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Appointments

Vanderbilt University, Nashville, TN

Associate Professor of Mathematics	8/2022 –
Assistant Professor of Mathematics	8/2015 – 8/2022

University of Illinois, Urbana, IL   8/2011 – 5/2015

J.L. Doob Research Assistant Professor of Mathematics

NSF Postdoctoral Fellow, University of Illinois, Urbana, IL   6/2012 – 5/2015

Education

University of Chicago, Chicago, IL   9/2006 – 6/2011

Ph.D. in Mathematics, June 2011
    Dissertation: *On the Dilatations and Self-Intersections of*
        Point-Pushing Pseudo-Anosov Homeomorphisms
    Advisor: Benson Farb
M.S. in Mathematics, June 2008

University of Michigan, Ann Arbor, MI   9/2002 – 5/2006

M.S. in Mathematics, May 2006
M.S. in Physics, May 2006
B.A. in Honors Mathematics, May 2006

Research Interests

My research areas include low-dimensional and geometric topology, geometric group theory, and dynamics, with particular focus on Teichmüller spaces, mapping class groups, $\mathrm{Out}(F_N)$, and dynamical properties of surface homeomorphisms and free group automorphisms.

Fellowships, Honors and Awards

NSF Individual Grant DMS-2005368 – \$239,596	6/2020 – 5/2023
NSF Individual Grant DMS-1711089 – \$169,930	6/2017 – 5/2021
GEAR Network Conference Grant – \$25,000 for YGGT 2018 Conference	June 2017
NSF Conference Grant DMS-1707524 – \$35,000 for 2017 Shanks Conference	April 2017
List of Teachers Ranked as Excellent, University of Illinois	Fall 2014
List of Teachers Ranked as Excellent, University of Illinois	Spring 2013
NSF Mathematical Sciences Postdoctoral Research Fellowship	2012–2015

Institution: University of Illinois,   Sponsor: Christopher J. Leininger

Lawrence and Josephine Graves Teaching Prize, University of Chicago   May 2010
>*for excellence in undergraduate teaching*

McCormick Fellowship, University of Chicago   2006–2008

Publications and Preprints

(Copies available at `http://www.math.vanderbilt.edu/~dowdalsd/research.html`)

Dilatation versus self-intersection number for point-pushing pseudo-Anosov homeomorphisms. *Journal of Topology* Vol 4 (2011) no. 4: 942-984.

Statistical hyperbolicity in Teichmüller space, with M. Duchin and H. Masur. *Geom. Funct. Anal.* Vol. 24 (2014) 748–795.

Spheres in the curve complex, with M. Duchin and H. Masur. *Contemporary Mathematics*, Vol. 590, Amer. Math. Soc., Providence, RI, 2013, 1-8.

Pseudo-Anosov subgroups of fibered 3–manifold groups, with R. P. Kent IV and C. J. Leininger. *Groups Geom. Dyn.* 8 (2014) no. 4, 1247-–1282.

Dynamics on free-by-cyclic groups, with I. Kapovich and C. J. Leininger. *Geometry & Topology* 19-5 (2015), 2801–2899.

McMullen polynomials and Lipschitz flows for free-by-cyclic groups, with I. Kapovich and C. J. Leininger. *J. Eur. Math. Soc. (JEMS)* 19 (2017), no. 11, 3253–3353.

Unbounded asymmetry of stretch factors, with I. Kapovich and C. J. Leininger. *Comp. Rend. Math. Acad. Sci. Paris, Ser. I.* Vol. 352 (2014) 885–887.

Hyperbolic extensions of free groups, with S. Taylor. *Geometry & Topology* 22 (2018), no. 1 517–570.

Contracting orbits in Outer space, with S. Taylor. *Mathematische Zeitschrift* 293 (2019), no. 1-2, 767–787.

Cannon–Thurston maps for hyperbolic free group extensions, with I. Kapovich and S. Taylor. *Israel Journal of Mathematics* 216 (2016), 753–797.

Endomorphisms, train track maps, and fully irreducible monodromies, with I. Kapovich and C. Leininger. *Groups Geom. Dyn.* 11 (2017), 1179–1200.

The co-surface graph and the geometry of hyperbolic free group extensions, with S. Taylor. *Journal of Topology* 10 (2017) no. 2, 447–482.

Rank and Nielsen equivalence in hyperbolic extensions, with S. Taylor. *Internat. J. Algebra Comput.* 29 (2019), no. 4, 615–625

Isomorphisms between big mapping class groups, with J. Bavard and K. Rafi. *Int. Math. Res. Not. IMRN* (2020), no. 10, 3084–3099

Discretely shrinking targets in moduli space, with G. Work. arXiv:1909.05817 [math.DS]. To appear in *Geometriae Dedicata*

Extensions of Veech groups I: A hyperbolic action, with M. Durham, C. Leininger, and A. Sisto. arXiv:2006.16425 [math.GT]. Submitted for publication

Extensions of Veech groups II: Hierarchical hyperbolicity and quasi-isometric rigidity, with M. Durham, C. Leininger, and A. Sisto. arXiv:2111.00685 [math.GT]. Submitted for publication

Orientable maps and polynomial invariants of free-by-cyclic groups, R. Gupta and S. Taylor.
arXiv:2203.12134 [math.GR]. Submitted for publication

Invited Talks

Conferences and Colloquia

54th Spring Top. & Dynam. Sys. Conf. (online) Murray State Univ., KY	May 2021
(Canceled)*AMS Special Session on Combinatorial Methods in Geometric Group Theory*, University of Virginia	March 2020
AMS Special Session on Group actions on manifolds & related spaces, SUNY Binghamton, NY	October 2019
MSRI Grad. School on Geom. Group Theory (5-part minicourse), Oaxaca, Mexico	July 2019
Dubrovnik IX - Topology & Dynamical Systems, Dubrovnik, Croatia	June 2019
Workshop on surfaces of infinite type (lightning talk), AIM, San José, CA	May 2019
Workshop on Geometry of Teichmüller Space, Fields Institute, Toronto	August 2018
40th Semiannual Wasatch Topology Conference, Midway, Utah	August 2018
Summer Conference on Topology and its Applications, Western Kentucky Univ.	July 2018
Geometry of outer spaces and outer automorphism groups, Univ. Warwick	April 2018
Geometry of Teichmüller space and mapping class groups, Univ. Warwick	April 2018
52nd Spring Topology and Dynamical Systems Conf. Auburn Univ.	March 2018
No Boundaries: Groups in Algebra, Geometry, and Topology, Univ. Chicago	October 2017
Groups explored through geometry and dynamics, Princeton University	September 2017
Geometric Structures in Group Theory, Oberwolfach Research Institute	June 2017
Graduate Student Conf. in Algebra, Geometry, and Dynamics, Temple Univ.	June 2017
51st Spring Topology and Dynamical Systems Conf. New Jersey City Univ.	March 2017
Surface Bundles Workshop, Oberwolfach Research Institute	December 2016
Geometry of mapping class groups and $\mathrm{Out}(F_n)$, Math. Sci. Research Inst.	October 2016
Introductory Workshop: Geometric Group Theory, Math. Sci. Research Inst.	August 2016
Effective and Algorithmic Methods in Hyp. Geom. and Free groups, ICERM	May 2016
50th Spring Topology and Dynamical Systems Conf. Baylor University	March 2016
Young Geometric Group Theory V, Karlsruhe, Germany	February 2016
Moduli Crossroads Retreat I, University of Wisconsin - Madison	June 2015
Workshop on Mapping Class Groups and $\mathrm{Out}(F_n)$, University of Texas at Austin	May 2015
AMS Special Session on Geometric Group Theory and Topology, University of Alabama in Huntsville	March 2015
Geometry, Groups, and Dynamics Day, Rose-Hulman Inst. of Technology	February 2015
University of Nebraska - Lincoln, Department Colloquium	February 2015
North Dakota State University, Department Colloquium	January 2015
University of Illinois at Chicago, Department Colloquium	January 2015

Vanderbilt University, Department Colloquium	January 2015
SUNY Buffalo, Department Colloquium	December 2014
Ahlfors–Bers Colloquium, sixth triennial, Yale University	October 2014
Topology Student Workshop, Georgia Tech	June 2014
CMS Special Session on Low-dimensional Topology and Geometric Group Theory, Winnipeg, Manitoba	June 2014
Georgia Topology Conference, University of Georgia	May 2014
Redbud Topology Conference, University of Oklahoma	April 2014
AMS Special Session on Low-dimensional Topology and Group Theory, University of Maryland	March 2014
AMS Special Session on Geometric Topology and Number Theory, University of Tennessee	March 2014
Joint Meetings – Crash Course on Mapping Class Groups, Baltimore, MD	January 2014
Geometric and Dynamical Aspects of Discrete Groups, Université Lille 1	September 2013
Research program on the Geometry of Outer Space, Université d'Aix Marseille	July 2013
Workshop on Higher Teichmüller–Thurston Theory, Northport, Maine	June 2013
CRM Semester Program on Automorphisms of Free Groups, Barcelona	October 2012
GEAR Retreat, University of Illinois	August 2012
AMS Special Session on Geometric Topology and Group Theory, University of Kansas	March 2012
Park City Math Institute summer session on Moduli spaces of Riemann surfaces, Park City, Utah	July 2011
Ahlfors–Bers Colloquium, fifth triennial, Rice University	March 2011
Wasatch Topology Conference, Park City, Utah	August 2010
Workshop on pseudo-Anosovs with small dilatation, University of Wisconsin	April 2010
Graduate Student Topology and Geometry Conference, University of Michigan	April 2010

Seminars

Univeristry of Wisconsin *Geometry and Topology Seminar*	February 2022
Vanderbilt University *Topology & Group Theory Seminar*	February 2021
University of Glasgow *Geometry & Topology Seminar*	November 2020
Vanderbilt University *Subfactor Seminar*	May 2020
Vanderbilt University *Undergraduate Math Seminar*	February 2020
University of Michigan *Geometry Seminar*	November 2019
University of Michigan *Undergraduate MathClub Seminar*	November 2019
University of Utah *Max Dehn Seminar*	September 2019
Yale University *Geometry & Topology Seminar*	October 2018
Vanderbilt University *Topology & Group Theory Seminar*	September 2018

Universidad Autónoma de Madrid / ICMAT *Group Theory Seminar*	May 2018
Columbia University *Geometric Topology Seminar*	March 2018
Vanderbilt University *Group Theory & Topology Seminar*	November 2017
Regensberg University, *2–part Minicourse on free-by-cyclic groups*	June 2017
Vanderbilt University *Group Theory & Topology Seminar*	January 2017
University of Florida *Topology Seminar*	January 2017
University of California Santa Barbara *Topology Seminar*	November 2016
University of Chicago *Geometry/Topology Seminar*	June 2016
University of Illinois *Geometry, Groups and Dynamics/GEAR Seminar*	April 2016
Boston College *Geometry/Topology Seminar*	April 2016
Vanderbilt University *Group Theory & Topology Seminar*	March 2016
Vanderbilt University *Geometry Seminar*	November 2015
Vanderbilt University *Geometry Seminar*	November 2015
University of California Santa Barbara *Topology Seminar*	May 2015
University of Arkansas *Topology Seminar*	April 2015
The Ohio State University *Geometric Group Theory Seminar*	April 2015
MSRI semester program on Dynamics on Moduli Spaces, *Postdoc Seminar*	February 2015
Brown University, *GATSBY Seminar*	December 2014
University of Michigan *Topology Seminar*	November 2014
University of Illinois *Geometry, Groups and Dynamics/GEAR Seminar*	November 2014
Purdue University *Geometry Seminar*	October 2014
Yale University *Geometry and Topology Seminar*	September 2014
University of Illinois at Chicago *Geometry, Topology and Dynamics Seminar*	April 2014
University of Illinois *Group Theory Seminar*	March 2014
University of Texas at Austin *Topology Seminar*	February 2014
University of Wisconsin *Geometry and Topology Seminar*	January 2014
Brown University *Geometry Topology Seminar*	November 2013
Columbia University *Geometric Topology Topology Seminar*	September 2013
University of Toronto *Geometry and Topology Seminar*	March 2013
University of Illinois *Group Theory Seminar*	February 2013
University of Chicago *Geometry and Topology Seminar*	December 2012
University of Oklahoma *Geometry and Topology Seminar*	November 2012
Yale University *Geometry and Topology Seminar*	November 2012
University of Illinois *Group Theory Seminar*	December 2011
University of Illinois *Geometry Seminar*	October 2011
Indiana University *Geometry Seminar*	October 2011
University of Michigan *Topology Seminar*	March 2011

Ohio State University *Geometric Group Theory Seminar*	December 2010
Georgia Tech *Geometry Topology Seminar*	November 2010
Rice University *Topology Seminar*	November 2010
University of Illinois *Differential Geometry Seminar*	October 2010

Teaching Experience

Vanderbilt University

Instructor, Linear Algebra (Math 2600)	Spring 2022
Instructor, Multivariable Calculus (Math 2300)	Fall 2021
Instructor, Linear Algebra (Math 2600)	Fall 2021
Instructor, Introduction to Differential Geometry (Math 3230)	Spring 2021
Instructor, Multivariable Calculus (Math 2300)	Fall 2020
Instructor, Seminar in Topology (Math 9200)	Fall 2020
Instructor, Linear Algebra (Math 2600)	Spring 2020
Instructor, Linear Algebra (Math 2600)	Fall 2019
Instructor, Riemannian Geometry (Math 7210)	Fall 2019
Instructor, Selected Topics: Dynamical Systems (Math 3890)	Spring 2019
Instructor, Multivariable Calculus (Math 2300; 2 sections)	Fall 2018
Instructor, Seminar in Topology (Math 9201)	Spring 2018
Instructor, Linear Algebra (Math 2600)	Fall 2017
Instructor, Riemannian Geometry (Math 7210)	Spring 2017
Instructor, Introduction to Topology (Math 3200)	Spring 2016
Instructor, Linear Algebra (Math 2600)	Fall 2015

University of Illinois at Urbana-Champaign

Instructor, Curve complexes and Surface Topology (Math 595) Graduate advanced topics course	Fall 2014

Instructor, Calculus II (Math 231, two sections)
    Large lecture course – taught 509 students, managed 9 TAs,
    and coordinated 17 discussion sections
	Spring 2013

Instructor, Non-Euclidean Geometry (Math 402, two sections)	Spring 2012
Instructor, Non-Euclidean Geometry (Math 402)	Fall 2011

University of Chicago

co-Instructor, Basic Geometry (Math 176)	Winter 2011
Inquiry-based learning / Moore method class	
Instructor, Studies in Mathematics (Math 112)	Fall 2010
Instructor, Calculus III (Math 153)	Winter 2010
Instructor, Calculus II (Math 152)	Fall 2009
Instructor, Elementary Functions and Calculus III (Math 133)	Spring 2009
Instructor, Elementary Functions and Calculus II (Math 132)	Winter 2009
Instructor, Elementary Functions and Calculus I (Math 131)	Fall 2008
College Fellow, Honors Calculus III (Math 163)	Spring 2008
College Fellow, Honors Calculus II (Math 162)	Winter 2008
College Fellow, Honors Calculus I (Math 161)	Fall 2007

Service Activities

Referee work   2008–present
*Adv. Studies in Pure Math., Adv. Geom., Adv. Math., Algebr. Geom. Topol.,
Ann. Inst. Fourier, Bull. Aust. Math. Soc. Bull. Lond. Math. Soc.,
Compos. Math., Duke Math J., Geom. Dedicata, Geometry & Topology,
Groups Geom. Dyn., IRMN, Indiana Univ. Math. J., Israel J. Math., J. Top.,
J. Top. Analysis, Math. Z., New York J. Math., Proc. Amer. Math. Soc.,
Proc. Roy. Soc. Edinburgh Sect. A, Topology Proc., Trans. Amer. Math. Soc.,*

AMS Joint Mathematics Meetings Travel Grants Committee   2021–24
Chair of the committee for year 2022–23

Co-organizer: AMS Special Session on *Boundaries and Non-positive Curvature*   April 2018
in Group Theory, Sectional Meeting, Vanderbilt University, Nashville, TN

Co-organizer: Young Geometric Group Theory VII, Les Diablerets, Switzerland   March 2018

Ran reading seminar on *Random walks in groups*, Vanderbilt University   Fall 2017

Co-organizer: Shanks Conference on Low-dimensional Topology and Geometry   May 2017
Vanderbilt University, Nashville, TN

Co-organizer: Workshop & Conference on Mapping class groups and Out(F_N)   May 2015
University of Texas, Austin, TX

Illinois Geometry Lab, University of Illinois   Fall 2014
Faculty Mentor for undergraduate research project

Mentor at the Topology Student Workshop, Georgia Inst. of Technology   June 2014

Co-organizer for the *GEAR Junior Retreat*, Urbana IL   Summer 2012

Park City Math Institute, Teaching Assistant   July 2011
Undergraduate Summer School on Moduli Space of Riemann Surfaces

Organizer for the *Farb and Friends Student Seminar*, University of Chicago   2008–2009

University of Chicago Polk Brothers Mathematics Program   2010–2011
Guest teacher in Chicago Public Schools

University of Chicago Directed Reading Program   Winter 2009
  Mentored undergraduate student in directed reading course on PDEs.

University of Chicago Mathematics REU   Summers 2007, 2008, 2009
  Mentored undergraduate students in projects across a variety of disciplines,
  including algebraic and differential topology, complex analysis, and dynamics.