

Curriculum Vitae

Nicole Marie Lanie Fonger

Syracuse University
College of Arts and Sciences, Mathematics Department
School of Education, Teaching and Leadership
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FORMAL EDUCATION

Ph.D., Mathematics Education, Western Michigan University, August 2012
Dissertation: *Characterizing and Supporting Change in Algebra Students' Representational Fluency in a CAS/Paper-and-Pencil Environment*

M.A., Mathematics, Western Michigan University, December 2009

M.A., Mathematics Education, Western Michigan University, April 2008

B.A., Mathematics, minor in Spanish, University of Saint Thomas, May 2006
Minor: Spanish, *Magna cum laude*

PROFESSIONAL EXPERIENCE

Assistant Professor of Mathematics and Mathematics Education, Syracuse University, 2017-present

Postdoctoral Research Fellow, University of Wisconsin-Madison, IES Postdoctoral Training Program in Mathematical Thinking, Learning, and Instruction, 2014-2017

Research Associate, North Carolina State University, William and Ida Friday Institute for Educational Innovation, 2013-2014

Instructor of Mathematics Education, Department of Mathematics, Western Michigan University, 2012-2013

Doctoral Fellow, Center for the Study of Mathematics Curriculum (CSMC), 2007-2012

Graduate Research Assistant, Department of Mathematics, Western Michigan University, 2006-2009, 2011-2012

Teaching Doctoral Associate/Graduate Teaching Assistant, Department of Mathematics, Western Michigan University, 2010-2011/2009-2010

Mathematics Teacher, Kalamazoo Public and Private Schools, Kalamazoo, Michigan, 2006-2008

AWARDED FUNDING

Award Amount	Personnel, Project, Sponsoring Agency
\$5000	Fonger, N. L. (PI) and Keech, K. (Collaborator). A Research-Practice Partnership to Enrich and Support Youth Experience of Meaningful Math Learning in an Urban Public High School. Syracuse University, School of Education Awarded April 30, 2018, Funding Period: 2 years.

AWARDS

National Council of Teachers of Mathematics

Linking Research and Practice Outstanding Publication Award *Mathematics Teacher*

The winning article, “Equivalent Expressions Using CAS and Paper-and-Pencil Techniques” was authored by Nicole L. Fonger, published May 2014, pp. 688-93.

Western Michigan University

Graduate Research and Creative Scholar Award, Department of Mathematics, 2011-2012

All University Teaching Effectiveness Award, 2010-2011

PUBLICATIONS

Peer Reviewed Journal Articles

Fonger, N. L., Stephens, A., Blanton, M., Isler, I., Knuth, E., Gardiner, A. (2018). Developing a learning progression for curriculum, instruction, and student learning: An example from mathematics education. *Cognition and Instruction*, 36(1), 30-55.
<https://doi.org/10.1080/07370008.2017.1392965>

Fonger, N. L. (2018). A design-based research partnership to support students’ coordination of computer algebra systems and paper-and-pencil. *International Journal for Technology in Mathematics Education*.

Fonger, N. L., Davis, J., Rohwer, M. L. (2018). Instructional supports for representational fluency in solving equations with computer algebra systems and paper-and-pencil. *School Science and Mathematics*, 118(30), 30-42. doi:10.1111/ssm.12256

Stephens, A. C., **Fonger, N.**, Strachota, S., Isler, I., Blanton, M., Knuth, E., Gardiner, A. M. (2017). A learning progression for elementary students’ functional thinking. *Mathematical Thinking and Learning*, 19(3), 143-166.

Fonger, N. L., Reiten, L., Strachota, S., Ozgur, Z. (2017). Engaging in research: Why? How? Now! *Mathematics Teacher* 110(6), 462-465.

Davis, J. D., & **Fonger, N. L.** (2015). An analytical framework for categorizing the use of CAS symbolic manipulation in textbooks. *Educational Studies in Mathematics*, 88(2), 239-258. doi: 10.1007/s10649-014-9581-z

- Fonger, N. L.** (2014). Equivalent expressions using CAS and paper-and-pencil techniques. *Mathematics Teacher*, 107(9), 688-693.
- Fonger, N. L.** (2012). Shed new light on student thinking with a representational lens. *Consortium: The newsletter of the consortium for mathematics and its applications*, 102, 1-6.
- Fonger, N. L.** (2011). Lessons learned as a novice researcher: The case of a pilot study in mathematics education. *The Hilltop Review*, 4(2), 55-62. Retrieved October 25, 2011, from http://www.wmich.edu/gsac/Events/Spring2011/Hilltop%20Review/Hilltop_Review_4.2.2011_Final.pdf
- Hedican, E. B., Kemper, J. T., & **Lanie, N. M.** (2007). Modeling biomarker dynamics with implications for the treatment of prostate cancer. *Computational and Mathematical Methods in Medicine*, 8(2), 77-92.

Edited Book Chapters

- Blanton, M. Brizuela, B., Stephens, A., Knuth, E., Isler, I., Gardiner, A. M., Stround, R., **Fonger, N.**, Stylinou, D. (2018). Implementing a framework for early algebra. In C. Kieran (Ed.) *Teaching and Learning Algebraic Thinking with 5- to 12-Year Olds*, ICME-13, Monographs, https://doi.org/10.1007/978-3-319-68351-5_2
- Hirsch, C., Keller, B., **Fonger, N.**, & Edson, A. (2013). Core Math Tools: Supporting equitable implementation of the common core state standards for mathematics. In D. Polly (Ed.), *Common Core Mathematics Standards and implementing digital technologies* (pp. 1-22). Hershey, PA: IGI Global.
- Ziebarth, S. W., **Fonger, N. L.**, & Kratky, J. L. (2013). Instruments for studying the enacted mathematics curriculum. In D. Thompson & Z. Usiskin (Eds.), *Enacted Mathematics Curriculum: A Conceptual Framework and Research Needs* (pp. 97-120). Information Age Publishing.

Peer-Reviewed Conference Proceedings

- Fonger, N. L.** (2017). Characterizing sophistication in representational fluency. In Galindo, E., & Newton, J., (Eds.). (2017). In E. Galindo & J. Newton (Ed.) *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.
- Ellis, A., **Fonger, N. L.**, Dogan, M. F. (2017). Developing function understanding through dependency relations of change. In Galindo, E., & Newton, J., (Eds.). (2017). In E. Galindo & J. Newton (Ed.) *Proceedings of the 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 283-286. Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

- Fonger, N. L.**, Dogan, M. F., Ellis, A. (2017). Students' clusters of concepts of functions. In Kaur, B., Ho, W.K., Toh, T.L., & Choy, B.H. (Eds.). *Proceedings of the 41st Conference of the International Group for the Psychology of Mathematics Education*, Vol. 2, pp. 329-336. Singapore: PME.
- Fonger, N. L.**, Ellis, A., Dogan, M. F. (2016). Students' conceptions supporting their symbolization and meaning of function rules. 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. 156-163). Tucson, AZ: University of Arizona.
- Strachota, S., Isler, I., **Fonger, N. L.**, Blanton, M., & Gardiner, A. (2016). Analyzing generalizations through discourse. 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*. Tucson, AZ: University of Arizona.
- Strachota, S., **Fonger, N. L.**, Stephens, A., Blanton, M., Knuth, E., Gardiner, A. (2016). Understanding variation in elementary students' functional thinking. *Proceedings of the 40th annual meeting of the International Group for the Psychology of Mathematics Education*.
- Fonger, N. L.**, Stephens, A., Blanton, M., Knuth, E. (2015). A learning progressions approach to early algebra research and practice. In T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Badfield, & H. Dominguez (Eds.). *Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. East Lansing, MI: Michigan State University.
- Ziols, R., **Fonger, N. L.**, Tran, D. T., Elliott, N. (2015). Children's reasoning with fraction representation systems. In T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Badfield, & H. Dominguez (Eds.). *Proceedings of the 37th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. East Lansing, MI: Michigan State University.
- Fonger, N. L.** (2013). Equivalence and equation solving with multiple tools: Toward an instructional theory. 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* (pp. 1141-1148). Chicago, IL: University of Illinois at Chicago.
- Fonger, N. L.** (2011). An analytic framework for representational fluency: Algebra students' connections between representations using CAS. In L. R. Wiest & T. Lamberg (Eds.), *Proceedings of the 33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 88-96). Reno, NV: University of Nevada, Reno. Retrieved from <http://convention3.allacademic.com/one/pmena/pmena11/>
- Davis, J. D., & **Fonger, N. L.** (2010). Computer algebra systems: Their roles and connections to paper-and-pencil skills in reform-oriented curricula. Paper presented at the *Annual*

Meeting of the American Educational Research Association, Denver, CO. Retrieved from <http://www.aera.net/repository/>

Fonger, N. M. L. (2009). CAS-based task frameworks and linking multiple representations. In Dj. Kadijevich & R. M. Zbiek (Eds.), *Proceedings of the 6th CAME (Computer Algebra in Mathematics Education) Symposium*. Belgrade, Serbia. Retrieved from http://www.megatrend.edu.rs/came_files/CAME%202009-Proceedings.pdf

Policy Report

Stallings, T., **Fonger, N.**, & DeWitt, J. (2014). Recommendations for Moving North Carolina Forward in Digital Learning and Mathematics Instruction. Friday Institute for Educational Innovation, North Carolina State University. March 2014.

Opinion Education

Fonger, N. L. (2014/2015). Reader reflections: Hexagons reply. *Mathematics Teacher*, 108(5), 325.

TEACHING AND MENTORING

Graduate-Level Mathematics Education Courses

Syracuse University

Linking Research and Practice (School of Education, EDU 700 / MTD 700, Spring 2018)

University of Wisconsin-Madison

Seminar in Research on Mathematics Education (Curriculum and Instruction 942 Fall 2015), Collaborating professor of record: Dr. Amy Ellis

Undergraduate Mathematics Courses

Syracuse University

Precalculus (Mathematics, MAT 194 Fall 2017)

Western Michigan University

Computing Technology in Secondary School Mathematics (Math 3510: Fall 2009, Fall 2010, Fall 2012, Spring 2013)

Excursions in Mathematics (Math 1140: Summer 2011, Summer 2013)

Teacher Preparation Courses (Undergraduate/Master's Level)

Syracuse University

Methods and Curriculum in Teaching Mathematics (School of Education, SED 413/613 Fall 2017)

Candidacy Student Teaching Experience (School of Education, SED 508, Fall 2017)

Teaching Assistant: Nigar Atlindas (Fall 2017, SED 413/613)

Graduate Student Intern: Joash Mochogi (Fall 2017, SED 413/613)

Western Michigan University

Geometry for Elementary and Middle School Teachers (Math 1510: Spring 2010, Fall 2012, Spring 2013)

Number Concepts for Elementary and Middle School Teachers (Math 1500: Spring 2011)

High School Courses (Kalamazoo, Michigan Schools)

Geometry I & Geometry II (Summer 2006)

Algebra I (Shared teaching/Internship) (Fall 2007- Spring 2008)

Honors Geometry (Shared teaching/Internship) (Fall 2007- Spring 2008)

Graduate Student Mentoring

Syracuse University

- Nigar Altindis, Phd Student, Mathematics Education, Research Apprenticeship, Fall 2017 – present.

University of Wisconsin-Madison (while a Postdoctoral Research Fellow)

Graduate students (related projects, years):

- Susanne Strachota (LEAP 2: The impact of early algebra on students' algebra-readiness, 2015-2016)
- Fatih Dogan (SPARQ: Supporting Students' Proof Practices Through Quantitative Reasoning in Algebra, 2014-2016)

PROFESSIONAL SERVICE

Panel Review

National Science Foundation, Ad Hoc Reviewer, 2018.

National Science Foundation, Panel Review Member, 2016.

National Science Foundation, Panel Review Member, 2015.

Peer Review of Journal Manuscripts and Conference Proceedings

Journal of Mathematics Teacher Education, 2017-present

Contemporary Issues in Technology and Mathematics Teacher Education (CITE), 2010-present.

Journal for Research in Mathematics Education, 2014-present.

Mathematics Teacher, 2013-present.

North American Chapter of the International Group for the Psychology of Mathematics Education, 2016-present.

Mentorship and Outreach

Women in Science and Engineering Postdoctoral Faculty Liaison, Syracuse University College of Arts and Sciences, Fall 2017 – present

Conference Planning

Assistant to Coordinators, Convening on K-12 Mathematics Education: Common Core, Digital Learning, and State Policy, March 2014.

Local Organizing Committee Member, Psychology of Mathematics Education North American Chapter, Western Michigan University, Kalamazoo, MI, Spring 2011 – Fall 2012.

Planning Committee Member, CSMC Doctoral Fellows Symposium, San Diego, CA. Fall 2009 – Spring 2010.

Assistant to Coordinators, Conversations Among Colleagues Conference, Western Michigan University, Kalamazoo, MI, Fall 2007 – Winter 2008.

PRESENTATIONS

International Professional Meetings

Fonger, N. L., Dogan, M. F., Ellis, A. (2017). Students' clusters of concepts of functions. In Kaur, B., Ho, W.K., Toh, T.L., & Choy, B.H. (Eds.). *Proceedings of the 41st Conference of the International Group for the Psychology of Mathematics Education*, Vol. 2, pp. 329-336. Singapore: PME.

Isler, I., Strachota, S, Stephens, A, **Fonger, N.**, Blanton, M., Gardiner, A., Knuth, E. (2017). Grade 6 students' abilities to represent functional relationships. Presented at the 10th International Congress on European Research in Mathematics Education (CERME10). Dublin, Ireland. February 1-5, 2017.

Huntley, M. A., Terrell, M., **Fonger, N. L.** (2016). The algebra content of high school textbooks in the US. Presented at the 13th International Congress on Mathematics Education. Hamburg, Germany. July 24-31, 2016.

Fonger, N. L. (2013). Design research. *Season School on Design-Based Research*. University of Jaén, Jaén, Spain. November 4-8, 2013.

Fonger, N. L. & Rohwer, M. L. (2012). Expressions, equations, and equivalence, oh my! TI-Nspire CAS handhelds as a learning tool in algebra. *Teachers Teaching with Technology International Conference*. Chicago, IL. March 2012.

Fonger, N. M. L. (2009). CAS-based task frameworks and linking multiple representations. Presented virtually at the 6th CAME (*Computer Algebra in Mathematics Education Symposium*). Belgrade, Serbia.

National Professional Meetings

Fonger, N. L. (2018). A self-study on mindfulness in precalculus. *Research in Undergraduate Mathematics Education (RUME), Pre-calculus working group*. San Diego, CA.

Fonger, N. L. (2017). Characterizing sophistication in representational fluency. In Galindo, E., & Newton, J., (Eds.) *39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

Ellis, A., **Fonger, N. L.**, Dogan, M. F. (2017). Developing function understanding through dependency relations of change. In Galindo, E., & Newton, J., (Eds.) *39th annual meeting of the North American Chapter of the International Group for the Psychology of*

Mathematics Education. Indianapolis, IN: Hoosier Association of Mathematics Teacher Educators.

- Fonger, N. L.**, Stephens, A., Isler, I., Strachota, S. Blanton, M., Knuth, E. (2016). An Early Algebra Learning Progression for Characterizing and Supporting Students' Generalization and Representation of Functions: A Longitudinal Approach to Integrating Curriculum, Instruction, Assessment, and Student Learning. *Institute of Education Sciences Principal Investigators Meeting*. Washington, DC. December 2016.
#ProjectLEAP advances effective curricular and instructional supports for students' functional thinking in early algebra
#MathEd
- Fonger, N. L.**, Ellis, A., Dogan, M. F. (2016). Students' conceptions supporting their symbolization and meaning of function rules. *38th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Tucson, AZ: University of Arizona. November 2016.
- Stephens, A., **Fonger, N. L.**, Knuth, E., Blanton, M. (2016). Elementary students' generalization and representation of functional relationships: A learning progressions approach. *American Educational Research Association*. Washington, DC. April 2016.
- Fonger, N. L.** (2015). How partnerships are core to a linking research and practice agenda. *National Council of Teachers of Mathematics Research Conference*. Boston, MA. April 2015.
- Fonger, N. L.**, Tran, D., Elliott, N. (2015). Variation in Children's Understanding of Fractions: Preliminary Findings. *National Council of Teachers of Mathematics Research Conference*. Boston, MA. April 2015.
- Fonger, N. L.**, Tran, D., Elliott, N. (2015). What fraction of children's knowledge of fractions can you see? *National Council of Teachers of Mathematics Annual Meeting*. Boston, MA. April 2015.
- Fonger, N. L.** (2014). Synergy in linking research and practice to support students' use of multiple tools. *National Council of Teachers of Mathematics Research Conference*. New Orleans, LA. April 2014.
- Fonger, N. L.** (2014). Conjecturing a linear equations, inequalities, and functions learning trajectory for teacher education. *Association of Mathematics Teacher Educators*. Irvine, CA. February 2014.
- Fonger, N. L.** (2013). Equivalence and equation solving with multiple tools: Toward an instructional theory. *35th Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education*. The Palmer House, Chicago, IL. November 2013.
- Fonger, N. L.** (2013). A research-based learning progression for beginning algebra. *Annual Meeting of the National Council of Teachers of Mathematics*, Denver, CO. April 2013.
- Fonger, N. L.** (2013). Equivalence and equation solving with multiple tools: A learning progression. *National Council of Teachers of Mathematics Research Presession*, Denver,

- Fonger, N. L.** (2012). Students' development of representational fluency with CAS: An instructional theory. *National Council of Teachers of Mathematics Research Pre-session*. Philadelphia, PA. April 2012.
- Fonger, N. L.** (2011). An analytic framework for representational fluency: Algebra students' connections between representations using CAS. *33rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Reno, NV. October 2011.
- Davis, J. D. & **Fonger, N.** (2010). Computer algebra systems: Their roles and connections to paper-and-pencil skills in reform-oriented curricula. *American Educational Research Association Annual Meeting*. Denver, CO. May 2010.
- Ziebarth, S. W., **Fonger, N. L.**, & Edson, A. J. (2010). Tools to help teachers and school leaders understand curriculum implementation. *Annual Meeting of the National Council of Teachers of Mathematics*. San Diego, CA. April 2010.
- Ziebarth, S., **Fonger, N. L.**, Edson, A., Engelman, J., & Kratky, J. (2010). Pursuing a doctorate in mathematics education: The varieties of research experience. *National Council of Teachers of Mathematics Research Pre-session*. San Diego, CA. April 2010.

Invited Presentations

- Fonger, N. L.** (2017). The academic job market. Hosted by the Future Professoriate Program at Syracuse University. Panel Discussion, School of Education. Nov. 30, 2017.
- Fonger, N. L.** (2017). The Tenure-Track Interview Process Luncheon. Hosted by Women in STEM (WiSE) Postdocs at Syracuse University. Panel Discussion, College of Arts and Sciences. Oct. 27, 2017.
- Fonger, N. L.** (2017). Math anxiety: Causes and possible supports through instruction and leadership. Presentation at a Fall meeting of the Math Mavens, Teacher Leaders and Math Coaches of Central New York. Fayetteville Elementary School, Fayetteville, NY. Dec. 8, 2017.
- Fonger, N. L.** (2017). Building bridges to link research and practice. Presentation at the spring meeting for the Tristate Instructors of Mathematics Network. University of Wisconsin Platteville Department of Mathematics, Platteville, WI. April 2017.
- Fonger, N. L.** (2015). Perspectives on Linking Research and Practice: Thoughts From the Field. National Council of Teachers of Mathematics Research Conference, Boston, MA. April 2015.
- Kemper, J. T. Hedican, E. B., & **Lanie, N.** (2004). Prostate specific antigen as bio-marker for prostate cancer. Invited presentation for the Center for Applied Mathematics, Math Appreciation Day, University of Saint Thomas, Saint Paul, MN. November 2004.

Other Presentations, Posters, and Colloquia

- Fonger, N. L.**, Mayer, J., Huntley, M. A., Terrell, M. (2017). Engaging in research. Why? How? Now! A teacher-researcher partnership. Presented at the Association of Mathematics Teachers in New York State (AMTNYS), Nov. 2017. Buffalo, NY.

- Stephens, A., Blanton, M., Demers, L., Knuth, E., Stylianou, D. Burrows, A., Eiland, M., **Fonger, N. L.**, Gardiner, A. M., Hayes, R., Isler, I., Kang, H., Strachota, S. (2016). Project LEAP: Learning through an early algebra intervention. University of Wisconsin-Madison Education Research Poster Fair. February, 2016.
- Fonger, N. L.** (2015). A learning progressions approach to supporting algebra students' representational fluency in equation solving. Poster presented at 3rd Annual Meeting on Mathematical Thinking (M3T-3). University of Minnesota. August 14, 2015.
- Fonger, N. L.**, Davis, J. D., Rohwer, M. L. (2015). A functions approach to solving equations with computer algebra systems/paper-and-pencil: Supports for students' change in representational fluency. Poster presented at Social Policy and Research in Cognition & Mathematics Education: A focus on Common Core (SPaRCME). University of California, Berkeley. May 29-30, 2015.
- Blanton, M., Demers, L., Knuth, E., Stephens, A., Stylianou, D. Burrows, A., Eiland, M., **Fonger, N. L.**, Gardiner, A. M., Hayes, R., Isler, I., Kang, H., Strachota, S. (2015). Project LEAP: Learning through an early algebra intervention. University of Wisconsin-Madison Education Research Poster Fair. February, 2015.
- Blanton, M., Knuth, E., Stephens, A., Eiland, M., **Fonger, N. L.**, Gardiner, A. M., Hayes, R., Isler, I., Kang, H., Strachota, S. (2015). The impact of early algebra on students' algebra-readiness. University of Wisconsin-Madison Education Research Poster Fair. February, 2015.
- Fonger, N. L.** (2015). How partnerships are Core to a linking research and practice agenda. Mathematics Education Seminar, University of Wisconsin-Madison. February, 2015.
- Fonger, N. L.** (2014). Advancing a program of research. Mathematics Education Seminar, University of Wisconsin-Madison. October, 2014.
- Fonger, N. L.**, Maloney, A. M., Confrey, J. (2013). Three musketeers of algebra. *North Carolina Council of Teachers of Mathematics 43rd Annual Conference*. Joseph S. Koury Convention Center, Greensboro, NC. October 2013.
- Fonger, N. L.** (2013). The strategic use of paper-and-pencil and CAS: Reconciling differences between representations. *Conversations Among Colleagues*, Central Michigan University, Mount Pleasant, MI. March 2013.
- Fonger, N. L.** (2012). Visualize shape center and spread with Core Math Tools. *Annual Meeting of the National Council of Teachers of Mathematics BuzzHub*. Philadelphia, PA. April 2012.
- Hirsch, C. & **Fonger, N.** (2012). Core Math Tools supporting CCSSM-oriented curriculum design and enactment. *Center for the Study of Mathematics Curriculum Research Conference*. Phoenix, AZ. March 2012.
- Fonger, N.** (2012). Algebra students' representational fluency in a CAS and paper-and-pencil environment. *Center for the Study of Mathematics Curriculum Research Conference*. Phoenix, AZ. March 2012.

- Fonger, N. L.** (2011). How dynamic links can bolster connections between representations. *Michigan Council of Teachers of Mathematics Annual Conference*. Macomb, MI. August 2011.
- Fonger, N.** & Davis, J. (2010). The role of computer algebra systems in high school curricula: A textbook analysis. Poster presentation at the Fourth Annual WMU Research and Creative Activities Poster Day, Western Michigan University, Kalamazoo, MI. April 2010.
- Ziebarth, S. **Fonger, N. L.**, & Edson, A. J. (2009). Fidelity of implementation tools: High school curricula. Poster presentation at the *Center for the Study of Mathematics Curriculum Research Conference*. Phoenix, AZ. February 2009.
- Fonger, N. L.**, Edson, A. J., & Ziebarth, S. (2009). Fidelity of implementation tools: High school curricula. Poster presentation at the Third Annual WMU Research and Creative Activities Poster Day, Western Michigan University, Kalamazoo, MI. April 2009.
- Fonger, N. L.** (2009). Technology-intensive curricula and student learning. *Center for the Study of Mathematics Curriculum Research Conference*. Phoenix, AZ. February 2009.
- Lanie, N.** (2008). Delving deeper into CPMP-Tools: Java-based software for data analysis and probability simulation. Poster presentation at the *Center for the Study of Mathematics Curriculum Research Conference*. Phoenix, AZ. February 2008.
- Lanie, N.** (2008). New software tools supporting new expectations for high school mathematics. Workshop presentation at the *Mathematics in Action Conference*. Grand Valley State University, Grand Valley, MI. February 2008.
- Lanie, N.** (2007). Interactive geometry software for all Michigan teachers and students. Workshop presentation at *Michigan Council of Teachers of Mathematics Annual Conference*. Holt, MI. August 2007.
- Lanie, N.** & Hirsch, C. (2007). Design and development of curriculum-embedded, Java-based software for high school mathematics. Poster presentation at the *Center for the Study of Mathematics Curriculum Research Conference*. Phoenix, AZ. February 2007.
- Lanie, N.** & Thompson, A. (2006). GEMS Camp at UST: Girls experiencing math in the summer. Presentation at the *Minnesota Council of Teachers of Mathematics Annual Conference*. Duluth, MN. April 2006.
- Rezac, L. & **Lanie, N.** (2005). Arabesque: Studying geometry in Spain. Presentation at the *Minnesota Council of Teachers of Mathematics Annual Conference*. Duluth, MN. April 2005.
- Lanie, N.** (2005). Symmetry in southern Spain: Classification of 17 planar symmetry groups. Presentation at the *Minnesota Council of Teachers of Mathematics Conference*. Andover MN. October 2005.
- Lanie, N.** (2005). GEMS camp: Counseling girls in mathematics. Presentation at the *Minnesota Council of Teachers of Mathematics Conference*. Andover MN. October 2005.
- Rezac, L. & **Lanie, N.** (2004). Classification and proof of 17 planar symmetries. Poster presentation at University of Saint Thomas, Saint Paul, MN. September 2004.

LEADERSHIP TRAINING

Undergraduate research mentor training, DELTA program, University of Wisconsin-Madison, May 2016.

Postdoctoral Training Course in Scientific Leadership & Management, University of Wisconsin-Madison, School of Medicine and Public Health, October 2015 - March 2016.

Conflict Management Training, North Carolina State University, April 2014.

PROFESSIONAL DEVELOPMENT FOR TEACHERS

Course Developer, MOOC-Ed Series Course on Fractions Foundations. Fall 2014. www.mooc-ed.org

Course Developer and Leader, MOOC-Ed Series Course on Mathematics Learning Trajectories, Equipartitioning as a Foundation for Rational Number Reasoning in K-5. Online web platform October 7 – November 26, 2013. www.mooc-ed.org

Workshop Developer and Leader, *Deep Understanding of Geometry*, Michigan Mathematics Rural Area Project workshop for elementary teachers. Gaylord, MI, June 26 – 28, 2013

RESEARCH & DEVELOPMENT EXPERIENCE

Postdoctoral Research Fellow for the U.S. Department of Education—IES Training Program in the Education Sciences under grant no: R305B130007, and as part of the Wisconsin Center for Education Research Postdoctoral Training Program in Mathematical Thinking, Learning, and Instruction, and the University of Wisconsin-Madison. Drs. Mitchell Nathan (Project Director), Amy Ellis, Eric Knuth (Faculty Mentors). Duties include conducting and leading research on learning trajectories/progressions, students' conceptions of quadratic functions, generalization, and representational fluency in CAS and paper-and-pencil learning environments. Project work:

- SPARQ: Supporting Students' Proof Practices Through Quantitative Reasoning in Algebra, NSF Career Grant (Award #0952415), led by PI Dr. Amy Ellis, July 2014 – present.
- LEAP 3: The impact of a teacher-led early algebra intervention on children's algebra-readiness for middle school, IES Math and Science Education, Goal 3: Efficacy and Replication project, led by PIs: Drs. Maria Blanton, Despina Stylianou, Eric Knuth, Ana Stephens, and Lindsay Demers (Award # R305A140092), July 2014 – Aug. 2017.
- LEAP 2: Collaborative Research: The impact of early algebra on students' algebra-readiness, NSF DRK-12, led by PIs: Drs. Maria Blanton, Eric Knuth, and Ana Stephens (Award # 1219606), July 2014 – Aug. 2017.
- GAMMA: Generalization Across Multiple Mathematical Areas, NSF EHR Core Research Grant, led by PI Dr. Amy Ellis with CoPIs: Elise Lockwood, Erik Tillema, and Kevin Moore. July 2015 – February 2016.
- AVATAR: Connecting Mathematical Ideas through Animated Multimodel Instruction, IES, Mitch Nathan (Co-PI), Collaborators: Martha Alibali (UW-Madison), Voicu Poescu (Purdue), Nicolette Adamo-Villani (Purdue), Susan Cook (U Iowa). April – July 2015.

Professional Consultant on Examining Different Curricular Approaches and Their Impact on High-School Students' Understanding of Algebra: Phase 1 - Studying the Intended Curriculum (NSF Grant 0901311). Dr. Mary Ann Huntley (Cornell U), PI, Collaborators: Dr. Maria Terrell (Cornell U), Jennifer Mayer, Dick Furnas. Duties include analyses of content and cognitive processes in an algebra textbook series and reconciling code assignments with a master teacher. Fall 2012 – Summer 2015.

Postdoctoral Research Associate on Learning Trajectories for the K-8 Common Core Math Standards, TurnOnCCMath.net. Dr. Alan Maloney (NC State). Duties included review of literature to inform revisions to learning trajectories and descriptors, review and organization of external reviews of learning trajectories, and dissemination of learning trajectories for teachers and mathematics educators. Summer 2013 – Spring 2014.

Postdoctoral Research Associate on Massive Open Online Course for Educators (MOOC-Ed), www.mooc-ed.org/. Drs. Glenn Kleiman, Alan Maloney, Mary Ann Wolf (Friday Institute, NC State). Duties included course development and facilitation in a course on The Equipartitioning Learning Trajectory, A K-5 Foundation for Rational Number Reasoning, and Fraction Foundations. Fall 2013 – Summer 2014.

Doctoral Research Assistant on Transition to College Mathematics and Statistics, www.wmich.edu/tcms. Dr. Christian Hirsch (Western Michigan U), PI. Duties included writing and revising curriculum materials for a Linear Programming unit including utilization of web-based technologies to support problem-based inquiry. Spring 2012.

Postdoctoral Research Assistant on ERGO: Developing Principles for Curriculum Ergonomics in the Common Core Era. Drs. Jeffrey Choppin, Jon Davis, Corey Drake, and Amy Roth McDuffie, Co-PIs. Duties included assisting in school recruitment and conducting background interviews with middle school teachers on their perceptions of the Common Core State Standards for Mathematics and their district's efforts to support them. Fall 2012 – Winter 2013.

Doctoral Research Assistant on Core Math Tools, www.nctm.org/coremathtools. Drs. Christian Hirsch, Sabrina Keller, and NCTM's Core Math Tools Task Force (Dr. Rose Mary Zbiek, Pat Hopfensperger, Dr. W. Gary Martin). Duties included refinement and dissemination of web-based tools for the Common Core State Standards for Mathematics and writing help documentation for use of the tools and data sets. Spring 2011 – Spring 2012.

Graduate Research Assistant on Core-Plus Mathematics Project, www.wmich.edu/cpmp/, www.wmich.edu/cpmp/CPMP-Tools/index.html. Dr. Christian Hirsch, James Laser, and Beth Ritsema, and Dr. Sabrina Keller. Duties included contributing to the development of 2nd edition and Copyright update for the Student Edition and Teacher's Guide curriculum materials with an emphasis on technology notes in Courses 2-3 and a geometry unit in Course 3. I also collaborated with the software developer on the design and testing of Java Web-Based software and created the CPMP-Tools help menu. Summer 2006 – Fall 2008, Fall 2011 – Summer 2012.

Graduate Research Assistant on Fidelity of Implementation Tools Group. Dr. Steven Ziebarth (Western Michigan U), in partnership affiliates of the Center for the Study of Mathematics Curriculum including Michigan State University, Horizon Research, Inc., and University of Missouri. Duties included designing, developing, and analyzing lesson logs, surveys, and annotated unit guides for high school mathematics curricula. 2010-2012

Graduate Research Assistant on Center for the Study of Mathematics Curriculum's Curriculum Databases, www.mathcurriculumcenter.org/resources_databases.php. Drs. Robert Reys (U of Missouri), Steven Ziebarth (Western Michigan U). Duties included updating literature and instrument databases for the CSMC Web site. Fall 2008 – Spring 2010.

INDIVIDUAL DEVELOPMENT AND CONTINUING EDUCATION

University of Wisconsin-Madison

Culturally Relevant Pedagogy (Curriculum and Instruction 844, Dr. Gloria Ladson-Billings), Spring 2017.

Wisconsin Ideas in Education Series, School of Education, Fall 2014-Spring 2017.

Theory and Design of the Curriculum (Curriculum and Instruction 830, Dr. Michael Apple), Fall 2016.

Negotiating Effectively (Workshop for Postdoctoral Scholars), Spring 2016.

Regression Models in Education (Educational Psychology Course 763, Dr. Peter Steiner), Fall 2015.

IES PI Meeting, Washington, D.C., December 2015.

Milwaukee Public Schools Research and Development Opportunities, Wisconsin Center for Education Research and The Wisconsin Collaborative Education Research Network, March 2015.

The Development of Mathematical Thinking (Educational Psychology Course 925, Dr. Percival Matthews), Spring 2015.

Educational Psychology Lab Meeting (Dr. Martina Rau), Spring 2015.

Psychology Lab Meetings (Dr. Martha Alibali), Spring 2015.

CSMC Third International Conference: Mathematics Curriculum Development, Delivery, and Enactment in a Digital World (<http://csmc-intlconf.uchicago.edu/>), November 2014.

Mathematics Education Seminar (Curriculum and Instruction Course 942, Dr. Amy Ellis), Fall 2014-Spring 2015.

Grants and Grant Writing (Educational Psychology Course 711, Dr. Mitchell Nathan), Fall 2014.

Theories of Learning in Mathematics Education (Curriculum and Instruction Course 811, Dr. Amy Ellis), Fall 2014.

Statistical Methods for the Social Sciences, Educational Psychology (Educational Psychology Course Sequence 760-761, Instructor Carol Eckerly), Fall 2014-Spring 2015.

Scholarly Publishing Symposium, October 30, 2014.

Best Practices for Linked In, September 2014.

IES PI Meeting, Washington, D.C., September 2014.

Secrets of PhD Headhunter, Dr. Susan Basalla, August 2014.

North Carolina State University, Friday Institute for Educational Innovation

Convening on K-12 Mathematics Education, Digital Learning, and State Policy, <https://gismo.fi.ncsu.edu>, March 2014.

Preparing to Teach Mathematics with Technology: An Integrated Approach, Drs. Karen Hollebrands, Hollylynne Stohl Lee, Allison McCulloch (Co-PIS), Spring 2014.

Noyce Mathematics Education Teaching Institute led by Dr. Karen Hollebrands and Hollylynne Lee, Summer 2014.

Maximizing the Impact of STEM Outreach (MISO) workshop, Friday Institute, March 2014.

Season School on Design-Based Research, Universidad de Jaén, Jaén, Spain, <http://www4.ujaen.es/~antquesa/DBR/Home.html>, November 4-8th, 2013.

Western Michigan University

Psychology of Mathematics Education North American Chapter (PME-NA), 34th Annual Conference, Western Michigan University, Kalamazoo, MI, November 2012.

Conversations Among Colleagues Conference, Grand Valley State University, Allendale, February 2011.

Conference on Research on the Enacted Mathematics Curriculum, Tampa, FL, Nov. 4-6, 2010.

USACAS, Annual Meeting, Chicago, IL, June 2010.

CSMC Doctoral Symposium, San Diego, CA, April 2010.

Conversations Among Colleagues Conference, University of Michigan, Dearborn, MI, March 2009.

Fall Central Section Meeting of the American Mathematical Society, Western Michigan University, Kalamazoo, MI, October 2008.

CSMC Second International Mathematics Curriculum Conference: Future curricular trends in school algebra and geometry, The University of Chicago and the Field Museum, Chicago, May 2008, <http://www.mathcurriculumcenter.org/conferences/CSMC/index.php>.

Conversations Among Colleagues Conference, Western Michigan University, Kalamazoo, MI, March 2008.

CSMC Doctoral Retreat, Michigan State University's Kellogg Biological Station, Hickory Corners, MI, May 2008.

CSMC Doctoral Fellow Institute, University of Missouri, Columbia, MO, May 2007.

PROFESSIONAL MEMBERSHIPS

National Council of Teachers of Mathematics (NCTM), 2007-Present.

North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA), 2011-Present.

International Group for the Psychology of Mathematics Education (IGPME), 2017-present.

European Research in Mathematics Education (ERME), 2017-present.

American Educational Research Association (AERA), 2009-2011, 2017-present.

Association of Mathematics Teacher Educators (AMTE), 2013-2014.

Association of Mathematics Teachers of New York State (AMTNYS), 2017-present.

North Carolina Council of Teachers of Mathematics (NCCTM), 2013-2014.

Michigan Council of Teachers of Mathematics (MiCTM), 2007-2013.
Minnesota Council of Teachers of Mathematics (MCTM), 2005-2006.

TECHNOLOGICAL COMPETENCIES

Experienced user of both Macintosh and Windows operating systems and familiarity and expertise with software including: Adobe, Dreamweaver, Endnote, Dynamic Statistics (e.g., Fathom), Freehand, Dynamic Geometry (GSP, Geogebra, TI-Nspire, CPMP-Tools), HyperRESEARCH, iMovie, JAVA applets (e.g., Core Math Tools), MaxQDA (qualitative data analysis), Microsoft (Word, Excel, Powerpoint, Publisher), Studiocode video coding software, TeXShop (LaTeX editor), and handheld and presenting/navigation software for CAS and calculators (e.g., Texas Instruments products).