

# Jim Fowler

Curriculum Vitae

The Ohio State University ▪ Department of Mathematics  
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## Education

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University of Chicago 2003–2009  
Chicago, Illinois

M.S. in Mathematics, June 2005.

Ph.D. in Mathematics, June 2009.

Harvard University 1999–2003  
Cambridge, Massachusetts

A.B. in Mathematics, *summa cum laude*, June 2003.

Junior Phi Beta Kappa.

## Employment and Teaching

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The Ohio State University, Assistant Professor 2014–Present

Mathematics 5520H: Honors Linear Algebra and Differential Equations

Mathematics 2162.02: Accelerated Calculus II for Honors Engineers

Mathematics 5801: General Topology and Knot Theory

Mathematics 2153: Calculus 3

Mathematics 2568: Linear Algebra.

The Ohio State University, Ross Mathematics Program Summer 2010–Present

The Ohio State University, Program Manager 2013–2014

Mathematics 2568: Linear Algebra.

Calculus Two MOOC on Coursera (23k student enrollments).

Multivariable calculus MOOC on Coursera (11k student enrollments).

The Ohio State University, Lecturer 2012–2013

Calculus One MOOC on Coursera (87k student enrollments).

iTunesU Calculus One (ranked #1 in Summer 2013; 37k subscribers).

Mathematics 1151: Calculus I.

Mathematics 1161: Accelerated Calculus I.

Mathematics 1181: Honors Calculus I.

Taught the number theory course; ran a number theory recitation for high school students; taught a piecewise-linear topology course for undergraduate and high school students.

The Ohio State University, Zassenhaus Assistant Professor 2009–2012

Mathematics 151: Calculus and Analytic Geometry I.  
 Mathematics 153: Calculus and Analytic Geometry III.  
 Mathematics 254 and 254.02: Calculus and Analytic Geometry IV.  
 Mathematics 660: Introductory Complex Analysis.  
 Mathematics 953: Topics in Topology  
 Mathematics 345: Foundations of Higher Mathematics  
 Mathematics 758: Algebraic Topology: Cohomology  
 Mathematics 765: Smooth Manifolds

University of Chicago, Directed Reading Program, Mentor 2004–2009  
 Mentored undergraduate projects on automatic groups, geometric group theory, combinatorial game theory, piecewise-linear topology, knot theory, stochastic processes.

University of Chicago, Polk Brothers Program 2005–2009  
 Taught middle school students in small groups and whole-classroom settings; assisted Chicago public school teachers with pedagogy and their study of mathematics.

University of Chicago, Graduate Student Lecturer 2005–2006  
2008–2009  
 Mathematics 131–133: Elementary Functions and Calculus.  
 Mathematics 153: Calculus.  
 Mathematics 204–205: Inquiry-based learning (Moore method); analysis in  $\mathbb{R}^n$ .

University of Chicago, College Fellow 2004–2005  
 Mathematics 203–205: Analysis in  $\mathbb{R}^n$ .

University of Chicago, Research Experience for Undergraduates, Mentor Summer 2004  
Summer 2006  
Summer 2007

University of Chicago, Undergraduate Lie Theory Seminar Fall 2006

Canada/USA Mathcamp, Mentor Summer 2004  
Summer 2005  
 Taught and mentored high school students in topics including piecewise-linear topology, quaternions, knots and links, game theory, projective geometry,  $p$ -adic numbers.

University of Chicago, Warm Up Program, Lecturer September 2005  
 Lectured in a mini-course reviewing point-set topology for incoming graduate students.

Harvard University, Course Assistant 2000–2003  
 Graded homework and ran weekly recitation sessions for multivariable calculus and linear algebra, representation theory, algebraic topology.

## Awards, Fellowships, Grants

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Four million views on YouTube May 2019  
 My calculus videos have been viewed more than 4 million times.

Building a Buckeye calculus community (SEMINAL) \$90k to sustain success in implementing active learning in undergraduate mathematics classes	February 2018
Ohio Open Ed Collaborative, Team Lead, Calculus 1 and 2 Support to make Ximera resources useful to instructors at other schools	June 2018–July 2019
NSF Grant DUE–1505246 \$248k for creating and curating linear algebra materials.	2015–2018
Crestron Summum Bonum Award for Excellence in Teaching	March 2014
NSF Grant DUE–1245433 \$180k for building online textbooks.	2013–2016
ODEE, eLearning Professional Development Grant	September 5, 2013
The STEAM Factory, OSU Outreach and Engagement Impact Grant	2013
“Steal My Idea” Presentation Winner	March 27, 2013
NSF Graduate Research Fellowship	2003–2008
McCormick Fellowship, University of Chicago	2003–2005
Palfrey Exhibition, Harvard University Awarded to the most distinguished scholar in the senior class holding a stipendiary scholarship.	May 2003
Wister Prize, Harvard University Awarded to the student with the highest record in mathematics.	May 2003
Robert Fletcher Rogers Prize, Harvard University Awarded to the two students who gave the best talks at the undergraduate mathematics table.	May 2003
Certificate of Distinction in Teaching, Derek Bok Center for Teaching and Learning	Fall 2000

## Publications

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- J. Fowler, C. Ogle, and M. Bevis. An analytic method for computing the infinite sums occurring in the geoelectric disk load problem. *Journal of Geophysical Research: Solid Earth*, 124(2):2184–2201, 2019.
- Jim Fowler. Both  $\text{\TeX}$  and DVI viewers inside the web browser. *TUGboat*, 40(1):22–24, 2019.
- Jim Fowler and Zhixu Su. Smooth manifolds with prescribed rational cohomology ring. *Geometriae Dedicata*, pages 1–18, 2016.

- Michael W. Davis, Jim Fowler, and Jean-François Lafont. Aspherical manifolds that cannot be triangulated. *Algebr. Geom. Topol.*, 14(2):795–803, 2014.
- J. Fowler. Finiteness properties for some rational Poincaré duality groups. *Illinois J. Math.*, 56(2), 2012.
- J. Fowler and C. Ogle. Bounded homotopy theory and the  $K$ -theory of weighted complexes. *Proc. Steklov Inst. Math.*, 275(Classical and Contemporary Mathematics in honor of Boris Delone):210–226, 2011.
- C. Adams, A. Colestock, J. Fowler, W. Gillam, and E. Katerman. Cusp size bounds from singular surfaces in hyperbolic 3-manifolds. *Trans. Amer. Math. Soc.*, 358(2):727–741 (electronic), 2006.
- C. Adams, A. Colestock, J. Fowler, W. Gillam, and E. Katerman. Cleanliness of geodesics in hyperbolic 3-manifolds. *Pacific J. Math.*, 213(2):201–211, 2004.
- Jeremy Brandman, James Fowler, Brian Lins, Ilya Spitkovsky, and Nahum Zobin. Convex hulls of Coxeter groups. In *Function spaces, interpolation theory and related topics (Lund, 2000)*, pages 213–240. de Gruyter, Berlin, 2002.

## Other Papers

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- Robert A. Beezer, Petra Bonfert-Taylor, Sarah Eichhorn, David Farmer, and Jim Fowler. CuratedCourses: A fine-grained educational repository demonstrated with linear algebra resources. *IMAGE*, (60):26–27, 2018.
- J. Fowler, A. Groot, D. Pandya, and B. Snapp. The no-three-in-line problem on a torus. *ArXiv 1203.6604*, March 2012.
- James A. Fowler. *Poincare duality groups and homology manifolds*. ProQuest LLC, Ann Arbor, MI, 2009. Thesis (Ph.D.)—The University of Chicago.

## Talks and Presentations

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| CAT(0) Square Complexes<br>Wittenberg University, Mathematics Department Colloquium                                                                                 | April 22, 2019   |
| Webinar on Open Educational Resources in Mathematics<br>Ohio Mathematics Initiative, Subgroup 3                                                                     | April 10, 2019   |
| Maximizing Student Outcomes in Flipped Classrooms<br>Project NExT Workshop on Flipped Classroom<br>Joint Mathematics Meeting                                        | January 19, 2019 |
| Open Resources for the Mathematics Curriculum<br>MAA Poster Session: Projects Supported by the NSF Division of Undergraduate Education<br>Joint Mathematics Meeting | January 17, 2019 |

Putting worksheets on the web with Ximera Math Colloquium, Kent State University	November 28, 2018
Creating open educational resources as if they were open-source software Reimagining Math Education, Stevens Institute of Technology	November 2, 2018
Calculus Redesign Strong Start to Finish Kickoff, Greater Columbus Convention Center	October 5, 2018
Mathematics as collaborative storytelling Mount Leadership Summit, Ohio State University	September 23, 2018
Mathematics as collaborative storytelling Mount Leadership Summit, Ohio State University	September 23, 2018
Ximera Imaginarium Presentation Innovate, Ohio State University	May 11, 2018
Ongoing calculus reforms in the mathematics department Math Colloquium, Denison University	February 21, 2018
STEAM-powered mathematics Idea Day Upper Arlington High School	February 9, 2018
Ongoing calculus reforms in the mathematics department Center for Life Science Education, Graduate Student Seminar, Ohio State University	February 8, 2018
The STEAM Factory: building a community of engaged academics Community Engagement Conference Ohio State University	January 25, 2018
Linear actions of $\mathbb{Z}/p \times \mathbb{Z}/p$ on $S^n \times S^n$ AMS Contributed Paper Session on Topology and Geometry Joint Mathematics Meeting	January 12, 2018
Using CuratedCourses to match OER to other OER. MAA Session on The Advancement of Open Educational Resources Joint Mathematics Meeting	January 12, 2018
Using Ximera to build online interactive math activities SIGMAA on Mathematics Instruction Using the WEB (WEB SIGMAA) Guest Lecture Joint Mathematics Meeting	January 12, 2018
Open Resources for the Mathematics Curriculum Poster Session: Projects Supported by the NSF Division of Undergraduate Education Joint Mathematics Meeting	January 11, 2018
The Calculus Knowledge Assessment: an open-source instrument for measuring learning gains in calculus courses Session on the Scholarship of Teaching and Learning in Collegiate Mathematics Joint Mathematics Meeting	January 10, 2018
Flipping your Mathematics Course using Open Educational Resources Minicourse Joint Mathematics Meeting	January 10–12, 2018

Ongoing calculus reforms in the mathematics department Research Initiatives on Student Progress, Ohio State University	December 19, 2017
Using Ximera to build online interactive math activities Canadian Math Society, Winter 2017 Meeting, Digital Assets in Math Education and Outreach University of Waterloo	December 10, 2017
Talking Points Ohio Math Initiative Ohio State University	November 3, 2017
Communications Strategy External Advisory Board Ohio State University	October 26, 2017
Ohio Math Initiative and its math pathways Engineering faculty focus group Ohio Department of Higher Education	October 2, 2017
word2vec: representing English words as vectors OSU Radical Pi	October 18, 2017
Folding paper and other math stories Columbus Science Pub Backstage Bistro	September 7, 2017
CoCalc and SageMath in service of Ximera Sage Days: Opening Workshop for a Year of Coding Sprints University of Minnesota	August 23, 2017
Ximera: Collaboratively teaching calculus with online tools Ohio PKAL The University of Findlay	May 20, 2017
Ximera Collaboration and Commercialization Summit organized by the Ohio State College of Arts and Sciences	May 8, 2017
Multiple interventions for success in calculus Colloquium Wright State University	April 21, 2017
Calculus and OMI Update External Advisory Board Ohio State University	April 20, 2017
What is Random? COSI After Dark Columbus, Ohio	April 6, 2017
Overview of 3-manifold topology Reading seminar on Agol, Kahn, Markovic, Wise	March 3, 2017
Ohio Math Initiative and its math pathways Business Cluster Faculty Panel Ohio Department of Higher Education	February 7, 2017

Calculus Re-design at Ohio State University Ohio Mathematics Chairs/Leads Network Meeting Ohio State University	January 20, 2017
Mystery in Mathematics: Diffie-Hellman Key Exchange Creative Mornings SparkSpace Columbus	January 13, 2017
Find, Review, Promote: CuratedCourses aligns OER to the course syllabus. Session on The Advancement of Open Educational Resources Joint Mathematics Meeting	January 7, 2017
Flipping your Linear Algebra Course using Open Educational Resources Minicourse Joint Mathematics Meeting	January 4–6, 2017
Ximera: Collaboratively teaching calculus with online tools Colloquium Colorado State University	December 2, 2016
Linear actions of $\mathbb{Z}/p \times \mathbb{Z}/p$ on $S^n \times S^n$ Rocky Mountain Algebraic Combinatorics Seminar Colorado State University	December 2, 2016
State of Online Teaching of College Level Mathematics in Ohio MAA Section Meeting College of Wooster	October 28–29, 2016
Ximera: open source texts for the open web Committee on the Advancement of the Learning of Calculus 2 University of Minnesota	October 14, 2016
Calculus Redesign at Ohio State External Advisory Board Ohio State University	September 30, 2016
Collaboratively Teaching Calculus with Online Tools Keynote eCOTS Regional Conference	May 20, 2016
Ohio's Gateway Mathematics Courses Bridges to Success Workshop Ohio Department of Higher Education, Sharonville Convention Center	April 20, 2016
Open and active calculus interventions at Ohio State Gateway to Mathematical Sciences: Lectures on Instruction Michigan State University	February 23, 2016
Discussion of Active Learning in Calculus Courses Ohio Mathematics Chairs/Leads Network Meeting Ohio State University	January 22, 2016
An Introduction to Ximera Precalculus and Calculus Innovation Workshop Northwestern University	November 13–14, 2015

Ximera: Collaboratively Develop Interactive Online Content Ohio MAA Section CONSACT Workshop Capital University	October 23–24, 2015
Use Ximera to collaborate on open and interactive texts Unizin Innovation Summit Grapevine, Texas	October 8–9 2015
Projective Planes Minnesota State University, Mankato	October 2, 2015
What’s in it for the Professor? A discussion on instructor impact. Coursera Partners Conference Newport Beach, California	March 2015
High-dimensional unknotting, Part 1 Invitations to Mathematics	December 3, 2014
High-dimensional unknotting, Part 2 Invitations to Mathematics	December 8, 2014
Shor’s algorithm OSU Quantum Topology Group	November 18, 2014
Rational projective planes IUPUI Modern Analysis and Geometry Seminar Indianapolis, Indiana	November 11, 2014
Humanity of Calculus TEDx Columbus Riffe Center, Columbus, Ohio	November 7, 2014
Aspherical manifolds that cannot be triangulated Midwest Topology Seminar Indianapolis, Indiana	April 19, 2014
Reaching Online Learners: Being Smart Isn’t Enough SXSWedu Austin, Texas	March 3–6, 2014
Computing in topology and student learning Job Talk	January 28, 2014
Turbocharging Our MOOCs with Mooculus EDUCAUSE Anaheim, California	October 15–18, 2013
Plenary lecture on Desargues’ theorem Undergraduate Mathematics Symposium University of Illinois at Chicago	October 5, 2013
E-Learning and the MOOCs at OSU OSURA Columbus, Ohio	September 26, 2013
Hyperbolic knots and their volumes OSU Quantum Topology Group	September 10, 2013



Numeric methods in topology OSU Topology Seminar	November 13, 2012
Manifolds realizing rational homotopy types AMS Special Session on Interactions Between Geometry and Topology AMS Fall Central Sectional Meeting	October 20–21, 2012
Rational projective planes Spring Topology and Dynamics Conference Universidad Nacional Autonoma de México	March 22–24, 2012
Poincaré duality groups Stratified Spaces: Joining Analysis, Topology and Geometry Mathematisches Forschungsinstitut Oberwolfach	December 11–17, 2011
Remarks on rational homology manifolds Conference in Geometric Group Theory and related topics The Ohio State University	May 30–June 3, 2011
Weighted algebraic topology Geometrical methods in high-dimensional topology The Ohio State University	May 16–21, 2011
Projective Planes OSU Radical Pi	April 20, 2011
CAT(0) square complexes OSU Math Circle	April 17, 2011
$\mathcal{B}$ -bounded finiteness Spring Topology and Dynamics Conference The University of Texas at Tyler	March 17–19, 2011
$\mathcal{B}$ -bounded finiteness University of Michigan	March 31, 2011
$\mathcal{B}$ -bounded finiteness OSU Topology Seminar	February 15, 2011
A first talk on surgery OSU Topology Seminar	October 5, 2010
Rational Poincaré duality groups and controlled symmetric signature Workshop in Geometric Topology Colorado College	June 10–12, 2010
Rational Poincaré duality groups and controlled symmetric signature Spring Topology and Dynamics Conference Mississippi State University	March 18–20, 2010
Rational Poincaré duality and controlled symmetric signature University of Notre Dame	March 4, 2010
Rational Poincaré duality and controlled symmetric signature OSU Topology Seminar	March 2, 2010
Dividing a square into triangles of equal-area OSU Radical Pi	January 13, 2010

Rational Poincaré duality groups OSU Topology Seminar	November 24, 2009
Rational Poincaré duality groups Ferryfest University of Chicago	March 22–24, 2009
Lattices with torsion and rational homology manifolds Topology of Stratified Spaces Mathematical Sciences Research Institute	September 8–12, 2008
Double suspensions of homology spheres Farb and Friends Student Seminar	May 20, 2008
The $\alpha$ -approximation theorem Farb and Friends Student Seminar	November 4, 2008
Quaternionic toric varieties Farb and Friends Student Seminar	April 4, 2008
Hyperbolization of polyhedra Farb and Friends Student Seminar	March 7, 2008
Classifying high-dimensional manifolds Farb and Friends Student Seminar	October 12, 2007
Wall's finiteness obstruction Algebraic Topology Proseminar	September 27, 2007
Introduction to Surgery Algebraic Topology Proseminar	May 29, 2007
PL-unknotted of codimension $\geq 3$ knots Farb and Friends Student Seminar	May 11, 2007
Building Aspherical Manifolds via Davis' Construction Farb and Friends Student Seminar	January 25, 2007
Approximating $L^2$ invariants by finite-dimensional analogues $L^2$ Seminar	November 22, 2006
Algebraic topology and distributed computing Applied algebraic topology seminar	November 2, 2006
The $h$ -cobordism theorem Shmuel's Student Seminar	March 7, 2005
Wall's finiteness obstruction Algebraic Topology Proseminar	November 23, 2004
2-adics and equidissections of squares Pizza Seminar	November 16, 2004
Introduction to characteristic classes Algebraic Topology Proseminar	October 19, 2004

Dissecting squares into equal-area triangles Harvard Mathematics Table	October 15, 2002
Bounding the volume of hyperbolic 3-manifolds Harvard Mathematics Table	October 23, 2001
Clean geodesic journeys through hyperbolic manifolds MAA MathFest Madison, Wisconsin	August 3, 2001
Functions growing faster than any computable function Harvard Mathematics Table	December 12, 2000

## Other conferences attended

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Ohio OER Grant Summit North Central State College	October 19, 2017
Making Sense of the Future of Learning KnowledgeWorks	May 24–25, 2016
Spring Topology and Dynamics Conference Baylor University	March 10–13, 2016
Spring Topology and Dynamics Conference Bowling Green State University	May 14–16, 2015
Transforming Post-Secondary Education in Mathematics University of Chicago	September 19–20, 2015
Sage Education Days 5 University of Washington	June 19–21, 2013
Workshop on High Dimensional Topology University of Notre Dame	December 8–9, 2012
Singularities in Geometry and Topology Courant Institute of Mathematical Sciences	March 17–20, 2008
AMS Special Session on Geometric Topology Courant Institute of Mathematical Sciences	March 15–16, 2008
Topological and Geometric Rigidity Banff International Research Station	July 29–August 3, 2007
Problems in Geometric Group Theory American Institute of Mathematics	April 23–27, 2007
Nil Phenomena in Topology Vanderbilt University	April 14–15, 2007
Introductory Workshop on Computational Application of Algebraic Topology Mathematical Sciences Research Institute	September 5–8, 2006

Conference on Geometric Group Theory Centre de recherches mathématiques	July 3–14, 2006
Workshop on Group Actions and Rigidity University of Hawaii, Manoa	March 20–22, 2006
Ricci Flow, 3-manifolds, and Geometry Clay Mathematics Institute	June 20–July 15, 2005
Submanifolds, Singular Varieties and Stratified Spaces Courant Institute of Mathematical Sciences	March 13–16, 2005
Braids, Links, and Mapping Class Groups Columbia University	March 15–20, 2005
Conference on Low-dimensional topology University of Virginia	December 15–19, 2004

## Professional activities and service

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Organize American Institute of Mathematics workshop on interactive assessments in open source textbooks	December 9–13, 2019
The Ohio State University, STEAM Factory, Founding Director, Executive Director	2012–Present
Spring Topology and Dynamics Conference, Steering Committee	2016–Present
The Ohio State University, Intellectual Property, Patents, and Copyrights Committee, Chairperson	August 2018–June 2019
The Ohio State University, Committee on Distance Education, Libraries, Information Technology, Chairperson	August 2017–June 2018
Spring Topology and Dynamics Conference, Geometric Topology special session organizer, Baylor University	March 10–13, 2016
Spring Topology and Dynamics Conference, Geometric Topology special session organizer, Bowling Green	May 14–16, 2015
Ohio Mathematics Initiative, Subgroup 3: Communications Co-chair	2015–Present
Ohio Mathematics Initiative, Subgroup 3: Communications	2014–Present
The Ohio State University, Committee on Distance Education, Libraries, Information Technology	2014–Present
The Ohio State University, Distance Education Steering Committee	2014–Spring 2015
The Ohio State University, Innovate Conference Advisory Committee	Autumn 2014–Spring 2015

The Ohio State University, ODEE Impact Grant review committee	Autumn 2014
The Ohio State University, New Media in the Classroom	Autumn 2014
The Ohio State University, Intellectual Property, Patents, Copyright Senate Committee Chairperson	August 2015–June 2016
The Ohio State University, Intellectual Property, Patents, Copyright Senate Committee	2013–Present
The Ohio State University, Data Analysis Hiring Committee	2013
The Ohio State University, Special Year in Geometry and Topology, Proceedings Co-editor	2013–2017
The Ohio State University, eLearning Committee Organized technology enhanced lectures and built mooculus.osu.edu.	2012–Present
The Ohio State University, Topology Seminar Co-Coordinator	2010–Present
Ohio Board of Regents, Ohio Textbook Affordability Summit, Faculty Panelist	September 27, 2013
National Science Foundation, INGenIOuS, Faculty Panelist	May 30, 2013
The Ohio State University, Innovate Conference, MOOC Panelist	March 26, 2013
The Ohio State University, University Center for the Advancement of Teaching, Faculty Panelist	February 20, 2013
The Ohio State University, Special Year in Geometry and Topology, Graduate Student Seminar Organizer	2010–2011
University of Chicago, Directed Reading Program, Committee Member Paired undergraduates with graduate student mentors; organized undergraduate talks; designed database-driven website to monitor students' progress.	2006–2009
University of Chicago, Center for Teaching and Learning, Panelist	September 2007 September 2008
Moderated a large-group discussion of teaching issues, including initial course design, midquarter course changes, assessment techniques, lecturing styles.	