# MARIA L. BLANTON, PH.D.

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## **ACADEMIC DEGREES:**

Ph.D., Mathematics Education, (Minor, Mathematics), North Carolina State University, 1998 M. A., Mathematics, University of North Carolina - Wilmington, 1991 B. A. Mathematics, Secondary Cartification, University of North Carolina, Wilmington, 1986

B. A., Mathematics, Secondary Certification, University of North Carolina - Wilmington, 1989 (*summa cum laude*)

## **PROFESSIONAL APPOINTMENTS & AWARDS:**

Senior Scientist, TERC, 2011 - Present

**Full Professor**, Science, Technology, Engineering and Mathematics Education Dept, University of Massachusetts Dartmouth, 2009-2011

**Full Professor**, Dept of Mathematics, University of Massachusetts Dartmouth, 2009 **Associate Professor**, Dept of Mathematics, University of Massachusetts Dartmouth, 2003-2009 **Assistant Professor**, Dept of Mathematics, University of Massachusetts Dartmouth, 1998-2003

**2020 Recipient,** International Award for Interdisciplinary Excellence in Mathematics Education, Texas A&M University

**Elected to SIGRME National Office** - AERA Special Interest Group in Mathematics Education (Co-Chair, 2012-2014; Recording Secretary, 2005-2007)

**Chair & Member, Editorial Panel**, *Journal for Research in Mathematics Education*. Appointment period: May 2008-May 2011. \***Chair** of panel, May 2010-May 2011.

Editorial Board, Mathematical Thinking and Learning

## **SCHOLARSHIP AND PROFESSIONAL ACTIVITIES:**

### **Research Grants Awarded:**

**Principal Investigator**, with co-PIs A. Gardiner, TERC; Barbara Brizuela, Tufts University; Rena Stroud, Merrimack College; Despina Stylianou, City College of New York–CUNY. (\$3,954,093; 07/01/24 – 06/30/28). *The Impact of an Inclusive Grades K-2 Early Algebra Intervention Implemented by Classroom Teachers* Awarded by the National Science Foundation (Award # 2404984).

**Principal Investigator**, with A. Gardiner, R. Stroud, TERC; A. Stephens, University of Wisconsin Madison; E. Knuth, University of Texas Austin, (\$1,617,966; 9/1/17-8/31/20). *Building a Grades K-2 Early Algebra Learning Progression Prototype for Diverse Populations.* Awarded by the National Science Foundation (Award #1720129).

Principal Investigator, with A. Gardiner, R. Stroud, TERC; A. Stephens, University of

Wisconsin Madison; E. Knuth, University of Texas Austin, (\$1,399,921; 7/1/17-6/30/21). *Project LEAP: Extending a Grades 3-5 Early Algebra Learning Progression into Grades K-2* Awarded by the IES, US Dept. of Education (Award #R305A170378).

**Co-Principal Investigator**, with (PI) E. Knuth, University of Texas Austin; A. Gardiner, TERC; A. Stephens, University of Wisconsin Madison (\$1,378,542; 6/1/17-5/31/21). Identifying Effective Instructional Practices that Foster the Development of Algebraic Thinking in Elementary School. Awarded by the National Science Foundation (Award #DRL 1721192).

**Principal Investigator** (\$42,000; 2017). *Exceptional Children's Early Algebraic Thinking: Exploring Cognitive Challenges and How Instruction Can Support Learning for Children with Special Needs*. Internal grant awarded by CSTL/TERC.

**Principal Investigator**, with E. Knuth, A. Stephens, University of Wisconsin-Madison (\$97,919; 10/01/15-10/01/16). *RAPID: Retention of Early Algebraic Understanding*. Awarded by the National Science Foundation.

**Principal Investigator**, with co-Principal Investigator B. Brizuela, Tufts University. (\$449,893; 07/15/14-06/30/16). *Learning Trajectories in Grades K-2 Children's Understanding of Algebraic Relationships*. Awarded by the National Science Foundation Discovery Research K-12 Program (DRL-1415509).

**Principal Investigator**, with E. Knuth, A. Stephens, University of Wisconsin-Madison; D. Stylianou, CCNY-CUNY; Lindsay Demers, TERC (\$3,475,976; 7/1/14-6/30/18). *The Impact of a Teacher-Led Early Algebra Intervention on Children's Algebra-Readiness for Middle School*. Awarded by IES, US Department of Education (R305A140092).

**Principal Investigator**, with E. Knuth, A. Stephens, University of Wisconsin-Madison. \$942,794; 10/1/12-9/30/15. *The Impact of Early Algebra on Students' Algebra-Readiness*. Awarded by the National Science Foundation Discovery Research K-12 Program (DRL-1219605).

**Principal Investigator**, with co-Principal Investigator B. Brizuela, Tufts University. (\$415,222; 09/01/11-07/31/13). *Exploring K-2 Children's Understandings of Functions*. Awarded by the National Science Foundation Discovery Research K-12 Program (DRL-1154355).

**Principal Investigator**, with co-Principal Investigator E. Knuth, University of Wisconsin Madison. (\$1.6 million, 2009-2012). *Developing Algebra-Ready Students for Middle School: Exploring the Impact of Early Algebra*. Awarded by the National Science Foundation Discovery Research K-12 Program.

**Principal Investigator**, Invigorating The Early Undergraduate Mathematics Experience: Understanding Linkages Between Social And Cognitive Aspects Of Students' Transition To Mathematical Proof (\$580,350, 2003-2008). Awarded by the National Science Foundation, Research on Learning and Education (ROLE) Division (D. Stylianou - Co-Principal Investigator).

**Co-Principal Investigator**, *Generalizing to Extend Arithmetic to Algebraic Reasoning*. (\$750,000, 1999-2003). **Awarded** by the U.S. Department of Education, Office of Educational Research and Improvement. (James J. Kaput - Principal Investigator)

### **Research Publications:**

#### BOOKS & JOURNALS PUBLISHED:

Blanton, M., Gardiner, A., Stephens, A., & Knuth, E., (2022). *LEAP: Learning through an early algebra progression (Grade K)*. Didax: Rowley, MA.

Blanton, M., Gardiner, A., Stephens, A., & Knuth, E., (2022). *LEAP: Learning through an early algebra progression (Grade 1)*. Didax: Rowley, MA.

Blanton, M., Gardiner, A., Stephens, A., & Knuth, E., (2022). *LEAP: Learning through an early algebra progression (Grade 2)*. Didax: Rowley, MA.

Blanton, M., Gardiner, A., Stephens, A., & Knuth, E., (2021). *LEAP: Learning through an early algebra progression (Grade 3)*. Didax: Rowley, MA.

Blanton, M., Gardiner, A., Stephens, A., & Knuth, E., (2021). *LEAP: Learning through an early algebra progression (Grade 4)*. Didax: Rowley, MA.

Blanton, M., Gardiner, A., Stephens, A., & Knuth, E., (2021). *LEAP: Learning through an early algebra progression (Grade 5)*. Didax: Rowley, MA.

Cañadas, M. C., Blanton, M., & Brizuela, B. (2019). (Eds.) Early algebraic thinking. Special Journal Issue for *Infancia y Aprendizaje/Journal for the Study of Education and Development*.

Stylianou, D., & Blanton, M. (2018). *Teaching with mathematical argument: Strategies for supporting everyday instruction*. Heinemann: Portsmouth, NH.

Blanton, M., Levi, L., Crites, T., & Dougherty, B. (2011). *Developing Essential Understanding of Algebraic Thinking for Teaching Mathematics in Grades 3-5* Essential Understanding Series. Reston, VA: National Council of Teachers of Mathematics.

Stylianou, D., Blanton, M., & Knuth, E. (Eds). (2009) *Teaching and Learning Proof Across the Grades: A K-16 Perspective*. Mahwah, NJ: Taylor & Francis Group.

Blanton, M. (2008) *Algebra and the Elementary Classroom: Transforming Thinking, Transforming Practice.* Invited book. Portsmouth, NH: Heinemann Publishers.

Kaput, J., Carraher, D. & Blanton, M. (Eds.). (2008) *Algebra in the Early Grades* Mahwah, NJ: Lawrence Erlbaum Associates/Taylor & Francis Group.

#### SELECTED INVITED PUBLICATIONS (SINCE 2015):

Rycroft-Smith, L., & Blanton, M. (2024). *Early development of functional thinking*. An Espresso by the Cambridge Mathematics Consortium. Available at <u>https://www.cambridgemaths.org/for-teachers-and-practitioners/espresso/view/early\_development\_of\_functional\_thinking/</u>.

Blanton, M., Gardiner, A. (2024). Developing an effective curriculum for early algebra. *TERC Hands-On!* 

Brizuela, B., Blanton, M., Kim, Y. (2021). A kindergarten student's uses and understandings of tables while working with function problems. In *Mathematical reasoning of children and adults: Teaching and learning from an interdisciplinary perspective* (pp. 171 – 190). Gewerbestrasse, Switzerland: Springer International Publishing.

Blanton, M., Gardiner, A., Stephens, A., Stroud, R., Knuth, E., & Stylianou, D. (in press). Lessons learned from designing an effective early algebra curriculum for Grades K–5. In D. Thompson, M. Huntley, & C. Suurtamm (Eds.), *Lessons learned from reseach on mathematics curriculum.* Information Age: Charlotte, NC.

Blanton, M., Gardiner, A., Knuth, E., Stephens, A., Stylianou, D., & Stroud, R. (2018). Building Solutions for Algebra Readiness. *TERC Hands-On!* 

Sarama, J., Clements, D., Nielsen, N., Blanton, M., Romance, N., Hoover, M., Staudt, C., Baroody, A., McWayne, C., and McCulloch, C., (2018). Considerations for STEM education from PreK through grade 3. Waltham, MA: Education Development Center, Inc. Retrieved from <u>http://cadrek12.org/resources/considerations-stem-educationprek-through-grade-3</u>.

Blanton, M. (2018). *Empowering children to think algebraically*. Invited WikiLetter available at <u>https://maths4maryams.org/mathed/farsi/</u> and <u>https://maths4maryams.org/mathed/</u>.

Blanton, M., Brizuela, B., Stephens, A., Knuth, E., Isler, I., Gardiner, A., Stroud, R., Fonger, N., & Stylianou, D. (2018). Implementing a framework for early algebra. In C. Kieran (Ed.), *Teaching and learning algebraic thinking with 5- to 12-year-olds: The global evolution of an emerging field of research and practice*. (pp. 27-49). Hamburg, Germany: Springer International Publishing.

Strachota, S., Knuth, E., & Blanton, M., (2018). Cycles of generalizing activities in classroom. In C. Kieran (Ed.), *Teaching and learning algebraic thinking with 5- to 12-year-olds: The global evolution of an emerging field of research and practice*. Hamburg, Germany: Springer International Publishing.

Blanton, M. (2017). Algebraic reasoning in grades 3-5. In M. Battista (Ed.), *Reasoning and sense making in the elementary grades: Grades* 3 - 5. Pp. 67 - 102. NCTM: Reston, VA.

Stephens, A.C., & Blanton, M. (2017). Algebraic reasoning in kindergarten – Grade 2. In M. Battista (Ed.), *Reasoning and sense making in elementary grades: Grades K* – 5. NCTM: Reston, VA.

Soares, J., Blanton, M., & Kaput, J. (2017). Thinking algebraically across the elementary school curriculum. In D. Thiessan (Ed.) *Exploring math through literature*. Reston, VA: National Council of Teachers of Mathematics. Available at <a href="http://www.nctm.org/Publications/Microsites/Exploring-Math-through-Literature/Algebraic-Thinking-K-5/Thinking-Algebraically-across-the-Elementary-School-Curriculum/">http://www.nctm.org/Publications/Microsites/Exploring-Math-through-Literature/Algebraic-Thinking-K-5/Thinking-Algebraically-across-the-Elementary-School-Curriculum/</a>.

Stephens, A. C., Ellis, A. B., Blanton, M., & Brizuela, B. M. (2017). Algebraic thinking in the elementary and middle grades. In J. Cai (Ed.), *Compendium for Research in Mathematics Education* (pp. 386-420). Reston, VA: National Council of Teachers of Mathematics.

Blanton, M., & Kaput, J. (2016). Classroom practices that promote algebraic reasoning. In E. Silver & P. Kenney (Eds). *Lessons learned from research: Volume 2: Useful research on teaching important mathematics to all students* (pp. 123–134). NCTM: Reston, VA.

Sawrey, K., Brizuela, B. M., & Blanton, M. (2015). Student-Produced Representations as a Means for Interrupting the Flow of an Interview. *Estudios de Psicología* (Taylor & Francis, to be published in both Spanish and English).

Brizuela, B.M., Blanton, M., Gardiner, A., Newman-Owens, A., & Sawrey, K. (2015). A first grade student's exploration of variable and variable notation. *Estudios de Psicología* (pp.1-13). Routledge: London (to be published in both Spanish and English).

#### ARTICLES IN REFEREED JOURNALS (SINCE 2015):

Stylianou, D., Lee, B., Ristroph, I., Knuth, E., Blanton, M., Stephens, A., & Gardiner, A. (2024). Semiotic mediation of gestures in the teaching of early algebra: the case of the equal sign. *Educational Studies in Mathematics*. https://doi.org/10.1007/s10649-024-10319-3

Brizuela, B., Strachota, S., Raymond, S., Savid, S., & Blanton, M., (2023). "Tia was the right one:" Mathematical authority and trust among first graders. *Mathematical Thinking and Learning*. <u>https://www.tandfonline.com/doi/full/10.1080/10986065.2023.2215408</u>

Strachota, S., Brizuela, B., Gibbins, A., Blanton, M., Murphy Gardiner, A., & Sawrey, K. (2023). First Graders' Generalizations and Justifications of Even and Odd Numbers. *Canadian Journal of Science, Mathematics and Technology Education*. https://doi.org/10.1007/s42330-023-00297-8

Strachota, S., Stephens, A., Morton, K., Veltri-Torres, R., Blanton, M., Murphy Gardiner A., Sung, Y., Stroud R., & Knuth, E. (2023). How tools mediate elementary students' algebraic reasoning about evens and odds. *Mathematics Education Research Journal*. DOI: <u>https://doi.org/10.1007/s13394-023-00457-x</u>

Blanton, M., Gardiner, A., Ristroph, I., Stephens, A., Stroud, R., & Knuth, E. (2024). Progressions in young learners' understandings of parity arguments. *Mathematical Thinking and Learning*, 26(1), 90–121. <u>https://doi.org/10.1080/10986065.2022.2053775</u>

Stephens, A., Sung, Y., Strachota, S., Veltri Torres, R., Morton, K., Gardiner, A.M., Blanton, M., Knuth, E., & Stroud, R. (2022). The Role of Balance Scales in Supporting Productive Thinking about Equations Among Diverse Learners. *Mathematical Thinking and Learning*, 24(1), 1–18. DOI: <u>10.1080/10986065.2020.1793055</u>

Stephens, A., Stroud, R., Strachota, S., Stylianou, D., Blanton, M., Knuth, E., & Gardiner, A. M. (2021). What early algebra knowledge persists one year after an elementary grades intervention? *Journal for Research in Mathematics Education*, *52*(3), 332 – 348.

Stephens, A., Torres, R., Sung, Y., Strachota, S., Gardiner, A., Blanton, M., Stroud, R., & Knuth, E. (2021). From "you have to have three numbers and a plus sign" to "It's the exact same thing": K–1 students learn to think relationally about equations. *Journal of Mathematical Behavior*.

Ventura, A. C., Brizuela, B. M., Blanton, M., Sawrey, K., Gardiner, A., & Newman-

Owens, A. (2021). A learning trajectory in Kindergarten and first grade students' thinking of variable and use of variable notation to represent indeterminate quantities. *Journal of Mathematical Behavior*. https://doi.org/10.1016/j.jmathb.2021.100866.

Ucles, R., Brizuela, B., & Blanton, M. (2020). Kindergarten and first-grade students' understandings and representations of arithmetic properties. *Early Childhood Education Journal*. <u>https://doi.org/10.1007/s10643-020-01123-8</u>

Blanton, M., Isler, I., Stroud, R., Stephens, A., Knuth, E., & Gardiner, A. (2019). Growth in children's understanding of generalizing and representing mathematical structure and relationships. *Educational Studies in Mathematics* 102(2), 193–219, DOI:10.1007/s10649-019-09894-7

Blanton, M., Stroud, R., Stephens, A., Gardiner, A., Stylianou, D., Knuth, E., Isler-Baykal, I., Strachota, S. (2019). Does Early algebra matter?: The effectiveness of an early algebra intervention in grades 3–5. *American Educational Research Journal 56*(5), 1930–1972, DOI: 10.3102/0002831219832301

Blanton, M., Otalora Sevilla, Y., Brizuela, B., Gardiner, A., Sawrey, K., & Gibbons, A. (2018). Exploring Kindergarten Students' Early Understandings of the Equal Sign. *Mathematical Thinking and Learning*, 20(3), 167–201, doi: 10.1080/10986065.2018.1474534

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, DOI: 10.1080/07370008.2017.1392965

Stephens, A. C., Fonger, N. L., Strachota, S., Isler, I., Blanton, M., Knuth, E., & Gardiner, A. (2017). A Learning Progression for Elementary Students' Functional Thinking. *Mathematical Thinking and Learning* 19(3), 143 – 166. <u>https://doi.org/10.1080/10986065.2017.1328636</u>

Blanton, M., Brizuela, B., Gardiner, A., & Sawrey, K. (2017). A progression in first-grade children's thinking about variable and variable notation in functional relationships. *Educational Studies in Mathematics* 95(2), 181 – 202, DOI 10.1007/s10649-016-9745-0.

Cañadas, M. C., Brizuela, B. M., & Blanton, M. (2016). Second graders articulating ideas about linear functional relationships. *Journal of Mathematical Behavior*, *14*, 87-103.

Bolt, D., Kim, J., Blanton, M., & Knuth, E. (2016). Applications of Item Response Theory in mathematics education research. In A. Izaak and J. Remillard (Eds.), Psychometrics and Assessment in Mathematics Education: Opportunities, Challenges, and Interdisciplinary Collaborations, Monograph for *Journal for Research in Mathematics Education*.

Knuth, E., Stephens, A., Blanton, M., & Gardiner, A. (2016). Building a foundation for success in algebra. *Phi Delta Kappan* 97(6), 65-68.

Blanton, M., Brizuela, B., Gardiner, A., Sawrey, K., & Newman-Owens, A. (2015). A learning trajectory in 6-year-olds' thinking about generalizing functional relationships. *Journal for Research in Mathematics Education*, 46(5), 511-558.

Isler, I., Marum, T., Stephens, A., Blanton, M., Knuth, E., & Gardiner, A. (2014/2015). The string task: Not just for high school. *Teaching Children Mathematics*, 21(5), 282-292.

Stylianou, D. & Blanton, M. & Rotou, O. (2015). Undergraduate students' proof conceptions: Relationships between understanding, beliefs, and classroom experiences with learning proof. *International Journal for Research in Undergraduate Mathematics Education*, *1* (1), 91-134.

Blanton, M., Stephens, A., Knuth, E., Gardiner, A., Isler, I., & Kim, J. (2015). The Development of Children's Algebraic Thinking: The Impact of a Comprehensive Early Algebra Intervention in Third Grade. *Journal for Research in Mathematics Education*, 46(1), 39-87.

Brizuela, B. M., Blanton, M., Sawrey, K., Newman-Owens, A., & Gardiner, A. (2015). Children's Use Of Variables and Variable Notation To Represent Their Algebraic Ideas. *Mathematical Thinking and Learning*, *17*, 1-30.

Stephens, A., Blanton, M., Knuth, E., Isler, I., Gardiner, A. (2015). Just say YES to early algebra! *Teaching Children Mathematics*, 22(2), 92–101.

\*Selected by TCM Editorial Panel as the "Year Favorite" for 2015

#### SELECTED CONFERENCE PROCEEDINGS WITH PRESENTATIONS (SINCE 2015):

Strachota, S., Lopez, M. A., Brizuela, B. M., Pérez-Martos, M. C. & Murphy Gardiner, A. & Blanton, M. (2024). Young Students' Understandings of Function Graphs. In Lindgren, R., Asino, T. I., Kyza, E. A., Looi, C. K., Keifert, D. T., & Suárez, E. (Eds.), *Proceedings of the 18th International Conference of the Learning Sciences - ICLS 2024* (pp. 330-337). Buffalo, USA: International Society of the Learning Sciences.

Lopez, M. A., Strachota, S., Brizuela, B. M., Pérez-Martos, M. C. & Murphy Gardiner, A. & Blanton, M. (2024). *Kindergarteners' Understandings and Representations of the Additive Inverse*. In Lindgren, R., Asino, T. I., Kyza, E. A., Looi, C. K., Keifert, D. T., & Suárez, E. (Eds.), *Proceedings of the 18th International Conference of the Learning Sciences - ICLS 2024* (pp. 1199-1202). Buffalo, USA: International Society of the Learning Sciences.

Ristroph, I., Blanton, M., Gardiner, A., Stephens, A., Stroud, R. Knuth, E. (2022). Progressions in Grade 1 Students' Understanding of Parity Arguments. Paper presented at 44th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics, Nashville, TN: Middle Tennessee State University.

Sung, Y. Stephens, A., Veltri Torres, R., Strachota, S., Blanton, M., Gardiner, A. (2022). Teacher language and gesture in an intervention focused on developing kindergartners's understanding of the equal sign. Paper presented at 44th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics, Nashville, TN: Middle Tennessee State University.

Strachota, S., Brizuela, B., Raymond, S., Savid, S., Blanton, M., Murphy Gardiner, A., & Sawrey, K. (2022). In Chinn, C., Tan, E., Chan, C., & Kali, Y. (Eds.), The Construction of Mathematical Authority in a First Grade Classroom. *Proceedings of the 16th International Conference of the Learning Sciences* (pp. 941-944). Hiroshima, Japan: International Society of the Learning Sciences.

Veltri, R., Prough, S., Strachota, S., Knuth, E., Stephens, A., Stylianou, D., Blanton, M., Stroud, R., & Gardiner, A. (2017). The Impact of a Teacher-led Early Algebra Intervention. Poster presented at *39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics*, Indianapolis, IN: Purdue University.

Prough, S., Strachota, S., Veltri, R., Isler, I., Blanton, M., Gardiner, A., Knuth, E., & Stephens, A. (2017). Fostering Generalizations: a classroom discourse analysis. Paper presented at 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics, Indianapolis, IN: Purdue University.

Cassidy, M., Stroud, R., Stylianou, D., Blanton, M., Gardiner, A., Knuth, E. & Stephens, A. (October, 2017). *Examining the fidelity of implementation of an early algebra intervention and student learning*. Paper presented at the Psychology of Mathematics Education – North America Conference, Indianapolis, IN.

Isler, I., Strachota, S., Stephens, A., Fonger, N., Blanton, M., Gardiner, A., & Knuth, E. (2017). Grade 6 students' abilities to represent function rules. In *Proceedings of the Tenth Congress of the European Society for Research in Mathematics Education* (pp. 432 - 439). Dublin, Ireland: DCU Institute of Education and ERME.

Strachota, S., Prough, S., Veltri, R., Isler, I., Blanton, M., Gardiner, A., Knuth, E., & Stephens, A. (2017). *Fostering generalizations: A classroom discourse analysis*. Paper presented at 39th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics, Indianapolis, IN: Purdue University.

Sawrey, K., Brizuela, B., Blanton, M., Gardiner, A., Kim, Y., & Gibbins, A. (2016). *Fosterining young students' relational understanding of the equal sign*. Paper presented at the 13<sup>th</sup> Annual Conference of the International Congress on Mathematical Education, Hamburg, Germany.

Strachota, S., Blanton, M., Gardiner, A. M., & Brizuela, B. (2016). *Cycles of Generalizing Activity in the Classroom.* Paper presented at the 13<sup>th</sup> Annual Conference of the International Congress on Mathematical Education, Hamburg, Germany.

Strachota, S., Fonger, N., Stephens, A., Blanton, M., Knuth, E., & Gardiner, A. M. (2016). *Understanding Variation in Elementary Students' Functional Thinking*. Paper presented at the 40th Annual Conference of the International Group for the Psychology of Mathematics Education, Szeged, Hungary.

Strachota, S., Isler, I., Fonger, N., Blanton, M., & Gardiner, A. M. (2016, November). *Analyzing Generalizations Through Discourse*. Poster presented at 38th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Tuscon, AZ.

Strachota, S., Isler, I., Kang, H., Stephens, A., Blanton, M., Knuth, E., & Gardiner, A. M. (2015, November). *Arithmetic Properties as a Route into Algebraic Reasoning*. Poster presented at 37th Annual North American Chapter of the International Group for the Psychology of Mathematics Education, East Lansing, MI.

Fonger, N., Stephens, A., Blanton, M., & Knuth, E. (2105). A learning progressions approach to early algebra research and practice. In T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Bradfield, & H. Dominguez (Eds.). *Proceedings of the 37<sup>th</sup> Annual Meeting of the* 

*North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 201-204). East Lansing, MI: Michigan State University.

Newman-Owens, A., Brizuela, B. M., Blanton, M., Sawrey, K., Gardiner, A. M. (2015). "Natural Resources": Two Case Studies in Early Expressions of Generality. In Bartell, T. G., Bieda, K. N., Putnam, R. T., Bradfield, K., & Dominguez, H. (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.

#### INVITED ADDRESS/PRESENTATIONS (SINCE 2015)

Blanton, M. (2024). *Exploratory to Efficacy: The Value of Different Research Methods (in Early Algebra Research)*. Invited presentation as a panelist for *How to Research in Mathematics Education* at the XIV Symposium on Mathematics and Mathematical Education, the XIII International Congress on Computer-assisted Mathematics, and the IV Symposium on Mathematical Competitions (Symposium MEM 2024), Bogotá, Columbia.

Blanton, M. (2023). *What I wish I had known in graduate school about research.* Invited presentation as a panelist for *How to Research in Mathematics Education* at the XIII Symposium on Mathematics and Mathematical Education, the XII International Congress on Computer-assisted Mathematics, and the III Symposium on Mathematical Competitions (Symposium MEM 2023), Bogotá, Columbia.

Blanton, M. (2022). *The role of learning progressions in "democratizing"students' access to algebra.* Invited plenary address at the North American Chapter of the Psychology of Mathematics Education, Nashville, TN.

Blanton, M. (2019). *Algebra in the elementary curriculum: Building authentic learning experiences for all students.* Invited presentation at the NCTM Regional Conference, Boston, MA.

Blanton, M. (2018). *Can Young Children Think Algebraically?* Invited presentation, The Kaput Center for Research and Innovation in STEM Education, University of Massachusetts Dartmouth, Dartmouth, MA.

Blanton, M. (2018). *Early Algebraic Thinking: The Case of Variable Notation*. Invited presentation, MESA, University of Georgia, Athens, GA.

Blanton, M., (2016). *How do we prepare students for algebra?* Invited keynote address at the 2016 North Carolina Council of Teachers of Mathematics, Greensboro, NC.

Blanton, M., Brizuela, B., & Stephens, A. (2016). *Elementary children's algebraic thinking*. Invited Paper presented in the Early Algebra Topic Study Group at the 13<sup>th</sup> Annual *Conference of the International Congress on Mathematical Education*, Hamburg, Germany.

Blanton, M., Brizuela, B., & Stephens, A. (2016). *Children's understanding and use of variable notation.* Invited Paper presented in the Algebra Topic Study Group at the 13<sup>th</sup> Annual Conference of the International Congress on Mathematical Education, Hamburg, Germany.

Blanton, M. (2015). Children's understanding and use of variable notation. Invited

presentation to the IES Post Doctoral Group, WCER, University of Wisconsin Madison.

Blanton, M. (2015). *Reasoning Algebraically about Functions*. Invited Keynote at the NCTM Algebra Readiness Institute, Chicago, Illinois.

Blanton, M. (2015). *Early algebraic thinking: EQuIPping children to become mathematical thinkers.* Invited presentation to "EQuIP" Johnston County Summer Teacher Institute.

#### SELECTED REFEREED PRESENTATIONS (NO PROCEEDINGS) SINCE 2015:

Ristrophe, I., Blanton, M., & Gardiner, A. (2022). *Thinking relationally about the equal sign: Successful strategies for diverse learners*. Presented at the National Council of Teachers of Mathematics Annual Meeting, Los Angeles, CA.

Blanton, M., Gardiner, A., Stephens, A., Stroud, R., & Knuth, E. (2022). *Broadening access to early algebra in Grades K*–2. Presentation at the NSF 2022 Stem For All Video Showcase.

Stephens, A., Knuth, E., Blanton, M., Gardiner, A., & Stroud, R. (April 2019). *Developing a Comprehensive Approach to Early Algebra*. Paper presented as part of the symposium *Exploring Diversity and Synergy Across Research Programs Within Early Algebra* at the Annual Meeting of the American Educational Research Association, Toronto, Canada.

Strachota, S., Blanton, M., Stephens, A., Murphy Gardiner, A., Ristroph, I., & Knuth, E. (February, 2019). *Supporting instruction that fosters algebraic thinking*. Paper presented at the Association of Mathematics Teacher Educators Annual Conference, Orlando, FL.

Strachota, S., Murphy Gardiner, A., Blanton, M., Stephens, A., & Knuth, E. (April, 2019). *Building Students' algebraic thinking: Explorations with evens and odds*. Paper presented at the National Council of Teachers of Mathematics Annual Meeting, San Diego, CA.

Stroud, R., Blanton, M., Gardiner, A., Knuth, E., Stephens, A., & Stylianou, D. (2019). *Results of a Grades 3 – 5 Early Algebra Intervention with At-Risk Populations*. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, Canada.

Veltri Torres, R., Prough, S., Strachota, S., Stephens, A., Sung, Y., Gardiner, A., Blanton, M., & Knuth, E., (2019). *Describing the unknown: Moving toward variable notation and algebraic thinking in kindergarten*. Paper presented at the American Educational Research Association Annual Meeting, Toronto, Canada.

Blanton, M., Stroud, R., Gardiner, A., Stylianou, D., Stephens, A., & Knuth, E. (2019). *Project LEAP: Building practical solutions for algebra readiness for all students*. Poster presented at the 2019 IES PI Meeting, Washington, DC.

Allen, S., Brizuela, B. M., & Blanton, M. (2018, April). *Use of Variable Notation to Represent Indeterminate Quantities Among Early and Late Elementary School Students*. Paper presented as part of the Roundtable Session "PreK and Elementary Students' Mathematical Reasoning Processes" at the annual American Educational Research Association (AERA) meeting, New York, NY. Blanton, M., Stephens, A., Stroud, R., Gardiner, A., & Knuth, E. (2018). *Building a K-2 early algebra learning progression for diverse learners*. Presentation at the NCTM Research Conference, Washington, DC.

Prough, S., Veltri, R., Strachota, S., Stephens, A., Knuth, E., & Blanton, M. (2017). *Supporting Students' Algebraic Reasoning in the Early Grades*. Presentation at Wisconsin Mathematics Council Annual Conference (National Council of Teachers of Mathematics-Affiliate), Green Lake, WI.

Prough, S., Veltri, R., Blanton, M., Gardiner, A., Stroud, R., Knuth, E., Stylianou, D., & Stephens, A. (2018). *Preparing Elementary Students for Algebra: Results of a Grade 3 – 5 Early Algebra Intervention*. Presentation at the 2018 NSF STEM Video Showcase.

Veltri, R., Prough, S., Strachota, S., Sung, Y., Stephens, A., Knuth, E., Stylianou, D., Blanton, M., Stroud, R., & Gardiner, A., (2018). *Impact of a Teacher-Led Early Algebra Intervention*. Presentation at the University of Wisconsin Madison Poster Fair, Madison WI.

Stylianou, D., Cassidy, M., Stroud, R., Blanton, M., Knuth, E., Gardiner, A., & Stephens, A. (April, 2018). *Fidelity of Implementation: Exploring instructional characteristics in a large scale early algebra intervention*. Paper presented at the Annual Meeting of the American Educational Research Association.

Gardiner, A., Stylianou, D., Stephens, A., Knuth, E., Blanton, M., & Stroud, R. (2018). *Pedagogy that Advances Algebraic Reasoning in Elementary Grades*. Presentation at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, DC.

Blanton, M., Gardiner, A., Stylianou, D., Stephens, A., Knuth, E., & Stroud, R. (2018). *How Do We Prepare Students for Algebra?: Designing Tasks that Build Students' Algebraic Thinking*. Presentation at the Annual Meeting of the National Council of Teachers of Mathematics, Washington, DC.

Blanton, M., Stroud, R., Stephens, A., Gardiner, A., Knuth, E., Stylianou, D. (2018). *An Early Algebra Intervention for Upper Elementary Grades*. Presentation at the National Council of Teachers of Mathematics Research Conference as part of the Symposium *Rigorous Research to Improve Learning in Elementary Math for All Students*, Washington, DC.

Blanton, M., Knuth, E., Stephens, A., Stylianou, D., Stroud, R., Gardiner, A., Isler, I., & Strachota, S. (2018). *The Impact of a Teacher-Led Early Algebra Intervention on Children's Algebra-Readiness for Middle School: Grade 3 – 4 Results*. Presentation at the Annual IES PI Meeting, Washington, DC.

Veltri, R., Prough, S., Blanton, M., Gardiner, A., Stroud, R., Knuth, E., Stylianou, D., & Stephens, A. (May, 2018). *Preparing Elementary Students for Algebra: Results of a Grade* 3 – 5 *Early Algebra Intervention*. Presentation at the 2018 NSF STEM Video Showcase.

Veltri, R., Prough, S., Strachota, S., Sung, Y., Stephens, A., Knuth, E., Stylianou, D., Blanton, M., Stroud, R., & Gardiner, A., (2018). *Impact of a Teacher-Led Early Algebra Intervention*. Presentation at the University of Wisconsin Madison Wisconsin Center for Education Research Poster Fair, Madison WI. Knuth, E., Blanton, M., Stephens, A., Gardiner, A., Strachota, S., Isler, I., & Stroud, R. (2017). *Longitudinal Study of the Development of Children's Algebraic Thinking in Grades* 3 – 5. Video presentation at the NSF STEM Video Showcase.

Blanton, M., Isler, I., Gardiner, A., Stephens, A., Knuth, E., Stroud, R., & Strachota, S. (2017). *Growth in children's algebraic thinking: A grades 3–5 early algebra intervention*. Paper presented at the National Council of Teachers of Mathematics Research Conference, San Antonio, TX.

Prough, S., Veltri, R., Strachota, S., Stephens, A., Knuth, E., & Blanton, M. (2017). *Supporting Students' Algebraic Reasoning in the Early Grades*. Presentation at Wisconsin Mathematics Council Annual Conference (National Council of Teachers of Mathematics-Affiliate), Green Lake, WI.

Strachota, S., Knuth, E., Stephens, A., & Blanton, M. (2017). *The co-development of Functional Thinking and Equivalence*. Paper presented at the National Council of Teachers of Mathematics Research Conference, San Antonio, TX.

Sawrey, K., Brizuela, B., Blanton, M., Gardiner, A., & Gibbons, A. (2017). *Young children's* (K - 2) *understandings of generalizing*. Presentation at the STEM Video Showcase for National Science Foundation research projects.

Gibbons, A., Brizuela, B., Blanton, M., Gardiner, A., & Sawrey, K. (2017). *First graders defining and justifying even and odd numbers*. Paper presented at the Research Conference of the National Council of Teachers of Mathematics, San Antonio, Texas.

Stephens, A., Isler, I., Stroud, R., Strachota, S., Blanton, M., Knuth, E., & Gardiner, A. (2016). *The impact of a large-scale early algebra intervention*. Paper presented at the Research Conference of the National Council of Teachers of Mathematics.

Strachota, S., Isler, I., Stephens, A., Blanton, M., Knuth, E., Demers, L., & Gardiner, A. (2016). *The Co-development of Core Concepts in Algebra: Functional Thinking and Equality.* Paper presented at the Research Conference of the National Council of Teachers of Mathematics.

Blanton, M., Knuth, E., Stephens, A., Stylianou, D., Stroud, R., Gardiner, A., Isler, I., & Strachota, S. (2016). *The Impact of a Teacher-Led Early Algebra Intervention on Children's Algebra-Readiness for Middle School: Grade 3 Results.* Presentation at the Annual IES PI Meeting, Washington, DC.

Blanton, M., Isler, I., Stephens, A., Knuth, E., Gardiner, A., Strachota, S. (2016). *A longitudinal study of elementary students' use of variable notation to represent mathematical generalizations*. Paper presented at the American Educational Research Association, Washington, DC.

Blanton, M. (2016). *Children's understanding of generalizing relationships*. Poster presented at the DRK-12 PI Meeting, Washington, DC.

Eiland, M.D., Blanton, M., Knuth, E., Stephens, A., & Demers, L. (2016, May). *An early algebra intervention's positive impact on students in grades 3-5*. Poster presentation at 2016 Education and Inequality in 21st Century America: A Research Conference, Stanford, CA.

Blanton, M., Brizuela, B., Gardiner, A., Sawrey, K., Gibbons, A., Yangsook, K. (2016). *The emergence of young children's understanding of the equal sign*. Paper presented at the Annual Meeting of the American Education Research Association, Washington, DC.

Brizuela, B., Sawrey, K., Gardiner, A., Gibbons, A., Yangsook, K. Blanton, M. (2016). *First graders' use of variable notation in a teaching experiment*. Paper presented at the Research Conference of the National Council of Teachers of Mathematics, San Francisco, CA.

Stephens, A., Fonger, N., Blanton, M, Knuth, E., Strachota, S., & Isler, I. (2016). *Elementary students' generalization and representation of functional relationships: A learning progressions approach.* Poster presented at the Annual Meeting of the American Education Research Association, Washington, DC.

Eiland, M., Blanton, M., Knuth, E., & Stephens, A. (2016). *An Early Algebra Intervention's Positive Impact on Arithmetic Comprehension*. Paper presented at the Research Conference for the National Council of Teachers of Mathematics, San Francisco, CA.

Kang, H., Stephens, A., Blanton, M., Gardiner, A., Isler, I., & Knuth, E. (2015). *Examining students' algebraic thinking through interview assessment*. Paper presented at the Research Conference of the National Council of Teachers of Mathematics, Boston, MA.

Blanton, M., Brizuela, B., Gardiner, A., & Sawrey, K. (2015). *A learning trajectory for children's understanding of variable*. Paper presented at the Research Conference of the National Council of Teachers of Mathematics, Boston, MA.

Brizuela, B., Sawrey, K., Blanton, M., & Gardiner, A. (2015). *First Grade Students' Uses of Tables as they Explore Functional Relations*. Paper presented at the Research Conference of the National Council of Teachers of Mathematics, Boston, MA.

Sawrey, K., Brizuela, B., Blanton, M., & Gardiner, A., (2015). *Case Studies of Computation and Algebraic Reasoning in K-2 Students*. Paper presented at the Research Conference of the National Council of Teachers of Mathematics, Boston, MA.

Blanton, M. (2015). *Early algebra problems worth solving and why*. Invited presentation for "Problems Worth Solving" Strand, Annual Conference of the National Council of Teachers of Mathematics, Boston, MA.

Brizuela, B., Sawrey, K., Blanton, M., & Gardiner, A. (2015). *First Grade Students' Uses of Tables as they Explore Functional Relations*. Paper presented at the Annual Conference of the American Educational Research Association, Chicago, IL.

Sawrey, K., Brizuela, B., Blanton, M., & Gardiner, A., (2015). *Case Studies of Arithmetic and Algebraic Reasoning in K-2 Students*. Paper presented at the Annual Conference of the American Educational Research Association, Chicago, IL.