MICHAEL CHING - CURRICULUM VITAE

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EDUCATION

- **Massachusetts Institute of Technology** (2001-2005)
  Ph.D. Mathematics June 2005
  Thesis Advisor: Haynes Miller

- **University of Cambridge - Trinity College** (1997-2001)
  M.A. Mathematics February 2004 (automatically conferred three years after B.A.)
  Certificate of Advanced Study in Mathematics, June 2001
  B.A. Mathematics (Hons.), First Class, June 2000

EMPLOYMENT

- **Amherst College**
  Associate Professor of Mathematics (2017-present)
  Assistant Professor of Mathematics (2011-2017)

- **University of Georgia**
  Assistant Professor of Mathematics (2008-2011)

- **The Johns Hopkins University**
  J.J. Sylvester Assistant Professor (2005-2008)

EXTERNAL FUNDING AND VISITING POSITIONS

- NSF Research Grant: DMS-1709032: RUI: Calculus of Functors and Applications in Homotopy Theory (July 2017 - June 2020)

- NSF Research Grant: DMS-1308933: RUI: Koszul Duality of Operads and the Calculus of Functors (July 2013 - June 2017)

- NSF Research Grant: DMS-0968221: FRG: The Calculus of Functors and the Theory of Operads: Interactions and Applications (June 2010 - May 2013)

- Research Visitor: Isaac Newton Institute, Cambridge, UK (Sept - Dec 2018)

- Research Visitor: Hausdorff Trimester Program, Bonn, Germany (July 2015)

- Visiting Assistant Professor: Massachusetts Institute of Technology (Sept - Dec 2014)

- Research Member: Mathematical Sciences Research Institute (January - May 2014)

PUBLICATIONS AND PREPRINTS

14. *Infinity-operads and Day convolution in Goodwillie calculus*
    arxiv:1801.03467, 31 pages

13. *Derived Koszul duality and TQ-homology completion of structured ring spectra*
    Advances in Mathematics 341 (2019), 118–187
    (joint with John E. Harper)

12. *A nilpotent Whitehead theorem for TQ-homology of structured ring spectra*
    Tbilisi Mathematical Journal 11(3) (2018), 69–79
    (joint with John E. Harper)

11. *Manifolds, K-theory and the calculus of functors*
    Contemporary Mathematics 682 (2017), 1–38
    (joint with Gregory Arone)

10. *Cross-effects and the classification of Taylor towers*
    Geometry & Topology 20-3 (2016), 1445-1537
    (joint with Gregory Arone)

9. *Higher homotopy excision and Blakers-Massey theorems for structured ring spectra*
   Advances in Mathematics 298 (2016), 654–692
   (joint with John E. Harper)

8. *A classification of Taylor towers for functors of spaces and spectra*
   Advances in Mathematics 272 (2015), 471–552
   (joint with Gregory Arone)

7. *Coalgebraic models for combinatorial model categories*
   Homology, Homotopy and Applications 16(2) (2014), 171–184
   (joint with Emily Riehl)

6. *A note on the composition product of symmetric sequences*
   J. Homotopy Relat. Struct. 7 (2012), 237–254

5. *Apollonian circle packings of the half-plane*
   Journal of Combinatorics 3 (2012), 1–49
   (joint with John Doyle)

4. *Bar-cobar duality for operads and modules of spectra*
   Journal of Topology 5 (2012), 39–80

3. *Operads and chain rules for the calculus of functors*
   Astérisque 338 (2011), 158 pages
   (joint with Gregory Arone)

2. *A chain rule for Goodwillie derivatives of functors from spectra to spectra*
   Trans. Amer. Math. Soc. 362 (2010), 399–426

1. *Bar constructions for topological operads and the Goodwillie derivatives of the identity*
   Geometry & Topology 9 (2005), 833–933

RECENT AND UPCOMING TALKS

- 2018:
    - Transpennine Topology Triangle, Sheffield, UK (October 2018)
    - Isaac Newton Institute, Cambridge, UK (October 2018)
    - Stockholm University Topology Seminar, Sweden (September 2018)

- Category Theory 2018, University of the Azores, Portugal (July 2018)
- Workshop on Infinity-Operads, Utrecht, Netherlands (June 2018)
- AMS Sectional Meeting, Columbus, OH (March 2018)
- University of Calgary Peripatetic Logic and Category Theory Seminar (March 2018)
- 2017:
  - MIT Topology Seminar (December 2017)
  - Amherst College Math Colloquium (February 2017)
- 2016:
  - Stockholm University Topology Seminar, Sweden (August 2016)
  - Midwest Topology Seminar, Ohio State University (May 2016)
  - MIT Topology Seminar (May 2016)
  - Amherst College Lazerowitz Lecture (April 2016)
- 2015:
  - UMass-Amherst Representation Theory Seminar (September/October 2015)
  - Factorizable Structures in Topology and Algebraic Geometry, Banff (August 2015)
  - Functor Calculus Workshop, Münster, Germany (June 2015)
  - Lehigh University Geometry and Topology Conference, Bethlehem, PA (May 2015)
  - Lecture Series (4 talks) on the Classification of Taylor Towers, UIUC (March 2015)
- 2014:
  - Ohio State University Topology Seminar (October 2014)
  - Structured Ring Spectra and their Invariants, Manchester, UK (September 2014)
  - Category Theory 2014, Cambridge, UK (July 2014)
  - Manifolds, K-theory and Related Topics, Dubrovnik, Croatia (June 2014)
  - MSRI Algebraic Topology Research Seminar, Berkeley, CA (April 2014)
  - MSRI Introductory Workshop: Algebraic Topology, Berkeley, CA (January 2014)
- 2013:
  - Union College Mathematics Conference, Union College, Schenectady, NY (Oct. 2013)
  - Midwest Topology Seminar, University of Kentucky (May 2013)
  - Brown University Geometry/Topology Seminar (March 2013)
  - MIT Topology Seminar (February 2013)
- 2012:
  - Amherst College EDU Club (November 2012)
  - Colby College Mathematics Colloquium (November 2012)
  - Joint Brandeis-Harvard-MIT-Northeastern Colloquium (November 2012)
  - Fourth Arolla Conference on Algebraic Topology, Arolla, Switzerland (August 2012)
  - Conference on Homotopical Algebra and its Applications, Luminy, France (June 2012)
  - Virginia Conference on Algebraic Topology, University of Virginia (June 2012)
  - Canadian Mathematical Society Summer Meeting, Regina, Saskatchewan (June 2012)
  - MIT Talbot Workshop, Garden City, UT (May 2012)
  - Kansas State University Topology Seminar (April 2012)
  - Wesleyan University Topology Seminar (March 2012)
  - Wellesley College Mathematics Colloquium (February 2012)
  - SUNY Albany Topology Seminar (January 2012)
  - JMM: Special Session on the Calculus of Functors and its Applications (January 2012)

RECENT AND UPCOMING CONFERENCES

- Homotopy Harnessing Higher Structures, Isaac Newton Institute, Cambridge, England (July - December 2018)

- AMS Sectional Meeting, Columbus, OH (March 2018)
- Homotopy Theory in the Ecliptic, Reed College, Portland, OR (August 2017)
- Alpine Conference on Applied and Algebraic Topology, Saas, Switzerland (August 2016)
- Topology of Manifolds, Lisbon, Portugal (June 2016)
- Workshop on Homotopy Type Theory, Fields Institute, Toronto, Canada (May 2016)
- Factorizable Structures in Topology and Algebraic Geometry, Banff (August 2015)
- Homotopy Theory, Manifolds and Field Theories, Hausdorff Institute of Mathematics, Bonn, Germany (July 2015)
- Functor Calculus Workshop, Münster, Germany (June 2015)
- Lehigh University Geometry and Topology Conference, Bethlehem, PA (May 2015)
- Mid-Atlantic Topology Conference, Charlottesville, VA (April 2015)
- Geometry and Topology, Princeton, NJ (March 2015)
- Homotopical Algebra, Operads and Grothendieck – Teichmller groups, Nice, France (September 2014)
- Stable Homotopy Theory: Structured Ring Spectra and Their Invariants, Manchester, UK (September 2014)
- Category Theory 2014, Cambridge, UK (July 2014)
- Manifolds, K-Theory and Related Topics, Dubrovnik, Croatia (June 2014)
- MSRI Semester in Algebraic Topology, Berkeley, CA (January-May 2014)

PROFESSIONAL SERVICE

- Peer reviewer for 9 journals
- NSF panel reviewer
- PhD Thesis Committee: Luis Pereira, MIT (April 2013)
- MIT-Talbot Workshop Mentor (May 2012)
- Girls Inc. Math Tutor Training Workshop, Amherst College (March 2013, February 2012)
- Co-organizer of Banff International Research Station Workshop on Functor Calculus and Operads (March 2011)
- Main organizer for Georgia Topology Conference (May 2010)

TEACHING AT AMHERST COLLEGE

- **Math 111i: Introduction to Calculus (Intensive)** (Fall 2017, Fall 2016, Fall 2015)
  first-semester calculus: limits, derivatives, integration (25-35 students)
- **Math 111: Introduction to Calculus** (Fall 2013, Fall 2012, Fall 2011)
  first-semester calculus: limits, derivatives, integration (20-25 students)
- **Math 121: Intermediate Calculus** (Spring 2012)
  second-semester calculus: integration techniques, sequences and series (20 students)
- **Math 205: Inequality** (Spring 2017, Spring 2018)
  K-12 math education in the U.S., co-taught and cross-listed with History and Black Studies (25 students)
- **Math 211: Multivariable Calculus** (Fall 2017, Spring 2015, Spring 2013, Fall 2012, Fall 2011)
  curves in $\mathbb{R}^n$, functions of several variables, Stokes' Theorem (25-50 students)
- **Math 220: Discrete Mathematics** (Spring 2016)
  introduction to proof-writing, relations, functions (35 students)
- **Math 271: Linear Algebra** (Spring 2017, Fall 2016, Fall 2015)
  linear systems, matrices, vector spaces, linear transformations (35 students)
- **Math 355: Introduction to Analysis** (Spring 2012)

rigorous single-variable mathematical analysis (25 students)
- **Math 385: Mathematical Logic** (Spring 2018)
  propositional and predicate calculi, completeness and incompleteness (10 students)
- **Math 410: Galois Theory** (Fall 2013, Spring 2016)
  field extensions, Galois Correspondence, solvability by radicals (2-9 students)
- **Math 455: Topology** (Spring 2015, Spring 2013)
  an introduction to point-set and algebraic topology (10-20 students)
- **Special Topics courses taught**:
  - Motivic Homotopy Theory (Spring 2015)
  - Topics in Math Education (Spring 2015, Spring 2016)
  - Readings in Mathematics - Half Course (Spring 2015)
  - Homotopy Type Theory (Spring 2016)
  - Game Theory (Spring 2017)
  - Algebraic Topology (Spring 2017)
  - Reflections on Calculus (Fall 2017)
  - Higher Category Theory (Spring 2018)
- **Senior Thesis Students**:
  - Sunny Xiao (2013-14):
    $1-2$ *Quadruples in Self-Similar Unbounded Apollonian circle packings*
  - Kyle Ferendo (2015-16):
    The Maximal and Free (∞, n)-Categories of an $(\infty, n+1)$-Category
  - Fraser Binns (2016-17):
    The Kervaire Invariant of the Lie Framed Torus

COLLEGE SERVICE
- Faculty Computing Committee (2015-2017)
- Faculty Committee on Student Fellowships (2017-2018)

DEPARTMENTAL SERVICE
- Walker Prizes Coordinator (2016-2018)
- Math Colloquium Coordinator (2015)
- MAA Student Chapter and Math Club Advisor (2012-2013, 2015-2017)
- Putnam Exam Problem-Solving Sessions (2011, 2012, 2013)
- Faculty Search Committees (2012-2013, 2015-2017)

SCHOLARSHIPS AND AWARDS
- Amherst College Lazerowitz Lectureship (2016)
- Amherst College Trustee Faculty Fellowship (2014)
- Excellence in Teaching Award (JHU Department of Mathematics, 2007)
- Dean's Educational & Student Advising Award (MIT School of Science, 2005)
  for dedication to educational programs and student advising
- MIT Graduate Assistantship (2002-2005)
- Kennedy Memorial Trust Scholarship (2001-2002)
- International Mathematical Olympiad: Gold Medal (1996), Silver Medal (1997)