

# MATT THOMAS

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## EDUCATION

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### Ph.D., Mathematics

August 2013

University of Arizona

Dissertation title: Analyzing Conceptual Gains in Introductory Calculus  
with Interactively-Engaged Teaching Styles

### M.S., Mathematics

December 2009

University of Arizona

Thesis title: Approximation of the Dispersionless Toda Lattice by Toeplitz Operators

### B.A., Mathematics

May 2006

Cornell University

## EXPERIENCE

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### Associate Professor

2020 - present

*Ithaca College*

*Department of Mathematics*

### Assistant Professor

2014 - 2020

*Ithaca College*

*Department of Mathematics*

### Visiting Scholar

Summer 2017, Summer 2018

*Cornell University*

*Department of Mathematics*

### Assistant Professor

2013 - 2014

*University of Central Arkansas*

*Department of Mathematics*

## PUBLICATIONS

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### *Peer reviewed journal articles*

Peebles, C. & **Thomas, M.** (accepted with minor revisions). Using stylistic features to predict the composition date of an American contra dance. *Journal of Mathematics & The Arts*

Lockwood, E., DeJarnette, A., & **Thomas, M.** (2019). Computing as a Mathematical Disciplinary Practice. *Journal of Mathematical Behavior*, 100688.

Gleason, J., Bagley, S., **Thomas, M.**, Rice, L., & White, D. (2018). The Calculus Concept Inventory: A psychometric analysis and implications for use. *International Journal of Mathematical Education in Science and Technology*, 50:6, 825-838, DOI:10.1080/0020739X.2018.1538466

Weinberg, A., & **Thomas, M.** (2018). Student Learning and Sense-Making from Video Lectures. *International Journal of Mathematical Education in Science and Technology*, 49(6), 922-943.

Schoenle, L., & **Thomas, M.** (2017). Solving Hardy-Weinberg with geometry: An integration of biology and math. *The American Biology Teacher*, 79(4), 309-312.

Code, W., Merchant, S., Maciejewski, W., **Thomas, M.**, & Lo, J. (2016). The Mathematics Attitudes and Perceptions Survey: An instrument to assess expert-like views and dispositions among undergraduate mathematics students. *International Journal of Mathematical Education in Science and Technology*, 47(6), 917-937.

*Peer reviewed proceedings papers*

Weinberg, A., Tornai, J., **Thomas, M.**, Martin, J., Tallman, M., & Newman, K. (2019). Identifying students' attentive fidelity for calculus instructional videos. *Proceedings of the 41st annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, St. Louis, MO: The University of Missouri.

Weinberg, A., Martin, J., **Thomas, M.**, & Tallman, M. (2018). Failing to rewind: Students' learning from instructional videos. *Proceedings of the 40th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Greenville, SC.

Weinberg, A., Martin, J., **Thomas, M.**, Tallman, M. (2018). Investigating Student Learning and Sense-Making from Instructional Calculus Videos. *Proceedings of the Twenty-first Annual Conference on Research in Undergraduate Mathematics Education*. San Diego, CA.

**Thomas, M.**, Bagley, S., & Urban-Lurain, M. (2018). Using Machine Learning Algorithms to Categorize Free Responses to Calculus Questions. *Proceedings of the Twenty-first Annual Conference on Research in Undergraduate Mathematics Education*. San Diego, CA.

Lockwood, E., **Thomas, M.**, & DeJarnette, A. (2018). Computing as a Mathematical Disciplinary Practice. *Proceedings of the Twenty-first Annual Conference on Research in Undergraduate Mathematics Education*. San Diego, CA.

**Thomas, M.**, & Martin, J. (2017). Virtual Manipulatives, Vertical Number Lines, and Taylor Series Convergence: The Case of Cody. *Proceedings of the Twentieth Annual Conference on Research in Undergraduate Mathematics Education*. San Diego, CA.

Lockwood, E., Asay, A., DeJarnette, A., & **Thomas, M.** (2016). Algorithmic Thinking: An initial characterization of computational thinking in mathematics. *38th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Tucson, AZ.

**Thomas, M.** & Peebles, C. (2016). A Graph-Theoretic approach to the analysis of Contra dances. *Bridges Finland, 2016*. Jyväskylä, Finland.

Weinberg, A. & **Thomas, M.** (2016). Students' Sense-making Practices for Video Lectures. *Proceedings of the Nineteenth Annual Conference on Research in Undergraduate Mathematics Education*. Pittsburgh, PA.

Martin, J., **Thomas, M.**, & Oehrtman, M. (2016). Supporting Students in Seeing Sequence Convergence in Taylor Series Convergence. *Proceedings of the Nineteenth Annual Conference on Research in Undergraduate Mathematics Education*. Pittsburgh, PA.

Gleason, J., White, D., **Thomas, M.**, Bagley, S., & Rice, L. (2015). The Calculus Concept Inventory: A Psychometric Analysis and Framework for a New Instrument. *Proceedings of the Eighteenth Annual Conference on Research in Undergraduate Mathematics Education*. Pittsburgh, PA.

Gleason, J., **Thomas, M.**, Bagley, S., Rice, L., White, D., & Clements, N. (2015). Analyzing the Calculus Concept Inventory: Content validity, internal structure validity, and reliability analysis. *Proceedings of the PMENA-37*. East Lansing, MI.

**Thomas, M.** (2014). The construction of a video coding protocol to analyze interactive instruction in calculus and connections with conceptual gains. *Proceedings of the Seventeenth Annual Conference on*

*Research in Undergraduate Mathematics Education.* Denver, CO.

Kersting, N.B., Sutton, T., Kalinec Craig, C., Chen, M., Heshmati, S., Jablon Stoehr, K., **Thomas, M.**, & Goswami, G. (2014). Understanding the relationship between teacher value-added scores, instructional quality, and independent measures of student learning. *2014 Annual Meeting of the American Educational Research Association.* Philadelphia, PA.

**Thomas, M.**, & Lozano, G. (2013). Analyzing Calculus Concept Inventory Gains in Introductory Calculus. *Proceedings of the Sixteenth Annual Conference on Research in Undergraduate Mathematics Education.* Denver, CO. 2013.

### *Peer reviewed blog posts*

Bagley, S., Gleason, J., Rice, L., **Thomas, M.**, & White, D. (2016, July, 25). Does the Calculus Concept Inventory Really Measure Conceptual Understanding of Calculus? [Web log post]. AMS Blog: *On Teaching and Learning Mathematics*. Retrieved from <http://blogs.ams.org/matheducation/2016/07/25/does-the-calculus-concept-inventory-really-measure-conceptual-understanding-of-calculus/>

## GRANTS

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“STEM community building to support academic success and retention of low-income students,” Co-PI. 2019. \$646,847, NSF SSTEM award number 1930351, with Kelley Sullivan (PI), David Brown (Co-PI), and John Barr (Co-PI) ([https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=1930351](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1930351))

“Collaborative Research: Empowering faculty to run online learning experiments,” Co-PI. 2019. \$151,520 (Project total \$1,978,243), NSF IUSE Award Number 1915294, with Duane Nykamp (PI), Jim Fowler (Co-PI), and Bart Snapp (Co-PI) ([https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=1915294](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1915294))

“Collaborative Research: Investigating Student Learning and Sense-Making from Instructional Calculus Videos,” Co-PI. 2017. \$185,985.00 (Project total \$299,905), NSF IUSE Award Number 1712312, with Aaron Weinberg (PI), Jason Martin (Co-PI), and Michael Tallman (Co-PI) ([https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=1712312](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1712312))

Ithaca Teachers’ Math Circle (\$5,000+Travel funding), Math Teachers’ Circle Network, Fall 2015, with Cristina Gomez

REACHE Grant: Learning From Video Lectures (\$1560), Spring 2015, with Aaron Weinberg

## AWARDS AND FELLOWSHIPS

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Dean’s Merit, Ithaca College, 2018

Level II Departmental Merit, Ithaca College, 2017, 2018

Project STaR Fellowship, January 2015

Mathematics Department Teaching Award, University of Arizona, March 2012

Graduate Student Travel Grant Award, University of Arizona, March, 2012

VIGRE (Vertical InteGration of Research and Education) Fellowship, University of Arizona, Fall 2010

GK-12 Fellowship, University of Arizona, June 2009 to July 2010

Mathematics Department Service Award, University of Arizona, December 2009

## SELECTED TALKS AND PRESENTATIONS

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### *Invited talks*

“Measurement of Calculus Knowledge and Learning,” University of Texas, San Antonio, November 22, 2019

“Pieces of IBL” (with Rich Spindler), Inquiry-Based Learning (IBL) Special Session Workshop, MAA Seaway Sectional Meeting, St. John Fisher College, Rochester, NY, April 6, 2019

“Students’ Use of Online Calculus Videos”, Penn State University Teaching Seminar, March 14, 2019

“Psychometrics: How Facebook Knows So Much about You”, Houghton College, October 17, 2017

“Psychometrics: What That Buzzfeed Quiz Actually Tells You,” Pi Mu Epsilon Induction Ceremony, Utica College, March 21, 2017

“Measuring Conceptual Understanding in Calculus,” Ohio State Math Education Forum, August 5, 2015

### *Selected Presentations*

“The Analysis of Contra Dance” (with Crystal Peebles), Mathematics Department Colloquium, Ithaca College, April 8, 2019

“Psychometrics: What That Buzzfeed Quiz Actually Tells You,” World of Math Course, Ithaca College, Ithaca, NY, April 4, 2019

“Avoiding Skynet - How to Prevent Machines from Doing the Thinking for Us,” Ithaca College Data Day, October 25, 2018

“IBL in Statistics,” Working Group and Round-table Discussion Leader, National IBL Conference, Austin, TX, May 31 - June 2, 2018

“Mathematics Attitudes and Perceptions Survey: Assessing Students’ Expert-like Conceptions of Mathematics.” Joint Mathematics Meetings, Seattle, WA, January 6, 2016 (Presentation given by Warren J. Code, with additional authors Joseph Lo, Wes Maciejewski, and Sandra Merchant)

“Analyzing Interactively-Engaged Instruction and Conceptual Gains in Introductory Calculus” UCA Research in STEM Education Seminar, Department of Mathematics, University of Central Arkansas, Conway, AR, April 4, 2014

“The Construction of a Video Coding Protocol to Analyze Interactive Instruction in Calculus and Connections with Conceptual Gains” 17th Annual Conference on Research in Undergraduate Mathematics Education, Denver, CO, March 1, 2014

“An Introduction to R” Software Interest Group, Department of Mathematics, University of Arizona, March 25, 2013

## TEACHING EXPERIENCE

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### *Ithaca College*

Undergraduate research mentor:

- Rachel King, Summer 2020
- Jamie Woodworth, Summer 2019
- Kellie Wainwright, Summer 2019
- Kim Newmann, Summer 2018

## Independent Study Mentor:

- Jon Burger: Psychometrics, Fall 2016
- Eric Eichelberger: Math and Music, Spring 2016

## Senior Capstone Project Mentor:

- Xinran Liu: Structural Equation Modeling Using R, 2020
- Rachel King: Exploring Structural Equation Models, 2020
- Heetisha Inderjeet: Mathematics of Machine Learning, 2019
- Brittany (Dyer) McDowell: Bayesian Cognitive Modeling, 2018

111: Calculus I; Fall 2014, Fall 2016, Spring 2017, Fall 2017, Fall 2018

112: Calculus II; Spring 2015, Spring 2018

144: Business Statistics; Spring 2015, Spring 2016

145: Statistics for Health/Life Sciences; Fall 2014, Fall 2015, Fall 2017, Fall 2018, Spring 2020

185: Math Experimentation; Fall 2015, Spring 2016, Fall 2016, Spring 2019

216: Statistical Analysis; Fall 2019

231: Linear Algebra; Fall 2020

246: Intermediate Statistics; Spring 2018, Spring 2020, Fall 2020

316: Probability; Spring 2016, Spring 2017, Spring 2019

Ithaca Seminar: Are you your data?; Fall 2019, Fall 2020

***University of Central Arkansas***

1496: Calculus I; Fall 2013

1497: Calculus II; Spring 2014

3351: Number Systems, course for pre-service elementary grade teachers; Spring 2014

4320: Concepts of Calculus, course for pre-service middle grades teachers; Fall 2013

4360: Supervisor for 7th grade student teacher; Fall 2013

***University of Arizona***

Graduate Teaching Assistant for Mathematics Methods Classes for pre-service secondary teachers, (406B) Spring 2010 and (406A) Spring 2011

Graduate Teaching Assistant, Primary Instructor for:

- Intermediate Algebra (New Start Summer Program); Summer 2008
- 112: College Algebra; Fall 2006 and Spring 2007
- 120: Pre-Calculus; Fall 2007
- 125: Calculus I; Fall 2008 and Spring 2009
- 129: Calculus II; Fall 2011
- 263: Introduction to Statistics and Biostatistics; Spring 2011

- 302A: Mathematics for Elementary Education Majors; Spring 2008  
In addition to teaching, helped prepare video and worksheet lessons by videotaping middle school student interactions with mathematics questions (Wakefield Middle School, Tucson, AZ)

### ***K-12 Professional Development and Mathematics Education Outreach***

Professional development co-leader for Numbers and Operations & Fractions with Cristina Gomez, Ithaca College, July 13-14, 2016

Co-instructor for “Intel Math” - 80 hour professional development course for K-8 in-service teachers

- Chandler, AZ, February 2012 and September 2012
- Florence, AZ, June 2011 to March 2012
- Globe, AZ, October 2011 to February 2012

Practicum at Miles Exploratory Learning Center, 3rd grade, August 2011 to December 2011

NSF GK-12 fellow at Tucson High School, June 2009 to July 2010: Co-taught Pre-Calculus and Algebra 1 classes and brought in University speakers from the Mathematics Department at the University of Arizona

## **OUTREACH AND SERVICE**

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### ***Ithaca College***

#### *Service to Department*

Co-planner of Math Exploration Day, April 10, 2019

Activities Committee (chair), 2018-2019 AY

Departmental search committee, 2015-2016 AY, 2018-2019 AY

Personnel committee, 2017-2018 AY (elected)

Faculty advisor to Pi Mu Epsilon Math Honor Society, Fall 2016-current

Department community committee, 2016-2017 AY

Department merit committee, Spring 2016

School of Business search committee, Spring 2016

Colloquium organizer, Spring 2015 - Fall 2016

Member of statistics learning goals working group, Fall 2014

#### *Service to College*

Member of Data governance executive committee, Fall 2019 - current

Member of Middle States Accreditation working group - Standard III, Student Learning, Spring 2016 - Spring 2018

Presenter for Ithaca Today, April 12, 2015; April 13, 2019

Volunteer for IC Open House, September 27, 2014; October 4, 2014; October 3, 2015; April 8, 2017

### ***University of Central Arkansas***

Committee member, University of Central Arkansas, August 2013 to May 2014:

- Hiring search committee (elected)
- Mathematics education committee
- Technology committee
- Calculus committee
- Departmental library liaison

### *University of Arizona*

Graduate and Professional Student Travel Grant Judge, University of Arizona, April 2012

Graduate Student Representative to Undergraduate Education Committee, University of Arizona, August 2008 to May 2010

Founder and facilitator of Mathematics Education Graduate Student Brown Bag Seminar, University of Arizona, January 2010 to May 2010

Mathematics “Department Tea” Co-organizer, University of Arizona, August 2008 to May 2009

Incoming TA “grading workshop,” training for new teaching assistants, University of Arizona, August 2008 and August 2009

Assisted with administering the AP Calculus Practice Test, University of Arizona, April 2008 and April 2009

### *Service to Profession*

NSF Ad-hoc reviewer, 2020

Local Organizing Committee MAA Seaway Sectional Meeting, 2019

NSF Ad-hoc reviewer, 2018

Member of the Upstate New York Inquiry-Based Learning Leadership Team, Spring 2018 - Current

Published blog post for Ithaca College Center for Faculty Excellence, “Calculus: An Implementation of Standards/Specifications Based Grading”, <https://threadcfe.com/2017/03/29/calculus-an-implementation-of-standardsspecifications-based-grading/>, with Megan Martinez, March 29, 2017

Reviewer for *Mathematical Thinking and Learning*, the *Journal of MultiDisciplinary Evaluation*, and *PRIMUS*

Member of Local Organizing Committee: Psychology of Mathematics Education, North America (PME-NA) Conference, Tucson, AZ, 2016

Development of Statistics Labs using software R Commander in conjunction with OpenIntro open source statistics project, <https://www.openintro.org/about.php>.

Interviewer for Central New York Region Master Teacher Program, November 8th, 2014

Reviewer for Psychology of Mathematics Education, North America (PME-NA) Conference, 2015-2016

Reviewer for Research in Undergraduate Mathematics Education (RUME) conference proceedings, 2013-2017

Mathematics Judge for the 2014 ISEF State Science Fair, University of Central Arkansas, Conway, AR, April 4, 2014

Mathematics Professional Development Day for Elementary School Teachers, Ithaca, NY, October 7, 2014

Master Teachers Workshop on “Exploding Dots,” SUNY Cortland, Cortland, NY, September 6, 2014

### ***Outreach***

Organizing committee member for Greater Upstate New York Regional IBL Conference, Syracuse, NY, October 19, 2019

Mentor for Early Career Mathematicians (ECM) Network, 2019-2020

Co-organizer of the Rochester Math Teacher’s Circle (with Ryan Gantner, St John Fisher College), Spring 2018

Presenter at the National Mathematics Festival: Geometric Balloon Bending, Washington D.C., April 22, 2017 & May 4, 2019

Co-founder and monthly presenter (with Cristina Gomez) of the Ithaca Math Teachers’ Circle, 2015 to 2016

“Flexagons,” Math Exploration Day, Ithaca College, April 13th, 2015 & April 25, 2017

“Mathematical Card Tricks,” Math Day, Ithaca College, Ithaca, NY, November 15, 2014

Co-founder, weekly presenter, and organizer of the Tucson Math Circle for middle and high school students, August 2008 to September 2010

Founder and weekly organizer of second Tucson Math Circle at Tucson High School, August 2009 to May 2010

“The Prisoner’s Dilemma and Evolutionary Game Theory,” Advanced Biology classes at Salpointe Catholic High School, Tucson, AZ, October 20, 2009

“Math Fair” at University High School, Tucson, AZ, March 13, 2009

## **PROFESSIONAL DEVELOPMENT AND WORKSHOPS**

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### ***Professional Development***

Equity and Inclusion in Evaluating Teaching Workshop, Center for Faculty Excellence, Ithaca College, January 16, 2018

Member of the Upstate New York Inquiry-Based Learning Consortium, Fall 2015 - current

Early Career Excellence Institute, Center for Faculty Excellence, Ithaca College, January 2015 - December 2015.

### ***Workshops Attended***

Ximera Workshop V, Columbus, OH, July 9-10, 2018

Inquiry-Based Learning (IBL) Workshop, Nazareth College, Rochester, NY, July 18-21, 2017

Ximera Workshop IV, Columbus, OH, June 5-6, 2017

Ximera Workshop III, Columbus, OH, July 24 - 28, 2016

Mapping the Calculus Curriculum Workshop, Institute for Mathematics and Education, University of Arizona, Tucson, AZ, March 27 - 29, 2010

Circle on the Road, Mathematical Sciences Research Institute workshop, Phoenix, AZ, March 13-15, 2010



Great Circles Workshop, Mathematical Sciences Research Institute, Berkeley, CA, April 16 - 17, 2009