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EDUCATION

Institution	Degree	Date Received	Major
The Pennsylvania State University	Ph.D.	08/2010	Curriculum & Instruction: Mathematics Education
The Pennsylvania State University	M.Ed.	08/1997	Teaching & Curriculum
The Pennsylvania State University	B.S.	05/1992	Mathematics

Certificates

National Board for Professional Teaching Standards	Certificate	11/2005	National Board Certification, Mathematics, Adolescence, and Young Adulthood
Commonwealth of PA	Certificate	01/1996	Instructional II Certificate, Secondary Mathematics

PROFESSIONAL EXPERIENCE

Dates	Position
7/2022 – present	Professor of Mathematics Education School of Education and Human Development University of Colorado Denver
6/2016 – 7/2022	Associate Professor of Mathematics Education School of Education and Human Development University of Colorado Denver
08/2010 – 6/2016	Assistant Professor of Mathematics Education School of Education and Human Development University of Colorado Denver
06/2005 - 08/2010	Mid-Atlantic Center Graduate Research Fellow College of Education The Pennsylvania State University

[1] Publications prior to 2010 are listed under my former last name, Godine.

08/1992 - 06/2005 Mathematics Teacher
Central York High School
York, PA

PEER REVIEWED PUBLICATIONS

REFEREED JOURNAL ARTICLES

2022 **Johnson, H. L**. (2022). Task design for graphs: Rethink multiple representations with variation theory. *Mathematical Thinking and Learning. 24*(2), 91-98. https://doi.org/10.1080/10986065.2020.1824056

Johnson, H. L., Olson, G., Tsinnajinnie, B., & Bechtold, L. (2022). Boundary transitions within, across and beyond a set of digital resources: Brokering in College Algebra. *Digital Experiences in Mathematics Education*. https://doi.org/10.1007/s40751-022-00113-2

Johnson, H. L., Tzur, R., Gardner, A., Hodkowski, N., Lewis, A., & McClintock, E. (2022). A new angle: A teacher's transformation of mathematics teaching practice and engagement in quantitative reasoning. *Research in Mathematics Education. 24*(1), 88-108. https://doi.org/10.1080/14794802.2021.1988688

Olson, G. & **Johnson, H. L.** (2022). Promote students' function reasoning with techtivities. *PRIMUS*. *32*(5), 610-620. https://doi.org/10.1080/10511970.2021.1872751

Tzur, R., **Johnson, H. L.**, Davis, A., Hodkowski, N., Harrington, C., Wei, B., & Norton, A. (2022). A stage-sensitive, written assessment of multiplicative double counting for grades 3-8. *Studies in Educational Evaluation. 74.* Article 101152. https://doi.org/10.1016/j.stueduc.2022.101152

2021 Tzur, R., **Johnson, H. L.**, Norton, A., Davis, A., Wang, X., Ferrara, M., Harrington, C., & Hodkowski, N. M. (2021). Children's spontaneous additive strategy relates to multiplicative reasoning. *Cognition and Instruction. 39*(4), 451-476. https://doi.org/10.1080/07370008.2021.1896521

2020 **Johnson, H. L.**, McClintock, E., & Gardner, A. (2020). Opportunities for reasoning: Digital task design to promote students' conceptions of graphs as relationships between quantities. *Digital Experiences in Mathematics Education. 6*(3), 340-366. https://doi.org/10.1007/s40751-020-00061-9

Tzur, R., **Johnson, H. L.**, Hodkowski, N., Nathenson-Mejia, S., Davis, A., & Gardner, A. (2020). Beyond getting answers: Promoting conceptual understanding of multiplication. *Australian Primary Mathematics Classroom, 25*(4), 35-40.

2019 **Johnson, H. L.**, Dunlap, J., Verma, G., McClintock, E., Debay, D., & Bourdeaux, B. (2019). Video based teaching playgrounds: Designing online learning opportunities to foster professional noticing of teaching practices. *Tech Trends. 63*(2), 160-169. https://doi.org/10.1007/s11528-018-0286-5

2018 **Johnson, H. L** & McClintock, E. (2018). A link between students' discernment of variation in unidirectional change and their use of quantitative variational reasoning. *Educational Studies in Mathematics*, *97*(3), 299-316. https://doi.org/10.1007/s10649-017-9799-7

Johnson, H. L., Olson, G., Gardner, A., & Smith, A. (2018). From soliciting answers to eliciting reasoning: Questioning our questions in digital math tasks. *Colorado Mathematics Teacher*, *51*(1), 2. https://digscholarship.unco.edu/cmt/vol51/iss1/2/

2017 **Johnson, H. L.**, Coles, A., & Clarke, D. (2017). Mathematical tasks and the student: Navigating "tensions of intentions" between designers, teachers, and students. *ZDM: The International Journal on Mathematics Education*, *49*(6), 813–822. https://doi.org/10.1007/s11858-017-0894-0

Johnson, H. L., McClintock, E., & Hornbein, P. (2017). Ferris wheels and filling bottles: a case of a student's transfer of covariational reasoning across tasks with different backgrounds and features. *ZDM: The International Journal on Mathematics Education*, *49*(6), 851–864. https://doi.org/10.1007/s11858-017-0866-4

2016 Dunlap, J. C., Verma, G., & **Johnson, H. L.** (2016). Presence+Experience: A framework for the purposeful design of presence in online courses. *Tech Trends, 60*(2), 145-151.

Johnson, H. L., Hornbein, P., & Azeem, S. (2016). Investigating functions with a Ferris wheel. *Mathematics Teacher. 110*(5), 345-351.

Johnson, H. L., Hornbein, P., & Bryson, D. (2016). Designing online playgrounds for learning mathematics. *Mathematics Teacher, 110*(4), 298-303.

2015 **Johnson, H. L.** (2015) Secondary students' quantification of ratio and rate: A framework for reasoning about change in covarying quantities. *Mathematical Thinking and Learning, 17*(1), 64-90. https://doi.org/10.1080/10986065.2015.981946

Johnson, H. L. (2015). Together yet separate: Students' associating amounts of change in quantities involved in rate of change. *Educational Studies in Mathematics, 89*(1), 89-110. https://doi.org/10.1007/s10649-014-9590-y

2014 **Johnson, H. L.** (2014). A role of context in constructivist model building: What problem is the learner solving? *Constructivist Foundations, 9*(3), 339-341.

Johnson, H. L., Blume, G.W., Shimizu, J., Graysay, D., & Konnova, S. (2014). A teacher's conception of definition and use of examples when doing and teaching mathematics. *Mathematical Thinking and Learning, 16*(4), 285-311.

2013 **Johnson, H. L.** (2013). Predicting amounts of change in quantities. *Mathematics Teaching in the Middle School, 19*(5), 260-265.

Johnson, H. L. (2013). Reasoning about quantities that change together. *Mathematics Teacher*, *106*(9), 704-708.

Castillo-Garsow, C., **Johnson, H. L.**, & Moore, K. (2013). Chunky and smooth images of change. *For the Learning of Mathematics, 33*(3), 31-37.

Tzur, R., **Johnson, H. L.**, McClintock, E., Xin, Y. P., Si, L., Woodward, J., Hord, C., & Jin, X. (2013). Distinguishing schemes and tasks in children's development of multiplicative reasoning. *PNA, 7*(3), 85-101.

2012 **Johnson, H. L.** (2012). Reasoning about variation in the intensity of change in covarying quantities involved in rate of change. *Journal of Mathematical Behavior*, *31*(3), 313-330. https://doi.org/10.1016/j.jmathb.2012.01.001

2010 **Johnson, H. L**. (2010). Investigating the fundamental theorem of calculus. *Mathematics Teacher*, *103*(6), 430-435.

REFEREED CONFERENCE PROCEEDINGS

2022 Bechtold, L., Donovan, C., & **Johnson, H. L**. (2022). College algebra students' attitudes toward math and graphs: An exploratory factor analysis. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (Eds.), *Proceedings of the 44th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1630-1634). Middle Tennessee State University. https://doi.org/10.51272/pmena.44.2022

Bikner-Ahsbahs, A., **Johnson, H. L.**, Shvarts, A., & Seidouvy, A. (2022). Introduction to the thematic working group 17 on theoretical perspectives and approaches in mathematics education research of CERME 12: Horizontal and vertical theorizing. In J. Hodgen, E. Geraniou, G. Bolondi & F. Ferretti. (Eds.), *Proceedings of the Twelfth Congress of the European Society for Research in Mathematics Education (CERME12)* (pp.1-8). Free University of Bozen-Bolzano and ERME. https://hal.archives-ouvertes.fr/hal-03808704

Collopy, A. A., **Johnson, H. L.**, Goodman, K., Altman, T., Darbeheshti, M. Wood, K. L., & Mays, D. (2022). Exploring nudging approaches for growing a culture of diversity and inclusion with engineering faculty. *2022 ASEE Annual Conference & Exposition Proceedings*, Minneapolis, MN.

Johnson, H. L., McClintock, E., & Leech, N. (2022). A multifocal lens on qualitative data analysis: An affordance of networking theoretical approaches. In J. Hodgen, E. Geraniou, G. Bolondi & F. Ferretti. (Eds.), *Proceedings of the Twelfth Congress of the European Society for Research in Mathematics Education (CERME12)* (pp.1-8). Free University of Bozen-Bolzano and ERME. https://hal.archives-ouvertes.fr/hal-03749217

Knurek, R. & **Johnson, H. L.** (2022). Linear or nonlinear? Relating college algebra students' covariational reasoning and graph selection. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (Eds.), *Proceedings of the 44th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (p. 863-864). Middle Tennessee State University. https://doi.org/10.51272/pmena.44.2022

2021 **Johnson, H. L.**, Olson, G., Smith, A., Gardner, A., Wang, X., & Donovan, C. (2021). Validating an assessment of students' covariational reasoning. In Olanoff, D., Smith, K., and Spitzer, S. (Eds.), *Proceedings of the 43rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 63-67). Philadelphia, PA.

2019 Bikner-Ahsbahs, A., Bakker, A., **Johnson, H. L.**, & Chan, E. (2019). Introduction to the thematic working group 17 on theoretical perspectives and approaches in mathematics education research of CERME 11. In U. T. Jankvist, M. van den Heuvel-Panhuizen, & M. Veldhuis (Eds.), *Proceedings of the 11th Congress of the European Society for Research in Mathematics Education (CERME 11)* (pp. 3020-3027). Utrecht, The Netherlands: Utrecht University.

Gardner, A., Smith, A, & **Johnson, H. L.** (2019) Humanizing the coding of college algebra students' attitudes towards math. In Weinberg, A., Moore-Russo, D., Soto, H., & Wawro, M. (Eds.). *Proceedings of the 22nd Annual Conference on Research in Undergraduate Mathematics Education* (pp. 1113-1114). Oklahoma City, OK: RUME.

Johnson, H. L., Gardner, A., Smith, A., Olson, G., & Wang, X. (2019). Interacting with dynamic computer activities impacts college algebra students' math attitudes and performance. In Otten, S., Candela, A., de Araujo, Z., Haines, C., & Munter, C. (Eds.). *Proceedings of the 41st Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1424-1433). St Louis, MO: University of Missouri.

Johnson, H. L., McClintock, E., & Gardner, A. (2019). Leveraging difference to promote students' conceptions of graphs as representing relationships between quantities. In U. T. Jankvist, M. van den Heuvel-Panhuizen, & M. Veldhuis (Eds.), *Proceedings of the 11th Congress of the European Society for Research in Mathematics Education (CERME 11)* (pp. 4539-4546). Utrecht, The Netherlands: Utrecht University.

Johnson, H. L., McClintock, E., & Gardner, A. (2019). Locally integrating theories to investigate students transfer of mathematical reasoning. In U. T. Jankvist, M. van den Heuvel-Panhuizen, & M. Veldhuis (Eds.), *Proceedings of the 11th Congress of the European Society for Research in Mathematics Education (CERME 11)* (pp. 3114-3121). Utrecht, The Netherlands: Utrecht University.

Jorgensen, C., Smith, A., Tzur, R., & **Johnson, H. L**. (2019). Unit distinction as a pre-requisite for multiplicative reasoning: A case study of Adam's unit transformation. In Otten, S., Candela, A., de Araujo, Z., Haines, C., & Munter, C. (Eds.). *Proceedings of the 41st Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 874-881). St Louis, MO: University of Missouri.

Tzur, R., Hodkowski, N., Wei, B., Davis, A, Ferrara, M., Jorgensen, C., & **Johnson, H. L**. (2019). A teacher's conceptual 'aha' enables real-time adaptation to students' multiplicative reasoning. In M. Graven, H. Venkat, A. Essien & P. Vale (Eds.). *Proceedings*

of the 43rd Conference of the International Group for the Psychology of Mathematics Education (Vol. 3, pp. 390-397). Pretoria, South Africa: PME.

2018 **Johnson, H. L.**, Kalir, J., Olson, G., Gardner, A., Smith, A., & Wang, X. (2018). Networking theories to design a fully online assessment of students' covariational reasoning. In Hodges, T.E., Roy, G. J., & Tyminski, A. M. (Eds.). *Proceedings of the 40th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1343-1346). Greenville, SC: University of South Carolina & Clemson University.

Johnson, H. L., McClintock, E., & Gardner, A. (2018). Promoting secondary students' shifts to covariational reasoning: Theory networking and digital task design. In E. Bergqvist, M. Österholm, C. Granberg, & L. Sumpter (Eds.). *Proceedings of the 42nd Conference of the International Group for the Psychology of Mathematics Education* (Vol. 5, p. 78). Umeå, Sweden: PME.

Johnson, H. L., McClintock, E., Kalir, J., & Olson, G. (2018) Networking theories to design dynamic covariation techtivities for college algebra students. In (Eds.) A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown, *Proceedings of the 21st Annual Conference on Research in Undergraduate Mathematics Education* (pp. 1224-1233), San Diego, CA: RUME.

Johnson, H. L., Tzur, R., Hodkowski, N., Jorgensen, C., Wei, B., Wang, X., & Davis, A. (2018). A written, large-scale assessment measuring gradations in students' multiplicative reasoning. In E. Bergqvist, M. Österholm, C. Granberg, & L. Sumpter (Eds.). *Proceedings of the 42nd Conference of the International Group for the Psychology of Mathematics Education* (Vol. 3, pp. 163-170). Umeå, Sweden: PME.

Tzur, R., **Johnson, H. L.**, Hodkowski, N., Jorgensen, C., Nathenson-Mejia, S., Wei, B., Smith, A., & Davis, A. (2018). Impact of a student-adaptive PD program on students' multiplicative reasoning. In Hodges, T.E., Roy, G. J., & Tyminski, A. M. (Eds.). *Proceedings of the 40th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1084-1090). Greenville, SC: University of South Carolina & Clemson University.

Tzur, R., Wei, B., Smith, A., Norton, N., Davis, A., & **Johnson, H. L.** (2018). Same unit coordination: A conceptual screener for mixed unit coordination and base-10, place value reasoning. In E. Bergqvist, M. Österholm, C. Granberg, & L. Sumpter (Eds.). *Proceedings of the 42nd Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, pp. 323-330). Umeå, Sweden: PME.

2017 **Johnson, H. L**., McClintock, E., Hornbein, P., Gardner, A., & Grieser, D. (2017). When a critical aspect is a conception: Using multiple theories to design dynamic computer environments and tasks to foster students' discernment of covariation. In Dooley, T., & Gueudet, G. (Eds.). *Proceedings of the Tenth Congress of the European Society for Research in Mathematics Education* (CERME10, pp. 2738-2745). Dublin, Ireland: DCU Institute of Education and ERME.

Tzur, R., **Johnson, H. L.**, 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.

2016 Hodkowski , N. M., Hornbein, P., Gardner, A., **Johnson, H. L.**, Jorgensen, C., & Tzur, R. (2016). Designing a stage-sensitive written assessment of elementary students' scheme for multiplicative reasoning. In M. B. Wood, E. E. Turner, M. Civil, & J. A. Eli (Eds.), *Proceedings of the 38th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1581-1587). Tucson, AZ: The University of Arizona.

2015 Verma, G., **Johnson, H.**, Dunlap, J., & McClintock, E. (2015, December). Fully online methods courses? Reconceptualizing STEM teacher preparation through spaces of learning. In Chandresekharan, S., Murthy, S., Banerjee, G., & Muralidhar, A. (Eds.). *Proceedings of epiSTEME 6—Emerging Computational Media and Science Education (pp. 372-380)*, Mumbai, India: Cinnamon Teal Publishing.

Johnson, H. L. (2015, July). Task design: Fostering secondary students' shifts from variational to covariational reasoning. In Beswick, K., Muir, T., & Wells, J. (Eds.) *Proceedings of the 39th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 3, pp. 129-136). Hobart, Tasmania: University of Tasmania

2014 Clarke, D., Strømskag, H., **Johnson, H. L.,** Bikner-Ahsbahs, A., Gardner, K. (2014, July). Mathematics tasks and the student. In Oesterle, S., Liljedahl, P., Nicol, C., & Allan, D. (Eds.). (2014). *Proceedings of the 38th Conference of the International Group for the Psychology of Mathematics Education and the 36th Conference of the North American Chapter of the Psychology of Mathematics Education* (Vol. 1, pp. 117-143). Vancouver, Canada: PME.

Hodkowski, N., Tzur, R., **Johnson, H. L.,** McClintock, E. (2014, July). Relating student outcomes to teacher development of student-adaptive pedagogy. In Oesterle, S., Liljedahl, P., Nicol, C., & Allan, D. (Eds.). (2014). *Proceedings of the 38th Conference of the International Group for the Psychology of Mathematics Education and the 36th Conference of the North American Chapter of the Psychology of Mathematics Education* (Vol. 3, pp. 321-328). Vancouver, Canada: PME.

2013 **Johnson, H. L.** (2013). Designing covariation tasks to support students reasoning about quantities involved in rate of change. In A. Watson, M. Ohtani, J. Ainley, J. Bolite Frant, M. Doorman, C. Kieran, A. Leung, C. Margolinas, P. Sullivan, D. Thompson, & Y. Yang (Ed.). *Proceedings of ICMI Study 22: Task Design in Mathematics Education,* (pp. 213-220). Oxford: International Commission on Mathematics Instruction.

Johnson, H. L., McClintock, E., & Ahmed J. (2013, November). Coordinating representations of covarying quantities: Linking dynamic graphs & filling area animations. In M. Martinez & A. Castro Superfine (Eds.) *Proceedings of the 35th*

Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education (p. 323). Chicago, IL: University of Illinois at Chicago.

Johnson, H. L., Moore, K. C., Mayes, R., Tillema, E., Gaze, E., & Peterson, F. (2013, November). Wisdom^{e}: Quantitative Reasoning and Mathematical Modeling (QRaMM) Working Group. In M. Martinez & A. Castro Superfine (Eds.) *Proceedings of the 35th Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education* (p. 1335-1339). Chicago, IL: University of Illinois at Chicago.

2012 **Johnson, H. L.** (2012, November). Two forms of reasoning about amounts of change in covarying quantities. In L. R. Van Zoest, J. J. Lo, & J. L. Kratky (Eds.), *Proceedings of the 34th Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 143-150). Kalamazoo, MI: Western Michigan University.

Mayes, R., Forrester, J., Moore, K., & **Johnson, H. L.** (2012, November). WISDOMe: Quantitative reasoning and mathematical modeling working group. In L. R. Van Zoest, J. J. Lo, & J. L. Kratky (Eds.), *Proceedings of the 34th Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1268-1277). Kalamazoo, MI: Western Michigan University.

Tzur, R., **Johnson, H. L.**, McClintock, E., & Risley, R. (2012, November). Culturally-mathematically relevant pedagogy (CMRP): Fostering urban english language learners' multiplicative reasoning. In L. R. Van Zoest, J. J. Lo, & J. L. Kratky (Eds.), *Proceedings of the 34th Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 829-836). Kalamazoo, MI: Western Michigan University.

Tzur, R., **Johnson, H.**, McClintock, E., Xin, Y. P., Si, L., Kenney, R., et al. (2012, July). Children's development of multiplicative reasoning: A schemes and tasks framework. In T.-Y. Tso (Ed.), *Proceedings of the 36th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, pp. 155-162). Taipei, Taiwan: National Taiwan Normal University.

2011 **Johnson, H. L.** (2011, October). Secondary students' quantification of variation in rate of change. In L. R. Wiest & T. Lamberg (Eds.), *Proceedings of the 33rd Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 2140-2148). Reno, NV.

2010 **Johnson, H. L.** (2010, October). Making sense of rate of change: Examining students' reasoning about changing quantities. In P. Brosnan, D. B. Erchick & L. Flevares (Eds.), *Proceedings of the 32nd Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education* (p. 879). Columbus, OH: The Ohio State University.

REFEREED BLOG POST

2018 **Johnson, H. L.** (2018, February 27). Helping students see how graphs work. *Edutopia*. edutopia.org/article/helping-students-see-how-graphs-work

PEER REVIEWED BOOK CHAPTERS

2022 **Johnson, H. L**. (2022). An intellectual need for relationships: Engendering students' quantitative and covariational reasoning. In: Karagöz Akar, G., Zembat, İ.Ö., Arslan, S., Thompson, P.W. (eds) *Quantitative reasoning in mathematics and science education.* Mathematics Education in the Digital Era, vol 21. Springer, Cham. https://doi.org/10.1007/978-3-031-14553-7_2

2021 **Johnson, H. L.**, McClintock, E. & Gardner, A. (2021). Opening possibilities: An approach for investigating students' transfer of mathematical reasoning. In C. Hohensee & J. Lobato (Eds.), *Transfer of learning: Progressive perspectives for mathematics education and related fields*. (pp. 59-79). Switzerland: Springer Nature. https://link.springer.com/chapter/10.1007/978-3-030-65632-4_3

2018 Jansen, A., **Johnson, H. L.**, Gardner, A. (2018). Mathematics problem solving: Handout for school. In G.G. Bear & K. Minke (Eds.). *Helping handouts to support students at school and home* (pp. 1-4). Bethesda, MD: National Association of School Psychologists.

2016 **Johnson, H. L.** (2016). Quantitative reasoning in mathematics education: Directions in research and practice. In R. A. Duschl & A. Bismack (Eds.), *Reconceptualizing STEM education: The central role of practices* (pp. 149-166). London: Routledge, Taylor & Francis

2015 **Johnson, H.**, Karunakaran, S., Fox, R., & McClintock, E. (2015). Square root of *i*: Situation 9 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 171-177). Charlotte, NC: Information Age Publishing

Johnson, H., Karunakaran, S., McClintock, E., Nazarewicz, P., Jacobson, E., & Edenfield, K. (2015). Absolute value in complex plane: Situation 7 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 155-161). Charlotte, NC: Information Age Publishing

Johnson, H., McClintock, E., Zbiek, R. M., Gleason, B., Broderick, S., & Wilson J. (2015). Graphing sin(2x): Situation 36 from the MACMTL-CPTM situations project. In M. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 385-389). Charlotte, NC: Information Age Publishing

Johnson, H., Reed, S., McClintock, E., Jacobson, E., & Edenfield, K. (2015). The product rule for differentiation: Situation 42 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 425-431). Charlotte, NC: Information Age Publishing

Bismarck, S., Blume, G., **Johnson, H.**, Konnova, S., & Shimizu, J. (2015). Faces of a polyhedral solid: Situation 29 from the MACMTL-CPTM situations project. In M. K. Heid,

P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 323-327). Charlotte, NC: Information Age Publishing

Blume, G., **Johnson, H.**, Grady, M., Konnova, S., & Heid, M. K. (2015). Temperature conversion: Situation 24 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 283-292). Charlotte, NC: Information Age Publishing

Boone, T., Fratto, C., Lunt, J., **Johnson, H.**, Heid, M. K., Grady, M., & Karunakaran, S. (2015). Zero exponents: Situation 12 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 191-198). Charlotte, NC: Information Age Publishing

Boone, T., Lunt, J., Fratto, C., Banyas, J., Donaldson, S., Wilson, J., Wilson, P., **Johnson, H.**, & Gleason, B. (2015). Square roots: Situation 15 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 211-215). Charlotte, NC: Information Age Publishing

Hackenberg, A., Murray, E., **Johnson, H.**, Blume, G., & Heid, M. K. (2015). Adding square roots: Situation 14 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 207-210). Charlotte, NC: Information Age Publishing

Hembree, D., Tillema, E., McClintock, E., Zbiek, R. M., **Johnson, H.**, Wilson, P., Wilson, J., & Fox, R. (2015). Simultaneous equations: Situation 29 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson & G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 229-237). Charlotte, NC: Information Age Publishing

McClintock, E., Peters, S., Kinol, D., Reed, S., **Johnson, H.**, Tillema, E., Zbiek, R. M., Heid, M. K., Donaldson, S., Murray, E., & Blume, G. (2015). Similarity: Situation 32 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 343-350). Charlotte, NC: Information Age Publishing

Nazarewicz, P., Blume, G., **Johnson, H.**, Konnova, S., & Shimizu, J. (2015). Modular arithmetic: Situation 5 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 135-145). Charlotte, NC: Information Age Publishing

Peters, S., McClintock, E., Kinol, D., Grady, M., **Johnson, H.**, Konnova, S., & Heid, M. K. (2015). Least squares regression: Situation 41 from the MACMTL-CPTM situations

project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 421-424). Charlotte, NC: Information Age Publishing

Reed, S., Conner, A. M., Fox, R., Karunakaran, S., Heid, M. K., McClintock, E., **Johnson, H.**, Edenfield, K., Kilpatrick, J., & Gold, E. (2015). Summing the natural numbers: Situation 4 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 121-133). Charlotte, NC: Information Age Publishing

Reed, S., Conner, A. M., Heid, M. K., **Johnson, H.**, Grady, M., & Konnova, S. (2015). Graphing inequalities containing absolute values: Situation 19 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 239-248). Charlotte, NC: Information Age Publishing

Reed, S., Conner, A. M., **Johnson, H.**, Heid, M. K., Allen, B., Karunakaran, S., Donaldson, S., & Gleason, B. (2015). Circumscribing polygons: Situation 34 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 365-375). Charlotte, NC: Information Age Publishing

Shimizu, J., Boone, T., Lunt, J., Fratto, C., Tillema, E., Kilpatrick, J., Donaldson, S., Fox, R., **Johnson, H.**, Grady, M., Konnova, S., & Heid, M. K. (2015). Multiplying monomials and binomials: Situation 13 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 199-206). Charlotte, NC: Information Age Publishing

Shimizu, J., **Johnson, H.**, Fox, R., Singletary, L., & Donaldson, S. (2015). Zero-product property: Situation 17 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 223-227). Charlotte, NC: Information Age Publishing

Tillema, E., **Johnson, H.**, O'Kelley, S. K., Jacobson, E., Blume, G., & Heid, M. K. (2015). Connecting factoring with the quadratic formula: Situation 22 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 263-275). Charlotte, NC: Information Age Publishing

Tillema, E., Kilpatrick, J., **Johnson, H.**, Grady, M., Konnova, S., & Heid, M. K. (2015). Proof by mathematical induction: Situation 43 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 433-442). Charlotte, NC: Information Age Publishing

Tillema, E., McClintock, E., Heid, M. K., & **Johnson, H.** (2015). Properties of *i* and other

complex numbers: Situation 8 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 163-170). Charlotte, NC: Information Age Publishing

Wilson, P., **Johnson, H.**, Shimizu, J., McClintock, E., Zbiek, R. M., Heid, M. K., Grady, M., & Konnova, S. (2015). Calculation of sine: Situation 35 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 377-384). Charlotte, NC: Information Age Publishing

Zbiek, R. M., Heid, M. K., Fox, R., Edenfield, K., Kilpatrick, J., McClintock, E., **Johnson, H.**, & Gleason, B. (2015). Inverse trigonometric functions: Situation 16 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 217-222). Charlotte, NC: Information Age Publishing

Zbiek, R. M., Murray, E., **Johnson, H.**, Grady, M., Konnova, S., & Heid, M. K. (2015). Parametric drawings: Situation 26 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 299-306). Charlotte, NC: Information Age Publishing

Zbiek, R. M., Wilson, J., **Johnson, H.**, Heid, M. K., Grady, M., & Konnova, S. (2015). Locus of a point on a moving segment: Situation 27 from the MACMTL-CPTM situations project. In M. K. Heid, P. S. Wilson, with G. W. Blume (Eds.), *Mathematical understanding for secondary teaching: A framework and classroom-based situations* (pp. 307-315). Charlotte, NC: Information Age Publishing

GRANTS FUNDED

EXTERNAL

2021 *Engineering is not Neutral: Transforming Instruction via Collaboration and Engagement (ENNTICE)*. PI: David Mays, Co-PIs: **Heather Lynn Johnson**, Tom Altman, Maryam Darbehesthi, and Katherine Goodman. National Science Foundation (EEC 2040095). Received: **$350,000**

2020 *Promoting Mathematical Reasoning and Transforming Instruction in College Algebra (ITsCRITiCAL)*. PI: **Heather Lynn Johnson**, Co-PIs: Belin Tsinnajinnie, Courtney Donovan, Gary Olson, and Bikai Nie. National Science Foundation (DUE 2013186). Received: **$1,600,000**

2017 *Implementing Techtivities to Promote Students' Covariational Reasoning in College Algebra (ITSCoRe)*. PI: **Heather Lynn Johnson**, Co-PIs: Jeremiah Kalir, Gary Olson. National Science Foundation (DUE 1709903). Received: **$300,000**

Recruiting and Preparing Exemplary Mathematics and Science Teachers through a Teacher Residency Model. PI: Doris Kimbrough, Co-PIs: Laurel Hartley, Robert Talbot,

Michael Jacobson, **Heather Johnson**. National Science Foundation (DUE 1660770). Received: **$1,200,000.**

2015 *Adaptive Pedagogy for Elementary Teachers: Promoting Multiplicative and Fractional Reasoning to Improve Students' Preparedness for Middle School Mathematics*. PI: Ron Tzur, Co-PIs: Xin Wang, Alan Davis, **Heather Johnson,** Michael Ferrara. National Science Foundation (DRL 1503206). Received: **$3,000,000.**

2013 *IMA ICMI Study 22 Grant.* The London Mathematical Society. Received: **£250**.

INTERNAL

2021 *A New Angle: Open Access Publication Costs.* PI: **Heather Johnson**. Office of Research Services, University of Colorado Denver. Received: **$1500**.

2020 *Rethink Multiple Representations: Open Access Publication Costs.* PI: **Heather Johnson**. Office of Research Services, University of Colorado Denver. Received: **$995**.

Open Access to Research: Springer Open Choice Publication. PI: **Heather Johnson**. Office of Research Services, University of Colorado Denver. Received: **$750**.

School of Education Faculty Development Grant. The University of Colorado Denver: School of Education and Human Development. Received: **$750**.

2017 *International Collaboration to Promote Students' Covariational Reasoning.* PI: **Heather Johnson**. Office of Research Services, University of Colorado Denver. Received: **$1,500**.

Making Research Accessible for All: Publishing via Springer's Open Choice. PI: **Heather Johnson**. Office of Research Services, University of Colorado Denver. Received: **$1,500**.

School of Education Faculty Development Grant. The University of Colorado Denver: School of Education and Human Development. Received: **$1,500**.

2016 *Covariational Reasoning of Secondary Students Using Desmos (CReStD).* PI: **Heather Johnson**. Office of Research Services, University of Colorado Denver. Received: **$3,000**.

School of Education Faculty Development Grant. The University of Colorado Denver: School of Education and Human Development. Received: **$1,000**.

2015 *COLTT (Colorado Learning and Teaching with Technology) Conference Registration Award.* The University of Colorado Denver. Received: **$125**.

Faculty Development Grant: Mathematical Task Design and Use: An International Research Symposium. The University of Colorado Denver. Received: **$2,000**.

From Variation to Covariation: Leveraging Dynamic Computer Environments to Foster Shifts in Secondary Students' Reasoning about Changing Quantities. PI: **Heather Johnson**. Office of Research Services, University of Colorado Denver. Received: **$2,000**.

Ph.D. Research Assistantship Grant. University of Colorado Denver: School of Education and Human Development. REC: **Funding to support a part-time RA (10 hours per week for 15 weeks)** Received: **$3,000**.

School of Education Faculty Development Grant. The University of Colorado Denver: School of Education and Human Development. Received: **$1,000**.

2014 *CU Online Virtual Web Camp Grant.* Funding to support the development of a fully online course: MTED 5623: Geometrical Ways of Reasoning Underlying K-12 Common Core Standards. The University of Colorado Denver. Received: **$4000**.

COLTT (Colorado Learning and Teaching with Technology) Conference Registration Award. The University of Colorado Denver. Received: **$125**.

School of Education Faculty Development Grant. The University of Colorado Denver: School of Education and Human Development. Received: **$1,000**.

2013 *Faculty Development Grant: Task design in mathematics educatio*n. The University of Colorado Denver. Received: **$2,000**.

2012 *Ph.D. Research Assistantship Grant.* University of Colorado Denver: School of Education and Human Development. Received: **Funding to support a full-time RA (20 hours per week for 32 weeks, including tuition)** for 2012-2013.

2011 *Faculty Development Grant: Middle school ELL students' reasoning about rate of change.* PI: **Heather Johnson**. The University of Colorado Denver. Received: **$2,000**.

2009 *Graduate Student Research Initiation Grant.* PI: **Heather Johnson**. College of Education, The Pennsylvania State University. Received: **$600**

Graduate Student Conference Travel Award. College of Education, The Pennsylvania State University. Received**: $400**

OTHER INDICATORS OF SCHOLARLY AND CREATIVE ACTIVITY

AUDIOVISUAL MEDIA

2018 **Johnson, H. L.** (2018, April 17). *Global Math Department webinar: Helping students see how graphs work* [Video]. Retrieved from: https://www.bigmarker.com/GlobalMathDept/Helping-Students-See-How-Graphs-Work?bmid=376c71a2106a

Johnson, H. L. (2018, March 19). *MathEd podcast episode 1805* [Audio Podcast]. Retrieved from: https://www.podomatic.com/podcasts/mathed/episodes/2018-03-19T08_32_36-07_00

2015 Annenberg Learner (2015). *Reading and writing in mathematics* [Video]. Retrieved from: http://www.learner.org/courses/readwrite/video-detail/reading-and-writing-mathematics.html. Education Experts: Jacob Foster, **Heather Lynn Johnson**, Magdalene Lampert.

2013 **Johnson, H. L.** (2013, April 18). *Reasoning about quantities that change together* [Audio Podcast]. Retrieved from: http://www.nctm.org/Conferences-and-Professional-Development/Webinars-and-Webcasts/Reasoning-about-Quantities-That-Change-Together/

INSTRUCTIONAL MATERIALS

2018 **Johnson, H. L.** (n.d.). *See how graphs work*. Desmos. https://teacher.desmos.com/collection/614cb66216afe74d1ebae02d

2021 **Johnson H. L.,** Olson, G., Tsinnajinnie, B., Bechtold, L. & Berryman, L. (n.d.) *How Graphs Work* [Canvas Course]. https://ucdenver.instructure.com/

2020 Shvarts, A., & **Johnson, H.** (n.d.). *Graphs*. Utrecht University: Embodied Design. https://embodieddesign.sites.uu.nl/activity/

2019 Olson, G., Gardner, A., & **Johnson, H. L.** (2019). *Changing Kite and Dynamic Tent Facilitation Guides.* ITSCoRe. https://itscore.cu.studio/techtivities/

Olson, G., Gardner, A., & **Johnson, H. L.** (2019). *Facilitation guide for cannon man.* ITSCoRe. from https://itscore.cu.studio/techtivities/

Olson, G., Gardner, A., & **Johnson, H. L.** (2019). *Facilitation guide for toy car.* ITSCoRe. https://itscore.cu.studio/techtivities/

Olson, G., Gardner, A., & **Johnson, H. L.** (2019). *Ferris wheel facilitation guide.* ITSCoRe. https://itscore.cu.studio/techtivities/

2018 **Johnson, H. L.** (n.d.). *How graphs work*. Desmos. https://teacher.desmos.com/collection/60086a857bfbb13454adb918

Johnson, H. L. (n.d.). *The changing kite*. Desmos. https://teacher.desmos.com/activitybuilder/custom/5b5ce3539ee0953106ad93e7

Johnson, H. L. (n.d.). *The dynamic tent*. Desmos. https://teacher.desmos.com/activitybuilder/custom/5b58e70f82e28e59fd47115d

2017 **Johnson, H. L.** (n.d.). *Ferris wheel: Height v. width*. Desmos. https://teacher.desmos.com/activitybuilder/custom/599e0813a7e37e113af6c5b9

Johnson, H. L. (n.d.). *Ferris wheel: Width v. distance.* Desmos. https://teacher.desmos.com/activitybuilder/custom/599de9948ac1a60bcfcd20d8

Johnson, H. L. (n.d.). *Ferris Wheel: Height v. distance.* Desmos. https://teacher.desmos.com/activitybuilder/custom/59a7272c5e844d0a1dfccfe7

Johnson, H. L. (n.d.). *The toy car.* Desmos. https://teacher.desmos.com/activitybuilder/custom/59d4ef46485df80ac5242bc1

Johnson, H. L. (n.d.). *The cannon man.* Desmos. https://teacher.desmos.com/activitybuilder/custom/59cd35c5332df9060cbde87c

2008 **Johnson, H. L.** (2008). *Domain representations.* NCTM Illuminations. http://illuminations.nctm.org/Lesson.aspx?id=2071.

Johnson, H. L. (2008). *Growth rate*. NCTM Illuminations. http://illuminations.nctm.org/Lesson.aspx?id=2265.

Johnson, H. L. (2008). *Inequalities in triangles.* NCTM Illuminations. http://illuminations.nctm.org/Lesson.aspx?id=2339.

Johnson, H. L. (2008). *Law of cosines*. NCTM Illuminations. http://illuminations.nctm.org/Lesson.aspx?id=2441.

Johnson, H. L. (2008). *Law of sines*. NCTM Illuminations. http://illuminations.nctm.org/Lesson.aspx?id=2433.

Johnson, H. L. (2008). *Successive discounts*. NCTM Illuminations. http://illuminations.nctm.org/Lesson.aspx?id=2252.

NON-PEER REVIEWED PUBLICATIONS

INVITED BOOK CHAPTERS

2014 **Johnson, H. L.** (2014). Images of intensive and extensive quantity: A framework for reasoning about change in covarying quantities. In L. P. Steffe, K. Moore & R. Mayes (Eds.), *Epistemic algebraic students: Emerging models of students' algebraic knowing* (Vol. 4, pp. 267-280). Laramie, WY: University of Wyoming College of Education.

2012 **Johnson, H. L.** (2012). Reasoning about quantities involved in rate of change as varying simultaneously and independently. In R. Mayes & L. L. Hatfield (Eds.), *Quantitative reasoning and mathematical modeling: A driver for STEM integrated education and teaching in context* (Vol. 2, pp. 39-53). Laramie, WY: University of Wyoming College of Education.

2011 **Johnson, H. L.** (2011). Participant research essay for QRAMM research team. In S. A. Chamberlain & L. L. Hatfield (Eds.), *New perspectives and directions for collaborative research in mathematics education: Papers from a planning conference for wisdom^e* (Vol. 1, pp. 66-69). Laramie, WY: University of Wyoming College of Education.

TECHNICAL REPORTS

2011 Nocon, H., Davis, A., Keenan, T., Brancard, R., Dray, B. J., **Johnson, H.**, Mitchell, K., Nathenson-Mejia, S., Shanklin, N., Shannon, S., Poulsen, S., Thomas-Ruzic, M., Tzur, R., Verma, G. & DPS-UCD Research Collaborative (2011). *DPS exemplary schools case study: A cross-case analysis*. DPS-UCD collaborative. Denver, CO: University of Colorado & Denver Public Schools.

Thomas-Ruzic, M., **Johnson, H.**, Shanklin, N., Keenan, T., & the DPS-UCD Research Collaborative (2011). *DPS exemplary schools case study: Merrill middle school*. Denver, CO: University of Colorado & Denver Public Schools.

DOCTORAL DISSERTATION

2010 **Johnson, H. L.** (2010). *Making sense of rate of change: Secondary students' reasoning about changing quantities*. Unpublished doctoral dissertation, The Pennsylvania State University, University Park, PA.

INVITED ARTICLE

2003 **Godine, H.** (2003). Using data and linguine to discover the triangle inequality. *PCTM Magazine*, 41(1), 4-6.

PEER REVIEWED PRESENTATIONS AT MEETINGS/CONFERENCES

2023 Donovan, C., **Johnson, H. L.**, Bechtold, L., Knurek, R., & Whitmore, K. (2023, April). A Rasch analysis of a measure of graph selection and reasoning for dynamic situations. *Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.*

Donovan, C., **Johnson, H. L.**, Bechtold, L., Whitmore, K., & Knurek, R. (2023, April). Modeling a relationship between students' graph selection and reasoning. *Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.*

Johnson, H. L., Donovan, C., Knurek, R., Whitmore, K., & Bechtold, L. (2023, March). A link between students' graph reasoning and their attitudes toward mathematics and graphs. *ICMI Symposium on Mathematics Education and the Socio-Ecological*. Online.

2022 Mays, D.C., Darbeheshti, M., Altman, T., Goodman, K., **Johnson, H. L.**, and Evans, M. (2022, September), Nudging engineering faculty toward best practices for equity and inclusion, *Engineering Education and Centers (EEC) Grantees Conference*, U.S. National Science Foundation, Arlington, Virginia.

Olson, G., Nie, B., Carter, J., Tsinnajinnie, B., & **Johnson, H. L.** (2022, August). Enhancing STEM pathways by fostering students' reasoning in College Algebra. *MAA Math Fest.* Philadelphia, PA.

Olson, G., Nie, B., Carter, J., Tsinnajinnie, B., & **Johnson, H. L.** (2022, August). Implementing Techtivities to Promote Covariational Reasoning and Instructional Transformation in College Algebra. *MAA Math Fest.* Philadelphia, PA.

2021 **Johnson, H. L.**, Olson, G., McClintock, E., Mesa, V., & Rasmussen, C. (2021, June). Theorizing departmental change in early undergraduate math courses: Leveraging digital resources to influence practice. *Transforming Institutions 2021 Virtual Conference,* https://ascnhighered.org/ASCN/transforming_institutions/2021/index.html

2020 Donovan, C., **Johnson, H.**, & Wang, X. (2020, April). Measuring covariational reasoning: the interaction struggle of getting correct answers versus mathematical reasoning*. The International Objective Measurement Workshop*, San Franscisco, CA. (Conference Cancelled)

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2020, Jan). Cartesian graphs, covariational reasoning, and powerful positioning in college algebra. *Joint Mathematics Meetings,* Denver, CO.

Olson, G., **Johnson, H. L.**, Gardner, A., Smith, A., & Wang, X. (2020, Jan). Implementing techtivities to promote students' covariational reasoning in college algebra (ITSCoRe). *Joint Mathematics Meetings,* Denver, CO.

2019 Gardner, A., & Smith, A, Olson, G., & **Johnson, H. L**. (2019, June). An asset based approach to analyzing college algebra students' reasoning on graphing tasks. *National Inquiry Based Learning Conference,* Denver, CO.

2018 Smith, A., Gardner, A., & **Johnson, H. L**. (2018, August) Techtivities: Help students see how graphs work. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

Olson, G., **Johnson, H. L.**, & Kalir, J. (2018, August). Implementing Desmos techtivities to promote students' covariational reasoning. *2018 Math Fest Meeting of the Mathematical Association of America,* Denver, CO.

Johnson, H. L., Olson, G., Kalir, J., Gardner, A., & Smith, A. (2018, June): Questioning our questions: From soliciting answers to eliciting reasoning. *National Inquiry Based Learning Conference,* Austin, TX.

Olson, G., **Johnson, H. L.**, Kalir, J., Gardner, A., & Smith, A. (2018, June): Two graphs are better than one: Techtivities for College Algebra. *National Inquiry Based Learning Conference,* Austin, TX.

Olson, G., Kalir, J., & **Johnson, H. L.** (2018, April). Desmos techtivities for the college algebra classroom. *2018 Meeting of the Rocky Mountain Section of the Mathematical Association of America*, Pueblo, CO.

Coughlin, J. P., **Johnson, H. L.**, & Mays, D. C. (2018, March). Genetic decomposition: How do students learn to turn concepts into relationships? *Zone IV Meeting of the American Society for Engineering Education*, Boulder, CO.

Johnson, H.L., Kalir, R., Olson, G.A., Sutton, J**.** (2018, January). Implementing techtivities to promote students' covariational reasoning in college algebra. MAA/NSF Poster Session. Joint Math Meetings. San Diego, CA.

2017 **Johnson, H. L.** (2017, April). Didn't you learn that in high school? Why students struggle with rate and function, and how a covariation approach can help. *2017 Meeting of the Rocky Mountain Section of the Mathematical Association of America*, Pueblo, CO.

Johnson, H. L. & Tzur, R. (2017, April). Adapting Instruction to students' mathematical thinking: 5 practices of student adaptive pedagogy. *2017 Meeting of the Rocky Mountain Section of the Mathematical Association of America*, Pueblo, CO.

Johnson, H. L., Hornbein, P., & Bryson, D. (2017, April). Designing online playgrounds for learning mathematics. *National Council of Teachers of Mathematics' 95th Annual Meeting*, San Antonio, TX.

Johnson, H. L., Wang X., Tzur, R., & Sutton, J. (2017, April). Developing written, prompt-sensitive measures of multiplicative reasoning. *National Council of Teachers of Mathematics' Annual Research Meeting*, San Antonio, TX.

Sutton, J., **Johnson, H. L.**, & Tzur, R. (2017, April). Changing instructional practice—Permission isn't enough—Teachers need adaptive pedagogy to support student learning. *Annual Meeting of the National Council of Supervisors of Mathematics*, San Antonio, TX.

2016 Dunlap, J. C., Verma, G., & **Johnson, H. L.** (2016, October). The Presence+Experience framework: Supporting the purposeful design of presence in online courses. *Association for Educational Communications and Technology International Convention*, Las Vegas, NV.

Hornbein, P., & Azeem, S., & **Johnson, H. L.** (2016, September). Investigating function with a Ferris wheel. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

Johnson, H. L. (2016, July). Designing technology-rich tasks to foster secondary students' covariational reasoning. *13th International Congress on Mathematical Education*, Hamburg, Germany.

Johnson, H. L., McClintock, E., & Hornbein, P. (2016, April). Ferris wheels and filling bottles: Investigating a student's transfer. *National Council of Teachers of Mathematics' Annual Research Meeting*, San Francisco, CA.

2015 Hornbein, P., Bryson, D., & **Johnson, H. L.** (2015, September). Expanding Conceptions of Algebra: Zoom, Tweet, Interact!. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

Johnson, H. L., Hornbein, P., & Azeem, S. (2015, September). Leveraging a dynamic computer environment to foster secondary students' shifts from variational to covariational reasoning: The Ferris wheel. *The 5th Realistic Mathematics Education Conference.* Boulder, CO.

Clarke, D. J., Polotskaia, E., Bikner-Ahsbahs, A., **Johnson, H. L.,** Strømskag, H., Aizikovitsh-Udi, E., Coles, A., Thanheiser, E., & Clarke, D. (2015, September). The role of mathematical tasks in promoting domain-specific and domain-transcendent reasoning.

The Annual Meeting of the European Educational Research Association. Budapest, Hungary.

Verma, G., Dunlap, J., & **Johnson, H. L.** (2015, August) Presence+Experience: A framework for the purposeful design of presence in online courses. *Colorado Learning and Teaching with Technology Conference.* Boulder, CO.

Verma, G. & **Johnson, H. L.** (2015, February) Leveraging online environments: Preparing today's secondary STEM teachers. *13th Annual CU Women Succeeding Professional Development Symposium.* Denver, CO.

2014 **Johnson, H. L.** (2014, September) Predicting amounts of change in quantities. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

Verma, G. & **Johnson, H. L.** (2014, August) Creating online content methods courses in STEM: Challenges and opportunities. *Colorado Learning and Teaching with Technology Conference.* Boulder, CO.

Liss, D. R., Lee, H. Y., Steffe, L. P., Hackenberg, A., Ellis, A., & **Johnson, H. L.** (2014, April) Elaborations on the construction of quantitative and algebraic reasoning. *National Council of Teachers of Mathematics' Annual Research Meeting*, New Orleans, LA.

Johnson, H. L. (2014, April) Predicting amounts of change in quantities. *National Council of Teachers of Mathematics' 92nd Annual Meeting*, New Orleans, LA.

2013 **Johnson, H. L.,** (2013, October). Reasoning about quantities that change together. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

Johnson, H. L., McClintock, E., & Ahmed J. (2013, September). Supporting students' quantitative & covariational reasoning: Designing & implementing tasks linking dynamic animations and graphs. *The 4th Realistic Mathematics Education Conference.* Boulder, CO.

Johnson, H. L., Castillo-Garsow, C., Moore, K., Tillema, E., & Ellis, A. (2013, April). Reasoning with discrete & continuous images of quantity: Emerging research. *Research Presession of the National Council of Teachers of Mathematics' 91st Annual Meeting*, Denver, CO.

Johnson, H. L., (2013, April). Reasoning about quantities that change together. *National Council of Teachers of Mathematics' 91st Annual Meeting*, Denver, CO.

2012 Gonzalez, G., Herbst, P., Crespo, S., **Johnson, H. L.**, & Chazan, D. (2012, April). Designing and creating representations of mathematics teaching. *Research Presession of the National Council of Teachers of Mathematics' 90th Annual Meeting*, Philadelphia, PA.

Moore, K., **Johnson, H. L.**, Castillo-Garsow, C., Mayes, R., & Steffe, L. (2012, April). Quantitative reasoning in secondary mathematics: An avenue to coherence. *Research*

Presession of the National Council of Teachers of Mathematics' 90th Annual Meeting, Philadelphia, PA.

Johnson H. L., Tzur, R., McClintock, E., Risley, R., King, K., Xin, Y. P., & Si, L. (2012, April). Opening multiplicative reasoning doors for *all* students: Task design for transfer-empowering learning. *Paper presented at the annual meeting of the American Educational Research Association*, Vancouver, BC.

Blume, G. W., **Johnson, H. L.**, Shimizu, J. K., Konnova, S., & Graysay, D. (2012, February). Creating and working from definitions: Mathematical knowledge for teaching (MKT). *Association of Mathematics Teacher Educators' 16th Annual Meeting*, Fort Worth, TX.

2011 **Johnson, H. L.** (2011, October). Reasoning about rate of change prior to calculus. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

Mayes, R., **Johnson, H.,** Moore, K., & Forrester, J. (2011, October). Wisdom^e Quantitative reasoning and mathematical modeling working group: Wisdom^e quantitative reasoning and mathematical modeling (qramm). *The 33rd Annual Meeting of the International Group for the Psychology of Mathematics Education North American Chapter*. Reno, NV.

Johnson, H. L. (2011, June). Using constant and average rate of change to make sense of varying rate of change: Secondary students' ways of reasoning. *The 41st annual meeting of the Jean Piaget Society*, Berkeley, CA.

Johnson, H. L. (2011, April). Secondary students' covariational reasoning related to rate of change. *Poster presented at the Research Presession of the National Council of Teachers of Mathematics' 89th Annual Meeting*, Indianapolis, IN.

2010 **Johnson, H. L.** (2010, April). A model for reasoning about rate of change. Poster presented at the Research Presession of the National Council of Teachers of Mathematics' 88th annual meeting, San Diego, CA.

2009 Blume, G. W., **Godine, H. L**., Graysay, D., & Shimizu, J. K. (2009, April). The roles of examples in a prospective secondary mathematics teacher's use of mathematical processes when doing and teaching mathematics. *Paper presented at the annual meeting of the American Educational Research Association*, San Diego, CA.

2007 Heid, M. K., Kilpatrick, J., Wilson, P., Zbiek, R. M., Blume, G., Fox, R., & **Godine, H.** (2007, January). Developing a framework for mathematical knowledge for teaching at the secondary level. *Association of Mathematics Teacher Educators' 11th Annual Meeting*, Irvine, CA.

2005 **Godine, H.** (2005, October). Engaging students in the concepts of algebra II. *Eastern Regional Meeting of the National Council of Teachers of Mathematics*, Hartford, CT.

Godine, H. (2005, October). Got students? Engage them in meaningful mathematics. *Pennsylvania Council of Teachers of Mathematics' 54th Annual Meeting*, Harrisburg, PA.

Godine, H. (2005, April). Representing accumulated area as a function. *National Council of Teachers of Mathematics' 83rd Annual Meeting*, Anaheim, CA.

2004 **Godine, H**. (2004, October). Using problem-solving journals to communicate mathematically. *Eastern Regional Meeting of the National Council of Teachers of Mathematics*, Baltimore, MD.

Godine, H. (2004, October). Using data to discover geometric concepts. *Eastern Regional Meeting of the National Council of Teachers of Mathematics*, Baltimore, MD.

Godine, H. (2004, October). Engaging students in the concepts of algebra II. *Pennsylvania Council of Teachers of Mathematics' 53rd Annual Meeting*, Erie, PA.

Godine, H. (2004, April). Using data to discover geometric concepts. *National Council of Teachers of Mathematics' 82nd Annual Meeting*, Philadelphia, PA.

2003 **Godine, H.** (2003, April). Using problem-solving journals to communicate mathematically. *National Council of Teachers of Mathematics' 81st Annual Meeting*, San Antonio, TX.

Godine, H. (2003, March). Using data to discover geometric concepts. *Pennsylvania Council of Teachers of Mathematics' 52nd Annual Meeting*, Lake Harmony, PA.

2002 **Godine, H**. (2002, March). Using problem-solving journals to communicate mathematically. *Pennsylvania Council of Teachers of Mathematics' 51st Annual Meeting*, Philadelphia, PA.

INVITED PRESENTATIONS

2023 **Johnson, H. L.** (2023, March). Modeling a relationship between college algebra students' graph selection and graph reasoning. *Florida International University Mathematics Education Seminar*. Online.

Johnson, H. L. (2023, April). Modeling a relationship between college algebra students' graph selection and graph reasoning. *Colorado State University Mathematics Education Seminar*. Fort Collins, CO. $500 honorarium.

Johnson, H. L., Tsinnajinnie, B., Olson, G., & Bechtold, L. (2023, April). Boundary transitions within, across, and beyond a set of digital resources: Brokering in college algebra. *Oklahoma University Research in Undergraduate Mathematics Education Seminar*. Online.

2022 **Johnson, H. L.** (2022, June). Growing a college algebra community of transformation. *Sync On*. Boulder, CO.

Johnson, H. L. (2022, March). Modeling a relationship between students' covariational reasoning and their graph selection. *Texas State Mathematics Colloquium*. San Marcos, TX.

2021 **Johnson, H. L.** (2021, December). Curating experiences in asynchronous online courses in mathematics teacher education. *University of Maryland NOTICE Lab Colloquium*. College Park, MD. (Presentation given via Zoom).

2020 **Johnson, H. L.** & Tsinnajinnie, B. (2020, October). Navigating a mathematics education collaboration across institutions. *University of Northern Colorado Mathematics Department Seminar*. Greeley, CO. (Presentation given via Zoom). $100 honorarium.

Johnson, H. L. (2020, September). ITsCRITiCAL: An intervention to promote students' reasoning and address power dynamics in college algebra. *Texas State Mathematics Colloquium*. San Marcos, TX. (Presentation given via Zoom). $200 honorarium.

2019 **Johnson, H. L.** (2019, June). Opportunities for reasoning impact students' math attitudes and course performance. *Annual Conference of the Maine Center for Research in STEM Education (RiSE)*. Orono, ME.

Johnson, H. L. (2019, July) Share your practice: Write for the Colorado Math Teacher journal. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

2017 **Johnson, H. L.** (2017, December). Promote students' smooth covariational reasoning. *Mathematics Education Colloquium.* Tempe, AZ: Arizona State University. $200 honorarium.

Johnson, H. L. (2017, November). Networking theories to design techtivities to promote students' covariational reasoning. *Universiteit Utrecht Freudenthal Institute Research Meeting*, Utrecht, Netherlands.

Johnson, H. L. (2017, October). Task design to promote students' covariational reasoning: A multi-theoretic approach. *Universität Bremen Mathematisches Kolloquium*. Bremen, Germany. €200 honorarium.

Johnson, H. L. (2017, September). Networking theories to design dynamic computer environments to foster students' quantitative and covariational reasoning. *Mathematics Education Research Colloquium*, Linköping, Sweden: Linköping University.

Harding, J., **Johnson, H. L.**, & Kitchen, R. (2017, April). K-8 math specialist panel discussion. *2017 Meeting of the Rocky Mountain Section of the Mathematical Association of America*, Pueblo, CO.

2016 Pape, S., Munter, C., Beckmann, S., Leatham, K. R., Silver, E. A., **Johnson, H. L.**, Dixon, J. K., Boston, M. D., Arbaugh, F., & Kastberg, S. (2016, April). Graduate student, junior faculty, and researcher mentoring session. *Invited Mentoring Session for the National Council of Teachers of Mathematics' Annual Research Conference*, San Francisco, CA.

2015 **Johnson, H. L.** (2015, May). Investigating roots of covariational reasoning: Leveraging a dynamic computer environment to foster students' shifts from variational to

covariational reasoning. *Research presentation for the 2014-15 Maseeh Mathematics and Statistics Colloquium Series*, Portland, OR: Portland State University.

Johnson, H. L. (2015, March). Laying groundwork for function and rate: Leveraging a dynamic computer environment to foster students' quantitative and variational reasoning. *Research presentation for the Mathematics and Science Colloquium*, Athens, GA: The University of Georgia.

2014 Thomas, J. N., Jackson, K., **Johnson, H. L.**, & Fish M. C. (2014, April). Perspectives on linking research and practice: Thoughts from the field. *Highlighted, invited symposium for the National Council of Teachers of Mathematics' Annual Research Conference*, New Orleans, LA.

2013 **Johnson, H. L.** (2013, October). Linking research and practice: Writing for a practitioner audience. *Online presentation for a mathematics education doctoral seminar*. University Park, PA: The Pennsylvania State University.

Johnson, H. L. (2013, August). Session 3 – Quantitative reasoning. *Paper presentation for the Waterbury Summit*. $1000 honorarium, University Park, PA: The Pennsylvania State University.

Johnson, H. L. (2013, June). Using images of intensive and extensive quantity to extend a covariation framework. *Research presentation for the Algebraic Reasoning Conference*. $500 honorarium. Athens, GA: The University of Georgia.

2011 **Johnson, H. L.** (2011, February). Making sense of rate of change: Characterizing students' reasoning. *Online presentation for a graduate seminar on quantitative reasoning and mathematical modeling in the sciences*. $250 honorarium, Laramie, WY: The University of Wyoming.

NON-PEER REVIEWED PRESENTATIONS AT MEETINGS/CONFERENCES

2019 **Johnson, H. L.** (2019, February). College algebra students' attitudes toward math. *CU Denver School of Education and Human Development STEM Symposium*, Denver, CO.

2018 **Johnson, H. L.**, Kalir, J., Olson, G., & Sutton, J. (2018, January). Implementing techtivities to promote students' reasoning in college algebra. *Joint Mathematics Meetings*, San Diego, CA.

2017 **Johnson, H. L**. (2017, October). Engendering Opportunities for Embodied Covariation: Networking Theories to Design Dynamic Computer Activities. *Conference on Embodied Design in Interaction*, Utrecht, Netherlands.

2012 **Johnson, H. L.** (2012, June). Representing middle school students' quantitative and covariational reasoning. *Thought Experiments in Mathematics Teachings' 4th Conference on Representations of Practice*, Ann Arbor, MI.

Johnson, H. L., (2012, February). Designing & Using Representations of Students' Mathematical Reasoning. Poster presented at the 2012 Service, Teaching, and Research

(STaR) *Preconference Session at the Association of Mathematics Teacher Educators' 16th Annual Meeting*, Fort Worth, TX.

2011 **Johnson, H. L.** (2011, October). Using video analysis to investigate students' mathematical reasoning. *Annual Meeting of the Colorado Council of Teachers of Mathematics*, Denver, CO.

Johnson, H. L. (2011, June). Representations of students' reasoning: Rate of change. Poster presented at *Thought Experiments in Mathematics Teachings' 3rd Conference on Representations of Mathematics Teaching*, Ann Arbor, MI.

2010 **Johnson, H. L.** (2010, June). Making sense of rate of change: Examining students' reasoning about changing quantities. *Poster presented at Thought Experiments in Mathematics Teachings' 2nd Conference on Representations of Mathematics Teaching*, Ann Arbor, MI.

2009 **Godine, H.** (2009, August). Secondary students' reasoning about constant and varying rates of change. *Mid-Atlantic Center for Mathematics Teaching and Learning Graduate Research Conference*, College Park, MD.

2008 **Godine, H.** (2008, August). Coordinating between representations of mathematical objects. *Mid-Atlantic Center for Mathematics Teaching and Learning Graduate Research Conference*, State College, PA.

2007 **Godine, H.** (2007, August). Characterizing the nature of students' mental activity of coordinating between representations of mathematical objects. *Mid-Atlantic Center for Mathematics Teaching and Learning Graduate Research Conference*, Newark, DE.

2006 **Godine, H.** (2006, August). How do students using graphing technology develop and draw on their understanding of graphical representation of functions? *Mid-Atlantic Center for Mathematics Teaching and Learning Graduate Research Conference*, College Park, MD.

2004 **Godine, H.** (2004, October). Instructional goal setting for high school mathematics. *York County Teacher Induction Program*, York, PA. (One of six such presentations)

SEMINARS, WORKSHOPS, AND GUEST LECTURES PRESENTED

2023 **Johnson, H. L**. (2023, April). Promote students' function reasoning with techtivities. *Math Journal Club.* Denver, CO. University of Colorado Denver.

Johnson, H. L. (2023, April). Secondary students' reasoning about ratio and rate: A framework for reasoning about covarying quantities. MTED 5060/7060: *Developmental Pathways in Students' Mathematical Thinking.* Denver, CO. University of Colorado Denver.

2022 **Johnson, H. L**., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, November). Promoting mathematical reasoning and transforming instruction in college algebra (Part 4 of 4). *Professional Development for the National Science Foundation funded*

ITsCRITiCAL project [NSF #2013186]. Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, October). Promoting mathematical reasoning and transforming instruction in college algebra (Part 3 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, September). Promoting mathematical reasoning and transforming instruction in college algebra (Part 2 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, August). Promoting mathematical reasoning and transforming instruction in college algebra (Part 1 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, April). Promoting mathematics reasoning and instructional transformation in college algebra (Part 4 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, March). Promoting mathematics reasoning and instructional transformation in college algebra (Part 3 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, February). Promoting mathematics reasoning and instructional transformation in college algebra (Part 2 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., Tsinnajinnie, B., Nie, B., & Carter, J. (2022, January). Promoting mathematics reasoning and instructional transformation in college algebra (Part 1 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

2021 **Johnson, H. L**., Olson, G., & Tsinnajinnie, B. (2021, November). Promoting mathematics reasoning and instructional transformation in college algebra (Part 4 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF*

#2013186]. Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., & Tsinnajinnie, B. (2021, October). Promoting mathematics reasoning and instructional transformation in college algebra (Part 3 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., & Tsinnajinnie, B. (2021, September). Promoting mathematics reasoning and instructional transformation in college algebra (Part 2 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., & Tsinnajinnie, B. (2021, August). Promoting mathematics reasoning and instructional transformation in college algebra (Part 1 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., & Tsinnajinnie, B. (2021, April). Promoting mathematics reasoning and instructional transformation in college algebra (Part 4 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., & Tsinnajinnie, B. (2021, March). Promoting mathematics reasoning and instructional transformation in college algebra (Part 3 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., & Tsinnajinnie, B. (2021, February). Promoting mathematics reasoning and instructional transformation in college algebra (Part 2 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

Johnson, H. L., Olson, G., & Tsinnajinnie, B. (2021, January). Promoting mathematics reasoning and instructional transformation in college algebra (Part 1 of 4). *Professional Development for the National Science Foundation funded ITsCRITiCAL project [NSF #2013186].* Denver, CO. (Presentation given via Zoom). University of Colorado Denver.

2019 **Johnson, H. L**., Olson, G., Gardner, A., Smith, A., & Wang, X. (2019, September). Be opportunity creators, not opportunity preventers. *Professional Development for New Mathematics Department Instructors, supported by the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2019, August). Help students learn how graphs work. Learn who our students are. *Professional Development for New Mathematics Department Instructors, supported by the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L. (2019, June). Two graphs are better than one: Help students learn how graphs work. *Annual Conference of the Maine Center for Research in STEM Education (RiSE)*. Orono, ME

Johnson, H. L., Bouwmeester, H. (2019, April). Faculty career panel. *Student Led Seminar.* Denver, CO. University of Colorado Denver.

Johnson, H. L. (2019, April). Students are experts in their own mathematical reasoning: Analyzing for evidence of students' capabilities. *Guest Lecture for MTED 5050/5070: Critique of Research in Mathematics Education.* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2019, April). Promoting College Algebra students' covariational reasoning and positive math attitudes (Part 4 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2019, March). Promoting College Algebra students' covariational reasoning and positive math attitudes (Part 3 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2019, February). Promoting College Algebra students' covariational reasoning and positive math attitudes (Part 2 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2019, January). Promoting College Algebra students' covariational reasoning and positive math attitudes (Part 1 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

2018 **Johnson, H. L**., Olson, G., Gardner, A., Smith, A., & Wang, X. (2018, November). From soliciting answers to eliciting reasoning: Promoting College Algebra students' success (Part 4 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2018, October). From soliciting answers to eliciting reasoning: Promoting College Algebra students' success (Part 3 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2018, September). From soliciting answers to eliciting reasoning: Promoting College Algebra students' success (Part 2 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2018, August). From

soliciting answers to eliciting reasoning: Promoting College Algebra students' success (Part 1 of 4). *Professional Development for the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

Johnson, H. L., Olson, G., Gardner, A., Smith, A., & Wang, X. (2018, August). Promoting College Algebra students' success. *Professional Development for New Mathematics Department Instructors, supported by the National Science Foundation funded ITSCoRe project [NSF #1709903].* Denver, CO. University of Colorado Denver.

2017 **Johnson, H. L.** (2017, October). Task design in mathematics education: Development, navigation, iteration. *Doctoral Student Seminar, Universität Bremen Mathematisches Kolloquium*. Bremen, Germany.

Johnson, H. L. (2017, September). Functions and a Ferris Wheel. *Mathematics Education Student Seminar.* Linköping, Sweden: Linköping University

Johnson, H. L. (2017, September). Quantity, covariation, and images of change. *Mathematics and Education Faculty Seminar.* Linköping, Sweden: Linköping University

2016 **Johnson, H. L.** (2016, April). Didn't you learn that in high school? Why students struggle with rate and function, and how a covariation approach can help. *Critical Issues in Undergraduate Mathematics Education Seminar,* University of Colorado Denver. Denver, CO.

Johnson, H. L. (2016, April). Making sense of change in a changing world. *School of Education and Human Development Assistant Professor Lecture Series*. University of Colorado Denver, Denver, CO.

2013 **Johnson, H. L.** (2013, February). Designing task sequences to support students' quantitative and covariational reasoning. *Brown Bag Lunch Seminar*. The University of Colorado, Boulder, CO.

2012 **Johnson, H. L.** (2012, November). Designing task sequences to support students' quantitative and covariational reasoning. *Mathematics and Science Learning and Education Seminar*. The University of Colorado Denver, Denver, CO.

Johnson, H. L. (2012, March). About which quantities is she reasoning? Investigating context from a student perspective. *Faculty and Doctoral Student Colloquia*. The University of Colorado Denver, Denver, CO.

Tzur, R., **Johnson, H. L**., McClintock, E., Risley, R., & King, K. (2012, January). Multiplicative reasoning for elementary teachers, part 2. Goldrick Elementary School, Denver, CO. (Half-day)

2011 Tzur, R., **Johnson, H. L.**, McClintock, E., Risley, R., & King, K. (2011, November). Multiplicative reasoning for elementary teachers, part 1. Goldrick Elementary School, Denver, CO. (Half-day)

Tzur, R., **Johnson, H. L.**, McClintock, E., Risley, R., & King, K. (2011, November). Early number concepts for elementary teachers. Goldrick Elementary School, Denver, CO. (Half-day)

Tzur, R., **Johnson, H. L.**, McClintock, E., Risley, R., & King, K. (2011, September). Place value, base ten concepts for elementary teachers. Goldrick Elementary School, Denver, CO. (Half-day)

Tzur, R., **Johnson, H. L.**, McClintock, E., Risley, R., & King, K. (2011, August). Mathematics for elementary teachers: ECE-K, 1-2, and 3-4-5 grade bands. Goldrick Elementary School, Denver, CO. (Three half-days)

2006 **Godine, H.**, & McClintock, E. (2006, July). K-6 grade-band. *Rural Academy for Mathematics Teachers*, Shippensburg, PA. (Two days)

2005 **Godine, H.** (2005, July). 9-12 grade-band. *Rural Academy for Mathematics Teachers*, Shippensburg, PA. (Two days)

Schroeder, B., & **Godine, H.** (2005, July). 9-12 grade-band. *Pennsylvania Governor's School for Mathematics Educators*, Williamsport, PA. (One week)

2004 **Godine, H.** (2004, January). Strategies for incorporating reading in mathematics classes. Red Lion Area High School, Red Lion, PA. (Full day)

PROFESSIONAL ORGANIZATIONS

- 1991 - Present: National Council of Teachers of Mathematics
- 2007 - Present: American Educational Research Association
- 2006 - Present: Association of Mathematics Teacher Educators
- 2010 - Present: Psychology of Mathematics Education: North American Chapter
- 2011 - Present: Colorado Council of Teachers of Mathematics
- 2021 - Present: Mathematical Association of America
- 2003 - 2010: Pennsylvania Council for Teachers of Mathematics
- 2007 - 2010: Pennsylvania Association of Mathematics Teacher Educators

COURSES TAUGHT

Course	**Level**	**Format**	**Department**	**Institution**
Assessment and Equity in Secondary Mathematics, MTED 5301/4301, *Developed*	Graduate/ Undergraduate	Face to Face, Online	School of Education and Human Development	University of Colorado Denver
Critique of Mathematics Education Research, MTED 7050/5050, *Developed*	Graduate	Face to Face, Blended	School of Education and Human Development	University of Colorado Denver

Curriculum and Methods in Secondary Mathematics, MTED 5300/4300, *Revised*	Graduate/ Undergraduate	Face to Face, Blended	School of Education and Human Development	University of Colorado Denver
Developmental Pathways in Students' Mathematical Thinking, MTED 7060/5060, *Revised*	Graduate	Face to Face	School of Education and Human Development	University of Colorado Denver
Expanding Conceptions of Algebra, MTED 5622/4622, *Developed*	Graduate/ Undergraduate	Online	School of Education and Human Development	University of Colorado Denver
Geometrical Ways of Reasoning, MTED 5623/4623, *Developed*	Graduate/ Undergraduate	Online	School of Education and Human Development	University of Colorado Denver
Mathematics for Elementary Teachers, MTED 5400/3040, *Developed blended format*	Graduate/ Undergraduate	Face to Face, Blended	School of Education and Human Development	University of Colorado Denver
Mathematics Teaching: Theory and Practice, MTED 5040/7040 *Developed blended format*	Graduate	Blended	School of Education and Human Development	University of Colorado Denver
(Re)Humanizing Mathematics Teaching and Learning, MTED 5070, *Developed*	Graduate	Online	School of Education and Human Development	University of Colorado Denver
Teaching Elementary Mathematics I, MTED 5002/4002	Graduate/ Undergraduate	Face to Face	School of Education and Human Development	University of Colorado Denver
Teaching Elementary Mathematics II, MTED 5003/4003	Graduate/ Undergraduate	Face to Face	School of Education and Human Development	University of Colorado Denver
Teaching Secondary Mathematics I, MTHED 411	Undergraduate	Face to Face	College of Education	The Pennsylvania State University

Theories of Mathematical Learning, MTED 5030/7030 *Developed blended format*	Graduate	Blended	School of Education and Human Development	University of Colorado Denver
A World of (Different) Numbers, MTED 5621/4621, *Developed*	Graduate/ Undergraduate	Online	School of Education and Human Development	University of Colorado Denver

CERTIFICATES/ENDORSEMENTS DEVELOPED

Certificate/Endorsement	**Level**	**Department**	**Institution**
Mathematical Content Knowledge for Teaching (Online; 9 credits)	Graduate	School of Education and Human Development	University of Colorado Denver
Mathematics Learning and Teaching PK-12 (On site; 9 credits)	Graduate	School of Education and Human Development	University of Colorado Denver
Middle School Mathematics Endorsement (Online; 24 credits)	Graduate	School of Education and Human Development	University of Colorado Denver

ADVISING

DOCTORAL DISSERTATION PRIMARY ADVISOR

2020 Gardner, A. (2020). *Listening to college algebra survivors: A natural history ethnography.* Unpublished doctoral dissertation, University of Colorado Denver. (Heather Lynn Johnson, Advisor)

2018 Azeem, S. (2018). *Relationship of covariational reasoning on college algebra students' interpretation of function notation*. Unpublished doctoral dissertation, University of Colorado Denver. (Heather Lynn Johnson, Advisor)

Current Robert Knurek, Kristin Whitmore

DOCTORAL DISSERTATION COMMITTEE MEMBER

2022 Wei, B. (2022). *Relating elementary teachers' MKT with their task selection for teaching multiplicative reasoning: A constructivist viewpoint.* Unpublished doctoral dissertation, University of Colorado Denver. (Ron Tzur, Advisor)

2021 Harrington, C. (2021). *Progressions in mathematical reasoning: A case study of two teachers' levels of units coordination.* Unpublished doctoral dissertation, University of Colorado Denver. (Ron Tzur, Advisor)

Smith, A. (2021). *"Time is when you wait:" An exploration of children's conceptions of duration as an attribute of their lived experiences.* Unpublished doctoral dissertation, University of Colorado Denver. (Ron Tzur, Advisor)

2018 Hodkowski, N. (2018). *Manifestations of elementary teachers' shift towards second-order models*. Unpublished doctoral dissertation, University of Colorado Denver. (Ron Tzur, Advisor)

2016 Risley, R. (2016). *Considerations of numbers used in tasks for promoting multiplicative reasoning in students with learning difficulties in mathematics*. Unpublished doctoral dissertation, University of Colorado Denver. (Ron Tzur, Advisor)

2013 Lartson, C. (2013). *Effects of design-based science instruction on the science problem-solving skills among different groups of high-school traditional chemistry student*. Unpublished doctoral dissertation, University of Colorado Denver. (Carole Basile, Advisor)

Current Karina Costas-Bracero, Patrick Coughlin (College of Engineering)

MASTER'S THESIS ADVISOR

2019 Lanaghan, R. & Van Wright, J. (2019). *The effects of techtivities on students' reasoning: Examining how students interpret dynamic situations during an online covariational reasoning assessment*. Unpublished master's thesis, University of Colorado Denver. (Heather Lynn Johnson, Advisor)

2018 Ruiz, A. (2018). *Adapting covariation tasks for students learning English*. Unpublished master's thesis, University of Colorado Denver. (Heather Lynn Johnson, Advisor)

2015 Hornbein, P. (2015). *Students' use of metaphor and gesture during collaborative work on tasks designed to foster students' covariational reasoning*. Unpublished master's thesis, University of Colorado Denver. (Heather Lynn Johnson, Advisor)

2014 Lambert, R. (2014). *The use of questions and gestures in discourse during problem-based interviews.* Unpublished master's thesis, University of Colorado Denver. (Heather Lynn Johnson, Advisor)

MASTER'S THESIS COMMITTEE MEMBER

2021 Morin, M. (2021) *The role of mathematical knowledge in instruction for multiplicative reasoning: Unpacking a teacher's decision making process.* Unpublished master's thesis, University of Colorado Denver. (Ron Tzur, Advisor)

2017 Damon, S. (2017). *Changes in a middle school teacher's teaching of fractions: Goal selection and questioning based on the french fry activity.* Unpublished master's thesis, University of Colorado Denver. (Ron Tzur, Advisor)

2014 Hamilton, L. (2014). *Adapting multiplicative reasoning tools for use with Kenyan street children.* Unpublished master's thesis, University of Colorado Denver. (Ron Tzur, Advisor)

2013 Legnard, E. (2013). *Assessment for students' conceptual readiness and multiplicative reasoning.* Unpublished master's thesis, University of Colorado Denver. (Ron Tzur, Advisor)

LEADERSHIP AND SERVICE

SERVICE TO COMMUNITY: BOARD SERVICE

Membership	**Date(s)**	**Board**	**Level (Regional, State, National, International)**
Member	06/2018 – Present	Colorado Council of Teachers of Mathematics Board of Directors	State

SERVICE TO UNIVERSITY: COMMITTEE SERVICE

Membership	**Date(s)**	**Committee**	**The University of Colorado System**
Co-Chair	08/2019 – 06/2020; 08/2016 – 06/2017	Faculty Council—The Committee on Women	Boulder, Colorado Springs, Denver, Anschutz Medical Campus
Member	08/2013 – 06/2020	Faculty Council—The Committee on Women	Boulder, Colorado Springs, Denver, Anschutz Medical Campus
Membership	**Date(s)**	**Committee**	**The University of Colorado Denver**
Member	08/2020-present	Budget Priorities Committee	Campus
Member	08/2020-present	Leadership & Finance Committee	School of Education & Human Development
Member	08/2017– 06/2020	STEAM Consortium	Campus
Member	08/2014 – 06/2017	Curriculum Committee	School of Education & Human Development
Member	08/2018 – 6/2020; 08/2012 – 08/2014	Student Committee	School of Education & Human Development
Membership	**Date(s)**	**Committee**	**The Pennsylvania State University**
Member	08/2007 – 05/2010	Dean's Student Advisory Forum, College of Education	College of Education

SERVICE TO UNIVERSITY: PROGRAM LEADERSHIP

Membership	**Date(s)**	**Committee**	**The University of Colorado Denver**
Program Leader	08/2019 – present 08/2016 – 07/2017	Mathematics & Science Program Area	School of Education & Human Development
Program Leader	08/2016 – 07/2017	Doctoral Affiliate Program Area	School of Education & Human Development
Member	08/2020-present	Leadership and Finance Team	School of Education & Human Development
Member	06/2014 – 06/2016	Teacher Education Leadership Team	School of Education & Human Development

SERVICE TO PROFESSION: CONFERENCES

Role	**Date(s)**	**Conference/Meeting**
Guest Speaker for Publishing in NCTM Journals Session	04/2017	Research Conference of the National Council of Teachers of Mathematics, San Antonio, TX
Guest Speaker for Publishing Research in Practitioner Journals Session; Session Presider	04/2017	Research Conference of the National Council of Teachers of Mathematics, San Antonio, TX
Mentor for Publishing Research Session	04/2016	Research Conference of the National Council of Teachers of Mathematics, San Francisco, CA
Conference Planning Committee Member; Working Group Facilitator	03/2012-06/2012	An International STEM Research Symposium: Quantitative Reasoning in Mathematics and Science, Savannah, GA

SERVICE TO PROFESSION: PEER REVIEWING

Refereed Journal Articles

Cognition and Instruction, Taylor and Francis. 2019 Impact Factor: 2.516

Digital Experiences in Mathematics Education, Springer.

Educational Studies in Mathematics, Springer. 2019 Impact Factor: 1.500

The Elementary School Journal, Wiley. 2018 Impact Factor: 1.140

International Journal of Research in Undergraduate Mathematics Education, Springer.

International Journal of Science and Mathematics Education, Springer. 2019 Impact Factor: 1.578

Journal for Research in Mathematics Education, National Council of Teachers of Mathematics. 2019 Impact Factor: 2.809

Journal of Mathematical Behavior, Elsevier.

Journal of Teacher Education, SAGE. 2 year impact factor: 2.600

Journal for STEM Education, Springer

Mathematics Teacher, National Council of Teachers of Mathematics.

Mathematics Teacher: Learning and Teaching Pre-K–12, National Council of Teachers of Mathematics

Mathematics Teaching in the Middle School, National Council of Teachers of Mathematics.

Mathematical Thinking and Learning, Taylor & Francis. 2019 Impact Factor: 1.074

Research in Mathematics Education, Taylor & Francis.

Science Education, Wiley. 2019 Impact Factor: 3.500

Teaching Children Mathematics, National Council of Teachers of Mathematics.

Tech Trends, Springer.

ZDM: The International Journal of Mathematics Education, Springer. 2019 Impact Factor: 1.256

Conference Proposals

American Educational Research Association, SIG-Research in Mathematics Education.

Association of Mathematics Teacher Educators

Congress of the European Society for Research in Mathematics Education

International Congress on Mathematical Education

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

Research Conference of the National Council of Teachers of Mathematics.

External Grants

2021 Review Panel Member. National Science Foundation.

2021 Review Panel Member. National Science Foundation.

Internal Grants

2016 University of Colorado Denver Faculty Development Grants

2014 University of Colorado Denver Faculty Development Grants

2012 University of Colorado Denver Faculty Development Grants

SERVICE TO PROFESSION: DISSERTATION REVIEW

6/2019 External Dissertation Reviewer. Arizona State University, Tempe AZ.

11/2018 External Dissertation Reviewer. Arizona State University, Tempe AZ.

SERVICE TO PROFESSION: PAID CONSULTING

7/2022 Mathematics Content Consultant. 2Partner, Denver, CO.

7/2014 Mathematics Course Consultant. HOPE Online Learning Academy, Douglas County Public Schools, Englewood, CO.

6/2013 Project Aspire, Patrick Thompson, PI. Arizona State University, Tempe AZ.

AWARDS / HONORS

EDITORIAL APPOINTMENTS

Editor

2018-Present *Colorado Math Teacher Journal,* Colorado Council of Teachers of Mathematics. http://www.cctmath.org/cmtjournal/

Associate Editor

2019-Present *Mathematical Thinking and Learning,* Taylor & Francis. 2019 Impact Factor: 1.074

Editorial Board Member

2019-Present *Journal of Mathematical Behavior,* Elsevier.

2016-2018 *Mathematical Thinking and Learning,* Taylor & Francis. 2019 Impact Factor: 1.074

Editorial Team Member

2020-Present Bikner-Ahsbahs, A. & Johnson, H. L. Section Editors: The roles of theory, methodology, and design of digital resources in improving mathematics education. *To appear in B. Pepin, G. Gueudet, & J. Choppin (Eds.), Handbook of digital (curriculum) resources in mathematics education.* Springer

2015-2017 Clarke, D., Coles, A., & Johnson H. L. Mathematical Tasks and the Student, *ZDM Mathematics Education*, 2017, *49*(6)

Department Co-Editor

2014-2017 Technology Tips Department, *Mathematics Teacher*, National Council of Teachers of Mathematics.

INVITED LEADERSHIP ROLES AT INTERNATIONAL CONFERENCES

Role	**Conference *(Year)***
Chair: Thematic Working Group #17: Theoretical Perspectives and Approaches in Mathematics Education Research	Thirteenth Congress of the European Society for Research in Mathematics Education; Budapest, Hungary *(2023)*
Co-Chair: Thematic Working Group #17: Theoretical Perspectives and Approaches in Mathematics Education Research	Twelfth Congress of the European Society for Research in Mathematics Education; Bolzano, Italy *(Postponed to 2022)*
Organizing Team Member: Topic Study Group #38: Task Design and Analysis	Fourteenth International Congress on Mathematical Education; Shanghai, China *(Postponed to 2021)*
Co-Chair: Thematic Working Group #17: Theoretical Perspectives and Approaches in Mathematics Education Research	Eleventh Congress of the European Society for Research in Mathematics Education; Utrecht, Netherlands *(2019)*

EXTERNAL AWARDS

4/2014 Linking Research and Practice Outstanding Publication Award – Mathematics Teacher. National Council of Teachers of Mathematics.
Publication: **Johnson, H. L.** (2013). Reasoning about quantities that change together. *Mathematics Teache*r, *106*(9), 704-708.

7/2011 STaR Fellow
Service, Teaching, and Research for Early Career Mathematics Educators
National Science Foundation

3/2003 Presidential Award for Excellence in Mathematics Teaching ($10,000)
National Science Foundation https://www.paemst.org/finalist_profile/3556

INTERNAL AWARDS

2/2021 Faculty Award: Excellence in Service
School of Education and Human Development, University of Colorado Denver

2/2015 Faculty Award: Excellence in Teaching
School of Education and Human Development, University of Colorado Denver

4/2014 Faculty Award: Excellence in Research and Creative Activities
School of Education and Human Development, University of Colorado Denver