

Michael Axtell

Professor

Director, Actuarial Science Program

Department of Mathematics and Actuarial Science

University of St. Thomas

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Education

- **The University of Iowa**, Ph.D. in Mathematics (Commutative Ring Theory/Abstract Algebra), 2000
- **University of Wisconsin - LaCrosse**, B.S. Math major, History Minor, 1995

Professional Experience

- **Professor**, University of St. Thomas, (2018 - present)
- **Professional Work Experience**, Travelers Company, (Summer 2015)
- **Associate Professor**, University of St. Thomas, (2011 - 2018)
- **Assistant Professor**, University of St. Thomas, (2008 - 2011)
- **Associate Professor**, Wabash College, (2006 - 2008)
- **Visiting Scholar**, University of Aberdeen, Scotland, (Spring 2007)
- **Visiting Associate Professor**, Indiana University Purdue University at Indianapolis, (Fall 2006)
- **Assistant Professor**, Wabash College, (2000 - 2006)
- **Teaching Assistant**, University of Iowa, (1995 - 2000)

Administrative Experience

- **Director of Actuarial Science Program** - UST (July 2017-present)
- **Chief Editor** Notes - Mathematical Association of America (2015-2020)
- **Division Director**, University of St. Thomas (2013, 2015 - 2017)
- **REU Director** Hosted by Wabash College (2008, 2010)
- **NSF REU Principle Investigator** Hosted by Wabash College (2005-2010)
- **Indiana MAA Chair-elect** (2007 - 2008)
- **Cultures and Traditions Co-Chair** Wabash College, (2007-2008)

Actuarial Credentialing

- **Passed Exam P**, 2012.
- **Passed Exam FM**, 2015.
- **Passed Exam MFE/IFM**, 2017.
- **Credit for Exam SRM**, 2018.
- **Passed CAS Online Courses 1&2**, 2018, 2020.
- **Sitting Exam MAS-1**, Oct. 2020.

Honors, Awards, Grants

- **Submitted Risk Management and Insurance Educational Grant, \$32,000**, Spencer Educational Foundation, 2020.
- **Nominated by colleagues for UST Undergraduate Research Mentor Award**, 2013.
- **Co-PI of successful NSF TUES grant, \$599,952**, 2012-2015, Resequencing Calculus Phase 2, with sub-award to UST. DUE-1225566.
- **UST Research Assistance Grant, \$4,300**, provides a one-course teaching release during academic year 2010-2011.
- **Research Advisor** to John Holmes and Adam Shull, 2009 award winners of Pi Mu Epsilon's Richard V. Andree Award for Best Publication.
- **PI of successful NSF REU grant, \$288,703**, 2008-2010, Wabash Summer Institute in Mathematics. DMS-0755260.
- **PI of successful NSF REU grant, \$194,871**, 2005-2007, Wabash Summer Institute in Algebra.
- **Co-PI of Successful NSF-MAA grant for the Illiana Undergraduate Mathematics Conference, \$2000**, 2007.
- **Who's Who among America's Teachers**, Student nominated, 2005.
- **Nominated by colleagues for the MAA Alder Award**, 2003/4.
- **Carnegie Scholar**, Carnegie Academy for the Scholarship of Teaching and Learning, 2003-2004, one of 27 chosen nationwide.
- **Project NExT Fellow**, 2000.
- **U. of Iowa Outstanding Teaching Assistant Award**, 1999, one of 25 awarded across the university.
- **Top Graduating Senior, UW-LaCrosse**, 1995.

Courses Taught

- **University of St. Thomas:** Finite Mathematics, Calculus with Precalculus Review I and II, Calculus I, II, and III, Linear Algebra, Probability, Theory of Interest, Real Analysis, Abstract Algebra I and II, Introduction to Risk Management and Insurance.
- **Wabash College:** Finite Mathematics, Pre-calculus, Calculus I and II, Linear Algebra, Number Theory, Geometry, Topology, Abstract Algebra I and II, Real Analysis I, Cultures and Traditions I and II, Math Methods for Secondary Teachers
- **Indiana University Purdue University at Indianapolis:** Finite Mathematics
- **University of Iowa:** Basic Algebra, Trigonometry, Pre-calculus, Calculus I (reform, traditional, Business-track, Science-track), Calculus II (traditional), Ph.D. Comprehensive Exam Review Courses: Logic, Algebra, and Topology

Research Activities

- **Refereed Publications and Submissions in Commutative Ring Theory:**
 17. Axtell M., Baeth N., Stickles J., "Factorizations in self-idealizations of PIR's and UFR's," *Boll. dell'Unione Matematica It.*, **2017** Vol. 10(1), 649-670..
 16. Axtell M., Baeth N., Stickles J., "Cut-structures in Zero-divisor Graphs of Commutative Rings," *J. Comm. Algebra*, **2016** Vol. 8(2), 143-171.
 15. Axtell M., Mooney, C., " τ -U-factorizations and Their Graphs in Commutative Rings with Zero Divisors," *International Electronic Journal of Algebra*, **2015** Vol. 18, 72-91.

14. Axtell M. et al, "An Exploration of Ideal-divisor Graphs," *Involve*, **2015** Vol. 8 (1), 87-98.
 13. Axtell M., Baeth N., Stickles J., "Graphical Representations of Factorizations in Commutative Rings," *Rocky Mtn. J. of Math.* **2013** Vol. 43 (1), 1-36.
 12. Axtell M., Baeth N., Stickles J., "Irreducible Divisor Graphs and Factorization Properties of Domains," *Communications in Algebra*. **2011** Vol. 39 (11), 4148-4162.
 11. Axtell M., Baeth N., Stickles J., "Cut Vertices in Zero-divisor Graphs of Finite Commutative Rings," *Communications in Algebra*. **2011** Vol. 39 (6), 2179-2188.
 10. Anderson, D.F., Axtell M., Stickles J., "Zero-divisor Graphs in Commutative Rings: A Survey," edited by Fontana et al, *Commutative Algebra: Noetherian and Non-Noetherian Perspectives* Springer, **2010**, 23-47.
 9. Axtell M., Stickles J., Trampbachls W., "Zero-divisor Ideals and Realizable Zero-divisor Graphs," *Involve*. **2009** Vol. 2 (1), 17-27.
 8. Axtell M., Forman S., Stickles J., "Properties of Domainlike Rings," *Tamkang Journal of Mathematics*. **2009** Vol. 40 (2), 151-164.
 7. Axtell M. and Stickles J., "Irreducible Divisor Graphs in Commutative Rings with Zero Divisors," *Communications in Algebra*. **2008** Vol. 36 (5), 1883-1893.
 6. Axtell M., Stickles J., Warfel J. "Zero-divisor Graphs of Direct Products of Commutative Rings," *Houston Journal of Mathematics*. **2006** Vol. 32 (4), 985-994.
 5. Axtell M., Stickles J. "Zero-Divisor Graphs of Idealizations," *Journal of Pure and Applied Algebra*. **2006** Vol. 204 (2), 235-243.
 4. Axtell M., Coykendall J., Stickles J. "Zero-Divisor Graphs of Polynomials and Power Series over Commutative Rings," *Communications in Algebra*. **2005** Vol. 33 (6), 2043-2050.
 3. Anderson D., Axtell M., Forman S., Stickles J. "When Are Associates Unit Multiples?," *Rocky Mountain Journal of Mathematics*. **2004** Vol. 34 (3), 811-828.
 2. Axtell M., Forman S., Roersma N., Stickles J. "Properties of U-Factorizations," *Int'l Journal of Commutative Rings* Vol. 2, no. 2, **2003**.
 1. Axtell M. "U-factorizations in Commutative Rings with Zero Divisors," *Communications in Algebra*. **2002** Vol. 30 (3), 1241-1255.
- **Refereed Publications/Presentations in Pedagogy:**
 12. Axtell, M., Dwyer, D., Gruenwald, M., Stickles, J., "Resequencing Calculus," *PRIMUS*, Vol. 28(6), **2018**, 587-599.
 11. Axtell, M., Doree, S., Dray, T., "New Directions for Calculus", *Focus*, **2016** Vol 35(5), 33-34, 37.
 10. Axtell, M. and Turner, W., *An Investigation into the Effectiveness of Pre-class Reading Questions*, - Doing the Scholarship of Teaching and Learning, eds Dewar and Bennett, MAA Notes, vol. 83, **2015**, Washington D.C., 137-144.
 9. Axtell, M. and Westphal, C., "Ethics for Undergraduate Researchers," *AMS Notices*, **2012** Vol. 59 (3), 434-435.
 8. Axtell, M. and Curran, E., *The Effects of Online Homework in a University Finite Mathematics Course* - Proceedings of the 14th Annual Conference on Research in Undergraduate Mathematics Education, Vol. 1, **2011**, 16-25.
 7. Axtell M. and Stickles J., "Graphs and Zero-divisors," *College Mathematics Journal*. **2010** Vol. 41 (5), 395-398.
 6. Axtell, M., Curran, E., and Hosfrod, C., *Factors Impacting Student Performance in Introductory Calculus and Statistics Courses* - International Conference on the Scholarship of Teaching and Learning, U. Indiana, October 2009. Refereed presentation.
 5. Axtell M., Phillips J., Thompson P., "The Wabash College Mathematics Program," *Mathematics and Computer Education*. **2008**, Fall, 214-219.

4. Axtell M., Phillips J.D., Turner W. "Wabash Summer Institute in Algebra (WSIA)," *Proceedings of the Conference on Promoting Undergraduate Research in Mathematics*. Ed. J. Gallian, American Mathematical Society. Providence, Rhode Island, **2007**, pgs. 183-188. ISBN 978-0-8218-4321-5.
3. Axtell M., Turner W. "Examining the Effectiveness of Reading Questions in Introductory College Mathematics Courses," *Proceedings of the International Conference on the Scholarship of Teaching and Learning (2005 and 2006)*. Eds. J. Fanghanel and D. Warren, London, CEAP, City University, **2007**, pgs. 205-210. ISBN 0-9543742-3-1-978-0-9543742.
2. Axtell M. "A Two-Semester PreCalculus/Calculus I Sequence: A Case Study," *Mathematics and Computer Education*. **2006** Vol. 40 (2).
1. Axtell M. "A Survey of Multi-section, Trans-disciplinary Courses with a Common Syllabus"
Website: <http://persweb.wabash.edu/facstaff/axtellm/CarnegieProject.htm>
Funded by the Carnegie Academy for the Scholarship of Teaching and Learning. **2004**

- **Directed Undergraduate Research - Overview**

University of St. Thomas Center for Applied Mathematics 2011, 2012, 2015. Directed research of 2 students in 2011, 2 in 2012, 3 in 2015, 4 in 2018. Groups submitted papers for publication (appeared or to appear) and presented a poster at the Joint Mathematics Meetings (JMM). The 2012 group won a poster prize at this conference. The 2012 group was awarded the **Outstanding Summer Project** prize from the Center of Applied Mathematics.

Wabash Summer Institute in Mathematics - NSF-REU, Summer 2008-2010. PI, research leader, and director. Directed 8 students in 2008, 6 in 2009, and 7 in 2010. Five papers were published from the 2008 crew and multiple talks/posters presented. Two papers have been published by the 2009 crew and multiple talks/posters presented. Three papers have been submitted from the 2010 crew (2 accepted, 1 pending), and two posters were presented at the JMM.

Wabash Summer Institute in Algebra - NSF-REU, Summer 2005-2007. PI and research leader. Directed 4 students in 2005, 5 students in 2006, and 6 students in 2007. All students gave talks, participated in poster sessions and submitted papers to undergraduate journals.

Wabash College Supported Research 2001-2003 Supervised 1 or 2 students each summer. Each student presented talks and posters at mathematics conferences. Each student published at least one paper.

- **Directed Undergraduate Research - Refereed Publications and Submissions:**

18. Driscoll, M., Klein, M. and Ubel, A., "Zero-divisors, Compressed Zero-divisors, and Associate Class Graphs of Commutative Rings", *Rose-Hulman Undergraduate Mathematics Journal*, to appear.
17. Hausken, S. and Skinner, J., "Directed Graphs of Commutative Rings", *Rose-Hulman Undergraduate Mathematics Journal*, Vol. 14 (2), 2013.
16. Ang C., Schulte A., "Directed Graphs in Commutative Rings with Identity", *Rose-Hulman Undergraduate Mathematics Journal*, Vol. 14 (1), 2013.
15. Cain J., Mathewson L., Wilkins A., "Reduced Cozero-divisor Graphs of Commutative Rings", *International Journal of Algebra*, 5 (2011), 935-950.
14. Cain J., Mathewson L., Wilkins A., "Principal Ideals and Graphs", *Rose-Hulman Undergraduate Mathematics Journal*, Vol. 11 (2), 2010.
13. Cote B., Ewing C., Huhn M., Plaut C., Weber D., "Cut-Sets and Cut-Vertices in Zero-Divisor Graphs of Finite Commutative Rings", *Communications in Algebra*, **2011** Vol. 39 (8), 2849 - 2861.

12. Cote B., Ewing C., Huhn M., Plaut C., Weber D., "Cut-Sets and Cut-Vertices in Direct Products of Z_{n_i} ", *Rose-Hulman Undergraduate Mathematics Journal*, vol. 11 (1) 2010.
11. Bishop A., Cuchta T., Lokken K., Pechenik O., "The Nilradical and Non-Nilradical Graphs of Commutative Rings", *International Journal of Algebra*, 2 (2008) no. 17-20, 981-994.
10. Cuchta T., Lokken K., Young W., "Zero-divisor Graphs of Localizations and Modular Rings", *Rose-Hulman Undergraduate Mathematics Journal*, Webjournal, vol.9 (2), 2008.
9. Holmes J., Shull A., "Properties of Ideal-Divisors", *Pi Mu Epsilon Journal*, vol. 13 (1), 2009, 33-36. **This paper won the Andree Award for Best Publication in Pi Mu Epsilon (2009).**
8. Smallwood H., Swartz D., "An Investigation of the Structure Underlying Irreducible Divisors", *American Journal of Undergraduate Research*, vol. 8 (2,3) 2009.
7. Kelly B., Wilson E., "Investigating the Algebraic Structure Embedded in Zero-Divisor Graphs", to appear *American Journal of Undergraduate Research*.
6. Benson-Lender L., Martinez M., Roberts J., Skalak M., Taylor M., "The Structure of Rings Based on their Zero-Divisor Graphs", *Pi Mu Epsilon Journal*, submitted.
5. Duane A., "Proper Colorings and p-Partite Structures of the Zero-Divisor Graph", *Rose-Hulman Undergraduate Journal of Mathematics*, Webjournal, vol. 7 (2), 2006.
4. Brand T., Jameson M., McGowen M., McKeel JD, "Zero-Divisor and Ideal-Divisor Graphs of Commutative Rings", *Wabash College Technical Reports*, 2006.
3. Nick Roersma, Summer 2002, "Filtered Intersections and Products", *American Journal of Undergraduate Research*, vol. 1 (4), 2003.
2. Dan Smith, Summer 2002, "Generalizing Cwatsets", *Rose-Hulman Undergraduate Journal of Mathematics*, Webjournal, vol.4 (2), 2003.
1. Nick Roersma, Summer 2001, "U-factorizations and Rearrangements" *Rose-Hulman Undergraduate Journal of Mathematics*, Webjournal, vol. 2 (2), 2001.

- **Other Research:**

1. Anderson D.D., Axtell M., Forman S., Stickles J. "Survey of Rings with Domain-like Properties." *Wabash College Technical Report Series*, **2004**.

- **Research in Progress:**

Axtell M., Baeth N., Stickles J., "Factorizations in Toeplitz Matrices over Commutative Rings".

- **Recent Presentations:**

Factorizations in Self-Idealizations of PIR's - Invited Address, AMS Sectional Meeting, Charleston, SC (March, 2017)

CRAFTY Panel on New Trends in Mathematics in the First Two Years - Joint Mathematics Meeting, January 2016, Seattle WA.

Resequencing Calculus: An Early Multivariable Approach - MathFest, August 2014. Portland, OR.

Cut Structures in Zero-divisor Graphs - Invited Address, AMS Sectional Meeting, Knoxville, TN (2014)

Resequencing Calculus: An Early Multivariable Approach - Regional NCTM, Oct. 2013. Los Vegas, NV.

Resequencing Calculus - Short Course at MAA MathFest, August 2013. Hartford, CT.

Resequencing Calculus: An Early Multivariable Approach - Tri-Sectional Meeting of the MAA, April 2013. NWMSU Maryville, Mo.

Featured Panelist - Assessing Classroom Effectiveness - Project NExT, Mathfest, 2012.

A Picture's Worth a Thousand Words: Zero Divisor Graphs and Rings - Keynote Speaker, Illinois Sectional Meeting of the MAA, March 2012. Normal, IL.

Zero-divisor Graphs - Keynote Speaker, University of Tennessee Undergraduate Mathematics Research Conference, March 2011. Knoxville, TN.

The Effects of Online Homework in a University Finite Mathematics Course - MAA RUME Conference Portland OR, Feb. 2011, with E. Curran. Acceptance of this talk was refereed.

An Incredible Epic of Undergraduate Endeavors from Algebra Onward! - Keynote Speaker, Millikin Undergraduate Mathematics Research Conference, October 2009.

Compressed Irreducible Divisor Graphs - Invited Address, University of Nebraska - Lincoln, Commutative Algebra Seminar, July 2009.

Zero-divisors: The Horror and the Joy - Invited Address, Augsburg College, January 2009.

Cut Vertices and Maximal Ideals - Invited Address, Special Session on Commutative Rings, Joint Mathematics Meeting, Washington D.C., January 2009.

Using Gateway or Basic Skills Exams - Invited Address, Project NExT, Madison WI, Mathfest, August 2008.

Zero Divisor Graphs and Direct Products - Invited Address, AMS Sectional Meeting, Johnson City, TN (2005)

Featured Panelist - Seminar Courses: A Means to Build Community and Facilitate Institutional Change - AAC & U Pedagogies of Engagement Conference, Bethesda MD (2005).

Featured Panelist - Framing and Understanding Student Learning in the Seminar - Inaugural Meeting of the International Society for the Scholarship of Teaching and Learning, Bloomington IN (2004).

U-Factorizations: Rearrangements and Idealizations - AMS Southeastern Sectional Meeting (2003).

Zero Divisors - The Joy and Horror Miami University (2002), Wabash College (2003) and Rose-Hulman Institute of Technology (2004).

The Search for Meaning - Explorations in Pre-calculus with M. Perlwitz - MAA Mathfest (2001) and Ides Of August, Wabash College 2001.

U-Factorizations in Commutative Rings with Zero Divisors - AMS National Meeting (2001)

U-Factorizations II - AMS National Meeting (2000)

U-Factorizations - AMS Regional Meeting (1999)

Professional Activities

- **Grants**

Resequencing Calculus Phase 2 C0-PI of successful NSF TUES grant, \$599,952, 2012-2015, with sub-award to UST. DUE-1225566.

UST Research Assistance Grant Funding a one-course release for academic year 2010-2011, \$4,300.

Wabash Summer Institute in Mathematics (WSIM) Principal Investigator and Director (2008-2010, \$288,703). An 8-week REU hosted by Wabash College for 12 students every summer. NSF DMS-0755260

Illiana Undergraduate Mathematics Conference, 2007. A \$2000 grant provided by NSF grant DMS-0536991 through the MAA Regional Undergraduate Mathematics Conference program. With J. Stickles, Millikin University.

Wabash Summer Institute in Algebra (WSIA) Principal Investigator (2005-2007, \$ 194,871). An 8-week REU hosted by Wabash College for 12 students every summer.

Puerto Rico Experiences in Mathematics and Undergraduate Research (PRE-MUR) - With L. Caceres. A 3 year \$800,000 grant to fund undergraduates from Puerto Rico and the GLCA schools to engage in mathematical research. Funding approved by the NSA in 2004 - Funding Declined by Caceres/Axtell.

- **Professional Organizations**

Member, American Mathematical Society

Member, Mathematical Association of America

Fellow, Project NExT - New Experiences in Teaching

CASTL/CILA Scholar - Carnegie Academy for the Scholarship of Teaching and Learning, Center for Inquiry in to the Liberal Arts (2003-2004 Cohort)

- **Service to Profession**

MAA Subcommittee on Curriculum Renewal Across the First Two Years (CRAFTY) 2014-present.

Co-organizer - *Special Session in Commutative Ring Theory*, AMS Sectional Meeting, Ames, IA 2013.

Board of Editors - ISRN Algebra (International Scholarly Research Network) 2011-2014.

National Science Foundation REU Proposals Reviewer - Fall 2010.

Co-organizer - *Special Session in Commutative Ring Theory*, AMS Sectional Meeting, St. Paul, MN, 2010.

Panelist - YMN/Project NExT Session *How to Interview*, Joint Mathematics Meetings 2010.

Project NExT Consultant 2008-2009 - Mentor for 2008 Project NExT Fellows.

Calculus Advisory Board Member - 2008-Present (NSF-supported effort to redesign Calculus I - III)

Board of Editors - MAA Notes (2007-2010, 2011-2014, 2014-present)

Chair-elect - Indiana Section of the MAA (2007-2008).

Member, MAA National Committee Investigating the Liaisons System (2007 - Present)

Co-Organizer - Illiana Undergraduate Mathematics Conference, Wabash College, October 2007. Undergraduates from Illinois and Indiana presented research talks. Funded by an NSF-MAA grant.

Organizer - Indiana Summer Undergraduate Research Conference, Wabash College, July 2007. Indiana REU participants presented results of their summer inquiries. Funded by a Wabash College internal grant.

AP Calculus Grader - 2007.

Co-Organizer - Young Mathematician's Network Poster Session at Joint Mathematics Meetings, 2006 - 2012.

Co-Organizer - MAA Special Session "Innovative Undergraduate Math Majors," MathFest 2005.

Consultant - Educational Testing Services (ETS) PRAXIS, 2005-2010.

Co-Organizer - AMS Special Session "Commutative Ring Theory," AMS Sectional Meeting 2005, Bowling Green.

Co-writer and grader - Indiana TriSectional MAA Individual Exam 2004.

Co-writer and grader - Franklin College Senior Math Major Exam, 2003.

Co-writer and grader - Indiana College Mathematics Competition, 2003 - 2007.

Co-Organizer - MAA Special Session "Innovative Teaching Techniques in Upper Level Courses," MathFest 2003, Boulder.

Co-Organizer - MAA Project NExT-Indiana (New Experiences in Teaching), 2002 - 2003

Chair of Contributed Papers Session - Joint Meetings AMS/MAA, 2001

Organizer - MAA Graduate Student Special Session, Purdue University, 2001

Judge - MAA Undergraduate Posted Session at Joint Meetings, 2001-2007.

Reviewer/Referee - Various Journals - Ars Combinatoria, Communications in Algebra, Journal of Pure and Applied Algebra, Rocky Mountain Journal of Mathematics, Journal of Online Mathematics and its Applications, Mathematics Magazine, Math Digital Library, College Mathematics Journal, Rose-Hulman Undergraduate Journal of Mathematics, Discrete Mathematics, Mathematics and Computer Education, MAA Notes, Indian J. Pure and Applied Math., Linear Algebra and Its Applications, Arabian J. of Math.

- **Service to University of St. Thomas**

Program Director, Actuarial Science - 2017-present

Division Director - Mathematics and Sciences Division, spring 2013 and 2015-2017

Division Representative, CAS Dean Search - 2016-2017

Core Curriculum Committee - 2015-2019

Steering Committee for PriceWaterHouseCooper LLP and UST Recruiting Program, 2015-2016

Exploratory Calculus Committee - Department of Mathematics, spring 2013

UST Ad Hoc Committee on Yearly Evaluation Guidelines (2012-2013)

Departmental Job Search Committees (2011-2012): Pure Position, Director of the MARC

Advisor - Pure Math Majors (2011-2016)

College of Arts and Sciences Curriculum Committee (2011-2015)

Organizing Committee - Winchell Sciences Symposium, UST 2010.

Konhauser Problem Fest 2010 - co-organizer (and grader).

Usher, Graduation (May 2010)

Faculty Advisor for Golf Club (2010 - 2015)

Faculty Advisor for Math and Actuarial Science Club (2009 - 2014)

Faculty Senate (2009-2011)

Freshmen Advisor - Paired Course (2009, 2010, 2015)

Faculty Panelist - New Faculty Orientation (2009)

Faculty Marshall, Graduation (2009)

Drove Students To/From Konhauser Competition (2009)

Grader at Konhauser Competition (2009)

Admissions Phonathon (2009)

Math Education Committee (2008 - Present)