

# ERIK D. JACOBSON

January 2021

## CONTACT

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## EDUCATION

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### University of Georgia, Athens, GA

2013 – Ph.D., Mathematics Education with Qualitative Studies Certificate

Dissertation: *Mathematics teachers' professional experience and the development of mathematical proficiency for teaching.*

Advisers: Jeremy Kilpatrick, Andrew Izsák, Melissa Freeman, and Denise Spangler

2011 – M.A., Mathematics

### Dartmouth College, Hanover, NH

2004 – B.A., Mathematics, *cum laude*

## RESEARCH INTERESTS

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Mathematics teacher education, pedagogical content knowledge, productive disposition for teaching, conceptual change, quantitative and algebraic reasoning, measurement of teachers' knowledge and beliefs

## PROFESSIONAL EXPERIENCE

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### Appointment, Indiana University, Bloomington, IN

2019 – present, Associate Professor of Mathematics Education

2015 – present, Affiliate Member, Cognitive Science Program

2013 – 2019, Assistant Professor of Mathematics Education

### University of Georgia, Athens, GA

2012 – 2013, Instructor of Record, *Number and Operations for Mathematics Teachers.*

2011 – 2012, Teaching Assistant, *Number and Operations for Mathematics Teachers.*

### University of Michigan, Ann Arbor, MI

2010 - Co-facilitator: *Mathematical Knowledge for Teaching Teachers Workshop* (20 hours) with Hyman Bass, Judith Jacobs, Yvonne Lai, and Rohen Shah at the Elementary Mathematics Laboratory.

### Vermont Department of Education, Professional Development Network

2008 – Leader: *Using the New England Common Assessment Program (NECAP) Item Analysis Report to Stimulate Reflective Practice* (2 hours). Rutland, VT.

2007 – Leader: *Reaching the necessary depths of knowledge in assessment and instruction to prepare students for NECAP testing* (6 hours). Windsor, VT.

**Bellows Falls Union High School, Bellows Falls, VT**

2004 – 2008, Classroom Teacher: *Algebra I & II, Geometry, Math Applications, Probability, and Statistics.*

**Dartmouth College, Hanover, NH**

2004 – Teaching Assistant: *Introduction to Data Analysis.*

2002 – Teaching Assistant: *Calculus I.*

**GRANT ACTIVITY**

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**External**

2016 – 2021, PI on National Science Foundation EHR-CORE Grant, *Assessing the Structure of Knowledge in Teaching Mathematics* (Award ID: 1561453, Award amount: \$1,675,183)

**Internal**

2019 - XXX

2016 – 2017, PI on Indiana University Collaborative Research Grant, *Harnessing Human Perception and Gesture to Develop Sharable Expertise in Algebra.* (Award amount: \$72,941)

2016 – PI on Indiana University School of Education Research Proposal Incentive Grant (Award amount: \$8,000)

2014 – 2015, PI on Indiana University School of Education Maris M. Proffitt and Mary Higgins Proffitt Endowment Research Grant, *Decomposing and Rehearsing Explanations of Algorithms in Mathematics.* (Award amount: \$19,000)

**AWARDS**

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2014 – Association of Mathematics Teacher Educators, Service, Teaching, and Research (STaR) Fellow

2013 – American Educational Research Association, Dissertation Grant Awardee (Award amount: \$20,000)

2013 – University of Georgia, Outstanding Teaching Assistant Award (top 10% of instructors in each department)

2008 – 2013, University of Georgia, Presidential Graduate Fellowship (12 university-wide awards given annually)

2000 – 2004, Dartmouth College, Class of 1965 Scholarship

**PUBLICATIONS**

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*Note: R* designates manuscripts related to research and numbered in chronological order of inception, *T* designates manuscripts related to teaching, *S* designates manuscripts related to service, and \* designates an IU student coauthor.

**Refereed Journal Articles**

Jacobson, E., & Svetina, D. (2019). Prescribing Structure for Validation Arguments: Elemental, Structural, and Ecological Validity. *Applied Measurement in Education*, 32(1), 43-59, DOI: 10.1080/08957347.2018.1544137

Izsák, A., **Jacobson, E.**, & Bradshaw, L. (2019). Surveying middle grades teachers' reasoning about fraction arithmetic in terms of quantities. *Journal for Research in Mathematics Education*. 50(2) 156-209.

- Jacobson, E.**, & Simpson, A. (2019). Prospective elementary teachers' conceptions of multidigit number: Exemplifying a replication framework for mathematics education. *Mathematics Education Research Journal*, 31, 67–88.
- Lai, Y., & **Jacobson, E.** (2018). Implications of pedagogical context for eliciting pedagogical content knowledge. *For the Learning of Mathematics*, 38(2), 28–33.
- Copur-Gencturk, Y., Tolar, T., **Jacobson, E.**, & Fan, W. (2018). An empirical study of the dimensionality of the Mathematical Knowledge for Teaching construct. *Journal of Teacher Education*. Online preprint. <https://doi.org/10.1177%2F0022487118761860>
- Walkowiak, T. A., Berry, R. Q., Pinter, H. H., & **Jacobson, E.** (2018). Utilizing the M-Scan to measure standards-based mathematics teaching practices: Affordances and limitations. *ZDM: Mathematics Education*. 50(3), 461-474. doi:10.1007/s11858-018-0931-7
- de Araujo, Z., Orrill, C., & **Jacobson, E.** (2017). Examining the design features of a communication-rich, problem-centered mathematics professional development. *International Journal of Mathematical Education in Science and Technology*. Online preprint. <http://dx.doi.org/10.1080/0020739X.2017.1373153>
- Jacobson, E.**, Lobato, J., & Orrill, C. (2017). Middle school teachers' use of mathematics to make sense of student solutions to proportional reasoning problems. *International Journal of Science and Mathematics Education*. Online preprint. DOI: 10.1007/s10763-017-9845-z
- Izsák, A., & **Jacobson, E.** (2017). Preservice teachers' reasoning about relationships that are and are not proportional: A Knowledge-in-Pieces account. *Journal for Research in Mathematics Education*. 48(3), 300–339.
- Jacobson, E.** (2017). Field experience and prospective teachers' mathematical knowledge and beliefs. *Journal for Research in Mathematics Education*, 48(2), 148–190.
- Creager, M.,\* **Jacobson, E.**, & Aydeniz, F.\* (2016). Hypothesizing pedagogical blind spot: Can pedagogical concerns ellipse mathematical knowledge for teaching? *For the Learning of Mathematics*, 36(2), 2–7.
- Jacobson, E.**, & Izsák, A. (2015). Knowledge and motivation as mediators in mathematics teaching practice: The case of drawn models for fraction arithmetic. *Journal of Mathematics Teacher Education*, 18, 467–488.
- Jacobson, E.** (2014). Using covariation reasoning to support mathematical modeling. *Mathematics Teacher*, 107(7), 515–519.
- Bradshaw, L., Izsák, A., Templin, J., & **Jacobson, E.** (2014). Diagnosing teachers' understandings of rational number: Building a multidimensional test within the diagnostic classification framework. *Educational Measurement: Issues and Practice*, 33(1), pp. 2–14.
- de Araujo, Z., **Jacobson, E.**, Singletary, L., Wilson, P., Lowe, L., & Marshall, A. (2013), Teachers' conceptions of integrated mathematics curricula. *School Science and Mathematics*, 113, 285–296. doi: 10.1111/ssm.12028.
- Izsák, A., **Jacobson, E.**, de Araujo, Z., & Orrill, C. H. (2012) Measuring mathematical knowledge for teaching fractions with drawn quantities. *Journal for Research in Mathematics Education*, 43(4), 391–427.
- Jacobson, E.** (2009). Too little, too early. *Teaching Children Mathematics*, 16(2), 68–71.

### Book Chapters

- Jacobson, E.**, & Borowski, R.\* (2019). Measure design and validation as a research methodology for mathematics education. In J. Bostic, E. Krupa, & J. Shih (Eds.) *Assessment in Mathematics Education Contexts: Theoretical Frameworks and New Directions*, pp. 40–62. New York, NY: Routledge.

- Jacobson, E.**, Aydeniz, F.,\* Creager, M.,\* Diaga, M.\* & Uzan, E.\* (2018). Mathematics teachers' knowledge and productive disposition for teaching: A framework and measure. In G. Stylianides & K. Hino, *Research Advances in the Mathematical Education of Preservice Elementary Teachers*, pp. 187–203. New York, NY: Springer.
- Jacobson, E.**, Remillard, J. T., Hoover, M., & Aaron, W. (2016). The interaction between measure design and construct development: Building validity arguments. In A. Izsák, J. T. Remillard, & J. Templin (Eds.), *Psychometric methods in mathematics education: Opportunities, challenges, and interdisciplinary collaborations*, pp. 155–173. Journal for Research in Mathematics Education Monograph Series No. 15. Reston, VA: National Council of Teachers of Mathematics.
- Allen, R., O'Kelley, S., **Jacobson, E.** (2015). Trigonometric identities. In M. K. Heid, P. S. Wilson, G. W. Blume (Eds.) *Mathematical understanding for secondary teaching: A framework and classroom-based situations*, pp. 391–396. Charlotte, NC: Information Age.
- Johnson, H., Karunakaran, S., McClintock, E., Nazarewicz, P., **Jacobson, E.**, Edenfield, K. (2015). Absolute value in complex plane. In M. K. Heid, P. S. Wilson, G. W. Blume (Eds.) *Mathematical understanding for secondary teaching: A framework and classroom-based situations*, pp. 155–162. Charlotte, NC: Information Age.
- Johnson, H., Reed, S., McClintock, E., **Jacobson, E.** Edenfield, K. (2015). The product rule for differentiation. In M. K. Heid, P. S. Wilson, G. W. Blume (Eds.) *Mathematical understanding for secondary teaching: A framework and classroom-based situations*, pp. 425–432. Charlotte, NC: Information Age.
- Nazarewicz, P., O'Kelley, S., **Jacobson, E.**, Blume, G., Heid, M. K. (2015). Constructing a tangent line. In M. K. Heid, P. S. Wilson, G. W. Blume (Eds.) *Mathematical understanding for secondary teaching: A framework and classroom-based situations*, pp. 317–322. Charlotte, NC: Information Age.
- Reed, S., Conner, A., Donaldson, S., DuCloux, K., Edenfield, K., & **Jacobson, E.** (2015). Absolute value equations and inequalities. In M. K. Heid, P. S. Wilson, G. W. Blume (Eds.) *Mathematical understanding for secondary teaching: A framework and classroom-based situations*, pp. 147–154. Charlotte, NC: Information Age.
- Shimizu, J., Donaldson, S., Edenfield, K., & **Jacobson, E.** (2015). Solving quadratic equations. In M. K. Heid, P. S. Wilson, G. W. Blume (Eds.) *Mathematical understanding for secondary teaching: A framework and classroom-based situations*, pp. 249–255. Charlotte, NC: Information Age.
- Tillema, E., Johnson, H., O'Kelley, S., **Jacobson, E.**, Blume, G., & Heid, M. K. (2015). Connecting factoring with the quadratic formula. In M. K. Heid, P. S. Wilson, G. W. Blume (Eds.) *Mathematical understanding for secondary teaching: A framework and classroom-based situations*, pp. 263–276. Charlotte, NC: Information Age.
- Jacobson, E.** (2014). Developing knowledge for teaching from experience: Mathematics teaching and professional development. In J. Orchard & V. Ellis (Eds.) *Learning teaching from experience: Multiple perspectives, international contexts*, pp. 225–240. London, UK: Bloomsbury.
- Jacobson, E.**, & Izsák, A. (2014). Using coordination classes to analyze preservice middle-grades teachers' difficulties in determining direct proportion relationships. In J. Lo, K. R. Leatham, & L. R. Van Zoest (Eds.), *Research Trends in Mathematics Teacher Education*, pp. 47–66. New York, NY: Springer.

#### Editorials & Book Reviews

- Jacobson, E.**, & Liu, J.\* (2019) [Review of the book, *Math That Matters: Targeted Assessment and Feedback for Grades 3–8*, by M. Small]. *Teachers College Record*, ID Number: 23103.

**Jacobson, E.,** & Kilpatrick, A. (2015). Understanding teacher affect, knowledge, and instruction over time: An agenda for research on productive disposition for teaching mathematics. *Journal of Mathematics Teacher Education*, 18, 401–406. DOI 10.1007/s10857-015-9316-9.

### Conference Proceedings

**Jacobson, E.,** Ahmad, F.\*, Bharaj, P., & Savich, T.\* (2019). Prospective teachers conceptual understanding of linear functions: Principles or connections? In Otten, S., Candela, A. G., de Araujo, Z., Haines, C., & Munter, C. (Eds.). *Proceedings of the forty-first annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 1274–1278. St Louis, MO: University of Missouri.

Savich, T.\*, **Jacobson, E.,** Bharaj, P., & Eker, A., (2019). Modeling researcher discourse with analytic pragmatism. In Otten, S., Candela, A. G., de Araujo, Z., Haines, C., & Munter, C. (Eds.). *Proceedings of the forty-first annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 1832–1835. St Louis, MO: University of Missouri.

Park Rogers, M., **Jacobson, E.,** Allen, J.,\* Borowski, R.,\* & Roy, R.\* (2018). Walking a fine line: Teaching others about self-study while developing myself as a self-study researcher. In D. Garbett & A. Ovens (Eds), *Pushing boundaries and crossing borders: Self-study as a means for knowing pedagogy*. Herstmonceux, UK: S-STEP.

**Jacobson, E.** (2017). Conceptualizing measures of mathematical knowledge for teaching in terms of underlying components. In Galindo, E., & Newton, J., (Eds.). *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 605-609, Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

**Jacobson, E.** (2017). Reflected abstraction and pedagogical need: Teachers' intertwined knowledge and motivation for instructional representations. In Galindo, E., & Newton, J., (Eds.). *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 1435-1439. Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

**Jacobson, E.,** & Borowski, R.\* (2016). Examining the relationship between certification path and teaching self-efficacy. In M. B. Wood, E. E. Turner, M. Civil, & J. A., Eli (Eds.), *Proceedings of the 38th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. pp. 367–370. Tucson, AZ: The University of Arizona.

**Jacobson, E.,** Creager, M.,\* & Ayedeniz, F.\* (2015). Maintaining quantitative coherence: Preservice elementary teachers explanations using concrete representations. In T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Bradfield, & H. Dominguez (Eds.). (2015). *Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, p. 904–907. East Lansing, MI: Michigan State University.

**Jacobson, E.** (2014). The role of experience in the development of mathematical knowledge for teaching. In S. Oesterle, C. Nicol, P. Liljedahl, & D. Allan (Eds.) *Proceedings of the Joint Meeting of PME 38 and PME-NA 36, Vol. 6*, p. 113. Vancouver, Canada: PME.

Izsák, A., & **Jacobson, E.** (2014). Relationships between teacher characteristics and knowledge profiles for fractions. In S. Oesterle, C. Nicol, P. Liljedahl, & D. Allan (Eds.) *Proceedings of the Joint Meeting of PME 38 and PME-NA 36, Vol. 6*, p. 111. Vancouver, Canada: PME.

**Jacobson, E.** (2013). The timing of teaching practice: Teacher knowledge and the case for children's mathematical thinking. In M. Martinez, & A. Castro Superfine (Eds.). *Proceedings of the 35th annual meeting of the North American Chapter of the International Group for the*

*Psychology of Mathematics Education*, p. 621–628. Chicago, IL: University of Illinois at Chicago.

- Jacobson, E.** (2012). Knowledge and personal efficacy for teaching and the sources of teaching efficacy for multiplicative reasoning. In L. R. Van Zoest, J. J. Lo, & J.L. Kratky (Eds.). *Proceedings of the 34th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, p. 565. Kalamazoo, MI: Western Michigan.
- Jacobson, E.**, & Izsák, A. (2012). Using a knowledge-in-pieces approach to explore the illusion of proportionality in covariance situations. In L. R. Van Zoest, J. J. Lo, & J.L. Kratky (Eds.). *Proceedings of the 34th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 629–636. Kalamazoo, MI: Western Michigan.
- Jacobson, E.**, Singletary, L., & de Araujo, Z. (2011). Mathematical process and US secondary teachers' conceptions of integrated mathematics curricula. In B. Ubuz (Ed.). *Proceedings of the 35th Conference of the International Group for the Psychology of Mathematics Education, Vol. 3*, pp. 65–72. Ankara, Turkey: PME.
- Izsák, A., **Jacobson, E.**, de Araujo, A., & Orrill, C., H. (2010). Teachers' levels of units and fraction division. In P. Brosnan, D. B. Erchick, & L. Flevaris (Eds.). *Proceedings of the 32nd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (Vol. 4)*, pp. 1087–1094. Columbus, OH: The Ohio State University.
- Jacobson, E.**, & Singletary, L. (2010). Collaborating to meet the standards: Implications for professional development. In D. Gober (Ed.) *Proceedings of the fourth annual meeting of the Georgia Association of Mathematics Teacher Educators (Vol. 4)*, pp. 12–20. Retrieved July, 2011 from <http://www.gamte.org/GAMTE%20Proceedings%202010.pdf>
- Orrill, C. H., Izsák, A., **Jacobson, E.**, & de Araujo, Z. (2010). Teachers' understanding of representations: The role of partitioning when modeling fraction arithmetic. In K. Gomez, L. Lyons, & J. Radinsky (Eds.) *Learning in the Disciplines: ICLS 2010 Conference Proceedings (Vol. 2)*, pp. 338–340. Chicago, IL: University of Illinois at Chicago.

### Technical Reports

- Jacobson, E.** (2014). *The Nature and Growth of Mathematical Proficiency for Teaching in Schools and Districts in Georgia*. Research report for Georgia school districts.
- Izsák, A., **Jacobson, E.**, & Lobato, J. (2011) *Diagnosing Teachers Multiplicative Reasoning attributes for fractions*. Technical report.
- Lobato, J., Orrill, C., & **Jacobson, E.** (2011) *Diagnosing Teachers Multiplicative Reasoning attributes for proportional reasoning*. Technical report.
- Orrill, C. H., Izsák, A., Lobato, J., Cohen, A., Templin, J., .... (2010). *Multiplicative reasoning: Insights from the Does it Work and Diagnosing Teachers Multiplicative Reasoning projects*. Technical report.

### PRESENTATIONS

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Note: \* designates an IU student coauthor.

### Invited

- Jacobson, E.** (Mar., 2015) *Grand Challenges and Opportunities of Indiana Mathematics Education Research*. Talk presented at Indiana Mathematics Education Research Symposium, Indiana University – Purdue University, Indianapolis, IN.

- Jacobson, E.** (Nov. 2014). *Learning How to Teach from Rehearsal, Teaching Practice, and the Real Thing*. Talk presented at the Indiana University School of Education First Fridays Faculty Research Seminar, School of Education: Bloomington, IN.
- Jacobson, E.** (Sept. 2014). *Teaching Practice and K-6 Mathematics Teachers' Knowledge and Belief*. Paper presented at the Fall Research Conference of the American Educational Research Association, Washington, D.C.
- Jacobson, E.** (May, 2014). *Using a Ruler to Measure a Rhizome: The Nature of Pedagogical Content Knowledge and the Problem of Measuring Its Growth*. Paper presented at the MERU Seminar, University of Ottawa: Ottawa, ON, Canada.

### **International and National**

- Copur-Gencturk , **Jacobson, E.** & Rasiej, J. (2019, February). *Content alignment of teacher knowledge assessments with the Common Core Standards in mathematics*. Paper presented at the annual meeting of the Association of Mathematics Teacher Educators, Orlando, FL.
- Jacobson, E.**, Ahmad, F.\*, Bharaj, P., & Savich, T.\* (2019, November). Prospective teachers conceptual understanding of linear functions: Principles or connections? Paper to be presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, St Louis, MO.
- Savich, T.\* , **Jacobson, E.**, Bharaj, P., & Eker, A.,(2019, November). Modeling researcher discourse with analytic pragmatism. Paper to be presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, St Louis, MO.
- Izsak, A., **Jacobson, E.**, & Tillema, E. (2018, April). *Contrasting perspectives on multiplication, area and combinatorial problems*. Research Symposium presented at the annual Research Conference of the National Council of Teachers of Mathematics, Washington, DC.
- Savich, T.\* & **Jacobson, E.** (2018, April). Using meaning fields to understand students' hybridized representations. Paper presented at the annual Research Conference of the National Council of Teachers of Mathematics, Washington, DC.
- Jacobson, E.**, & Svetina, D. (2018, April). *Measuring knowledge and motivation for teaching multidigit arithmetic: Evidence of elemental, structural, and ecological validity*. Paper presented at the annual meeting of the American Educational Research Association, New York, NY.
- Jacobson, E.**, Simpson, A., & Willey, C. (2018, April). *Noticing bias: Teachers' attribution of mathematical competence and instructional response relative to perceived student identity*. Paper presented at the annual meeting of the American Educational Research Association, New York, NY.
- Borowski, R.\* & **Jacobson, E.** (2018, April). Fifth grade students' conceptions of number lines: Coordinating position and length. Paper presented at the annual meeting of the American Educational Research Association, New York, NY.
- Savich, T.\* & **Jacobson, E.** (2018, Feb.) *Using meaning fields to understand students' mathematical drawings*. Paper presented at the annual meeting of the Association of Mathematics Teacher Educators, Houston, TX.
- Jacobson, E.** (2017, Oct.). *Conceptualizing measures of mathematical knowledge for teaching in terms of underlying components*. Paper to be presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Indianapolis, IN.
- Jacobson, E.** (2017, Oct.). *Reflected abstraction and pedagogical need: Teachers' intertwined knowledge and motivation for instructional representations*. Paper to be presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Indianapolis, IN.

- Jacobson, E.**, & Liu, J.\* (2017, April). *Mapping fraction misconceptions to the Common Core*. Discussion session presented at the annual Research Conference of the National Council of Teachers of Mathematics, San Antonio, TX.
- Borowski, R.\* & **Jacobson, E.** (2017, April). *Student conceptions of number lines: Challenges in assessing understanding*. Discussion session presented at the annual Research Conference of the National Council of Teachers of Mathematics, San Antonio, TX.
- Jacobson, E.**, & Borowski, R.\* (2016, November). *Examining the relationship between certification path and teaching self-efficacy*. Paper presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Chicago, IL. Tucson, AZ.
- Jacobson, E.**, Aydeniz, F.,\* Creager, M.,\* Diaga, M.\* & Uzan, E.\* (2016, July). *Developing together: Measuring prospective teachers' intertwined, topic-specific knowledge and beliefs*. Paper presented at the International Congress on Mathematics Education: Hamburg, Germany.
- Jacobson, E.**, Ayedniz, F.,\* Creager, M.,\* Diaga, M.,\* & Uzan, E.\* (2016, April). *Hypothesizing fragmented growth of mathematical proficiency for teaching*. Paper presented at the annual National Council of Mathematics Teachers Research Conference: San Francisco, CA.
- Jacobson, E.**, Creager, M.,\* & Ayedniz, F.\* (2015, November). *Maintaining quantitative coherence & correspondence: PSTs' explanations using concrete representations*. Paper presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, East Lansing, MI.
- Ayedniz, F.,\* Creager, M.,\* **Jacobson, E.**, Diaga, M.,\* & Uzan, E.\* (2015, February). *Consequences of preservice teachers procedural views of student strategies for multidigit addition and subtraction*. Paper presented at the annual meeting of the Association of Mathematics Educators. Orlando, FL.
- Jacobson, E.**, Uzan, E.,\* Diaga, M.,\* Creager, M.,\* & Ayedniz, F.\* (2015, February). *Tracing mathematical proficiency for teaching multidigit addition and subtraction across content and methods classes*. Paper presented at the annual meeting of the Association of Mathematics Educators. Orlando, FL.
- Jacobson, E.** (2014, July). *The role of experience in the development of mathematical knowledge for teaching*. Paper presented at the Joint Meeting of PME 38 and PME-NA 36: Vancouver, Canada.
- Izsák, A., & **Jacobson, E.** (2014, July). *Relationships between teacher characteristics and knowledge profiles for fractions*. Paper presented at the Joint Meeting of PME 38 and PME-NA 36: Vancouver, Canada.
- Jacobson, E.** (2014, April). *The effects of the timing, duration, and quality of teaching practice on K-6 mathematics teachers' content knowledge for teaching*. Poster presented at the annual meeting of the American Educational Research Association: Philadelphia, PA.
- Jacobson, E.**, & Remillard, J. (2014, April). *The emergent relationship between item design and construct development in the cycle of discovery, innovation, and application*. Paper presented at the annual National Council of Mathematics Teachers Research Presession: New Orleans, LA.
- Jacobson, E.** (2013, November). *The timing of teaching practice: Teacher knowledge and the case for children's mathematical thinking*. Paper presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Chicago, IL.
- Izsák, A., & **Jacobson, E.** (2013, April). *Knowledge and productive disposition: The predictors of motivation for using drawn models in mathematics teaching*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.
- Jacobson, E.** (2013b, April). *Exploring the sources of teachers' personal efficacy and knowledge efficacy beliefs for teaching multiplicative reasoning*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.



- Remillard, J., & **Jacobson, E.** (2013, April). *The emergent relationship between item design and construct development in the cycle of discovery, innovation, and application*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.
- Lai, Y., **Jacobson, E.**, & Thames, M. (2013, April). *The role of pedagogical context in measures of specialized and pedagogical content knowledge*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.
- Izsák, A., Beckmann, S., Orrill, C. H., & **Jacobson, E.** (2013, April). *How do middle grades teachers recognize proportional relationships?* Research symposium presented at the annual National Council of Mathematics Teachers Research Presession, Denver, CO.
- Jacobson, E.** (2013a, April). *Modeling change in inservice teachers' mathematical knowledge for teaching*. Paper presented at the annual National Council of Mathematics Teachers Research Presession, Denver, CO.
- Jacobson, E.** (2012e, November). *Knowledge and personal efficacy for teaching and the sources of teaching efficacy for multiplicative reasoning*. Paper presented at poster session of the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Kalamazoo, MI.
- Jacobson, E.**, & Izsák, A. (2012, November). *Using a knowledge-in-pieces approach to explore the illusion of proportionality in covariance situations*. Research report presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Kalamazoo, MI.
- Jacobson, E.** (2012d, May). *Making mathematics teaching visible: Using activity theory to understand how mathematical knowledge for teaching develops*. Paper presented at the Eighth International Congress for Qualitative Inquiry, Urbana-Champaign, IL.
- Jacobson, E.** (2012c, May). *Using mixed methods to research learning as change in individuals and groups: Activity theory and multilevel models*. Paper presented at the Eighth International Congress for Qualitative Inquiry, Urbana-Champaign, IL.
- Jacobson, E.**, Singletary, L., & de Araujo, Z. (2011, July). *Mathematical process and US secondary teachers' conceptions of integrated mathematics curricula*. Research report presented at the annual meeting of the International Group for the Psychology of Mathematics Education. Ankara, Turkey.
- Izsák, A., & **Jacobson, E.** (2012, April). *Middle grades teachers' partitioning activity*. Paper presented at the annual meeting of the American Educational Research Association. Vancouver, Canada.
- Jacobson, E.** (2012b, April). *Mathematical knowledge for teaching and teachers' sense of efficacy*. Paper presented at poster session at the National Council of Teachers of Mathematics Research Presession, Philadelphia, PA.
- Jacobson, E.** (2011a, April) *Alternative routes to mathematical knowledge for teaching: Two cases of teacher development*. Paper presented in poster session at the annual meeting of the American Educational Research Association. New Orleans, LA.
- Lobato, J., Orrill, C., Drunken, B., & **Jacobson, E.** (2011, April). *Middle school teachers' knowledge of proportional reasoning for teaching*. Paper presented at the annual meeting of the American Educational Research Association. New Orleans, LA.
- Jacobson, E.**, Thames, M., Lai, Y., & Ball, D. (2011, April) *Examining content knowledge for teaching by comparing assessment items*. Working group presentation at the National Council of Teachers of Mathematics Research Presession, Indianapolis, IN.
- Howell, H., **Jacobson, E.**, & Steele, M. (2011, January) *Open questions about the mathematical knowledge for teaching of secondary teachers*. Discussion session presentation at the annual meeting of the Association of Mathematics Educators. Irvine, CA.
- Izsák, A., **Jacobson, E.**, de Araujo, A., & Orrill, C. H. (2010, October). *Teachers' levels of units and*

- fraction division*. Paper presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Columbus, OH.
- Izsák, A., Lobato, J., Orrill, C. H., **Jacobson, E.**, & Bradshaw, L. (2010, July). *Applying Cognitive Diagnosis Models to measure middle grades teachers' multiplicative reasoning*. Paper presented at the Seventy-Fifth Meeting of the Psychometric Society, Athens, GA.
- Orrill, C., Izsák, A., **Jacobson, E.**, de Araujo, Z. (2010, June). *Teachers understanding of partitioning when modeling fraction arithmetic*. Poster presented at the annual meeting of the International Conference of the Learning Sciences. Chicago, IL.
- de Araujo, Z., **Jacobson, E.**, Lowe, L., Marshall, A. M., Singletary, L., Wilson, P. (2010, April). *Teachers' conceptions of integration: A search for understanding*. Paper presented at the annual meeting of the American Educational Research Association. Denver, CO.
- Orrill, C., **Jacobson, E.**, de Araujo, Z. (2010, April). *Teachers' emerging understanding of fractions division as proportional reasoning in professional development*. Paper presented at the annual meeting of the American Educational Research Association. Denver, CO.
- Izsák, A., Lobato, J., Orrill, C. H., **Jacobson, E.**, & Bradshaw, L. (2010, April). *Identifying attributes and developing items to assess middle grades teachers' multiplicative reasoning*. Paper presented at the annual meeting of the American Educational Research Association, Denver, CO.
- de Araujo, Z., **Jacobson, E.**, Lowe, L., Marshall, A. M., Singletary, L., Wilson, P. (2010, April). *Teachers' conceptions of integration: Uncovering the process standards*. Paper presented at the annual meeting of the National Council of Teachers of Mathematics. San Diego, CA.
- Izsák, A., Lobato, J., Orrill, C. H., **Jacobson, E.**, & Bradshaw, L. (2010, April). *Designing attribute-based items to assess middle grades teachers' multiplicative reasoning*. Paper presented at the National Council of Teachers of Mathematics Research Pre-session, San Diego, CA.
- de Araujo, Z., **Jacobson, E.**, Lowe, L., Marshall, A. M., Singletary, L., Wilson, P. (2010, January). *Integrated mathematics: Conceptions and implications*. Paper presented at the annual meeting of the Association of Mathematics Educators. Irvine, CA.

### **Regional and State**

- Jacobson, E.**, Liu, J.\* , Matyska, R\* ., Sadak, M.\* , & Suksak, S.\* (2017, March). *Examining different kinds of mathematical work for teaching the same mathematical topic: How is knowledge for teaching mathematics structured?* Talk presented at Indiana Mathematics Education Research Symposium, Indiana University – Purdue University, Indianapolis, IN.
- Liu, J.\* & **Jacobson, E.**, (2017, February). *Mapping fraction misconceptions to the common core*. Paper presented at the Curriculum and Instruction Research Creative Activities Symposium, Indiana University, Bloomington, IN.
- Jacobson, E.**, Uzan, E.\* , Diaga, M.\* , Creager, M.\* , & Ayedniz, F.\* (2015, March). *Changes in elementary preservice teachers' mathematical proficiency for teaching*. Talk presented at Indiana Mathematics Education Research Symposium, Indiana University – Purdue University, Indianapolis, IN.
- Jacobson, E.**, Creager, M.\* , & Ayedniz, F.\* (2015, March). *Maintaining quantitative coherence: Pre-service elementary teachers' explanations using concrete representation*. Talk presented at Indiana Mathematics Education Research Symposium, Indiana University – Purdue University, Indianapolis, IN.
- Jacobson, E.** & Izsák, A. (2012, September). *Specialized content knowledge for teaching mathematical modeling in the middle grades*. Poster presented at the Studying the emerging challenges of the Common Core State Standards for Mathematics symposium. Columbia, MO.
- Thames, M., Lai, Y., **Jacobson, E.**, Kim, K., Kim, Y., & Shah, R. (2012, June). *Representing teaching in measures of mathematical knowledge for teaching: Understanding the role of pedagogical*

- context*. Paper presented at the Fourth Conference on Creating and Using Representations of Practice in Education Research and Teacher Education. Ann Arbor, MI.
- Jacobson, E.** (2012a, March). *Validating a measure of mathematics teaching self-efficacy beliefs that differentiates content and pedagogical content knowledge*. Paper presented at the Twelfth Annual Graduate Student Association Interdisciplinary Conference. Athens, GA.
- Izsák, A. & **Jacobson, E.** (2012, March). *Preparing middle grades teachers to use drawn models for developing arithmetic with rational numbers*. Paper presented at the First Annual Georgia Scholarship of Science, Technology, Engineering, and Mathematics Conference. Statesboro, GA.
- Jacobson, E.** & Izsák, A. (2011, October). *Leveraging research on unit levels for teacher education*. Paper presented at the annual meeting of the Georgia Association of Mathematics Teacher Educators. Rock Eagle, GA.
- Brunaud-Vega, V., **Jacobson, E.**, Kim, H. J. (2010, October). *What if? What if not? Assumptions and math problem posing*. Paper presented at the annual meeting of the Georgia Association of Mathematics Teacher Educators. Rock Eagle, GA.
- Jacobson, E.** & Singletary, L. (2010, October). *Collaborating to meet the standards: Implications for professional development*. Paper presented at the annual meeting of the Georgia Association of Mathematics Teacher Educators. Rock Eagle, GA.
- Jacobson, E.**, Lowe, L., Marshall, A. M. (2009, October). *Mathematical content connections in Georgia*. Paper presented at the annual meeting of the Georgia Council of Teachers of Mathematics. Rock Eagle, GA.

## STUDENTS

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### Students in Progress

- Dissertation co-chair, Theodore Savich
- Dissertation chair, Pavneet Bharaj
- Dissertation chair, Fatimah Ahmad
- Dissertation chair, Jinqing Liu
- Dissertation committee, Rebecca Borowski
- Dissertation committee, Kemol Lloyd
- Doctoral program chair, Lori Burch
- Doctoral program chair, Lloyd Potts
- Doctoral program committee, Crystal Vesperman

### Students Completed

- 2018 – Dissertation committee, Ranu Roy
- 2018 – Dissertation committee, Fetiye Aydeniz
- 2017 – Dissertation committee, Ayfer Eker
- 2017 – Dissertation committee, Erol Uzan
- 2014 – Dissertation committee, Arnulfo Perez

## SERVICE

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### University, School and Department

- 2017 – present, Member, Education Council, School of Education, Indiana University
- 2017 – present, Member, Learning and Teaching with Technology Committee, School of Education, Indiana University
- 2017 – 2018, Member, Ad hoc Committee for Face-to-Face Doctoral Programs, Department of Curriculum and Instruction, School of Education, Indiana University

- 2017 – 2018, Member, Doctoral Program Review Committee for Mathematics Education, School of Education, Indiana University
- 2017 – Member, Search Committee for Professor of Mathematics Education, School of Education, Indiana University
- 2016 – 2017, Member, Ad Hoc Committee for Restructuring Education, School of Education, Indiana University
- 2016 – present, Member, Undergraduate Awards Committee, School of Education Indiana University
- 2015 – present, Member, Academic Standards Committee, School of Education Indiana University
- 2015 – 2016, Member, Curriculum & Instruction Department Chair Review Committee, School of Education, Indiana University
- 2014 – Member, Elementary Education Council, Indiana University
- 2014 – present, Chair, Mathematics Education Event Committee, Indiana University

### **Professional**

- 2018 – present, Executive Editor, *Cognition and Instruction*.
- 2018 – 2021, Consultant, *Graspable Math Activities: Increasing Algebra Proficiency with Dynamic Notation Technology* directed by Erik Weitnauer (IES:SBIR)
- 2017 – Panel Reviewer for the National Science Foundation (DRK-12, EHR-CORE).
- 2008 – present, Ad Hoc Journal Reviewer, *American Educational Research Journal*, *Journal for Research in Mathematics Education*, *Journal of Mathematics Teacher Education*, *Journal of Teacher Education*, *International Journal of Science and Mathematics*, *Mathematics Teacher*, *Cognition and Instruction*, *Teaching and Teacher Education*, *International Journal of Testing*.
- 2008 – present, Conference Reviewer – AERA, AMTE, PME, PMENA, ICME, NCTM.
- 2014 – 2015, Guest Editor – Special Issue of *Journal of Mathematics Teacher Education* on Productive Disposition for Teaching Mathematics, published Oct. 2015.
- 2014 – Reviewer, Indiana CORE Assessments for Educator Licensure Passing Score Review Meeting.
- 2013 – 2015, Advisor, mathematics teacher knowledge assessments for *Educational Testing Services*.
- 2013 – Organizer, AERA SIG-RME roundtable symposium, *Exploring Productive Disposition for Teaching Mathematics*.
- 2009 – 2013, Associate Editor, *The Mathematics Educator*, a research journal published by the Mathematics Education Student Association at the University of Georgia.
- 2011 – Consultant, *Capturing Teacher Knowledge* project funded by the Institute of Education Sciences and directed by Nicole Kersting (University of Arizona), Rossella Santagata (University of California, Irvine), and Karen Givvin (University of California, Los Angeles).
- 2011 – Consultant, *Measures of Effective Teaching: Mathematical Quality of Instruction* project funded by the Bill and Melinda Gates Foundation and directed by Heather Hill (Harvard University).
- 2009 – 2010, Advisor, *Measures of Effective Teaching: Teacher Knowledge* project funded by the Bill and Melinda Gates Foundation and directed by Drew Gitomer, Barbara Werens, Geoffrey Phelps (Educational Testing Service), and Mark Thames (University of Michigan).

### **AFFILIATIONS**

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American Educational Research Association  
 Association of Mathematics Teacher Educators  
 International Group for the Psychology of Mathematics Education  
 International Society of the Learning Sciences  
 National Council of Teachers of Mathematics