

# Martha Makowski

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Department of Mathematics  
University of Alabama  
Tuscaloosa, AL 35487

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## Academic Employment

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- Assistant Professor* University of Alabama, Tuscaloosa, AL  
Department of Mathematics  
August 2017-present
- Research Assistant* University of Illinois at Urbana-Champaign, Urbana, IL  
Department of Curriculum & Instruction  
August 2012-August 2017
- Full-time Faculty* Kankakee Community College  
Math, Science and Engineering Division  
August 2008-August 2012

## Education

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- Ph.D.* Curriculum & Instruction  
University of Illinois at Urbana-Champaign, Urbana, IL  
Department of Curriculum & Instruction  
August 2017  
*Advisor:* Sarah Lubienski  
  
*Areas of Specialization:* Mathematics curriculum and instruction;  
elementary mathematics teacher preparation; community college  
students; developmental mathematics; large-scale data analyses;  
quantitative and mixed research methods
- M.S.* Teaching of Mathematics  
University of Illinois at Urbana-Champaign, Urbana, IL  
Department of Mathematics  
May 2007
- B.S.* Mathematics  
Grinnell College, Grinnell, IA  
Department of Mathematics  
May 2004

## Publications (\*denotes publication with a student)

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### *Published*

*Accepted for publication while at The University of Alabama*

- \*Zelkowski, J., Thomas, C. A., Makowski, M. B., Gleason, J., Campbell, T. G., Mudd, A., Keefe, A., Gooden, C., & Smith, F. A. (2023, in press). Leveraging longitudinal and annual analyses to improve program design structure and implement the AMTE standards effectively. In Benken, B. (Ed.). *Reflection on Past, Present and Future: Paving the Way*

*for the Future of Mathematics Teacher Education.* (pp. TBD). Information Age Publishing, Inc.

- Erickson, A., & Makowski, M. B. (2023). What's the Lesson? Using Lesson study to develop curriculum for preservice secondary mathematics teachers. *PRIMUS*, 33(10), 1135-1153. DOI: <https://doi.org/10.1080/10511970.2023.2248975>
- Makowski, M. B., & Lubienski, S. T. (2023). Classroom data visualization: Tracking individuals during group-centered instruction. *Educational Researcher*, 52(3), 164-169. DOI: 10.3102/0013189X231158374
- Makowski, M. B. (2021). The written and oral justifications of mathematical claims of middle school pre-service teachers. *Research in Mathematics Education*, 23(1), 63-84. <https://doi.org/10.1080/14794802.2020.1777190>
- Lubienski, S., Ganley, C., Makowski, M., Miller, E., & Timmer, J. (2021). "Bold problem solving": A new construct for understanding gender differences in math problem-solving performance. *Journal for Research in Mathematics Education*, 46(1), 39-87. DOI: <https://doi.org/10.5951/jresematheduc-2020-0136>
- Makowski, M. B. (2020). Exploring persistence and attitude change in an implementation of *Mathematical Literacy*. *MathAMATYC Educator*, 11(3), 40-46, 69.
- Makowski, M. B., Leckrone, L., & Williams, D. (2018). Consuming, participating and conducting research in community college classrooms. *MathAMATYC Educator*, 9(3), 28-31, 53.
- Ganley, C. M., George, C. E., Cimpian, J. P., & Makowski, M. B. (2018). Gender equity in college majors: Looking beyond the STEM/non-STEM dichotomy for answers regarding female participation. *American Educational Research Journal*, 55(3), 453-487.

*Accepted for and published prior to employment at The University of Alabama*

- Cimpian, J. P., Thompson, K., & Makowski, M. B. (2017). Evaluating English learner reclassification policy effects across districts. *American Educational Research Journal*, 54(1S), 255S-278S.
- Miller, E., Makowski, M. B., Copur-Gencturk, Y., & Lubienski S. T. (2017). Large-scale data, larger possibilities: A review of *Large-Scale Studies in Mathematics Education*. *Journal for Research in Mathematics Education*, 48(2), 224-228.
- Cimpian, J. R., Lubienski, S. T., Timmer, J. D., Makowski, M. B., & Miller, E. K. (2016). Have gender gaps in math closed? Achievement, teacher perceptions, and learning behaviors across two ECLS-K cohorts. *AERA Open*, 2(4), 1-19.

*Under Review*

- \*Makowski, M. B., Lubienski, S. T., Ganley, C., Sianturi, I., & Hart, S. (under review). Gender differences in computation strategies: Evidence across adolescent and adult samples.

*In Preparation*

- Makowski, M. B. (in preparation). Gender differences, courses, and math-intensive majors: "Bold problem solving" in the postsecondary mathematics pipeline.
- \*Makowski, M. B., Williams, D., Wladis, C., & McKeown, K. (in preparation). Understanding the developmental mathematics landscape: A critical look at intended audience and outcomes.
- Saclarides, E., Makowski, M. B., Munson, J., & Harbor, K. (in preparation). School characteristics and coaching access in US schools.

\*Wladis, C., Makowski, M. B., McKeown, K., & Williams, D. (in preparation). (Re)defining developmental mathematics: A critical examination of the research literature.

#### *Other Products*

Gleason, J., & Makowski, M. B. (2022). *Mathematical Knowledge for Secondary Teachers*. Retrieved from <https://gleasonua.github.io/MKT/>

Makowski, M.B. (2014). [Gender and the National Alliance for Doctoral Study in the Mathematical Sciences: The changing academic and career aspirations of Alliance students \(Report No. 6\)](#). Champaign, IL: Math Alliance Research Study.

Makowski, M.B., Dobson, L., Rincon, B., & George-Jackson, C. (2014). [Descriptive statistics and initial findings from the student survey \(Report No. 5\)](#). Champaign, IL: Math Alliance Research Study.

Makowski, M.B. (2013). [Evaluation vs. educational research \(Report No. 1\)](#). Champaign, IL: Math Alliance Research Study.

#### **Presentations** (\*denotes presentation with a student)

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Saclarides, E., Makowski, M.B., Harbour, K., & Munson, J. (2024, April). *School characteristics and coaching access in US schools*. Paper to be presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.

Makowski, M. B. (2023, October). *Unpacking gendered differences in approaches to mathematical problems: Implications and potential explanations*. University of South Alabama, Department of Mathematics, Colloquium.

\*Wladis, C., Makowski, M. B., McKeown, K., & Williams, D. (2023, April). *(Re)defining Developmental Mathematics: A Critical Examination of How it is Defined in the Research Literature*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

\*Wladis, C., Makowski, M. B., McKeown, K., & Williams, D. (2023, February). *(Re)defining developmental mathematics: A critical examination of the research literature*. Paper presented at the XXV annual Conference on Research on Undergraduate Mathematics Education, Omaha, NE.

\*Makowski, M. B., Taylor, K., Williams, D., & Wladis, C. (2022, February). *Understanding the developmental mathematics research landscape: A critical look at intended audience and outcomes*. Paper presented at the XXIV annual Conference on Research on Undergraduate Mathematics Education, Boston, MA.

\*Zelkowski, J., Gleason, J., Makowski, M., Bergson, B., Campbell, T., & Keefe, A. (2020, August). *Alabama's practitioner leaders for underserved schools in mathematics (A-PLUS in Math)*. Poster presented at the Robert F. Noyce Block Party Virtual Summit, Washington, D.C.

Makowski, M. B. (2020, April). *Sex differences, courses, and mathematics intensive majors: "Bold problem solving" in the postsecondary mathematics pipeline*. Paper accepted for presentation at the annual meeting of the American Educational Research Association, San Francisco, CA. [conference canceled]

Makowski, M. B. (2020, February). *Content-specific confidence in entry-level college mathematics courses: Relationships and patterns*. Paper presented at the XXIII Annual Conference on Research in Undergraduate Mathematics Education, Boston, MA.

- Erickson, A., & Makowski, M. B. (2020, February). *What's the lesson?: Following a lesson study through professional contexts*. Paper presented at the annual meeting of the American Mathematics Teacher Educators, Phoenix, AZ.
- Zelkowski, J., Gleason, J., Makowski, M., Bergson, B., & Campbell, T. (2020, January). *Alabama's Practitioner Leaders for Underserved Schools in Mathematics: A Noyce Master Teacher Fellowship*. Poster presented at the annual Joint Mathematics Meeting of the Mathematical Association of America and the American Mathematical Society, Denver, CO.
- Zelkowski, J., Gleason, J., Makowski, M., Westbrook, P., & Campbell, T. (2019, July). *Alabama's Practitioner Leaders for Underserved Schools in Mathematics (A-PLUS in Math)*. Poster presented at the Robert F. Noyce Summit, Washington, D.C.
- Makowski, M. B. (2019, May). *Developmental mathematics: Student experiences and the questions they raise*. Invited talk given in the mathematics department at the University of Washington at Tacoma, Tacoma, WA.
- Makowski, M. B. (2019, February). *"Bold problem solving" in postsecondary mathematics classes: Validation and patterns*. Poster presented at the XXII Annual Conference on Research in Undergraduate Mathematics Education, Oklahoma City, OK.
- \*Moore, S., Makowski, M. B., & Gleason, J. (2019, February). *Student, teacher, and institution effects on student achievement and confidence in college*. Paper presented at the Conference on Research in Undergraduate Mathematics Education, Oklahoma City, OK.
- Lubienski, S. T., Makowski, M. B., & Miller, E. K., (2018, April). *"Bold problem solving": A new construct for gender equity research*. Paper presented at the research session of the annual meeting of the National Council of Teachers of Mathematics, Washington, D.C.
- Makowski, M. B., & Miller, E. K. (2018, April). *Observing "bold problem-solving" behaviors in high-achieving boys and girls: Findings, issues, and reflections*. Paper presented at the annual meeting of the American Educational Research Association, New York, NY.
- Makowski, M. B., & Lubienski, S. T. (2018, April). *Using quantitative diagrams to examine curriculum enactment in a developmental mathematics classroom*. Poster presented at the annual meeting of the American Educational Research Association, New York, NY.
- Makowski, M. B. (2018, February). *Convergent and divergent student experiences in a problem-based developmental mathematics class*. Paper presented at the XXI Annual Conference on Research in Undergraduate Mathematics Education, San Diego, CA.
- Makowski, M. B. & Lubienski, S. T. (2018, February). *Using quantitative diagrams to explore interactions in a group work and problem-centered developmental mathematics class*. Paper presented at the XXI Annual Conference on Research in Undergraduate Mathematics Education, San Diego, CA.
- Makowski, M. (2017, April). *Changing student attitudes in a problem centered developmental math class*. Paper presented at the research session of the annual meeting of the National Council of Teachers of Mathematics, San Antonio, TX.
- Lubienski, S. T., Miller, E. K., Makowski, M., & Timmer, J. (2017, April). *Spatial skills, problem solving approaches and gender gaps in middle school*. Paper presented at the research session of the annual meeting of the National Council of Teachers of Mathematics, San Antonio, TX.
- Makowski, M., & Congleton, R. (2017, February). *Underrepresented students succeeding in math: The challenges and coping strategies of mathematically talented post-secondary*

- students*. Paper presented at the Conference on Research in Undergraduate Mathematics Education, San Diego, CA.
- Makowski, M. (2017, February). *Outcomes beyond success in a problem centered developmental mathematics class*. Paper presented at the Conference on Research in Undergraduate Mathematics Education, San Diego, CA.
- Makowski, M. (2017, January). *Learning for or through problems?: Exploring differentiating experiences in a problem-centered developmental math class*. Paper presented at the annual Joint Mathematics Meetings of the American Mathematics Association and Mathematical Association of America, Atlanta, GA.
- Makowski, M. (2016, October). *High school math in college: Trends and approaches*. 2016 Illinois Council of Teachers of Mathematics annual conference, Peoria, IL.
- Makowski, M. (2016, February). *Student experiences in a problem-solving-based developmental mathematics class*. Poster presented at the Conference on Research in Undergraduate Mathematics Education, Pittsburgh, PA.
- Makowski, M. (2015, November). *Student experiences in a problem solving based developmental mathematics class*. Paper presented at the annual meeting of the American Mathematical Association of Two-Year Colleges, New Orleans, LA.
- Makowski, M., & Wilding-Martin, E. (2015, November). *Outcomes from Mathematical Literacy: Do attitudes about math change?*, 2015 American Mathematical Association of Two-Year Colleges annual meeting, New Orleans, LA.
- Makowski, M. (2015, April). *Taking high school level math in college: Issues, trends, and novel approaches*, MSTE Friday Lunch Series (invited), Champaign, IL.
- Makowski, M. (2014, April). *Argument components, justification types, and accuracy of pre-service teachers' mathematical arguments over time*. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.
- Robinson-Cimpian, J.P., Ganley, C.M., George-Jackson, C.E., Makowski, M.B. (2014, April). *Gender equity in college majors: Looking beyond the STEM/non-STEM dichotomy for answers regarding female participation*. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.

## Grants

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### Funded

- |         |                                                                                                                                                                                                                                                     |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| \$4,750 | <p>2024 Workshop to Forge the Yellowhammer Network of Women in the Mathematical Sciences</p> <p><b>Grant agency:</b> Mathematical Association of America</p> <p><b>Role:</b> Principal investigator</p> <p><b>Period:</b> May 2023 – April 2024</p> |
| \$5,330 | <p>2022 Workshop to Forge the Yellowhammer Network of Women in the Mathematical Sciences</p> <p><b>Grant agency:</b> Mathematical Association of America</p> <p><b>Role:</b> Principal investigator</p> <p><b>Period:</b> May 2022 – April 2023</p> |

- \$5,080 *Forging the Yellowhammer Network of Women in the Mathematical Sciences*  
**Grant agency:** Mathematical Association of America  
**Role:** Principal investigator  
**Period:** April 2021 – March 2022
- \$466,984 (20% of award to date) *Alabama's Practitioner Leaders in Underserved Schools for Mathematics (A-PLUS in Math). Noyce Track-3 Master Teacher Fellows Grant*  
**Grant agency:** National Science Foundation  
**Role:** Co-Principal investigator  
**Period:** 04/15/2019 – 03/31/2025  
**Total award:** \$2,839,526  
**Contribution:** 20%  
**Website:** [Link](#)
- Jeremy Zelkowski (Principal Investigator), with James Gleason, Martha Makowski, and William Bergeron (Co-Principal Investigators).
- \$138,000 *NSF Graduate Research Fellowship program – Katie Lynn Taylor*  
**Grant agency:** National Science Foundation  
**Role:** Principal investigator  
**Period:** August 2019 – August 2022
- \$1,500 *Understanding Students' Math Course Perceptions and Withdraw Patterns at a Large University (CARSCA #255)*  
**Grant agency:** College Academy of Research, Scholarship, and Creative Activity (CARSCA), University of Alabama College of Arts and Sciences  
**Period:** December 2017-January 2019
- In Preparation*
- \$287,875 *Exploring Bold Problem Solving and Gender in Undergraduate Mathematics Students*  
**Grant agency:** National Science Foundation  
**Role:** Principal investigator  
**Contribution:** 60% of \$479,791 requested  
**Submitting:** October 5, 2023  
**Roles and contributors:** Martha Makowski (Principal Investigator), with James Gleason (Co-Principle Investigator).
- Unfunded*
- \$786,798 *CAREER: Exploring Gendered Patterns in Bold Problem Solving in a Postsecondary Population*  
**Grant agency:** National Science Foundation  
**Role:** Principal investigator  
**Submitted:** July 2022
- \$743,082 *CAREER: Exploring Gendered Patterns in Bold Problem Solving in a Postsecondary Population*

**Grant agency:** National Science Foundation

**Role:** Principal investigator

**Submitted:** July 2021

- \$316,514 Sub-award: *Exploring Gendered Patterns in Bold Problem Solving and Mathematics Outcomes*  
**Grant agency:** National Science Foundation through Indiana University  
**Role:** Site Principal Investigator, Co-PI for larger grant  
**Submitted:** October 2020
- \$5,797 *Similarities and Differences in Approaches to Mathematics Instruction in High School and College Settings*  
**Grant agency:** ORED (UA internal grant program)  
**Role:** Principal investigator  
**Submitted:** October 2020
- \$49,603 *Investigating the Similarities and Differences Between High School and College Mathematics Environments*  
**Grant agency:** Spencer Foundation  
**Role:** Principal investigator  
**Submitted:** February 2020
- \$102,214 Sub-award: *Exploring Gender Differences in Bold Problem Solving and Math Outcomes*  
**Grant agency:** Institute of Educational Statistics through Indiana University  
**Role:** Site Principal Investigator, Co-PI for larger grant  
**Submitted:** September 2018

## Teaching

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*Tenure-track faculty* University of Alabama  
 Department of Mathematics

### *Courses Taught*

Math 125: Calculus I

Math 355: Theory of Probability

Math 403/503: Algebraic Structures for Secondary Teachers

Math 405/505: Geometry for Teachers

Math 409/409: Advanced Data Analysis

Math 451/551: Mathematical Statistics with Applications I

Math 537: Applied Math Topics

Math 591: Teaching College Mathematics

### *Dissertation Committees*

- Chair
  - Katie McKeown, Spring 2024 (Anticipated; Preliminary exam defended and passed December 2022)

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- Skylyn Irby, December 2024 (Anticipated; Preliminary exam defended and passed August 2023)

- Committee Member
  - Anna Keefe, Spring 2022 (Defended)

#### *Graduate Students*

- Katie McKeown (formally Taylor): Fall 2018 - present
- Skylyn Irby: Fall 2022 - present

#### *Masters Projects*

- Logan Bishop (Spring 2024)
- Jabbar Lindsey (Spring 2021)

#### *Undergraduate Projects*

- Sarah Moore (September 2018 – May 2021)

*Course instructor* University of Illinois at Urbana-Champaign  
 Department of Curriculum & Instruction  
*Course taught:* Investigative Approach to Elementary Mathematics Instruction  
 Fall 2013, 2014, & 2015; Spring 2016

*Full-time faculty* Kankakee Community College  
 Math, Science and Engineering Division  
*Courses taught:* Pre-algebra II; Beginning Algebra; Intermediate Algebra; College Algebra; Trigonometry; Contemporary Mathematics; Math for Elementary Teachers I & II; Calculus I  
 August 2008-August 2012

### **Service**

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#### *External*

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|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Conference chair | Forging the Yellowhammer Network of Women in the Mathematical Sciences<br>January 2021 - present                                                                                                                                                                                                                    |
| Taskforce member | Strategic Taskforce to Amplify Mathematics Pathways (STAMP)<br>November 2019 – May 2022                                                                                                                                                                                                                             |
| Grant reviewer   | National Science Foundation - EHR<br>January 2020                                                                                                                                                                                                                                                                   |
| Journal reviewer | <i>American Educational Research Journal</i><br><i>Caribbean Educational Research Journal</i><br><i>International Journal of Science and Mathematics Education</i><br><i>Journal for Research in Mathematics Education</i><br><i>Mathematics Thinking and Learning</i><br><i>Educational Studies in Mathematics</i> |

Conference reviewer *AERA Annual Conference*  
2016, 2018, 2019, 2020, 2021, 2023, 2024 conference cycles

*AMTE Annual Conference*  
2020, 2023 conference cycles

*RUME Annual Conference*  
2018, 2019, 2020, 2022, 2023 conference cycles

*Internal*

Department

Graduate Program Committee  
April 2024 - present

Graduate Admissions and Scholarship Committee  
August 2019 - present

Faculty Advisor for the Student Chapter of the American Women in  
Mathematics (AWM)  
August 2018 - present

Major Advising (Approximately 15 students per semester)  
October 2019 - present

Course Coordinator – Math 355  
Fall 2021, Spring 2023

Tenure and Promotion Guideline Committee  
August 2020 – April 2021

Website Committee  
May 2018 – May 2021

Panel Member: *Delta Initiative: Capstone Women in STEM* (invited)  
Spring 2019

College

A&S Graduate Committee  
September 2020 – May 2023

University

Committee on External Scholarships and Fellowships  
August 2023 – present

University Recreation Committee  
January 2021 – May 2023  
(Co-chair August 2022 – May 2023)

Search committees  
2023 – 2024

Assistant Professor of Mathematics  
(Tenure Track)  
College of Arts and Sciences – Department of Mathematics

2022 – 2023	Department Chair College of Arts and Sciences – Department of Mathematics
2018 – 2019	Assistant/Associate Professor of Secondary Mathematics Education (Tenure Track) College of Education – Department of Curriculum & Instruction  Assistant/Associate Professor of Elementary Mathematics Education (Tenure Track) College of Education – Department of Curriculum & Instruction
2017 – 2018	Non-tenure Contract Renewable Faculty Position College of Arts and Sciences – Department of Mathematics

### **Fellowships & Awards**

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*Award for Fundraising/Sustainability*

Association for Women in Mathematics

Awarded to the Student Chapter of the national organization

*Outstanding Reviewer*

American Educational Research Association – SIG Research in Mathematics Education  
2020 Conference Cycle

*Scott Dissertation Completion Fellowship, 2016-2017 school year*

Graduate College

University of Illinois at Urbana-Champaign

University-level fellowship granted through a campus wide competition. Includes a stipend and full tuition waiver.

*Hardie Dissertation Award, April 2015*

College of Education

University of Illinois at Urbana-Champaign

*Hardie Conference Travel Award, April 2014*

University of Illinois at Urbana-Champaign

*State Farm Companies Foundation Doctoral Scholarship Award, August 2013*

University of Illinois at Urbana-Champaign

### **National Workshops & Mentoring Programs**

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*Designing Professional Development Programs for Graduate Student Teaching Assistants*

Professional development given by the Mathematical Association of America aimed at mathematics faculty at universities to promote active learning strategies in undergraduate mathematics classes taught by TAs. The approximately 30-hour virtual workshop was done in collaboration with Jil Chambless.

July 2023

*Bauer Grant Writing Workshop*

Thirteen month mentoring workshop designed to facilitate the submission of a grant at the end of the process.

January 2019 – March 2020

*AMTE STaR Fellow – 2018 Cohort*

Competitive fellowship focused on the professional development of pre-tenure faculty in mathematics education.

June 2018 – February 2019

*Mentoring and Partnerships for Women in RUME*

Special Interest Group of the American Mathematical Association on Research in Undergraduate Mathematics Education

February 2015 & 2016

NSF-funded seminar for women conducting research on undergraduate mathematics education.

*Measures of Effective Teaching Longitudinal Database: A Review of the MET Project and Available Data*

ICPSR Summer Program in Quantitative Methods of Social Science

June 2014, Ann Arbor, MI

*Mathematical Knowledge for Teaching*

Instrument training

April 2013, San Francisco, CA

*Project ACCCESS*

American Mathematical Association of Two-Year Colleges

August 2009 – November 2010

Mentoring program designed to help new faculty become effective teachers and active members of the mathematics teaching community

**Professional Organizations**

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*American Educational Research Association*

*American Mathematical Association of Two-Year Colleges*

*Association of Mathematics Teacher Educators*

*Association for Women in Mathematics*

*Mathematical Association of America*

*National Council of Teachers of Mathematics*