

Holly Krieger

Department of Pure Mathematics and Mathematical Statistics
University of Cambridge
Wilberforce Road
Cambridge, UK CB3 0WB

Email: hkrieger@dpmms.cam.ac.uk

URL: <https://www.dpmms.cam.ac.uk/~hk439>

Employment

- 2022 - Professor of Mathematics (Grade 11), University of Cambridge
- 2016 - 2022 Lecturer, University of Cambridge
- 2016 - Corfield Fellow, Murray Edwards College
- 2013 - 2016 NSF Postdoctoral Fellow and Instructor, Massachusetts Institute of Technology
Supervisor: Bjorn Poonen

Education

- 2013 PHD in Mathematics, University of Illinois at Chicago
Thesis co-advisors: Laura DeMarco and Ramin Takloo-Bighash
- 2008 MSc in Mathematics, University of Illinois at Chicago
- 2006 BS in Mathematics, University of Illinois at Urbana-Champaign

Professional recognition, grants, and awards

- 2021-22 Sally Starling Seaver Fellow, Harvard Radcliffe Institute
The [Radcliffe Fellowship Program](#) annually selects and supports artists, scholars, and practitioners who bring both a record of achievement and exceptional promise to the Institute.
- 2020 Alexanderson Award, American Institute of Mathematics
The [Alexanderson Award](#) recognizes an outstanding research article arising from AIM research activities that has been published within the past three years.
- 2020 Whitehead Prize, London Mathematical Society
The [Whitehead Prize](#) is awarded annually to early career UK mathematicians in recognition of their work in and influence on mathematics.
- 2019 Mahler Lectureship, Australian Mathematical Society
The [Mahler Lectureship](#) is awarded every two years to a distinguished mathematician who preferably works in an area of mathematics associated with the work of Professor Mahler.
- 2018 Isaac Newton Trust Early Career Support Scheme
The [INT Early Career Support](#) scheme is for newly appointed lecturers, to aid academics in beginning their research careers.
- Spring 2014 MSRI Postdoctoral Fellowship
[MSRI Postdoctoral Fellowship](#) awarded for semester program in Model Theory, Arithmetic Geometry, and Number Theory.

- 2013 - 2016 NSF Mathematical Sciences Postdoctoral Research Fellowship
 The purpose of the [MSPRF](#) is to support future leaders in mathematics and statistics by facilitating their participation in postdoctoral research environments that will have maximal impact on their future scientific development.
- 2005 - 2006 Emily Mann Peck Scholarship in Mathematics
[This scholarship](#) recognizes a student in mathematics who, in addition to academic excellence, displays a well-rounded personality with eclectic interests and a passion for the arts.

Publications and preprints (click on title to open publication)

- 2021 [Dynamical Shafarevich in arbitrary dimension](#)
 with J. Juul, N. Looper, and N.M. Mavraki
 under review, available on the arXiv.
- 2021 [Birational maps with transcendental dynamical degree](#)
 with J. Bell, J. Diller, and M. Jonsson
 under review, available on the arXiv.
- 2020 [Uniform Manin-Mumford for a family of genus 2 curves](#)
 with L. DeMarco and H. Ye
Annals of Math. (2020) Vol. 191, Issue 3, 949-1001.
- 2019 [A uniform bound on common preperiodic points for quadratic polynomials](#)
 with L. DeMarco and H. Ye
 under review, available on the arXiv.
- 2019 [Arboreal representations for rational maps with few critical points](#)
 with J. Juul, N. Looper, M. Manes, B. Thompson, L. Walton
 To appear in *Research Directions in Number Theory - Women in Numbers 4*.
- 2019 [Bounded height for unlikely intersections in algebraic dynamical systems](#)
 with L. DeMarco, D. Ghioca, K. Nguyen, T. Tucker, H. Ye
International Math. Research Notices. (2019) Vol. 2019, Issue 8, 2453-2482.
- 2018 [Reduction of dynatomic curves](#)
 with J. Doyle, A. Obus, R. Pries, S. Rubenstein-Salzedo, L. West
Ergodic Theory and Dynamical Systems (2019), 39(10), 2717-2768.
- 2017 [Cohomological conditions on endomorphisms of projective varieties](#)
 with P. Reschke
Bulletin de la SMF, (2017) Vol. 145 No. 3, 449-468.
- 2017 [The dynamical André-Oort conjecture for unicritical polynomials](#)
 with D. Ghioca, K. Nguyen, and H. Ye,
Duke Math. J. (2017) Vol. 166 No. 1, 1 - 25.
- 2016 [A case of the dynamical André-Oort conjecture](#)
 with D. Ghioca and K. Nguyen.
International Math. Research Notices (2016) Vol. 2016, Issue 3, 738-758.
- 2015 [Uniform boundedness of \$S\$ -units in arithmetic dynamics,](#)
 with A. Levin, Z. Scherr, T. Tucker, Y. Yasufuku, M. Zieve.
Pacific Journal of Mathematics (2015) Vol. 274, No. 1, 97-106.
- 2013 [Primitive prime divisors in the critical orbit of \$z^d + c\$](#)
International Math Research Notices (2013), no. 23, 5498-5525.

- 2009 [Some Consequences of Schanuel's Conjecture](#),
with C. Cheng, B. Dietel, M. Herblot, J. Huang, D. Marques, J. Mason, M. Mereb, S. R. Wilson.
J. Number Theory 129 (2009), no. 6, 1464-1467.

EXPOSITORY AND PROFESSIONAL ARTICLES

- 2019 [Cultivating an online presence for the academic job market](#)
Notices of the American Mathematical Society (2019) Vol. 66, No. 6, 853-854.
- 2018 [The attraction of dynamical systems](#)
Lond. Math. Soc. Newsl. (2018) No. 476, 30-33.

Selected recent service and outreach (full list available on request)

- ongoing Numberphile videos for the public on number theory and dynamics.
Over 10 million total views, [available on YouTube here](#).
- ongoing Development of biannual STEP school at Murray Edwards College.
The [STEP summer school at MEC](#) is designed to introduce STEP and to equip potential female applicants with the skills needed for the STEP entrance examinations, as well as offering an insight into university life.
- May 2023 Gresham Lecture for the London Mathematical Society, London, UK.
The [Gresham Lecture](#) is a yearly joint venture between Gresham College and the LMS presenting maths to the public.
- Aug 2019 Organizer, Women in Numbers Europe 3, Rennes, France.
The workshop supports new research collaborations for early career women in number theory.
- May 2019 National Math Festival, presenter.
A [free and public celebration](#) in Washington, D.C. with program tracks for adults, middle and high schoolers, as well as elementary schoolers and the very young, with attendance in the tens of thousands.
- 2016 - 2018 Director of Studies in Mathematics, Murray Edwards College.
[Murray Edwards College](#), Cambridge, October 2016 - September 2018.
- Jul 2018 Talk at the Royal Institution, London.
The [Royal Institution](#) is an independent charity dedicated to connecting people with the world of science.
- Feb 2018 Talk for New Scientist Live: Mathematics in the real world, London.
[New Scientist Live](#) is an award-winning, mind-blowing festival of ideas and discoveries for everyone curious about science and why it matters.
- Oct 2017 Talk at the [John Adams Institute](#).
The [John Adams Institute](#) provides an independent podium for American culture in the Netherlands. For three decades now, we have brought the best and the brightest of American thinking from the fields of literature, politics, history, technology and the arts.

Selected recent and upcoming invited talks (full list available on request)

- Jun 2023 Minicourse, Alpbach workshop in arithmetic and geometry, Alpbach, Austria.
Minicourse title: Heights, equidistribution, and arithmetic dynamics.

- Apr 2023 Departmental Colloquium, University of Warwick, Coventry, England.
- Feb 2022 MIT number theory seminar, Cambridge, USA.
- Dec 2021 Brandeis-Harvard-MIT-Northeastern Joint Mathematics Colloquium, Harvard University, Cambridge, USA.
- Nov 2021 Departmental Colloquium, Notre Dame University, South Bend, USA.
- Nov 2021 Algebraic Dynamics Seminar, Harvard University, Cambridge, USA.
- Mar 2021 PIMS network-wide colloquium, Pacific Institute for the Mathematical Sciences. Online lecture.
- May 2020 VaNTAGe virtual seminar.
A virtual seminar on open conjectures in number theory and arithmetic geometry.
- Dec 2019 63rd Annual Meeting of the AustMS, Monash University, Melbourne, Australia. Plenary lecture.
- Sep 2019 Topics in Rational and Integral Points, Basel, Switzerland.
Summer school title: Equidistribution in arithmetic and dynamics.
- May 2019 Algebraic, Complex, and Arithmetic Dynamics, Elmau, Germany. Simons symposium.
- Mar 2019 Pure Maths Colloquium, KU Leuven, Leuven, Belgium.
- Mar 2019 Heilbronn Seminar, University of Bristol, Bristol, UK.
Title: Uniform Manin-Mumford in genus 2.
- Sep 2018 Dynamics and Number Theory seminar, University of Michigan, Ann Arbor, USA.
Title: Common preperiodic points and a uniform Manin-Mumford result for a family of curves.
- Sep 2018 Diophantine approximation and transcendence, CIRM, Luminy, France.
Title: Height pairings, torsion points, and dynamics.

Selected recent and upcoming conferences (full list available on request.)

- Jan 2024 Joint Mathematics Meetings, San Francisco, USA.
- Jun 2023 Arithmetic and Geometry workshop, Alpbach, Austria.
- Apr 2023 Dynamics of Hénon maps, BIRS-Juniper, Banff, Canada.
- Sep 2022 Women in Arithmetic Geometry, Heidelberg, Germany (organizer).
- Aug 2022 Simons symposium: Algebraic, Complex, and Arithmetic Dynamics, Schloss Elmau, Germany.
- Jun 2022 The circle at infinity: an international colloquium in honor of Curtis T. McMullen, Harvard University, Cambridge USA.
- Sep 2021 Moduli spaces for algebraic dynamical systems, AIM, Palo Alto, USA.
- Dec 2019 63rd Annual Meeting of the AustMS, Monash University, Melbourne, Australia.
- Sep 2019 Heilbronn Annual Conference, University of Bristol, Bristol, UK.
- Sep 2019 Topics in Rational and Integral Points, Basel, Switzerland.
- May 2019 Simons symposium: Algebraic, Complex, and Arithmetic Dynamics, Schloss Elmau, Germany.
- Sep 2018 Diophantine approximation and transcendence, CIRM, Luminy, France.

Supervisees and students

- summer 2023 Aaron Kim, Mara-Ioana Postolache, and Vivian Szeto, undergraduate researchers at University of Cambridge.
- 2019 - Marley Young, PhD student at University of Cambridge.
starting autumn 2023 postdoc at SNS Pisa.
- 2018 - 2019 Nicole Looper, NSF MSPRF at University of Cambridge.
Currently Assistant Professor at University of Illinois at Chicago.
- summer 2017 Richard Birkett, undergraduate researcher at University of Cambridge.
starting autumn 2023 postdoc at University of Illinois at Chicago.

Teaching responsibilities

- 2023 Lecturer: Part IB Complex Analysis, University of Cambridge.
A first undergraduate course in complex analysis.
- 2020 Lecturer: Part III Complex Dynamics, University of Cambridge.
A master's level first course in complex dynamics.
- 2016 - Supervisor: Riemann surfaces, Complex analysis, Metric and topological spaces, Analysis I, Numbers and Sets, Analysis and Topology, University of Cambridge.
Tutorial-style teaching across a variety of undergraduate topics.
- 2016 - 2019 Lecturer: Part II Riemann surfaces, University of Cambridge.
A short advanced undergraduate course in the analytic basics of Riemann surfaces.
- Fall 2015 Lecturer: Complex Analysis, MIT.
A dense advanced undergraduate first course in complex analysis.
- 2009-2013 Teaching assistant and grader: real analysis, linear algebra, calculus 1, number theory, codes and cryptography, differential equations, algebra, UIC.
Assisted teaching a variety of undergraduate and early graduate courses.

Editorial service

- 2022 - Associate Editor, Research in Number Theory.