mathematics 703, 209–222 (2018).
Syzygy divisors on Hurwitz spaces, with Anand Patel.

— Mathematische Zeitschrift 288, No. 3-4, 1157–1164 (2018).
The canonical syzygy conjecture for ribbons.

2016 Algebraic Geometry 3, No. 1, 1–22 (2016).
Toward GIT stability of syzygies of canonical curves, with Maksym Fedorchuk, David Swinarski.

2015 Algebra & Number Theory 9, No. 2, 459–492 (2015).
The Picard rank conjecture for the Hurwitz spaces of degree up to five, with Anand Patel.

2014 Albanian Journal of Mathematics 8, No. 2, 55–70 (2014).
Groebner techniques for ribbons, with Maksym Fedorchuk, David Swinarski.

— International Mathematics Research Notices 2014, No. 14, 3863–3911 (2014).
Compactifications of Hurwitz spaces.

2013 Mathematical Research Letters 20, No. 5, 869–884 (2013).
Sharp slope bounds for sweeping families of trigonal curves, with Anand Patel.

— Advances in Mathematics 248, 96–154 (2013).
Modular compactifications of the space of marked trigonal curves.

Pre-prints

2022 Pre-print, arXiv:2211.16603.
Orbits of linear series on the projective line, with Anand Patel.

2021 Pre-print, arxiv:2109.12672.
A universal formula for counting cubic surfaces, with Anand Patel, Dennis Tseng.

2020 Pre-print, arXiv:2011.07908.
A Thurston compactification of the space of stability conditions, with Asilata Bapat, Anthony Licata.

2019 Pre-print, arXiv:1906.08196.
Anticanonical tropical cubic del Pezzos contain exactly 27 lines, with María Angélica Cueto.

2013 Pre-print, appendix to *Cyclic covering morphisms on* $\overline{M}_{0,n}$ by Maksym Fedorchuk.
Class of the Hodge eigenbundle using orbifold Riemann-Roch.

Expository

2010 Minor thesis, Harvard, 2010.
An introduction to intersection homology (expository).

2008 MIT Undergruate Journal of Mathematics.
Normalization of algebraic varieties (expository).

Supervision

2023 Charles McIntosh, Honours.

— Alex Huang, Summer Research Scholar, with Noah White.

— Charlotte Sherratt, Summer Research Scholar, with Noah White.

— Thomas Whitley, Summer Research Scholar, with Noah White.

— Jia En Toh, Summer Research Scholar, with Noah White.

2022 Oliver Bradley, Honours.

2021 Zongpu Zhang, Honours.

2020 Ben Leedom, Honours.

2019 Diclehan Erdal, Masters.

— Adwait Sengar, Masters, with Uri Onn.

— Dhruva Kelkar, Future Research Scholar.

— Sridhar Venkatesh, Future Research Scholar.

2018 Sean Carroll, Summer Research Scholar, with Asilata Bapat.

— Kyle Broder, Honours, with Alex Isaev.

— Likun Yao, Honours, with Amnon Neeman.

Talks and presentations

2022 Chennai Mathematical Institute, Chennai, India. *Carpentry, geometry, and category theory.*

— Canberra, Australia, ANU Mathematics Extension Program. *Error correcting codes* (expository).

— Australian National University, Canberra, Australia. *How to count using equivariant cohomology.*

— Tsinghua University (Online), Beijing, China. *Combinatorics and dynamics of Harder-Narasimhan filtrations.*

— ICERM, Brown University, Providence, Rhode Island, Braids in Symplectic and Algebraic Geometry. *Braids and monodromy in algebraic geometry* (preparatory talk for the conference).

— Harvard University, Cambridge, Massachusetts. *How to count using equivariant cohomology.*

— Brown University, Providence, Rhode Island. *Apparent boundaries of projective varieties.*

— Institute for Computational and Experimental Research in Mathematics, Providence, Rhode Island, Braids in representation theory and algebraic combinatorics. *The geometry and combinatorics of Harder–Narasimhan filtrations.*

— Bhaskaracharya Pratishthana, Pune, India, Trimester program on triangle groups, Belyi uniformization, and modularity. *The geometry of Fermat-like equations* (expository).

2021 Bhaskaracharya Pratishthana, Pune, India, Trimester program on triangle groups, Belyi uniformization, and modularity. *Algebraic curves and Belyi's theorem* (expository).

— Canberra, Australia, ANU Mathematics Extension Program. *Error correcting codes* (expository).

— Max Planck institute für Mathematics, Bonn, Germany, Workshop on compactifications of stability manifolds (Online). *A Thurston compactification of the space of stability conditions.*

— Tata Institute of Fundamental Research (Online), Mumbai, India. *A Thurston compactification of the space of stability conditions.*

— Jagiellonian University (Online), Kraków, Poland. *A Thurston compactification of the space of stability conditions.*

2020 University of New England, Amidale, Australia, Topology session, AustMS (Online). *A Thurston compactification for categories.*

— Mexico, Seminario nacional de geometria algebraica (Online joint seminar of multiple universities in Mexico). *Apparent boundaries of projective varieties.*

— University of California (Online), San Diego, California. *Apparent boundaries of projective varieties.*

2019 University of Sydney, Sydney, Australia, Workshop on triangulated categories in geometry and representation theory. *Groups, spherical twists, and stability conditions* (part of a series with Asilata Bapat and Anthony Licata).

— University of Sydney, Sydney, Australia, Birational geometry and moduli spaces. *Log surfaces of almost K3 type and curves of genus 4.*

— Australian National University, Canberra, Australia, Women in mathematics day. *The work of Claire Voisin* (expository).

2018 University of Auckland, Auckland, New Zealand, Character varieties and topological quantum field theory. *Geometry of Hurwitz spaces.*

— University of South Australia, Adelaide, Australia. *On the geometric Steinitz problem.*

— Australian National University, Canberra, Australia, Colloquium. *The work of Caucher Birkar* (expository).

— Xiamen University, Xiamen, China, Algebraic surfaces and related topics. *Moduli of almost K3 log surfaces and curves of genus 4.*

— Tata Institute of Fundamental Research, Mumbai, India. *How to count using (co)homology* (expository).

— Indian Institute of Science, Bengaluru, India. *What are ribbons and what do they tell us about Riemann surfaces.*

— Monash University, Melbourne, Australia. *What are ribbons and what do they tell us about Riemann surfaces.*

— Australian National University, Canberra, Australia. *On the critical loci of finite maps.*

— MATRIX, Creswick, Victoria, Australia, Workshop on algebraic geometry approximation, and optimization. *Quadrature and algebraic geometry.*

2017 University of North Carolina, Chapel Hill, North Carolina, Workshop on topics in algebraic geometry. *Vector bundles and finite covers.*

— University of Georgia, Athens, Georgia. *Vector bundles and finite covers.*

— Canada/USA Mathcamp, Tacoma, WA. *How to count using topology* (expository).

— Indian Institute of Science Education and Research, Pune, India. *Quivers and their representations.*

— Emory University, Atlanta, Georgia. *Vector bundles and finite covers.*

2016 Australian National University, Canberra, Australia. *Geometry of moduli spaces.*

— Jeju Island, South Korea, Conference on moduli and birational geometry. *Vector bundles and finite covers.*

— Indian Institute of Science Education and Research, Pune. *Vector bundles and finite covers.*

— University of South Carolina, Columbia, South Carolina. *Ribbons and Green's conjecture.*

— University of Georgia, Athens, Georgia. *Ribbons and Green's conjecture.*

— Institute for Computational and Experimental Research in Mathematics, Providence, Rhode Island, Workshop on cycles on moduli spaces, geometric invariant theory, and dynamics. *Cycles on Hurwitz spaces.*

— University of Georgia, Athens, Georgia. *The algebra of canonical curves and the geometry of their moduli space.*

— Seattle, Washington, Higher genus curves and fibrations of higher genus curves in mathematical physics and arithmetic geometry II, AMS joint mathematics meetings. *Picard groups of Hurwitz spaces.*

— Seattle, Washington, Moduli spaces in algebraic geometry I, AMS joint mathematics meetings. *Limits of plane quintics via covers of stacky curves.*

2015 Northeastern University, Boston, Massachusetts, Boston College–Northeastern algebraic geometry conference. *Limits of plane quintics via covers of stacky curves.*

— University of Utah, Salt Lake City, Utah, Summer institute in algebraic geometry. *Limits of plane quintics via covers of stacky curves* (poster).

— Daejeon, South Korea, SIAM applied algebraic geometry conference. *Syzygies of canonical curves and the geometry of* $\overline{M}_g$.

— Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany. *GIT stability of syzygies of curves* (mini talk).

— Purdue University, West Lafayette, Indiana. *Syzygies, GIT, and the moduli space of curves.*

— Ohio State University, Columbus, Ohio. *Limits of plane curves via stacky branched covers.*

— Harvard University, Cambridge, Massachusetts. *Syzygies, GIT, and the log minimal model program for* $\overline{M}_g$.

— Courant Institute, New York University, New York City, New York. *Picard groups of Hurwitz spaces.*

— Indian Institute for Science Research and Education, Pune, India. *The birational geometry of* $\overline{M}_g$.

— Stony Brook University, Stony Brook, New York. *Syzygies of canonical curves and birational geometry of* $\overline{M}_g$.

2014 University of Michigan, Ann Arbor, Michigan. *GIT stability of syzygies of canonical curves.*

— Yale University, New Haven, Connecticut. *GIT stability of syzygies of canonical curves.*

— Boston College, Boston, Massachusetts. *Towards GIT stability of syzygies of canonical curves.*

2013 Postech, Pohang, Korea. *Towards GIT stability of syzygies of canonical curves.*

— Philadelphia, Pennsylvania, Geometry of algebraic varieties, AMS sectional meeting. *Towards GIT stability of syzygies of canonical curves.*

— Boston College, Boston, Massachusetts, Algebraic geometry northeastern series. *Sharp slope bounds for sweeping families of trigonal curves* (poster).

— Stanford University, Palo Alto, California. *Alternate compactifications of Hurwitz spaces.*

— Princeton University, Princeton, New Jersey. *Compactifying spaces of branched covers.*

2012 Rice University, Houston, Texas. *Alternate compactifications of Hurwitz spaces.*

2011 Massachusetts Institute of Technology, Cambridge, Massachusetts. *Compactifications of Hurwitz spaces.*

— Columbia University, New York City, New York. *Compactifications of Hurwitz spaces.*

— Stony Brook University, Stony Brook, New York. *Compactifications of Hurwitz spaces.*

— Brown University, Providence, Rhode Island. *Compactifications of Hurwitz spaces.*

— Harvard University, Cambridge, Massachusetts, A celebration of algebraic geometry (conference for the 60th birthday of Joe Harris). *Birational geometry of the space of marked trigonal curves* (poster).

Service

***** Refereed for Journal of the European Mathematical Society, Journal of Differential Geometry, Journal of Algebraic Geometry, Annales Scientifiques de l'École Normale Supérieure, Mathematische Annalen, Algebra and Number Theory, Journal für die reine und angewandte Mathematik, manuscripta mathematica, Advances in Geometry, Mathematical Research Letters, European Journal of Mathematics.

***** Reviewed for Mathematical Reviews, American Mathematical Society.

2021– Convener for the Masters program, Mathematical Sciences Institute, Australian National University.

2022 Co-organised the workshop *Braids in Symplectic and Algebraic Geometry* Inanc Baykur, Benson Farb, Anthony Licata, and Ailsa Keating, Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University.

2021 Served on the award committee for the *BH Neumann prize* for the best student talk, AustMS meeting.

2020 Served on the thesis committee of Abhishek Bharadwaj, Mathematical Sciences Institute, Australian National University.

2019 Served on the selection committee for the *Future research talent fellowship*, Mathematical Sciences Institute, Australian National University.

— Served on the director search committee, Mathematical Sciences Institute, Australian National University.

— Served on the formal liaison committee, Mathematical Sciences Institute, Australian National University.

2018 Served on the award committee for the *BH Neumann prize* for the best student talk, AustMS meeting.

— Co-organised the workshop *Polynomial Algebraic Developments in Optimisation and Computation* Markus Hegland.

— Conducted training sessions in algebraic geometry at the *D21 Workshop*, Australian Signals Directorate.

2017 Co-organised the workshop *Stability and moduli spaces* Maksym Fedorchuk, Ian Morrison, Xiaowei Wang, American Institute of Matheatics, Palo Alto, California.

2016 Co-organised the *Summer workshop in algebraic geometry* Angela Gibney, Nicola Tarasca, University of Georgia, Athens, Georgia.

— Organised the *Fairly informal reading seminar and tea (FIRST)*, University of Georgia, Athens, Georgia.

— Co-organised the graduate student algebraic geometry seminar Johan de Jong, Columbia University.

2015 Conducted preparation sessions for the Putnam competition, Columbia University.

2014 Lectured in the *Workshop on birational geometry and stability of moduli stacks and spaces of curves*, Vietnam Institute for Advanced Studies in Mathematics, Hanoi, Vietnam.

2016 Served on the thesis committee of Natasha Potashnik, Columbia University, New York City, New York.

2013 Served on the thesis committee of Zachary Maddock, Columbia University, New York City, New York.

2014 Served on the thesis committee of Xuanyu Pan, Columbia University, New York City, New York.

2013 Co-organised the poster session at the *Algebraic geometry north-eastern series (AGNES)* conference Anand Patel, Boston College.

2011, **2010** Organised the student algebraic geometry seminar, Harvard/MIT.