

## MICHAEL A. TALLMAN

### Curriculum Vitae

Oklahoma State University  
Department of Mathematics  
401 Mathematical Sciences  
Stillwater, OK 74074  
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### EDUCATION

- Ph.D. Mathematics Education, Arizona State University, 2015  
Dissertation: An Examination of the Effect of a Secondary Teacher's Image of Instructional Constraints on His Enacted Subject Matter Knowledge  
Advisor: Dr. Marilyn P. Carlson  
Committee: Drs. Patrick W. Thompson, James Middleton, Guershon Harel, Luis Saldanha
- M.A. Mathematics, University of Northern Colorado, 2010  
Thesis: Examining the Relationship Between Classroom Community and Students' Ability to Write Proofs in Single Variable Calculus  
Advisor: Dr. Robert Powers
- B.Sc. Mathematics, University of Northern Colorado, 2007

### PROFESSIONAL APPOINTMENTS

- Assistant Professor of Mathematics Education, Oklahoma State University, Department of Mathematics, Stillwater, OK, August 2016 – Present.
- Postdoctoral Fellow of Mathematics Education, Oklahoma State University, Department of Mathematics, Stillwater, OK, August 2015 – May 2016.  
Advisor: Dr. Michael Oehrtman
- Mathematics Teacher, Mountain Range High School, Westminster, CO, August 2007 – May 2010.

### PUBLICATIONS

#### Refereed Journal Articles

- Tallman, M., Carlson, M. P., Bressoud, D., & Pearson, M. (2016). A characterization of calculus I final exams in U.S. colleges and universities. *International Journal of Research in Undergraduate Mathematics Education*, 2(1), 105-133.
- Madison, B. L., Carlson, M. P., Oehrtman, M., & Tallman, M. (2015). Conceptual precalculus: Strengthening students' quantitative and covariational reasoning. *Mathematics Teacher*, 109(1), 54-59.

Weber, E., Tallman, M., & Middleton, J. A. (2015). Developing elementary teachers' knowledge about functions and rate of change through modeling. *Mathematical Thinking and Learning*, 17, 1-33.

Weber, E., Tallman, M., Byerley, C., & Thompson, P. W. (2012). Introducing the derivative via calculus triangles. *Mathematics Teacher*, 106(4), 274-278.

### Chapters in Edited Collections

Middleton, J. A., Tallman, M., Davis, O., & Hatfield, N. (2015). Taking the *Severe* Out of Perseverance: Strategies for Building Mathematical Determination. In N. Alpert & C. Kurose (Eds.), *Mathematical Instruction for Perseverance*. Chicago, IL: Spencer Foundation.

### Refereed Conference Proceedings

Edalgo, S., Tallman, M., & Cook, J. P. (in press). Pre-service secondary teachers' meanings for radians and degrees. *Proceedings of the 39<sup>th</sup> Annual Meetings of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Indianapolis, IN.

Tallman, M. (in press). Angle measure, quantitative reasoning, and instructional coherence: The case of David. *Proceedings of the 20<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education*. San Diego, CA: San Diego State University/University of California at San Diego.

Tallman, M. (2016). Exploring the instructional consequences of a secondary teacher's level of attention to quantitative reasoning. In M. Wood, E. Turner, & M. Civil (Eds.), *Proceedings of the 38<sup>th</sup> Annual Meetings of the North American Chapter of the International Group for the Psychology of Mathematics Education*. pp. 1384-1387. Tucson, AZ: University of Arizona.

Tallman, M. (2016). Investigating the role of a secondary teacher's image of instructional constraints on his enacted subject matter knowledge. In T. Fukawa-Connelly, N. Engelke Infante, M. Wawro, & S. Brown (Eds.), *Proceedings of the 19<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education*. pp. 1330-1339. Pittsburgh, PA: West Virginia University.

Oehrtman, M., Wilson, M., Tallman, M., & Martin, J. (2016). Changes in assessment practices of calculus instructors while piloting research-based curricular activities. In T. Fukawa-Connelly, N. Engelke Infante, M. Wawro, & S. Brown (Eds.), *Proceedings of the 19<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education*. pp. 355-367. Pittsburgh, PA: West Virginia University.

Tallman, M. & Weber, E. (2015). Toward a framework for attending to reflexivity in the context of conducting teaching experiments. In T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Bradfield, & Dominguez H. (Eds.), *Proceedings of the 37<sup>th</sup> Annual Meetings of the North American Chapter of the International Group for the Psychology of Mathematics Education*. pp. 1298-1305. East Lansing, MI: Michigan State University.

Tallman, M. (2015). Examining the pedagogical implications of a secondary teacher's understanding of angle measure. In T. Fukawa-Connelly, N. Infante, K. Keene, & M. Zandieh (Eds.), *Proceedings of the 18<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education*. pp. 985-992. Pittsburgh, PA.

Tallman, M. & Weber, E. (2012). Contrasting characterizations of change among prominent theoretical perspectives in mathematics education. In L. R. Van Zoest, J. J. Lo, Kratky, & J. L. (Eds.), *Proceedings of the 34<sup>th</sup> Annual Meetings of the North American Chapter of the International Group for the Psychology of Mathematics Education*. pp. 1170-1177. Kalamazoo, MI: Western Michigan University.

Tallman, M. & Carlson, M. P. (2012). A characterization of calculus I final exams in U.S. colleges and universities. In S. Brown, S. Larsen, K. Marrongelle, & M. Oehrtman (Eds.), *Proceedings of the 15<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education* (p. 217-226). Vol. 2, pp. 217-226. Portland, OR: Portland State University.

Carlson, M. P., Moore, K. C., Teuscher, D., Slemmer, G., Underwood, K., & Tallman, M. (2012). Affecting and documenting shifts in secondary precalculus teachers' instructional effectiveness and students' learning. *Proceedings of the 2012 Math and Science Partnership (MSP) Learning Network Conference (LNC)*. Washington, D.C.

### Published Abstracts

Tallman, M. (2016). Instructional coherence and quantitative reasoning. *Abstracts of Papers Presented to the American Mathematical Society*, 37(1).

Tallman, M. (2015). Characterizing the pedagogical utility of a secondary teacher's understanding of angle measure. *Abstracts of Papers Presented to the American Mathematical Society*, 36(1), 453.

Tallman, M. & Carlson, M. P. (2013). Characterizing the cognitive demand of calculus I final exams in U.S. colleges and universities. *Abstracts of Papers Presented to the American Mathematical Society*, 34(1), 432.

Tallman, M. & Weber, E. (2012). Introducing the concept of derivative via the calculus triangle. *Abstracts of Papers Presented to the American Mathematical Society*, 33(1), 452.

### Published Curricula

Tallman, M., Carlson, M. P., & Hart, J. (2016). *Pathways Through Calculus* (1<sup>st</sup> Ed.). Gilbert, AZ: Rational Reasoning, LLC.

Carlson, M. P., O'Bryan, A., & Tallman, M. (2016). *Pathways Algebra I: Implementing the Common Core Mathematics Standards* (3<sup>rd</sup> Ed.). Gilbert, AZ: Rational Reasoning, LLC.

Carlson, M. P., O'Bryan, A., & Tallman, M. (2014). *Pathways Algebra I: Implementing the Common Core Mathematics Standards* (2<sup>nd</sup> Ed.). Gilbert, AZ: Rational Reasoning, LLC.

### Other Refereed Publications

Carlson, M. P. & Tallman, M. (2016). Learning from calculus I finals. *MAA Focus*, 36(3), 15-17.

### Manuscripts in Submission

Tallman, M. (in submission). Do teachers teach what they know? A comparison of a secondary teacher's personal and enacted subject matter knowledge.

Tallman, M. & Frank, K. M. (revise and resubmit). Angle measure, quantitative reasoning, and instructional coherence: An examination of the role of mathematical ways of thinking as a component of teachers' knowledge base.

## AWARDS AND HONORS

Fellow of the AMTE Service, Teaching, and Research (STaR) Program, 2017.

Robert G. Maule Excellence in Teaching Mathematics Award, Arizona State University, 2015.  
Amount: \$500

Graduate and Professional Student Association Teaching Excellence Award, 2015.

Floyd L. Downs Teaching of Mathematics Fellowship Award, Arizona State University, 2011.  
Amount: \$1,000.

## GRANTS

### External

Co-Principal Investigator (with Michael Oehrtman, William Jaco, and John Paul Cook), National Science Foundation: *The Mathematical Inquiry Project* (in submission; amount requested: \$1,999,876).

Principal Investigator (with Aaron Weinberg, Matthew Thomas, and Jason Martin), National Science Foundation: *Investigating Student Learning and Sense-Making from Calculus Video Lessons* (in submission; amount requested: \$299,905).

Co-Principal Investigator (with Melissa Mills and William Jaco), National Science Foundation: *Mathematics Resource Center Collaborative Workshop* (\$49,344, April 2017 – March 2019).

Co-Principal Investigator (with Michael Oehrtman and William Jaco), National Science Foundation: *EAGER NSF STEM Teacher Leader Initiative: Supporting Teacher Leaders through the Math Teacher's Circle Network* (not funded).

### Internal

Dean's Incentive Grant, *Investigating the Efficacy of Reflected Abstraction for the Development of Pre-Service Secondary Teachers' Mathematical Knowledge for Teaching*, 2017, \$3,000, Principal Investigator.

Arizona State University Block Grant, *The Effect of a Conceptually Oriented Curriculum on Reforming a Secondary Teacher's Image of Student Engagement*, 2013, \$6,645, Principal Investigator.

## PRESENTATIONS

### Invited Talks

Tallman, M. (2017, March). *Pedagogical content knowledge: What makes it "pedagogical"?* Invited presentation given at the Department of Mathematical and Statistical Sciences, University of Colorado at Denver, Denver, CO.

- Tallman, M. (2017, January). *The importance of quantitative and covariational reasoning for students' success in STEM disciplines*. Invited presentation given at the annual meeting of Project Lead the Way, Stillwater, OK.
- Tallman, M. (2017, January). *Insights from MAA studies of college algebra, precalculus, and calculus*. Panel presentation with David Bressoud, Marilyn Carlson, Jess Ellis, Bernard Madison, and Chris Rasmussen at the Joint Mathematics Meetings, Atlanta, GA.
- Tallman, M. (2016, June). *Research-based strategies for improving GTAs' pedagogical content knowledge*. Invited presentation given at the MAA Workshop on Instruction and Placement in Algebra and Precalculus, University of St. Thomas, Saint Paul, MN.
- Tallman, M. (2015, November). *A Piagetian-constructivist approach to instructional design*. Invited presentation given at the Department of Mathematics, Colorado State University, Fort Collins, CO.
- Tallman, M. (2015, September). *An examination of the cognitive factors that condition teachers' enacted subject matter knowledge*. Third Semi-Annual Oklahoma Research in Undergraduate Mathematics Education Conference. Norman, OK.
- Carlson, M. P. & Tallman, M. (2015, May). *A research based approach to curriculum development and refinement: Supporting student success in STEM*. Invited presentation given at East Tennessee State University's 9<sup>th</sup> Annual STEM Conference, Gray, TN.
- Tallman, M. (2014, November). *Piagetian abstraction as a principle of mathematics teaching*. Invited colloquium given at the Department of Mathematics and Computer Science, Ripon College, Ripon, WI.

### **Conference and Seminar Presentations**

- Tallman, M. (2017, March). *What makes pedagogical content knowledge "pedagogical"?* Mathematics Education Seminar, Oklahoma State University, Stillwater, OK.
- Tallman, M. (2016, November). *Exploring the instructional consequences of a secondary teacher's level of attention to quantitative reasoning*. 38<sup>th</sup> Annual Meetings of the North American Chapter of the International Group for the Psychology of Mathematics Education. Tucson, AZ.
- Tallman, M. (2016, April). *Toward a framework for fostering students' mathematical perseverance*. Mathematics Education Seminar, Oklahoma State University, Stillwater, OK.
- Tallman, M. (2016, March). *Attending to researcher reflexivity in the context of conducting constructivist teaching experiments*. Mathematics Education Seminar, Oklahoma State University, Stillwater, OK.
- Tallman, M. (2016, February). *Investigating the role of a secondary teacher's image of instructional constraints on his enacted subject matter knowledge*. 19<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education, Pittsburgh, PA.

- Tallman, M. & Weber, E. (2015, November). *Toward a framework for attending to reflexivity in the context of conducting teaching experiments*. 37<sup>th</sup> Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. East Lansing, MI.
- Tallman, M. & Cook, J. P. (2015, October). *Reflected abstraction as a means of advancing pre-service teachers' pedagogical content knowledge*. Mathematics Education Seminar, Oklahoma State University, Stillwater, OK.
- Tallman, M. (2015, October). *An examination of the role of instructional constraints on the quality of a teacher's enacted mathematical knowledge*. Mathematics Education Seminar, Oklahoma State University, Stillwater, OK.
- Tallman, M. & Cook, J. P. (2015, August). *A discussion of the instructional design principles of the OSUTeach Functions and Modeling course*. Mathematics Education Seminar, Oklahoma State University, Stillwater, OK.
- Tallman, M. (2015, July). *Taking the severe out of perseverance: Strategies for building students' mathematical determination*. Second Annual Big XII Teaching and Learning Conference. Stillwater, OK.
- Tallman, M. (2015, February). *Examining the pedagogical implications of a secondary teacher's understanding of angle measure*. 18<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education, Pittsburgh, PA.
- Tallman, M. (2015, January). *Characterizing the pedagogical utility of a secondary teacher's understanding of angle measure*. Joint Mathematics Meetings, San Antonio, TX.
- Tallman, M. & Carlson, M. P. (2013, January). *What is being assessed in post-secondary introductory calculus?* Mathematics Education Seminar, School of Mathematical and Statistical Sciences, Arizona State University, Tempe, AZ.
- Tallman, M. & Weber, E. (2012, November). *Contrasting characterizations of change among prominent theoretical perspectives in mathematics education*. 34<sup>th</sup> Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education, Kalamazoo, MI.
- Tallman, M. & Carlson, M. P. (2012, February). *A characterization of calculus I final exams in U.S. colleges and universities*. 15<sup>th</sup> Annual Conference on Research in Undergraduate Mathematics Education, Portland, OR.
- Carlson, M. P., Moore, K. C., Teuscher, D., Slemmer, G., Underwood, K., & Tallman, M. (2012, January). *Affecting and documenting shifts in secondary precalculus teachers' instructional effectiveness and students learning*. Paper presented at the 2012 Math and Science (MSP) Learning Network Conference (LNC), Washington, D.C.
- Tallman, M. & Weber, E. (2012, January). *Introducing the derivative function via the calculus triangle*. Joint Mathematics Meetings, Boston, MA.
- Tallman, M. (2011, April). *Developing sense of community: A strategy for engaging students and facilitating*

*productive perceptions of mathematics*. Graduate Student Seminar, Arizona State University, Tempe, AZ.

## TEACHING EXPERIENCE

- Assistant Professor of Mathematics Education, Oklahoma State University, Stillwater, OK (August 2016 – Present)
- Postdoctoral Fellow of Mathematics Education, Oklahoma State University, Stillwater, OK (August 2015 – May 2016)
- Teaching Assistant in Mathematics Education, Arizona State University, Tempe, AZ (January 2015 – May 2015)
- Teaching Assistant in Mathematics Education, Arizona State University, Tempe, AZ (August 2013 – May 2014)
- Adjunct Faculty in the College of Engineering, Arizona State University, Tempe, AZ (May 2012 – July 2012)
- Teaching Assistant in Mathematics Education, Arizona State University, Tempe, AZ (August 2010 – December 2010)
- Mathematics Teacher, Mountain Range High School, Westminster, CO (August 2007 – May 2010)

## COURSES TAUGHT

### Oklahoma State University

- MATH 6990 Topics in Collegiate Mathematics Education (Spring 2017)
- MATH 6000 Doctoral Research and Dissertation (Summer 2016)
- MATH 6923 Research in Undergraduate Mathematics Education (Spring 2016)
- MATH 2144 Calculus 1 (Fall 2015, Fall 2016, Spring 2017)
- MATH 3303 Functions and Modeling (Fall 2015)

### Arizona State University

- MTE 598 Introduction to Scholarly Writing – with Marilyn Carlson (Fall 2015)
- MAT 207 Algebra and Geometry in the High School (Spring 2015)
- MTE 591 Mathematics Education Seminar – with Marilyn Carlson (Fall 2014)
- MAT 170 Precalculus (Spring 2014, 2 sections)
- STM 591 Quantitative Modeling (Summer 2012)
- MAT 265 Calculus I for Engineers (Fall 2010, Spring 2010)
- MAT 270 Calculus with Analytic Geometry I – with Pat Thompson (Fall 2010, Spring 2010)

### Mountain Range High School

- Advanced Placement Calculus AB (3 sections)
- Contemporary Mathematics in Context – Course I (3 sections)
- Contemporary Mathematics in Context – Course III (9 sections)

## RESEARCH EXPERIENCE

Consultant, National Science Foundation: *Using Research to Shape Instruction and Placement in Algebra and Precalculus* (November 2015 – Present). PI: Dr. Bernard Madison (University of Arkansas)

Postdoctoral Researcher, National Science Foundation: *Initiating a Foundational Research Model for Secondary Mathematical Knowledge for Teaching* (August 2015 – Present). PIs: Dr. Michael Oehrtman (Oklahoma State University) and Dr. Jodie Novak (University of Northern Colorado)

Graduate Research Assistant in Mathematics Education, National Science Foundation: *Pathways to Preparing Future Mathematics Faculty to Transform Undergraduate Mathematics Teaching and Learning* (August 2014 – December 2014). PI: Dr. Marilyn Carlson (Arizona State University)

Graduate Research Assistant in Mathematics Education, National Science Foundation: *Project Pathways: A Math and Science Partnership Program for Arizona* (August 2012 – May 2013). PI: Dr. Marilyn Carlson (Arizona State University)

Graduate Research Assistant in Mathematics Education, National Science Foundation: *Characteristics of Successful Programs in College Calculus* (January 2011 – May 2012). PI: Dr. David Bressoud (Macalester College)

## PROFESSIONAL SERVICE

### National Level Service

Mathematical Association of America (MAA) Committee on Assessment (January 2017 – January 2020)

### University Level Service

OSUTeach Advisory Committee (August 2016 – Present)

### Department Level Service

M.S. Certification Program Committee (2016-2017)

Clinical Faculty Appointment Committee (2016–2017)

Entry Level Mathematics Committee (2016–2017)

Mathematics Learning Success Center (MLSC) Committee (2016–2017)

Calculus Revision Committee (2016–2017)

Precalculus/Trigonometry Committee (2016-2017)

### Manuscript, Conference and Grant Proposal Reviewer

Reviewer for *Educational Studies in Mathematics Education* (October 2016 – Present)

Reviewer for *Mathematical Thinking and Learning* (October 2016 – Present)

Reviewer for *Problems, Resources, and Issues in Mathematics Undergraduate Studies* (June 2016 – Present)

Reviewer for *Journal for Research in Mathematics Education* (March 2012 – Present)

Reviewer for the Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education (February 2016 – Present)

Reviewer for *Mathematics Teacher* (May 2014 – Present)

Reviewer for the Annual Conference on Research in Undergraduate Mathematics Education (2012 – Present)

Reviewer for the National Science Foundation (2015, 2016)

Reviewer for the *International Journal of Research in Education and Science* (2015)

### Workshops & Teacher Professional Development



- Preparing Students for Success in Calculus: Aligning Placement, Curriculum, and Assessment: Minicourse offered at MAA MathFest 2017, Chicago, IL (July 2017)
- Preparing Students for Success in Calculus: Aligning Placement, Curriculum, and Assessment: Minicourse offered at the 2017 Joint Mathematics Meetings, Atlanta, GA (January 2017)
- Project Pathways Precalculus professional development workshop for faculty and graduate teaching assistants, University of Arkansas (August 2016)
- Workshop on instruction and placement in algebra and precalculus, University of Saint Thomas (Summer 2016)
- Project Pathways Algebra I and Geometry professional development workshop for in-service secondary teachers, Wichita School District (March 2016)
- Supporting student learning of foundational ideas for calculus: A professional development workshop, Eastern Tennessee State University (Summer 2015)
- Project Pathways professional development workshop for in-service secondary teacher leaders, Scottsdale Unified School District (Summer 2015)
- Project Pathways Algebra II professional development workshops for in-service secondary teachers, Scottsdale Unified School District (Summer 2014)
- Project Pathways Algebra II professional development workshops for in-service secondary teachers, Mesa Public School District (Summer 2014)
- Project Pathways Algebra II professional development workshops for in-service secondary teachers, Chandler Public Schools (Summer 2014)
- Pathways TUME professional development initiative for graduate teaching assistants, Arizona State University, (August 2013 – May 2014)
- Project Pathways Algebra I professional development workshops for in-service secondary teachers, Mesa Public School District (Summer 2014)
- Project Pathways Precalculus professional development workshops for in-service secondary teachers, Mesa Public School District (Summer 2014)
- Project Pathways Precalculus professional development workshop for graduate teaching assistants and faculty, San Diego State University (Summer 2014)
- Project Pathways Precalculus professional development workshop for graduate teaching assistants and faculty, Arizona State University (Summer 2014)
- Project Pathways Precalculus professional development workshops for in-service secondary teachers, Scottsdale Unified School District (Summer 2013)

### **PROFESSIONAL AFFILIATIONS**

- National Council of Teachers of Mathematics (March 2010 – Present)
- Special Interest Group of the Mathematical Association of America on Research in Undergraduate Mathematics Education (January 2011 – Present)
- American Mathematical Society (January 2012 – Present)
- International Group for the Psychology of Mathematics Education (November 2012 – Present)
- Oklahoma Mathematics Alliance (June 2016 – Present)

### **CERTIFICATIONS**

- Colorado Initial Teacher Licensure, Secondary Education (May 2007 – August 2010)
- Colorado Professional Teacher Licensure, Secondary Education (August 2010 – August 2015)

### **GRADUATE STUDENTS**

**Major Advisor**

Steven Edalgo, Oklahoma State University (M.Sc. expected May 2017)

**Dissertation Committees**

Ashley Duncan, Arizona State University (Ph.D. expected May 2018)

Alan O'Bryan, Arizona State University (Ph.D. expected August 2018)

Adam Estrup, Oklahoma State University (Ph.D. expected May 2020)

Grant Sander, Arizona State University (Ph.D. expected May 2019)

Rosuara Uscanga, Oklahoma State University (Ph.D. expected May 2019)

Nafiseh Jahanbakht, Oklahoma State University (Ph.D. expected May 2020)

**PROFESSIONAL REFERENCES**

Marilyn P. Carlson, Professor of Mathematics Education, School of Mathematical and Statistical Sciences, Arizona State University, AZ 85287-1804, (480) 965-6168, [marilyn.carlson@asu.edu](mailto:marilyn.carlson@asu.edu).

Patrick W. Thompson, Professor of Mathematics Education, School of Mathematical and Statistical Sciences, Arizona State University, AZ 85287-1804, (480) 965-2821, [pat.thompson@asu.edu](mailto:pat.thompson@asu.edu).

James Middleton, Professor of Engineering Education, Director of CRESMET, Fulton School of Engineering, Arizona State University, AZ 85287-6106, (480) 965-9644, [james.middleton@asu.edu](mailto:james.middleton@asu.edu).

Luis Saldanha, Professor of Didactics of Mathematics, Department of Mathematics, University of Quebec at Montreal, 405 Rue Sainte-Catherine Est, Montreal, QC H2L 2C4, Canada, (514) 987-3000 ext. 1319, [saldanha.luis@uqam.ca](mailto:saldanha.luis@uqam.ca).

Michael Oehrtman, Associate Professor of Mathematics Education, Department of Mathematics, Oklahoma State University, 401 Mathematical Sciences, OK 74078-1058, (405) 744-5790, [michael.oehrtman@okstate.edu](mailto:michael.oehrtman@okstate.edu).