Curriculum Vitae – Johanna Mangahas

CONTACT INFORMATION

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EDUCATION

2004 - 2010 Ph.D. in Mathematics, The University of Michigan, Ann Arbor
Thesis advisors: Richard Canary and Juan Souto
Thesis title: *A Recipe for Short-Word Pseudo-Anosovs, and More*

1996 - 2000 B.A. in Mathematics and in English, University of California, Berkeley

APPOINTMENTS

2014 - Assistant Professor, University at Buffalo, NY

2014 - 2015 NSF Postdoctoral Fellow at University at Buffalo, NY

2012 - 2014 NSF Postdoctoral Fellow at Brown University, RI

2010 - 2012 Tamarkin Assistant Professor at Brown University, RI

VISITING POSITIONS (FUNDED)

- Research Member, Aug. – Dec. 2020, Mathematical Sciences Research Institute (MSRI) Program on Random and Arithmetic Structures in Topology – Virtual Semester
- Research Member, Aug. – Dec. 2016, Mathematical Sciences Research Institute (MSRI) Program on Geometric Group Theory
- Visitor, Sep. – Dec. 2013, Institute for Computational and Experimental Research in Mathematics (ICERM) Semester Program on Low-dimensional Topology, Geometry, and Dynamics

PUBLICATIONS: Peer-reviewed Journals

(9) Matt Clay, Johanna Mangahas, and Dan Margalit. *Right-angled Artin group as normal subgroups of mapping class groups.* **Accepted** for publication in Compositio Mathematica. Preprint available at `arXiv:2001.10587`.

(8) Matt Clay and Johanna Mangahas. *Hyperbolic quotients of projection complexes*, with Matt Clay. **Accepted** for publication in Groups, Geometry, and Dynamics. Preprint available at `arXiv:2005.14232`.

(7) Thomas Koberda, Johanna Mangahas, and Samuel J. Taylor. *The geometry of purely loxodromic subgroups of right-angled Artin groups.* **Published** in Transactions of the American Mathematical Society 369 (2017), no. 11.

(6) Johanna Mangahas and Samuel J. Taylor. *Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups.* **Published** in Proceedings of the London Mathematical Society (3) 112 (2016), no 5.

(5) Matt Clay, Johanna Mangahas, and Alexandra Pettet. *An algorithm to detect full irreducibility by bounding the volume of periodic free factors.* **Published** in Michigan Mathematical Journal 64 (2015), no 2.

(4) Thomas Koberda and Johanna Mangahas. *An effective algebraic detection of the Nielsen-Thurston classification of mapping classes.* **Published** in Journal of Topology and Analysis 7 (2015), no. 1.

(3) Johanna Mangahas. *A recipe for short-word pseudo-Anosovs.* **Published** in American Journal of Mathematics 135 (2013), no. 4.

(2) Matt Clay, Chris Leininger, and Johanna Mangahas. *The geometry of right-angled Artin subgroups of mapping class groups.* **Published** in Groups, Geometry, and Dynamics 6 (2012), no. 2.

(1) Johanna Mangahas. *Uniform uniform exponential growth of subgroups of the mapping class group.* **Published** in Geometric and Functional Analysis 19 (2010), no. 5.

PUBLICATIONS: BOOK CHAPTERS (1) *The ping-pong lemma.* **Published** in Office hours with a geometric group theorist, Princeton Univ. Press, Princeton, NJ, 2017.

AWARDS AND FUNDING
- Dr. Nuala McGann Drescher Leave Program (Fall 2020), $4,000
- Sole PI, National Science Foundation Research Grant,
  "Group Geometry and Mapping Class Groups"
  NSF DMS 1812021 (June 2018 - May 2022) $173,620
- Sole PI, National Science Foundation Postdoctoral Research Fellowship,
  NSF DMS 1204592 (July 2012 – July 2015) $150,000
- AMS–Simons Travel Grant (2011 – 2013) $5,500

TEACHING
MTH 101 Introduction to Contemporary Mathematics (created, developed, and taught): Sp. 2017, Fa. 2017, Fa. 2018, Fa. 2019, Sp. 2021
MTH 241 Calculus III: Sp. 2016
MTH 306 Differential Equations: Sp. 2015
MTH 309 Linear algebra: Sp. 2021, Sp. 2019 (2 sections)
MTH 635 Graduate Differential Geometry: Sp. 2020, Sp. 2018
MTH 827 Selected Topics in Topology: Sp. 2018, Sp. 2017, Sp. 2016
MTH 828 Topics in Topology: Sp. 2020
MTH 801/*807 Graduate Reading Course: Sp. 2021 (2), Fa. 2020 (2), Sp. 2020 (2), Fa. 2019, Sp. 2019, Fa. 2018, Fa. 2017*, Sp. 2017, Fa. 2016, Sp. 2015
Fundamental Problems of Geometry (Brown University): Sp. 2013
Advanced Placement Calculus (Brown University): Fa. 2011 (both instructor and course coordinator), Fa. 2010

Intermediate (Multivariable) Calculus (Brown University): Sp. 2011
Honors Linear Algebra (Brown University): Fa. 2010
Analysis: Functions of One Variable (Brown University): Sp. 2012
Complex Analysis (Brown University): Fa. 2011
Calculus I (University of Michigan): Fa. 2006, Fa. 2005
Calculus II (University of Michigan): Wi. 2009, Wi. 2008

GRADUATE MENTORING	Principal advisor for PhD students:

- Abdalrazzaq Zalloum Fall 2016 – Spring 2019
  (co-advised with Ruth Charney, Brandeis University)
  Ph.D. 2019; now Coleman Postdoctoral Fellow, Queen's University, ON, Canada
- Daxun Wang, Fall 2019 – present
- Bratati Som, Spring 2021 – present
- Amy Herron, Summer 2021 – present (co-advised with Yiqiang Li, UB)

Mentor for PhD student:

- Arya Vadnere, Spring 2021 – present

PhD committee member:

- Mark Nieland, defended Winter 2017, advised by Bill Menasco

UNDERGRADUATE MENTORING Sophomore Advisor for Brown University Office of the Dean of the College:

- Chukiat Phonsom, Fall 2011 – Spring 2012
  Ph.D. 2020 in Applied Mathematics at University of Southern California

SERVICE

- **Faculty Sponsor,** UB Association for Women in Mathematics Student Chapter, Spring 2015 – present
- Undergraduate Committee, UB Department of Mathematics, 2014 – present
- *ad hoc* Diversity Committee, UB Department of Mathematics, 2021 – present
- **Co-organizer,** Special Session on Geometric Group Theory, American Mathematical Society Fall Eastern Sectional Meeting 2017
- **Co-organizer,** Institute for Computational and Experimental Research in Mathematics Semester Workshop on Effective and Algorithmic Methods in Hyperbolic Geometry and Free Groups, May 16 – 20, 2016
- **Co-organizer,** Knots, Braids, and Mapping Classes: A Conference in Honor of Bill Menasco's 60th Birthday, May 11 – 12, 2015
- **Co-organizer,** Geometry and Topology Seminar @ Brown & Yale, 2012 – 2014
- Referee for: *Geometric and Functional Analysis*; *Journal of Topology*; *Geometriae Dedicata*; *Groups, Geometry, and Dynamics*; *Pacific Journal of Mathematics*; *International Journal of Algebra and Computation*; *Experimental Mathematics*

Invited Talks	**2020**

- (Virtual) MSRI Research Seminar, Nov. 5, 2020
  Title: "Hyperbolic quotients of projection complexes"
- (Virtual) Geometry and Topology Seminar at Yale, Oct. 27, 2020
  Title: "Hyperbolic quotients of projection complexes"

2019

- Tech Topology Conference, Georgia Tech, Dec. 7, 2019
  Title: "Normal subgroups of mapping class groups"
- ICERM Algorithms in Complex Dynamics and Mapping Class Groups, Nov. 2, 2019
  Title: "Mapping class group algorithms"
- Special Session on Effective and Quantitative Advances in Low Dimensional Topology and Geometric Group Theory,
  AMS Fall Eastern Sectional Meeting, Oct. 12, 2019
  Title: "Effective free normal subgroups of mapping class groups"
- Dubrovnik IX – Topology & Dynamical Systems, Dubrovnik, Croatia, June 27, 2019
  Title: "RAAGs as normal subgroups of mapping class groups"

2018

- Temple University Geometry and Topology Seminar, November 14, 2018 Title: "Right-angled Artin groups as as normal subgroups of mapping class groups"
- Workshop on Graphs, Surfaces and Cube Complexes, Warwick, UK, July 12, 2018
  Title: "Right-angled Artin groups as as normal subgroups of mapping class groups"
- University of Michigan Topology Seminar, March 22, 2018
  Title: "Right-angled Artin groups as as normal subgroups of mapping class groups"

2017

- Session on Low dimensional topology and geometric group theory, Canadian Mathematical Society Winter Meeting, Waterloo, Canada, Dec. 10, 2017
  Title: "Right-angled Artin groups as as normal subgroups of mapping class groups"
- Special Session on Infinite Groups and Geometric Structures: A Session in Honor of the Sixtieth Birthday of Andrew Nicas, AMS Fall Eastern Sectional Meeting, Buffalo NY, Sep. 16, 2017
  Title: "Normal right-angled Artin group subgroups of mapping class groups"
- Scientific Session on Geometric Group Theory, Mathematical Congress of the Americas 2017, July 26, 2017
  Title: "Normal right-angled Artin group subgroups of mapping class groups"
- 51st Spring Topology and Dynamics Conference, Mar. 8-11, 2017

Title: "Normal right-angled Artin groups in mapping class groups"
- MAA Invited Paper Session on Office Hours with a Geometric Group Theorist, 2017 JMM, Atlanta GA, Jan. 4, 2017
  Title: "Ping-Pong for Free Groups"

2016
- Special Session on Convex Cocompactness, AMS Fall Eastern Sectional Meeting, Bowdoin College, Sep. 24, 2016
  Title: "Contexts for convex cocompactness"
- Special Session on Geometric Group Theory, AMS Fall Eastern Sectional Meeting, Bowdoin College, Sep. 24, 2016
  Title: "After the Masur–Minsky Machinery"

2015
- Workshop on Mapping Class Groups and $\text{Out}(F_n)$, University of Texas at Austin, May 26, 2015
  Title: "Convex cocompactness in right-angled Artin groups"
- University of Virginia Colloquium, April 10, 2015
  Title: "Geometry in and around groups"
- Special Session on Geometric Group Theory and Topology, AMS Spring Southeastern Sectional Meeting, Huntsville, AL, March 28, 2015
  Title: "The geometry of purely loxodromic subgroups of right-angled Artin groups"

2014
- Session on Geometry and Topology of Manifolds in Low Dimensions, CMS Winter Meeting, Hamilton, Canada, Dec. 7, 2014
  Title: "Convex cocompactness in right-angled Artin groups"
- Combinatorial Link Homology Theories, Braids, and Contact Geometry, ICERM, Aug. 4 – 5 2014
  Title: "Minicourse: Nielsen-Thurston Theory I & II" (series of two lectures)
- GEAR Junior Retreat, Univ. of Michigan, May 25, 2014
  Tite: "Purely loxodromic subgroups of right-angled Artin groups"
- Syracuse University Colloquium, April 25, 2014
- Redbud Topology Conference, University of Oklahoma, April 13, 2014
  Title: "Sizing up invariant curves or free factors using intersection number"
- Special Session on Low-dimensional Topology and Group Theory, AMS Spring Eastern Sectional Meeting, Baltimore, MD, March 30, 2014
  Title: "Volume of periodic free factors and an algorithm to detect full irreducibility"
- Boston U. Dynamical Systems Seminar, March 17, 2014

Title: "List-and-check algorithms for classifying mapping classes and outer automorphisms"

- 48th Spring Topology and Dynamics Conference, March 15, 2014
  Title: "A 'list-and-check' algorithm for Nielsen-Thurston classification"
- Georgia Tech Geometry Topology Seminar, Feb. 10, 2014
  Title: "Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups"
- MAA Invited Paper Session on Six Crash Courses on Mapping Class Groups, 2014 Joint Mathematics Meetings, Baltimore, MD, Jan. 17, 2014
  Title: "The Nielsen-Thurston Classification of Mapping Classes"
- AMS Special Session on Geometric Group Theory, 2014 Joint Mathematics Meetings, Baltimore, MD, Jan. 16, 2014
  Title: "Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups"

2013

- Session on Geometric Group Theory and Low Dimensional Topology, CMS Winter Meeting, Ottawa, Canada, Dec. 8, 2013
  Title: "Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups"
- Cornell Topology and Geometric Group Theory Seminar, Nov. 5, 2013
  Title: "Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups"
- Boston College Geometry/Topology Seminar, Sept. 12, 2013
- Geometric Topology in New York, Aug. 13, 2013
  Title: "Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups"
- XXIInd Rolf Nevanlinna Colloquium, Helsinki, Finland, Aug. 6, 2013
  Title: "Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups"
- 47th Spring Topology and Dynamics Conf., Mar. 23, 2013
  Title: "Convex cocompactness in mapping class groups via quasiconvexity in right-angled Artin groups"
- Columbia Geometric Topology Seminar, Feb. 1, 2013
  Title: "Some Schottky subgroups of mapping class groups"

2012

- Session on Geometrical Group Theory, CMS Winter Meeting, Montreal, Canada, Dec. 9, 2012

Title: "Some Schottky subgroups of mapping class groups"

- Wesleyan Topology Seminar, Nov. 7, 2012
- University of Oklahoma Geometry and Topology Seminar, Oct. 10, 2012
  Title: "A 'list-and-check' algorithm for Nielsen-Thurston classification"
- Research Programme Seminar, Centre de Recerca Matemàtica, Spain, Sept. 20, 2012
  Title: "A 'list-and-check' algorithm for Nielsen-Thurston classification"
- The 8th William Rowan Hamilton Geometry & Topology Workshop, Ireland, Sept. 1, 2012
- CUNY Geometry and Topology Seminar, May 8, 2012
- RTG Workshop on Recent Progress on Hyperbolic 3-Manifolds, Univ. of Michigan, May 6, 2012
- Topology Seminar, U. T. Austin, April 30, 2012
- Yale Geometry and Topology Seminar, April 17, 2012
- Young Geometric Group Theory Meeting, Bedlewo, Poland, Jan. 12, 2012
- AMS Special Session on Hyperbolicity in Manifolds and Groups, 2012 JMM, Boston, MA, Jan. 5, 2012

2011
- New York Group Theory Cooperative, City University New York, Nov. 18, 2011
- Harvard Informal Dynamics and Geometry Seminar, Nov. 16, 2011
- Geometric Group Theory and Topology at Tufts, Nov. 15, 2011
- Special Colloquium, Florida State University, Nov. 3, 2011
- Allegheny College Math Lunch Talk, Oct. 27, 2011
- Brown Geometry and Topology Seminar, Sept. 28, 2011
- "40 Years and Counting" AWM Anniversary Conference, Sept. 17, 2011
- Mini-Course on Teichmüller Theory
  The 4th William Rowan Hamilton Geometry & Topology Workshop, Ireland, Aug. 30, 2011
- Cascade Topology Seminar, Victoria, BC Canada April 16, 2011
- G^3 (Geometric Groups on the Gulf Coast), Panama City, FL March 25, 2011
- Special Session on Geometric Group Theory
  AMS Spring Southeastern Section Meeting, Statesboro, GA, March 12, 2011
- Temple University Geometry-Topology Seminar, Feb. 15, 2011

2010
- Columbia Geometric Topology Seminar, Nov. 19, 2010
- Mathfest 2010 Invited Paper Session on Geometric Group Theory, Aug. 6, 2010
- Special Session on Teichmüller Theory, Hyperbolic Geometry, and Complex Dynamics

AMS Spring Eastern Sectional Meeting, Newark, NJ, May 22, 2010

- Special Session on Kleinian Groups and Teichmüller Theory

  AMS Spring Western Section Meeting, Albuquerque, NM, April 18, 2010

- Brown Geometry and Topology Seminar, April 7, 2010

- UC Berkeley Topology, Geometry, and Operator Algebras Seminar, Feb. 20, 2010