

**Anderson Hassell Norton III**

Department of Mathematics

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**Professional Preparation:**

**Ph.D. Mathematics Education**, August 2004

The University of Georgia, Athens, GA

Dissertation: *Students' Conjectural Operations* (advisor Leslie Steffe)

**M.A. Mathematics**, May 2004

The University of Georgia, Athens, GA

Thesis: *Demented Dimensions* (advisor Theodore Shifrin)

**M.A. Mathematics Education**, August 1999

The University of Georgia, Athens, GA

Thesis: *Plausible Reasoning in Geometry* (advisor Leslie Steffe)

**B.S. Mathematics**, May 1995

Virginia Polytechnic Institute and State University, Blacksburg, VA

**Appointments:**

Professor of Mathematics Education, Department of Mathematics, Virginia Tech, 2017-present

Associate Professor of Mathematics Education, Department of Mathematics, Virginia Tech, 2012-2017

Assistant Professor of Mathematics Education, Department of Mathematics, Virginia Tech, 2007-2012

Assistant Professor of Mathematics Education, School of Education, Indiana University, 2004-2007

**Honors:**

“Best EdApp of 2015” awarded to the Learning Transformation Research Group (LTRG), by Balefire labs, for the design of *CandyBot*

Adjunct Doctoral Faculty member, Mathematics Department, Texas State University, 2015-2017

Visiting Scholar, Department of Teaching & Learning, New York University, 2014

Affiliate Faculty, Department of Teaching & Learning, Virginia Tech, 2014-present

Early Career Award, from the Association of Mathematics Teacher Educators, 2013

National Educators Association Award for Innovative App, \$1000 awarded to LTRG, for the design of *CandyFactory*, 2012

XCaliber Certificate of Excellence from the Center for Innovation in Learning (VT), awarded to LTRG, 2012

Virginia Tech Favorite Faculty Nominee, 2009, 2011

Virginia Tech Math Club Professor of the Year, 2009

UGA Outstanding Graduate Teaching Award, 2001

### Peer-Reviewed Journal Articles:

- J64. Tzur, R., Johnson, H. L., Davis, A., Hodkowsky, N., Jorgensen, C., Wei, B., & Norton, A. (in review). A Stage-Sensitive Written Assessment of Multiplicative Double Counting for Grades 3-8. *Studies in Educational Evaluation*.
- J63. Dawkins, P., & Norton, A. (in review). Identifying Mental Actions Necessary for Abstracting the Logic of Conditionals. *Educational Studies in Mathematics*.
- J62. Tzur, R., Johnson, H., Norton, A., Davis, A., Wang, X., Ferrara, M., Jorgensen, C., & Hodkowsky, N. M. (in press). Conception of number predicts students' multiplicative reasoning: Quantitative corroboration of Steffe's model. *Cognition & Instruction*.
- J61. Wilkins, J. L. M., MacDonald, B., & Norton, A. (in review). Construction of Subitized Units is Related to the Construction of Arithmetic Units. *Educational Studies in Mathematics*.
- J60. Norton, A., Ulrich, C., & Kerrigan, S. (in review). Unit Transformation Graphs: Modeling the Cognitive Demands of Mathematical Tasks. *Journal for Research in Mathematics Education*.
- J59. Wilkins, J. L. M., Woodward, D., & Norton, A. (2020). Children's Number Sequences as Predictors of Later Mathematical Development. *Mathematics Education Research Journal*. DOI: 10.1007/s13394-020-00317-y
- J58. Stevens, A. L., Wilkins, J. L. M., Lovin, L. A., Siegfried, Z., Norton, A., & Busi, R. P. (2020). Promoting sophisticated fractions constructs through instructional changes in a mathematics course for PreK-8 prospective teachers. *Journal of Mathematics Teacher Education*, 23(2), 153-181. DOI: 10.1007/s10857-018-9415-5
- J57. Norton, A. (2019). An Erlangen program for empowering students' mathematics. *For the Learning of Mathematics*, 39(3), 22-27.
- J56. Boyce, S., & Norton, A. (2019). Maddie's units coordinating across contexts. *Journal of Mathematical Behavior*, 55. <https://doi.org/10.1016/j.jmathb.2019.03.003>
- J55. Norton, A., Seok, Y. and Choi-Koh, S. (2019). Examining Mathematics Anxiety of Undergraduates Using a Brain-Based Measurement, EEG. *Journal of Behavioral and Brain Science*, 9, 195-209. DOI: [10.4236/jbbs.2019.95017](https://doi.org/10.4236/jbbs.2019.95017).
- J54. Salado, A., Chowdhury, A., & Norton, A. (2019). Systems thinking and mathematical problem solving. *School Science and Mathematics Journal*, 119(1), 49-58. DOI: 10.1111/ssm.12312
- J53. Simon, M., Kara, M., Norton, A., Placa, N. (2018). Fostering construction of a meaning for multiplication that subsumes whole-number and fraction multiplication: A study of the learning through activity research program. *Journal of Mathematical Behavior*, 52, 151-173. <https://doi.org/10.1016/j.jmathb.2018.03.002>
- J52. Wilkins, J. L. M., & Norton, A. (2018). Learning progression toward a measurement concept of fractions. *International Journal of STEM Education*, 5(27).
- J51. Norton, A. (2018). Frameworks for modeling students' mathematics. *Journal of Mathematical Behavior*, 52, 201-207. <https://doi.org/10.1016/j.jmathb.2018.03.001>

- J50. Norton, A., Ulrich, C., Bell, M. A., & Cate, A. (2018). Mathematics at hand. *The Mathematics Educator*, 27(1), 33-59.
- J49. Norton, A., Wilkins, J. L. M., & \*Xu, C. Z. (2018). A progression of fractions schemes common to Chinese and U.S. classrooms. *Journal for Research in Mathematics Education*, 49(2), 210-226. DOI: 10.5951/jresmetheduc.49.2.0210
- J48. Lovin, L. A., \*Stevens, A., Siegfried, Z., Wilkins, J. L. M., & Norton, A. (2018). Pre-K-8 prospective teachers' understanding of fractions: An extension of fractions schemes and operations research. *Journal of Mathematics Teacher Education*, 21(3), 207-235. DOI: 10.1007/s10857-016-9357-8
- J47. Kim, S., Chang, M., Deater-Deckard, K., Evans, M., Norton, A., & Samur, Y. (2017). Educational Games and Students' Game Engagement in Elementary School Classroom. *Journal of Computers in Education*. DOI 10.1007/s40692-017-0095-4
- J46. \*Boyce, S., & Norton, A. (2017). Dylan's units coordination across contexts. *Journal of Mathematical Behavior*, 45, 121-136. <http://dx.doi.org/10.1016/j.jmathb.2016.12.009>
- J45. \*Boyce, S., & Norton, A. (2016). Co-construction of fractions schemes and units coordination structures. *Journal of Mathematical Behavior*, 41, 10-25.
- J44. Norton, A., \*Boyce, S., \*Phillips, N., \*Anwyll, T., Ulrich, C., & Wilkins, J. (2015). A written instrument for assessing students' units coordination structures. *International Electronic Journal of Mathematics Education*, 10(2), 111-136. DOI: 10.12973/mathedu.2015.108a
- J43. Norton, A., & \*Boyce, S. (2015). Provoking the construction of a structure for coordinating  $n+1$  levels of units. *Journal of Mathematical Behavior*, 40, 211-242. doi:10.1016/j.jmathb.2015.10.006
- J42. Norton, A., \*Boyce, S., Ulrich, C., & \*Phillips, N. (2015). Students' units coordination activity: A cross-sectional analysis. *Journal of Mathematical Behavior*, 39, 51-66.
- J41. Chang, M., Evans, M., Kim, S., Norton, A., & Samur, Y. (2015). Differential effects of learning games on mathematics proficiency. *Educational Media International*, 52(1), 47-57. DOI: 10.1080/09523987.2015.1005427
- J40. Norton, A., \*Boyce, S., Hatch, J. (2015). Coordinating units at the Candy Depot. *Mathematics Teaching in the Middle School*, 21(5), 280-287.
- J39. Norton, A. (2015). The wonderful gift of mathematics. *The Mathematics Educator*, 24(1), 3-20.
- J38. Chang, M., Evans, M., Kim, S., Norton, A., Deater-Deckard, K., & Samur, Y. (2015). The effects of an educational video game on mathematical engagement. *Education and Information Technologies*, 1-15.
- J37. Ulrich, C., Tillema, E., Hackenberg, A., & Norton, A. (2014). Constructivist model building: Empirical examples from mathematics education. *Constructivist Foundations*, 9(3), 328-339.
- J36. Deater-Deckard, K., El Mallah, S., Chang, M., Evans, M. A., & Norton, A. (2014). Student behavioral engagement during mathematics educational video game instruction with 11-14 year olds. *International Journal of Child-Computer Interaction*, 2, 101-108. DOI: 10.1016/j.ijcci.2014.08.001
- J35. Evans, M. A., Walker, M. H., Abel, T. D., McGlynn, M., & Norton, A. (2014). Evaluating design patterns for intentional learning in educational video games:

- Identifying a common language for interdisciplinary collaborations. *Journal of Applied Instructional Design*, 4(1), 5-20.
- [J34](#). Norton, A., & Deater-Deckard, K. (2014). Mathematics in mind, brain, and education: A neo-Piagetian approach. *International Journal of Science and Mathematics Education*, 12(3), 647-667.
- [J33](#). Norton, A., Wilkins, J. L. M., Evans, M. A., Deater-Deckard, K., Balci, O., Chang, M. (2014). Technology helps students transcend part-whole concepts. *Mathematics Teaching in the Middle School*, 19(6), 352-359.
- [J32](#). Evans, M., Norton, A., Chang, M., Deckard, K., & Balci, O. (2013). Youth and video games: Exploring the effects of learning, achievement, and engagement. *Zeitschrift für Psychologie*. 221(2), 98-106.
- [J31](#). Wilkins, J. L. M., Norton, A., & \*Boyce, S. (2013). Validating a written instrument for assessing students' fractions schemes and operations. *The Mathematics Educator*, 22(2), 31-44.
- [J30](#). Norton, A., & \*Boyce, S. (2013). A cognitive core for common state standards. *Journal for Mathematical Behavior*, 32, 266-279.
- [J29](#). Norton, A., & Wilkins, J. L. M. (2013). Supporting students' constructions of the splitting operation. *Cognition & Instruction*, 31(1), 2-28.
- [J28](#). Norton, A., & Wilkins, J. L. M. (2012). The splitting group. *Journal for Research in Mathematics Education*, 43(5), 557-583.
- [J27](#). Norton, A., & Kastberg, S. (2012). Learning to pose cognitively demanding tasks through letter writing. *Journal of Mathematics Teacher Education*, 15(2), 109-130.
- [J26](#). Norton, A., & \*Baldwin, M. (2012). Does 0.999... really equal 1? *The Mathematics Educator*, 21 (2), 58-67.
- [J25](#). Lovin, L. H., Sanchez, W. B., Leatham, K. R., Chauvot, J. B., Kastberg, S. E., & Norton, A. H. (2012). Examining Beliefs and Practices of Self and Others: Pivotal points for change and growth for mathematics teacher educators, *Studying Teacher Education: A journal of self-study of teacher education practices*, 8 (4), 51-68.
- [J24](#). \*Kosko, K. W., & Norton, A. (2012). Relationships between the process standards: Processes elicited through letter writing between preservice teachers and high school mathematics students. *School Science and Mathematics Journal*, 112(6), 340-348.
- [J23](#). Wilkins, J. L. M., & Norton, A. (2011). The splitting loop. *Journal for Research in Mathematics Education*, 42(4), 386-406.
- [J22](#). Norton, A., \*McCloskey, A., & \*Hudson, R. A. (2011). Prediction assessments: Using video-based predictions to assess prospective teachers' knowledge of students' mathematical thinking. *Journal of Mathematics Teacher Education*, 14(4), 305-325.
- [J21](#). Norton, A., & Wilkins, J. L. M. (2010). Students' partitive reasoning. *Journal of Mathematical Behavior*, 29(4), 181-194.
- [J20](#). Norton, A. (2010). Being radical. *For the Learning of Mathematics*, 30(3), 22.
- [J19](#). Bachman, D., Brown, E., & Norton, A. (2010). Chocolate key cryptography. *Mathematics Teacher*, 104(2), 100-105.
- [J18](#). Norton, A., & \*Rutledge, Z. (2010). Measuring responses to task posing cycles: Mathematical letter writing between algebra students and pre-service teachers. *The Mathematics Educator*, 19(2), 32-45.

- [J17](#). Norton, A. (2009). Re-solving the learning paradox: Epistemological and ontological questions for constructivists. *For the Learning of Mathematics*, 29(2), 2-7.
- [J16](#). Norton, A., & Wilkins, J. (2009). A quantitative analysis of children's splitting operations and fractional schemes. *Journal of Mathematical Behavior*, 28(2/3), 150-161.
- [J15](#). Norton, A. (2009). Eighty-eight thousand, four hundred and eighteen more ways to fill space. *College Mathematics Journal*, 40(2), 108-112.
- [J14](#). \*McCloskey, A., & Norton, A. (2009). Modeling students' mathematics using Steffe's advanced fractions schemes. *Mathematics Teaching in the Middle School*, 15(1), 44-56.
- [J13](#). Kastberg, S., Norton, A., & Klerlein, J. (2009). Trusting students. *Mathematics Teaching in the Middle School*, 14(7), 423-429.
- [J12](#). Norton, A., \*Rutledge, Z., Hall, K., & Norton, R. (2009). Mathematical letter writing: An opportunity for further partnership between high schools and universities. *Mathematics Teacher*, 103(5), 340-346.
- [J11](#). Norton, A., & \*McCloskey, A. (2008). Teaching experiments and professional development. *Journal of Mathematics Teacher Education*, 11(4), 285-305.
- [J10](#). \*Rutledge, Z., & Norton, A. (2008). Preservice teachers' mathematical task posing: An opportunity for coordination of perspectives. *The Mathematics Educator*, 18(1), 31-40.
- [J9](#). Norton, A., & \*McCloskey, A. (2008). Modeling students' mathematics using Steffe's fractions schemes. *Teaching Children Mathematics*, 15(1), 48-54.
- [J8](#). Norton, A. (2008). Josh's operational conjectures: Abductions of a splitting operation and the construction of new fractional schemes. *Journal for Research in Mathematics Education*, 39(4), 401-430.
- [J7](#). Norton, A., & D'Ambrosio, B. S. (2008). ZPC and ZPD: Zones of teaching and learning. *Journal for Research in Mathematics Education* 39, 220-246.
- [J6](#). Norton, A. (2006). What's on your nation's report card? (pp. 315-319), *Teaching Children Mathematics* 13(6).
- [J5](#). Abramovich, S., & Norton, A. (2006). Equations with parameters: A locus approach. *Journal of Computers in Mathematics and Science Education*, 25(1), 5-28.
- [J4](#). Norton, A. (2003). Mathematicians' religious affiliations and professional practices: The case of Bo. *The Mathematics Educator*, 12(1).
- [J3](#). Norton, A. (2002). Mathematicians' religious affiliations and professional practices: The case of Charles. *The Mathematics Educator*, 11(2).
- [J2](#). Norton, A. (2002). Mathematicians' religious affiliations and professional practices: The case of Joseph. *The Mathematics Educator*, 11(1).
- [J1](#). Abramovich, S., & Norton, A. (2000). Technology-enabled pedagogy as an informal link between finite and infinite concepts in mathematics (pp. 36-41). *The Mathematics Educator* 10(2).

#### **Books:**

- B3. Tabor, P., Dibley, D., Hackenberg, A., & Norton, A. (2020). *Numeracy for All Learners: Teaching Mathematics to Students with Special Needs*, London: Sage Publishers.

- B2. Norton, A., & Alibali, A. (Eds.) (2019). *Constructing Number: Merging Perspectives from Psychology and Mathematics Education*, a book in Springer's "Research in Mathematics Education" series (J. Cai, Series Editor).
- B1. Hackenberg, A., Norton, A., Wright, R. (2016). *Developing Fractions Knowledge*. London: Sage Publishers.

### **Book Chapters:**

- BC7. Norton, A., & Alibali, M. (2019). Mathematics in action. *Constructing Number: Merging Perspectives from Psychology and Mathematics Education*. Springer.
- BC6. Ulrich, C., & Norton, A. (2019). Discerning a progression in conceptions of magnitude during children's construction of number. *Constructing Number: Merging Perspectives from Psychology and Mathematics Education*. Springer.
- BC5. Alibali, A., & Norton, A. (2019). Synergizing research on constructing number: Themes and prospects. *Constructing Number: Merging Perspectives from Psychology and Mathematics Education*. Springer.
- BC4. Norton, A., & Bell, M. A. (2017). Mathematics educational neuroscience: Promises and challenges. In J. Cai (Ed.), *Compendium for Research in Mathematics Education*. Reston, VA: National Council of Teachers of Mathematics.
- BC3. \*Kosko, K. W., Norton, A., Conn, A., & San Pedro, J. M. (2010). Letter writing: Providing preservice teachers with experience in posing appropriate mathematical tasks to high school students. In J.W. Lott, & J. Luebeck (Eds.), *Association of Mathematics Teacher Educators Monograph 7: Mathematics teaching: Putting research into practice at all levels* (pp. 207-224). San Diego, CA: Association of Mathematics Teacher Educators.
- BC2. Norton, A., & Hackenberg, A. J. (2010). Continuing research on students' fraction schemes. In L. P. Steffe and J. Olive (Eds.), *Children's Fractional Knowledge*, (pp. 341-352). New York: Springer.
- BC1. Kastberg, S., & Norton, A. (2007). Building a system of rational numbers. In P. Kloosterman (Ed.), *The National Assessment of Educational Progress monograph*, (pp. 67-93). Reston, VA: NCTM.

### **Papers in Peer-Reviewed Proceedings:**

- P29. Norton, A., Ulrich, C., & Kerrigan, S. (2020; 35% acceptance rate). Unit transformation graphs: A case study (pp. 202-210). In *Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Sacristán, A.I., Cortés-Zavala, J.C. & Ruiz-Arias, P.M. (Eds.). Mazatlán, Mexico: Cinvestav/AMIUTEM/PME-NA. <https://doi.org/10.51272/pmena.42.2020>
- P28. Kerrigan, S., Norton, A., & Ulrich, C. (2020; 35% acceptance rate). Ranking the cognitive demand of fractions tasks (pp. 2253-2261). In *Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Sacristán, A.I., Cortés-Zavala, J.C. & Ruiz-Arias, P.M. (Eds.). Mazatlán, Mexico: Cinvestav/AMIUTEM/PME-NA. <https://doi.org/10.51272/pmena.42.2020>
- P27. Kerrigan, S., Norton, A., & Ulrich, C. (2019). Unit transformation capacity theory: Assessing cognitive demand with units coordination and working memory.

*Proceedings of the Forty-first Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Saint Louis, MO.

- P26. Norton, A., & Arnold, R. (2019). Meeting the cognitive demands of proof by induction: The case of Ben. *Proceedings of the Forty-first Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Saint Louis, MO.
- P25. Tzur, R., Wei, B., Smith, A., Norton, A., Davis, A., and Johnson, H. (2018). Same unit coordination: A conceptual screener for mixed unit coordination and base-10, place value reasoning. *Proceedings of the 42<sup>nd</sup> Conference of the International Group for the Psychology of Mathematics Education*. Sweden.
- P24. Tzur, R., Johnson, H., Norton, A., Davis, A., Wang, X., Ferrara, M, Jorgensen, C., & Wei, B. (2017). Conception of number as a composite unit predicts students' multiplicative reasoning: Quantitative corroboration of Steffe's model. In B. Kaur, W. K. Ho, T. L. Toh, & B. H. Choy (Eds.), *Proceedings of the 41st Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, pp. 289-296). Singapore: PME
- P23. Wilkins, J., Norton, A., & Ulrich, K. (2017). Activating a fourth level of units coordination. *Proceedings of the Thirty-Ninth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Indianapolis, IN.
- P22. Norton, A., & Arnold, R. (2017). Logical implication as the object of mathematical induction. *Proceedings of the Thirty-Ninth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Indianapolis, IN.
- P21. Arnold, R., & Norton, A. (2017). Mathematical actions, mathematical objects, and mathematical induction. *Proceedings of the 20<sup>th</sup> annual conference for Research in Undergraduate Mathematics Education*, San Diego, CA.
- P20. Norton, A. (2016). (Ir)reversibility in Mathematics. *Proceedings of the Thirty-Eighth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Tucson, AZ: University of Arizona.
- P19. \*Stephens, A., Lovin, L. A., Bussi, R., Siegfried, Z., Wilkins, J. L. M., & Norton, A. (2015). PreK-8 Preservice Teachers' Construction of Fractions Schemes and Operations. *Proceedings of the Thirty-Seventh Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Lansing, MI: Michigan State University.
- P18. Jones, R., Balci, O., & Norton, A. (2015). A cloud software system for visualization of game-based learning data collected on mobile devices. In *Proceedings of the 2015 Winter Simulation Conference* (Huntington Beach, CA, Dec. 6-9). IEEE, Piscataway, NJ, pp. 1080-1090.
- P17. Norton, A. (2015). Neural correlates for action-object theories. *Proceedings of the 18<sup>th</sup> annual conference for Research in Undergraduate Mathematics Education*. Pittsburgh, PA.
- P16. Cate, A., Rosen, A., Bell, M. A., Ulrich, C., Roldan, S., & Norton, A. (2014). Mathematical Ways of Operating: an fMRI Study with 12-year-old participants.

- International conference for the Organization for Human Brain Mapping, Hamburg, Germany.*
- P15. Norton, A. (2014). The construction of cohomology as objectified action. *Proceedings of the 17<sup>th</sup> annual conference for Research in Undergraduate Mathematics Education*. Denver, CO.
- P14. Norton, A., & \*Boyce, S. (2013). Coordinating  $n+1$  levels of units. *Proceedings of the Thirty-Fifth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Chicago, IL: University of Chicago.
- P13. Norton, A., Wilkins, J. L. M., & \*Boyce, S. (2012). Supporting students' constructions of fractions schemes: Is there an app for that, too? *Proceedings of the Thirty-Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Kalamazoo, MI: University of Western Michigan.
- P12. Evans, M.A., Norton, A., Deater-Deckard, K. & Chang, M. (2012). The CandyFactory Game: An educational iPad game for middle school algebra-readiness. In *Proceedings of International Conference of Learning Sciences*. Mahwah, NJ: Lawrence Erlbaum Associates Inc.
- P11. \*Boyce, S., & Norton, A. (2012). Examining the transition from part-whole to partitive understanding of fractions. *Proceedings of the Thirty-Third Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Kalamazoo, MI: University of Western Michigan.
- P10. Norton, A., & Wilkins, J. L. M. (2011). The genesis of splitting: A gateway to algebraic reasoning. *Proceedings of the Thirty-Second Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Reno, NV: University of Nevada.
- P9. Norton, A., & Wilkins, J. (2010). Mathematical structures and mental structures. *Proceedings of the Thirty-First Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Columbus, Ohio: Ohio State University.
- P8. Norton, A., & Wilkins, J. (2009). A comparison of part-whole and partitive reasoning with unit and non-unit proper fractions. In D. Y. White (Ed.), *Proceedings of the Thirtieth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Atlanta: Georgia State University.
- P7. Norton, A., & \*Rutledge, Z. (2007). Assessing cognitive activity in the context of letter writing. In T. Lamberg, L. R. Wiest (Eds.), *Proceedings of the Twenty-ninth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Stateline (Lake Tahoe): University of Nevada, Reno.
- P6. Chauvot, J., Ice, N., Sanchez, W., Kastberg, S. E., Leatham, K. R., Lovin, L. et al. (2007). A collaborative to study beliefs of mathematics teacher educators. In T. Lamberg, L. R. Wiest (Eds.), *Proceedings of the Twenty-ninth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Stateline (Lake Tahoe): University of Nevada, Reno.



- P5. Norton, A. (2005). The power of operational conjectures. In G. M. Lloyd, M. R. Wilson, J. L. M. Wilkins, & S. L. Behm (Eds.), *Proceedings of the Twenty-Seventh Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. [CD-ROM]. Eugene, OR: All Academic.
- P4. Abramovich, S., & Norton, A. (2002). Computer-based graphing calculator as a tool for secondary teachers' re-conceptualization of pre-calculus. In Goodell, G. (Ed.), *Proceedings of the 14<sup>th</sup> Annual International Conference for the Use of Technology in Mathematics Education*. New York: Addison Wesley Longman.
- P3. Norton, A., & Abramovich, S. (2001). Bridging transformational geometry and matrix algebra with a spreadsheet-based tool kit. In Price, P., Willis, D., Davis, N., & Willis J. (Eds.), *Proceedings of the 2001 Society for Use of Information Technology in Education Conference* (pp. 1379-1384). Norfolk, VA: AACE.
- P2. Norton, A. (2000). Student conjectures in geometry. In Fernandez, M. L. (Ed.), *Proceedings of the Twenty-Second Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 290-299). Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education.
- P1. Abramovich, S., & Norton, A. (1999). Exploring quadratic-like sequences with spreadsheets through a toolkit approach. In Goodell, G. (Ed.), *Proceedings of the 11<sup>th</sup> Annual International Conference for the Use of Technology in Mathematics Education*. New York: Addison Wesley Longman.

### Invited Papers:

- I9. Norton, A. (2019). Mathematics as a coordination of (inter)actions: Invited open peer commentary on “Problematizing: The lived journey of a group of students doing mathematics” by Gandell & Maheux. *Constructivist Foundations*.
- I8. Norton, A. (2018). Perspectives on the Nature of Mathematics. Invited plenary paper, in Hodges, T.E., Roy, G. J., & Tyminski, A. M. (Eds.). (2018). Proceedings of the 40th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Greenville, SC: University of South Carolina & Clemson University (pp. 63-71).
- I7. Norton, A., & Nurnberger-Haag, J. (2018). Bridging frameworks for understanding numerical cognition (editorial). *Journal of Numerical Cognition*, 4(1), 1-8.
- I6. Norton, A. (2017). Educational Opportunities for Virginia Mathematics Teachers: Master's in Education with Concentration in Mathematics Education. *Virginia Mathematics Teacher*, 43(2), 37.
- I5. Norton, A. (2016). What distinguishes mathematical experience from other experiences? *Journal of the Korean Society of Mathematical Education, Series D: Research in Mathematical Education*, 20(1), 11-19.
- I4. Norton, A. (2014). In search of a common cognitive core for algebra. In L. P. Steffe, K. C. Moore, & L. L. Hatfield (Eds.), *Epistemic Algebraic Students: Emerging Models of Students' Algebraic Knowing* (pp. 127-134). Laramie, Wyoming: University of Wyoming.
- I3. Steffe, L. P., & Norton, A. (2014). Epistemic algebraic students. In L. P. Steffe, K. C. Moore, & L. L. Hatfield (Eds.), *Epistemic Algebraic Students: Emerging Models*

- of Students' Algebraic Knowing* (pp. 317-323). Laramie, Wyoming: University of Wyoming.
- I2. Balci, O., Deater-Deackard, K., & Norton, A. (2013). Challenges to Teaching Modeling and Simulation Online. An invited paper published in the *Proceedings of the 2013 Winter Simulation Conference*, R. Pasupathy, S.-H. Kim, A. Tolk, R. Hill, and M. E. Kuhl (Eds.).
  - I1. Norton, A. (2013). Scientific Models for Mathematics Education. *AMTE Newsletter*, Summer issue.

### **Invited Presentations:**

- 1) Norton, A. (pending). Colloquium at Portland State University.
- 2) Norton, A. (November, 2019). Maintaining Appropriate Cognitive Demand for All Students: Leveraging Research from Mathematics Education, Cognitive Psychology, and Neuroscience. Keynote address for the US Math Recovery Conference in Providence, RI.
- 3) Norton, A. (November, 2019). Apps for Supporting AVMR Fractions Strategies. Pre-conference workshop at the US Math Recovery Conference in Providence, RI.
- 4) Norton, A. (November, 2019). Supporting AVMR Fractions Strategies with the *CandyDepot* App. Contributed talk at the US Math Recovery Conference in Providence, RI.
- 5) Norton, A. (October, 2019). Reaching All Students: Managing the Cognitive Demand of Fractions Tasks. Keynote address for the Blue Ridge Council of Teachers of Mathematics in Roanoke, VA.
- 6) Norton, A., & Sarama, J. (October, 2018). Perspectives on the Nature of Mathematics and Research. Plenary panel at the *Fortieth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Greenville, SC.
- 7) Norton, A. (February, 2018). *The Genesis of Mathematics*. Keynote address for the Math Learning Center in Phoenix, AZ.
- 8) Norton, A. (February, 2018). *The Fraction Learning Progression*. Keynote address for the Math Learning Center in Phoenix, AZ.
- 9) Hackenberg, A., & Norton, A. (October, 2017). *Units Coordination across Whole Numbers, Fractions, and Early Algebra*. Keynote address at the US Math Recovery Conference in Minneapolis, MN.
- 10) Norton, A. (October, 2017). *Tasks that Support the Development of Units Coordination*. Invited breakout talk at the US Math Recovery Conference in Minneapolis, MN.
- 11) Norton, A. (February, 2017). *Mathematisation and the Development of Fractional Knowledge*. Keynote address at the East Lothian Numeracy Conference in East Lothian, Scotland.
- 12) Norton, A. (February, 2017). *Making Learning Stick*. Keynote address at the East Lothian Numeracy Conference in East Lothian, Scotland.
- 13) Norton, A. (October, 2016). Developing Fractions Knowledge at Stages 1 and 2. Workshop at the US Math Recovery Conference in Minneapolis, MN.
- 14) Norton, A. & Hackenberg, A. (October, 2016). Developing Fractions Knowledge. Keynote address at the US Math Recovery Conference in Minneapolis, MN.
- 15) Norton, A. (May, 2016). *The CandyBot App: Fractions and Functions*. Workshop provided for the University of Georgia.
- 16) Norton, A. (March, 2016). *Promoting Units Coordination across Contexts*. Workshop provided for the University of Colorado at Denver.

- 17) Norton, A. (February, 2016). *Coordinating Units at the Candy Depot*. Colloquium presented to elementary school teachers at Utah State University.
- 18) Norton, A. (February, 2016). *Provoking the Construction of Units Coordinating Structures*. Colloquium presented to faculty at Utah State University.
- 19) Norton, A. (February, 2016). *Mathematics in Action*. Colloquium presented at Utah Valley University.
- 20) Norton, A. (February, 2016). *The CandyBot App: Developing Fractions Knowledge and Algebraic Reasoning by Coordinating and Transforming Units*. Keynote address for the Utah Association of Mathematics Teacher Educators in Orem, Utah.
- 21) Norton, A. (December, 2015). *Supporting Students' Development of Fractions Knowledge*. Keynote address for the Tidewater Team for Mathematics Education's 19th Annual Mathematics Day, Williamsburg, VA.
- 22) Norton, A. (December, 2015). *Tasks for Supporting Students' Development of Fractions Knowledge*. Working session at the Tidewater Team for Mathematics Education's 19th Annual Mathematics Day, Williamsburg, VA.
- 23) Norton, A. (October, 2015). *Tasks for Assessing and Supporting Students' Development of Fractional Knowledge*. Workshop for the US Math Recovery Council, Raleigh, NC.
- 24) Norton, A. (October, 2015). *Developing Fractional Knowledge from Whole Number Knowledge*. Featured talk for the US Math Recovery Council, Raleigh, NC.
- 25) Norton, A. (February, 2015). *The CandyBot Educational Game: Transforming Units, Units of Units, and Unit Fractions*. Colloquium for the Math Department at Texas State.
- 26) Norton, A. & Deater-Deckard, K. (November, 2014). *Psychologically and Mathematically Engaging Apps*. Colloquium at New York University.
- 27) Norton, A. (November, 2014). *Mathematics at Hand*. Colloquium at Rutgers University.
- 28) Norton, A. (November, 2014). *Mind, Mathematics, and Mental Action*. Plenary lecture at the 46<sup>th</sup> Conference of Mathematics Education, by the Korean Society of Mathematics Educators, held at Sogang University, Seoul, South Korea.
- 29) Norton, A. (October, 2014). *Coordinating  $n+1$  Levels of Units: There's an App for That*. Plenary lecture at *The 1<sup>st</sup> Lecture Series on Mathematics Education*, by the Korean Society of Mathematics Educators held at Sogang University, Seoul, South Korea.
- 30) Norton, A. (October 2014). *Three Implications of Mathematics Educational Neuroscience*. Colloquium at Seoul National University of Education.
- 31) Norton, A., & Ulrich, C. (June, 2014). *Assessing Program Quality with Noyce Teachers*. Invited workshop at the annual Noyce Conference in Washington, DC.
- 32) Norton, A. (March, 2014). *Snapshots in the History of a Research Program*. Keynote address to the Indiana Mathematics Education Research Symposium in Indianapolis, IN.
- 33) Norton, A. (February, 2014). *Mathematics as Objectified Action*. Invited presentation for the Annual conference for the Association of Mathematics Teacher Educators in Irvine, CA.
- 34) Norton, A. (September, 2013). *Mathematics in Action*. Keynote address to the 32nd Annual Conference on the Improvement of Mathematics Teaching, University of Purdue Calumet.
- 35) Norton, A. (September, 2013). *Fractions in Action*. Invited presentation, 32nd Annual Conference on the Improvement of Mathematics Teaching, University of Purdue University Calumet.
- 36) Norton, A. (September, 2013). *How Your Mind Makes Fractions: The Psychology of Mathematical Learning*. Invited colloquium for the Psychology Department at Virginia Tech.

- 37) Norton, A. (June, 2013). *In Search of a Common Cognitive Core for Algebra*. Invited presentation for the Epistemic Algebraic Students Conference in Athens, GA.
- 38) Norton, A. (October, 2012). *The Unreasonable Effectiveness of Mathematics*. Colloquium for the Mathematics Department at James Madison University.
- 39) Norton, A. (October, 2012). *CandyFactory: A Game that Engages Students' Mathematical Operations*. Invited presentation at Apps4VA's HACK4EDU Competition in Blacksburg, VA.
- 40) Norton, A. (October, 2012). *Connecting Fractions and Algebra*. Invited presentation at the 2012 VMI STEM Education Conference. Lexington, VA.
- 41) Norton, A. (May, 2011). Panelist for the *Mathematical Education of Teachers* workshop, Mathematical Sciences Research Institute, Berkeley, CA.
- 42) Norton, A. (January, 2011). *The Use of Group Theory in Modeling Students' Constructions of Fractions*. Colloquium for the Mathematics Education Student Association, University of Georgia, Athens, GA.
- 43) Norton, A. (2006, December). *Teaching Experiments: Learning from Students*. Invited presentation for EQUATE, District Session II, Lakota Local School District, Cincinnati, OH.
- 44) Galindo, E., Norton, A., Borgioli-Yoder, G., & McCloskey, A. (2005, February). *Making Mathematics Problematic*. Workshop held at Hoosier Road Elementary School, Fishers, IN.
- 45) Norton, A. (2004, April). *Demented Dimensions*. Invited presentation for the University of Georgia Math Club, Athens, GA.
- 46) Norton, A. (2003, October). *Advancing Technology and the Nature of Proof in the Geometry Classroom*. Two-day workshop hosted by the North Metro Collaborative and held at Kennesaw State University, Kennesaw, GA.
- 47) Norton, A. (2000, October). *Student Conjectures in Geometry*, Colloquium for the Mathematics Education Student Association at UGA, Athens, GA.

#### **Other Presentations:**

- 1) Kokushkin, V., Arnold, R., & Norton, A. (February, 2019). Logical implication as an object and proficiency in proof by induction. Poster presentation at the Research in Undergraduate Mathematics Education, Boston, MA.
- 2) Kerrigan, S., Norton, A., & Ulrich, C. (February, 2020). Unit transformation capacity: Assessing cognitive demand with units coordination and working memory. Presentation at the annual conference for the Association of Mathematics Teacher Educators in Phoenix, AZ.
- 3) Norton, A., Ulrich, C., and Kerrigan, S. (April, 2019). Coherence in mathematical development. Poster presentation for the Transdisciplinary Communities Research Symposium. Moss Arts Center, VT (hosted by the Vice Provost's Office for Learning Systems Innovation and Effectiveness).
- 4) Simon, M., Hackenberg, A., & Norton A. (April, 2018). Engendering Reflective Abstraction of Fraction and Algebra Concepts. Symposium at the NCTM Research Conference. Washington, DC.
- 5) Kerrigan, S., Kelly, S., Norton, A., & Ulrich, C. (2018). Modeling cognitive demand across mathematical domains. Poster presented at the *Fortieth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics*.
- 6) Norton, A. (December, 2017). Mathematics education at Virginia Tech. Presented to the First Year Experience class (MATH 1004) at Virginia Tech.

- 7) El Mallah, S., Zhang, L., Norton, A., Chang, M., Evans, M., & Deater-Deckard, K. (2016). Group Assessment of Middle School Students' Working Memory Using a Mobile Device Game. Poster presented at the 56<sup>th</sup> Annual Meeting of the New England Psychological Association, Worcester, MA.
- 8) Norton, A. (2017). Tasks for Promoting and Assessing Fractions Knowledge. Virginia Council of Teachers of Mathematics, Harrisonburg, VA.
- 9) Norton, A. (April, 2016). Taking risks and trusting students. Presentation for the SGTA at Virginia Tech.
- 10) Ulrich, C. & Norton, A. (March, 2016). Developing a Writing Habit. Presentation for the Mathematics Education seminar at Virginia Tech.
- 11) Boyce, S., & Norton, A. (November, 2015). Moderating Dylan's perturbations in coordinating units across contexts. Poster presented at the *Thirty-Seventh Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Lansing, MI: Michigan State University.
- 12) Bell, M.A., Norton, A., Ulrich, C., Cate, A., & Patton, L.A. (2015, March). Mathematical ways of operating: An EEG study with 6<sup>th</sup> graders. *Society for Research in Child Development*, Philadelphia.
- 13) Siegfried, J., Stevens, A., Lovin, L. A., Norton, A., & Wilkins, J. (February, 2015). Fraction Schemes and Operations: A Data-Driven Course Redesign for Prospective PreK-8 Teachers. Discussion session for the annual conference for the Association of Mathematics Teacher Educators, Orlando, FL.
- 14) Norton, A. (February, 2015). *Building Models of Students' Mathematics*. Virginia Tech Mathematics Department "Research Days", Blacksburg, VA.
- 15) Norton, A., & Ulrich, C. (June, 2014). *Assessing Program Quality with Noyce Teachers*. Poster presented at the annual Noyce Conference in Washington, DC.
- 16) Boyce, S., & Norton, A. (July, 2014). *Modeling Austin's Propensity to Coordinate Units*. International Conference for the Psychology of Mathematics Education, Vancouver, Canada.
- 17) Grant, M., Irwin, B., Barnes, D., Heaton, R., & Norton, A. (April, 2014). *National Council of Teachers of Mathematics (NCTM) and the Journal for Research in Mathematics Education (JRME) as Resources for Leaders of Professional Learning*. National Council of Supervisors of Mathematics, New Orleans, LA.
- 18) Norton, A. (March, 2014). *Psychological Origins of Mathematics and their Neural Correlates*. Virginia Tech Mathematics Department "Research Days", Blacksburg, VA.
- 19) Norton, A., & Hatch, J. (March, 2014). *Learning to Coordinate  $n+1$  Levels of Units: There's an App for That!* Virginia Council of Teachers of Mathematics, Harrisonburg, VA.
- 20) Chang, M., Norton, A. (February, 2014). *Educational Video Games and Engagement*. 12<sup>th</sup> Annual Hawaii International Conference on Education.
- 21) Stevens, A., Siegfried, J., Lovin, L., Norton, A., & Wilkins, J. (February, 2014). *Fraction Schemes and Operations: An Extension to PreK-8 Prospective Teachers*. Discussion session for the annual conference for the Association of Mathematics Teacher Educators, Irvine, CA.
- 22) Boyce, S., & Norton, A. (November, 2013). Fractions Schemes and Whole Number Units Coordination. Poster presented at the *Thirty-Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Chicago, IL: University of Chicago.
- 23) Ulrich, C., Norton, A., & Arvold, B. (May, 2013). *Teacher Quality as a Retrospective Assessment of Program Quality*. Poster presented at the annual Noyce Conference in

Washington, DC.

- 24) Langrall, C., Barnes, D., Izsak, A., Stinson, D. W., Norton, A., Graham, K., & Speer, N. (April, 2013). *The Life of a JRME Manuscript, Through Three Lenses* (April, 2013). Symposium presented at the Research Pre-session of the annual conference of the National Council of Teachers of Mathematics, Denver, CO.
- 25) Galindo, E., Amador, J., Norton, A., & Rapacki, L. (January, 2013). *Implementing an Innovative Elementary Mathematics and Science Field Experience: The Iterative Model Building (IMB) Approach*. A presentation for the annual conference of the Association of Mathematics Teacher Educators in Orlando, FL.
- 26) Norton, A., Arvold, B., & Plaxco, D. (May, 2012). *Virginia Tech to Virginia Teacher*. Poster presented at the annual Noyce Conference in Washington, DC.
- 27) Hackenberg, A., Norton, A., & Steffe, L. (April, 2012). *Students' Fractional Knowledge and the Common Core State Standards*. Paper presented at the Research Pre-session of the annual conference of the National Council of Teachers of Mathematics, Philadelphia.
- 28) Boyce, S., & Norton, A. (July, 2011). *The Noyce Experience: A Comparative Analysis of Exit Interviews*. Poster presented at the annual Noyce Conference, Washington, DC.
- 29) Norton, A. (June, 2011). Algebraic structures for modeling student construction of rational number. Forty-first annual meeting of the Jean Piaget Society, Berkeley, CA.
- 30) Galindo, E., Norton, A., Amador, J., Hudson, R. & Essex, K. (April, 2011). Assessing and Measuring Change in Reflective Practices of Preservice Teachers. Paper presented at the Research Pre-session of the annual conference of the National Council of Teachers of Mathematics, Indianapolis, IN.
- 31) Norton, A. (March, 2011). Virginia Teach: Building communities of teachers in high-needs schools. Virginia Council of Teachers of Mathematics, Richmond, VA.
- 32) Sanchez, W., Chauvot, J., Kastberg, S., Leatham, K., Lovin, L., & Norton, A. (August, 2010). Navigating Belief Systems of Mathematics Teacher Educators: Making the Private Public to Inform Practice. Paper presented at the Self-Study of Teacher Education Practices Castle Conference 2010 (Castle VIII) at Herstmonceux, East Sussex, UK.
- 33) Norton, A. (July, 2010). Virginia Teach: Serving Mathematics Students in Need. Poster presented at the annual Noyce Conference, Washington, DC.
- 34) Galindo, E., Heid, M. K., Hudson, R. A., & Norton, A. (April, 2010). Iterative Model Building: Researching how to prepare quality teachers and how to measure teacher quality. Paper presented at the annual meeting of the American Educational Research Association, Denver, CO.
- 35) Kosko, K. W., & Norton, A. (October, 2009). How demanding are the NCTM process standards? Paper presented at the annual conference of the School Science and Mathematics and Science Association, Reno, NV.
- 36) Norton, A. (July, 2009). Virginia Teach: Serving Mathematics Students in Need. Poster presented at the annual Noyce Conference, Washington, DC.
- 37) Galindo, E., Norton, A., McCloskey, A., Essex, K., Hudson, R. A., & Steffe, L. (April, 2009). Factors contributing to the preparation of quality mathematics teachers. Symposium presented at the Research Pre-session of the annual conference of the National Council of Teachers of Mathematics, Washington, DC.
- 38) Norton, A., Wilkins, J., Hackenberg, A., & Steffe, L. (April, 2009). Testing hypotheses about students' operational development of fractions. Symposium presented at the Research Pre-session of the annual conference of the National Council of Teachers of Mathematics,

Washington, DC.

- 39) Norton, A., & Kastberg, S. (February, 2009). Learning to pose cognitively demanding tasks through letter writing. Paper presented at the Thirteenth annual conference of the Association of Mathematics Teacher Educators, Orlando, FL.
- 40) Conn, A., & Norton, A. (October, 2008). *Eliciting NCTM process standards through mathematical letter writing*. Paper presented at the annual conference of the School Science and Mathematics Association, Raleigh-Durham, NC.
- 41) McCloskey, A., & Norton, A. (October, 2008). *Using video-based predictions to assess pre-service teachers' knowledge of students' math and science thinking*. Paper presented at the annual conference of the School Science and Mathematics Association, Raleigh-Durham, NC.
- 42) Leatham, K., Norton, A., Wilson, P., Peterson, B., & Galindo, E. (April, 2008). *Restructuring field experiences to focus on students' mathematical thinking*. Paper presented at the research pre-session of the annual conference for the National Council of Teachers of Mathematics, Salt Lake City, UT.
- 43) Norton, A., Galindo, E., Weinberg, A., & Findell, B. (2008, January). *Linking college courses to the secondary school curriculum*. Paper presented at the annual conference for the Association of Mathematics Teacher Educators, Tulsa, OK.
- 44) Lovin, L., Chauvot, J., Kastber, S., Norton, A., Leatham, K., & Sanchez, W. (2008, January). *The beliefs of mathematics teacher educators and the implications for mathematics teacher education*. Paper presented at the annual conference for the Association of Mathematics Teacher Educators, Tulsa, OK.
- 45) Norton, A., McCloskey, A., & Ellison, D. (2007, March). *Gaining Insight into Students' Development of Fractions Concepts*. Paper presented at the annual conference for the National Council of Teachers of Mathematics, Atlanta, GA.
- 46) Norton, A. (2007, February). *Fractions Recovery Interventions*. Invited presentation for the Extended Learning Session of the 2006 Summer Academy for School Psychologists (SASP): Critical Skills for Tiered Systems of Prevention and Intervention, Indianapolis, IN.
- 47) McCloskey, A., & Norton, A. (2006, April). *Fractions Recovery Triads*. Paper presented at the annual Mathematics Recovery conference, Denver, CO.
- 48) Norton, A. (2005, April). *Eliciting Student Conjectures*. Paper presented at the research pre-session of the annual conference for the National Council of Teachers of Mathematics, Anaheim, CA.
- 49) Kehle, P., Maki, D., Norton, A., & Nowlin, D. (2005). *Design and implementation of linking courses: Connecting college mathematics with high school mathematics for pre-service teachers*. Paper presented at the Joint AMS-MAA Annual Meeting, Atlanta, GA.
- 50) Norton, A. (2001, March). *Psychological Models of Students' Mathematical Conjectures*, 1<sup>st</sup> Annual Georgia Graduate Interdisciplinary Conference, Athens, GA.
- 51) Norton, A., & Abramovich, S. (2000, November). *Fractals, matrices and spreadsheets*,  
52) International Conference for the Use of Technology in Mathematics Education, Atlanta, GA.
- 53) Norton, A. (2000, October). *Student conjectures in geometry*, North American Chapter of the Psychology of Mathematics Education, Tuscon, AZ.
- 54) Norton, A., & Abramovich, S. (1999, December). *Approaching the concept of limit through the use of technology*, Asian Technology Conference in Mathematics, Zhangzhou, China.

55) Norton, A., & Abramovich, S. (1999, October). *Technology-enabled pedagogy as an informal link between finite and infinite concepts in secondary mathematics*, North Carolina's Conference of Teachers of Mathematics, Greensboro, NC.

### Discussant

- Norton, A., Izsak, Beckmann, Hackenberg, & Simon (April, 2016). *New Research on Extending Multiplicative Relationships beyond Whole Numbers*. NCTM Research Conference, San Francisco.
- Galindo, E., Amador, J., Hudson, R., Weiland, I., Lee, M. Y., Tsegai, S. K., & Yang, K. J. (April, 2013) *Reflecting ability and noticing students' thinking: What does it take?* Symposium presented at the Research Pre-session of the annual conference of the National Council of Teachers of Mathematics, Denver, CO.
- Galindo, E., Amador, J., Lee, M. Y., Tsegai, S. K., & Yang, K. J. (April, 2012). *Studying Reflection and Students' Thinking: Effect on Teaching Quality*. Symposium presented at the Research Pre-session of the annual conference of the National Council of Teachers of Mathematics, Philadelphia, PA.

### Interviews with Media

- Radio interview with WVTM (Blacksburg, VA), February 22, 2018
  - “Will there be math?” (on math teacher shortages)
  - <http://wvtm.org/post/will-there-be-math>
- Zone of Potential Construction Podcast, September 2016 (re-released May, 2017)
  - “Units coordination”
  - <https://podcast.app/the-best-of-zpc-dr-andy-norton-on-units-coordination-e19610343/>
- MathEd Podcast, Episode 1514, August, 2015
  - Discussion of *Journal of Mathematical Behavior* article, “Students’ units coordinating activity: A cross-sectional analysis”
  - <https://player.fm/series/math-ed-podcast/episode-1514-anderson-norton>
- WLSL and WDBJ interviews on CandyFactory and CandyBot apps, in 2012 and 2015
  - <https://www.wsls.com/news/2015/06/09/virginia-tech-creates-math-ipad-app/>

### Software

- iOS apps developed by the Learning Transformation Research Group (ltrg.centers.vt.edu) at Virginia Tech
  - *CandyFactory Educational Game* (Aslan, Norton, Balci, 2011)
    - with support from ISCE @ Virginia Tech
    - 301k downloads (as of July, 2020)
    - “Innovative App Award” from the National Educators Association
  - *CandyFactory Educational Game for iPad* (Aslan, Norton, Balci, 2012)
    - with support from NSF
    - 124k downloads
    - “TopRated App” awarded by Balefire Labs, in 2014
  - *CandyDepot Educational Game* (Aslan, Norton, Balci, 2013)
    - with support from NSF
    - 126k downloads (collectively, with *CandyDepot 2.0*)



- *CandyBot Educational Game* (Aslan, Norton, Boyce, Balci, 2015)
  - with support from NSF
  - 94k downloads
  - “Best EdApp of 2015” awarded by Balefire Labs
  - <https://www.wsls.com/news/2015/06/09/virginia-tech-creates-math-ipad-app/>
  - <https://vtnews.vt.edu/articles/2015/06/060915-science-candybotapp.html>
- *CandyDepot 2.0* Educational iPad Game (Jin, Norton, Balci, & Aslan, 2017)
  - with support from the US Math Recovery Council
  - <https://itunes.apple.com/us/app/candydepot/id690027609?ls=1&mt=8>
- Web-based apps
  - *CandyFactory* Educational Game for the web (Ying, Balci, & Norton, 2018)

### Grants:

- Principal Investigator for a \$24,700 Virginia Tech Adaptive Brain & Behavior grant, “Coherence in Mathematical Development.” Awarded 2018-2019.
- Co-Principal Investigator for a \$10,000 Virginia Tech ICTAS REU grant, “Developing a Digital Game Prototype to Support Systems Thinking Education in K12 and Initial Data Collection and Analysis” (PI Alejandro Salado). Awarded 2017-2018.
- Principal Investigator for a \$47,000 grant from the US Math Recovery Council, “Math Recovery Apps.” Awarded 2017.
- Co-Principal Investigator for an \$800,000 Robert Noyce Scholarship Phase II grant from NSF, “[Virginia Teach](#): Phase II” (PI Catherine Ulrich, School of Education, VPI). Awarded 2013-2019.
- Co-Principal Investigator for a \$19,000 grant from the Institute of Society Culture & Environment (ISCE) at Virginia Tech. “Validating Mathematical Ways of Operating with Neural Correlates (Math WONC)” (PI Anthony Cate, Psychology, VPI). Awarded 2013.
- Partner on a \$29,874 4VA grant in collaboration with James Madison University. Fraction Schemes and Operations: An Extension to Prospective PreK-8 Teachers” (Director LouAnn Lovin, JMU). Awarded 2013-2015.
- Co-Principal Investigator for a \$2,202,173 NSF DRK-12 grant, “Gateways to Algebraic Motivation, Engagement and Success (GAMES): Supporting and Assessing Fraction Proficiency with Game-Based, Mobile Applications and Devices” (PI Michael Evans, School of Education, VPI). Awarded 2011-2015.
  - \$8,000 supplement awarded in 2012 to fund an undergraduate researcher from the Mathematics Department.
- Co-Principal Investigator for a \$5,000 Engaged Department grant, proving preservice teachers with experiences engaging with ELL students (Bettibel Kreye, School of Education, VPI). Awarded, 2010-2011.
- Principal Investigator for a \$890,307 Robert Noyce Scholarship grant from NSF, “[Virginia Teach](#): Serving Mathematics Students in Need.” Awarded 2008-2015.
- Co-Principle Investigator for a \$900,388 DRK-12 grant from NSF, “Untangling Mathematical [KnoTSS](#) (Knowledge for Teaching Secondary School)” (PI Rebecca McGraw, UAZ). Awarded 2008-2011.
- Co-Principal Investigator for a \$311,650 MSP Grant from the State of Virginia, implementing a professional development program for all middle school mathematics

teachers in Montgomery County (PI Jesse Wilkins, School of Education, VPI). Awarded 2008-2009.

- Co-Principal Investigator for a \$1,499,884 DRK-12 grant from NSF, [Iterative Model Building](#), studying restructuring of early field experiences for elementary preservice teachers (PI Enrique Galindo, IUB). Awarded 2007-2012.
- Co-Principal Investigator for [The Mathematics Education Training Program for Korean Secondary Level School Teachers](#), a \$100,000 professional development grant from the Seoul Metropolitan Office of Education (Co-PI Enrique Galindo, IUB). Awarded Summer, 2007.
- Co-Principal Investigator for a \$499,987 Robert Noyce Scholarship Grant from NSF, [Deepening the Pool](#), providing scholarships in order to recruit future secondary math teachers for high-need schools in Indiana (PI Diana Lambdin, IUB). Awarded 2006-2009.
- AT&T Fellow, receiving a \$19,000 [Implementing Innovation Grant](#) to support pre-service mathematics teachers' development of web-based teaching tools, Awarded 2006-2007.
- Principal Investigator for a \$40,000 Proffitt Grant supporting a two-year *Fractions Recovery Triads* project, a professional development study for in-service elementary schools teachers using teaching experiments, Awarded 2005-2007.
- Proffitt Fellow, receiving a \$10,000 award to design the *Fraction Recovery Triads* project, Awarded Summer 2005.
- Recipient of a \$1,500 Campus Writing Program, Summer Writing-Teaching Grant to support pre-service teachers' production of professional web pages, Awarded 2005-2006.

### **Consulting:**

- Advisory board member for NSF-funded EHR grant, *Collaborative Research: Comprehending Conditional Claims' Proofs Organically* (PI Paul Dawkins, Texas State, El Paso), 2020-2023.
- Consultant for Montclair State University on their five-year review of the Red Hawk Math Learning Center, 2018
- Consultant for NSF-funded Career grant, *CAREER: Advancing Secondary Mathematics Teachers' Quantitative Reasoning* (PI Kevin Moore, University of Georgia), 2014-2019.
- Consultant for NSF-funded Career grant, *CAREER: Investigating Differentiated Instruction and Relationships Between Rational Number Knowledge and Algebraic Reasoning in Middle School* (PI Amy Hackenberg, Indiana University), 2013-2019
- Advisory board member for NSF-funded REAL project, *Investigating Proportional Relationships from Two Perspectives* (PI Andrew Izsak, University of Georgia), 2014-2017
- Advisory board member and consultant for NSF-funded DRK-12 project, *Adaptive Pedagogy for Elementary Teachers: Supporting Students' Transition from Elementary to Middle School Mathematics* (PI Ron Tzur, University of Colorado-Denver), 2015-2020.
- Educational consultant for Amplify Education, Inc., 2014-2015.
  - Designed professional development modules aligned with 3<sup>rd</sup> grade Common Core State Standards for Mathematics.
  - Created frameworks for designed and assessing professional development with regard to instruction aligned with Common Core Standards for Mathematics.

- Educational consultant for Scholastic, evaluating *Fractions Nation* curricular materials, 2012
- Co-Academic Director for [The Mathematics Education Training Program for Korean Secondary Level School Teachers](#), an \$85,000 professional development grant from the Seoul Metropolitan Office of Education, Awarded Summer, 2006.
- Mathematics education consultant for Encyclopedia Britannica, 2004

### **Doctoral Committees:**

- Brooke Mullins (committee member), PhD Virginia Tech, 2020  
Current position: Assistant Professor, Eastern Kentucky University
- Rachel Rupnow (committee member), PhD Virginia Tech, 2019  
Current position: Assistant Professor, Northern Illinois University
- Karen Zwanch (committee member), PhD (School of Education), 2019  
Current position: Assistant Professor, Oklahoma State University
- Daniel Cheshire (committee member), PhD, Texas State University, 2017
- Nicora Placa (committee member), PhD, NYU, 2016
- Le Thi Tran (primary thesis examiner), PhD, Southern Cross University (Australia), 2016
- Serdar Aslan (committee member), PhD (Computer Science) Virginia Tech, 2016
- David Plaxco (committee member), PhD Virginia Tech, 2015  
Current position: Assistant Professor, Clayton State University
- Steven Boyce (advisor), PhD Virginia Tech, 2014  
Current position: Assistant Professor, Portland State University
- Jean Mistele (committee member), PhD Virginia Tech, 2013  
Current position: Assistant Professor, Radford University
- Beth MacDonald (committee member), PhD Virginia Tech, 2013  
Current position: Assistant Professor, Utah State University
- Alexis Johnston (committee member), PhD Virginia Tech, 2012  
Current position: Assistant Professor, James Madison University
- Jonathan Schulz (committee member), EdD Virginia Tech, 2011  
Current position: Math Supervisor, Montgomery County, VA
- Karl Kosko (committee member), PhD Virginia Tech, 2010  
Current position: Assistant Professor, Kent State University
- Bettibel Kreye (committee member), EdD Virginia Tech, 2009  
Current position: Clinical faculty, Virginia Tech
- Stephanie Behm (committee member), PhD Virginia Tech 2008  
Current position: Assistant Professor, Georgia State
- Andrea McCloskey (committee member), PhD Indiana University, 2007  
Current position; Assistant Professor, Penn State
- Paula Stickle (committee member), PhD Indiana University, 2006  
Current position : Assistant Professor, Millikin University
- Crystal Walcott (committee member), PhD Indiana University, 2006  
Current position: Assistant Professor, IUPUI
- Joyce Xu (committee member), PhD (School of Education), expected in 2018
- Rachel Keller (committee member), PhD (School of Education), Virginia Tech, expected, 2018
- Ahsan Chowdhury (committee member), PhD, Virginia Tech, expected 2021
- Sarah Kerrigan (advisor), PhD, Virginia Tech, expected 2021

Vladislav Kokushkin (advisor), PhD, Virginia Tech, expected 2022  
Marcie Tiraphatna (committee member), PhD, Virginia Tech, expected 2022  
Kaitlyn Serbin (committee member), PhD, Virginia Tech, expected 2021  
Tiffany LaCroix (committee member), PhD, Virginia Tech, expected 2020  
Erika Rappold (advisor), PhD, Virginia Tech, expected 2021

**Masters Thesis Committees at Virginia Tech:**

Bradley Shapiro, Mathematics, 2009  
Steven Boyce, Mathematics, 2010  
David Plaxco (advisor), Mathematics, 2011  
Serdar Aslan, Computer Science, 2011  
Robert Jones, Computer Science, 2014  
Shareen El Mallah, Psychology, 2015  
Congwu Tao, Computer Science, 2016  
Tiancheng Ying, Computer Science, 2019  
Xuan Liu, Computer Science, 2019  
Nathan Phillips (advisor), Mathematics, 2019  
Marilyn Kelley, Mathematics, 2020

**Master of Arts in Education Final Examination Committees:**

Megan Louvet, 2018  
Brittany McFarlane, 2018  
Emma Mehfoud, 2018  
Daniel Tavenner, 2018  
Zack Calhoun, 2019  
Casey Castelli, 2019  
Sam Inge, 2019  
Kelsey Mack, 2019  
Angela Pangburn, 2019  
Julia Petras, 2019

**Undergraduate Researchers at Virginia Tech:**

Rachael Stinger. Modeling students' algebraic reasoning (Fall 2019)  
Gabrielle Acosta & Ricardo Rodriguez. Mathematics Induction project (Spring/Fall, 2019)  
Katherine Wilde, Emily Wright, & Julia Dotson. Coherence in Mathematical Development project (Spring/Summer 2019)

- Assisted with data collection and analysis

Samantha Kelly, Units coordination scales, Spring 2018, Fall 2018, Spring 2019

- Participated in the Department of Mathematics' Layman Prize competition (2018)
- Paper accepted at the 2019 Research Conference on Mathematical Learning
- Supported by the CMD project, Spring 2019

Katherine Wilde & Emily Wright, Systems thinking and mathematics education, Spring 2018, Fall 2018

- Presented at the Undergraduate Research Conference at Virginia Tech (2018)
- Supported by the ICTAS grant, Spring 2018, Fall 2018

Lindsay Lawrence & Aiden Lewis, Effectiveness of the *CandyDepot* app, Spring 2016  
Andrew Nicholas, Evaluating freely available apps as resources for math teachers, Spring 2012

- Presented results at the Virginia Council of Teachers of Mathematics Conference, March 2012

## **Teaching:**

### **Virginia Tech**

MATH 1614 Mathematics for Elementary School Teachers I  
MATH 3034 Introduction to Proofs  
MATH 4044 History of Mathematics  
MATH 4625-26 Mathematics for Secondary School Teachers I & II  
MATH 4644 Teaching Secondary School Mathematics with Technology  
MATH 4664 Senior Seminar in Mathematics Education  
MATH 3624 Early Field Experience for Mathematics Teachers  
MATH 5984 Mathematical Structures and Psychological Structures  
MATH 5624 Modeling Mathematical Knowledge & Learning  
MATH 7994 Graduate Student Seminar

### **Indiana University**

E343 Elementary Mathematics Methods  
M302/502 Algebra throughout the Secondary School Curriculum  
M321 Curriculum & Assessment for Secondary School  
M422/522 Secondary School Mathematics Methods  
M543 Elementary Graduate Certification Program Mathematics Methods  
N517 Advanced Mathematics Teaching Methods for Secondary School  
N716 Scheme Theory & Teaching Experiments  
N716 (with Signe Kastberg) Mathematics Education of Labeled Children

### **University of Georgia**

MATH 1113 Pre-Calculus  
EMAT 3410 Mathematics Teaching & Curriculum, pre-K-5  
EMAT 4550 Contemporary School Mathematics  
Secondary School Mathematics Student Teaching supervision

### **Loganville High School**

Math Teacher (Algebra I, II, III; Trigonometry), 2000-2001

### **Georgia's Governor's Honors Program**

Math Instructor, 1998-2000, 2003

## **University Committees:**

### **Virginia Tech**

Caldwell Postdoc Search Committee, 2019  
Pre-tenure Review Committees (4), Mathematics Department, 2013, 2015, 2017  
Neuroscience Search Committee, Psychology Department, 2013-2014  
Personnel Committee, Mathematics Department, 2012-2014, 2015-2016  
Mathematics Department Executive Committee, 2017-2019  
Instructor Affairs Committee, Mathematics Department, 2012-2014, 2015-2016  
Instructor Evaluation Committee, Mathematics Department, 2014-2015

Mathematics Education Search Committee, School of Education, 2011-2012  
Mentor for two tenure-track faculty and one collegiate faculty member in the  
Mathematics Department  
Chair, Mathematics Education Committee, Math Department, 2009-present  
Chair, Mathematics Education Satellite Search Committee, Math Department, 2010-  
2011, 2012-2013  
Graduate Program Committee, Mathematics Department, 2010-present  
Undergraduate Program Committee, Mathematics Department, 2008-2010  
Colloquium Committee, Mathematics Department, 2007-2008  
Neuroscience Interest Group member, 2008-present  
Evaluator of Comprehensive Exams for the MAEd program, 2008-present  
Chair of the Publicity Committee, Department of Mathematics, 2016-2019  
Beginning in 2018, this work extended to a re-design of the department's web  
page, converting to Ensemble One  
Steering Committee member for the College of Science Faculty Association, 2016-2019  
Chair: 2017-2018

### **Indiana University**

Mathematics Education Representative for the Secondary Education Council, 2004-2007  
School of Education Student Recruitment, Admissions, and Financial Aid Committee,  
2006-2007  
School of Education Grievance Committee, 2005-2007  
Junior Faculty Representative for the Curriculum & Instruction Annual Review  
Committee, 2007  
Mathematics Education Social Committee, 2005-2007  
Residential Fellow for the Forest Hall Education Committee, 2005-2007  
Learning Sciences Search Committee (3 searches), 2006-2007  
Mathematics Education Search Committee, Department of Curriculum & Instruction,  
2006-2007  
School of Education Dissertation Award Committee, 2006  
Reader for the School of Education Graduation, 2006

### **Professional Service:**

Steering Committee member for the North American Chapter of the International Group for the  
Psychology of Mathematics Education, 2013-2016  
Committee Chair: 2014-2015  
Oversaw the transition of the organization to a 501(c)3 non-profit corporation  
Organized conference planning subcommittees for 2015, 2016, and 2017  
Editorial Panelist, *Journal for Research in Mathematics Education*, 2011-2014  
Panel Chair, 2013-2014  
Led search for new JRME editor  
Led semi-annual panel meetings  
Reviewed 1-2 manuscripts per month  
Guest Editor, *Journal for Research in Mathematics Education*, 2013-2019  
Lead Guest Editor (with Julie Nurnberger-Haag), special issue of the *Journal of Numerical  
Cognition*, 2018. <https://jnc.psychopen.eu/issue/view/8>

Editorial Board, *International Electronic Journal of Mathematics Education*, 2015-2017.  
Principal Reviewer for the Institute of Educational Studies (US Dept. of Education): 2012-2015  
Reviewed 8-16 grant proposals per year  
Rated 20-50 proposals per year  
Reviewer for International Conference for the Psychology of Mathematics Education, 2014-2016, 2018  
Reviewer for Research in Undergraduate Mathematics Education conference and proceedings, 2013-2014  
Reviewer for NCTM's *Compendium for Research in Mathematics Education*, 2014-2015.  
External Reviewer for Tenure and Promotion, 2011 (1 case), 2012 (1 case), 2013 (1 case), 2015 (1 case), 2017 (1 case), 2018 (2 cases)  
Successful letters of nomination for the Edward A. Anderson scholarship (\$2,000) from the Virginia Council of Teachers of Mathematics: Hannah Joyce (2009), India Haun (2011), Elizabeth Fort (2016), Steven Deshong (2017), Sam Inge (2018), Emily Staskin (2019),  
Reviewer for the following journals:  
*Asian Pacific Education Review*  
*Cognition & Instruction*  
*Constructivist Foundations*  
*Early Education and Development*  
*For the Learning of Mathematics*  
*International Journal for Science & Mathematics Education*  
*Journal of Mathematical Behavior*  
*Journal of Mathematics Teacher Education*  
*Journal for Research in Mathematics Education*  
*Mathematical Thinking and Learning*  
*Proceedings of the Psychology of Mathematics Education conference*  
*Proceedings of PME-NA*  
*The Mathematics Educator*  
*The Mathematics Teacher*  
*Teaching Children Mathematics*  
*Virginia Mathematics Teacher*  
Reviewer for NSF proposals: 2009, 2011  
Organizer for the "Explorations of Math and Art through Tessellations" component of the *Women in Math Career Day*, 2008 & 2009  
Volunteer in local schools  
Mentor for student intern, Quinne Jimenez, from the Southwest Virginia Governor's School, 2019-2020  
Price's Fork Elementary School (Blacksburg, VA), 2011-2015  
Chess Team Coach, 2012-2014  
Shawsville Middle School (Riner, VA), 2011  
Blacksburg Middle School (Blacksburg, VA), 2008-2011  
The Harmony School (Bloomington, IN), 2004-2007  
Bloomington High School South (Bloomington, IN), 2004-2007