

# Steven R. Jones

Associate Professor, Mathematics Education  
Brigham Young University  
167 TMCB, Provo, UT 84602  
sjones@mathed.byu.edu  
(last updated: December, 2023)

## EDUCATION

### **PhD in Mathematics Education**, University of Maryland, 2010

- Dissertation title: Applying Mathematics to Physics and Engineering: Symbolic Forms of the Integral
- MAC-MTL student research fellow

### **MS in Mathematics**, Brigham Young University, 2005

- Masters project title: Hopf Bifurcations and Horseshoes, as Applied to the Brusselator
- Minor in mathematics education

### **BS in Mathematics**, Brigham Young University, 2003

- Minor in music

## ACADEMIC POSITIONS

### **Associate Professor of Mathematics Education**

Brigham Young University. Aug 2013—current (promoted to Associate in 2019).

- Research Foci: Bridging gaps between math learning and STEM usage; Calculus learning/instruction; Quantitative reasoning in mathematics education
- Courses Taught: Calculus I, II, & III; The Teaching and Learning of Calculus; The Teaching and Learning of Statistics and Probability; The History and Philosophy of Mathematics; Critical Review of School Mathematics

### **Professor of Mathematics**

Sierra Community College. Aug 2009—Aug 2013

- Courses Taught: Calculus I & II, Statistics, Trigonometry, Intermediate and Elementary Algebra, Mathematics for Elementary Education

### **Other Teaching Experiences**

- Adjunct instructor, Johns Hopkins University Center for Talented Youth, July 2007—Aug 2007 (Mathematical Logic)
- Adjunct instructor, LDS Business College. June 2005—Aug 2005 (College Algebra)
- Graduate student instructor, Brigham Young University, Aug 2003—Apr 2005 (Calc I, Trigonometry, Quantitative Reasoning)
- Math department assistant, Provo High School, Nov 2001—Jan 2004 (ASSIST program coordinator, student tutoring, substitute teaching)

## RESEARCH PUBLICATIONS

### *Peer-reviewed journal papers and book chapters*

- Rodriguez, J-M.G. & Jones, S.R. (*accepted*). How students understand graphical patterns: Fine-grained, intuitive knowledge elements used in graphical thinking. *Journal for Research in Mathematics Education*, (forthcoming).
- Naranjo, O.A. & Jones, S.R. (*accepted*). How students construct sophisticated differential equations to model real-world contexts. *International Journal of Science and Mathematics Education*, (forthcoming).
- Jones, S.R. & Ely, R. (2023). Approaches to integration based on quantitative reasoning: Adding up pieces and accumulation from rate. *International Journal of Research in Undergraduate Mathematics Education*, 9(1). <https://doi.org/10.1007/s40753-022-00203-x>
- Stevens, B.N. & Jones, S.R. (2023). Learning integrals based on adding up pieces across a unit on integration. *International Journal of Research in Undergraduate Mathematics Education*, 9(1). <https://doi.org/10.1007/s40753-022-00204-w>
- Jones, S.R. (2023). Introducing definite integrals quantitatively through adding up pieces. In D.L. Corey & S.R. Jones (Eds.), *Building a knowledge base for teaching undergraduate mathematics: Lesson analysis* (pp. 33-45). Washington, DC: Mathematical Association of America.
- Jones, S.R. (2022). Multivariation and students' multivariational reasoning. *Journal of Mathematical Behavior*, 67, article #100991. DOI: 10.1016/j.jmathb.2022.100991
- Weinberg, A., Corey, D.L., Tallman, M., Jones, S.R., & Martin, J. (2022). Observing intellectual need and its relationship with undergraduate students' learning of calculus. *International Journal of Research in Undergraduate Mathematics Education*. DOI: 10.1007/s40753-022-00192-x
- Corey, D.L. & Jones, S.R. (2022). Sharing instructional knowledge via lesson analysis. *International Journal of Mathematical Education in Science and Technology*. DOI: 10.1080/0020739X.2022.2121775
- Jones, S.R., Long, N.E., & Becnel, J.J. (2022). Design of virtual reality modules for multivariable calculus and an examination of student noticing within them. *Research in Mathematics Education*. DOI: 10.1080/14794802.2022.2045625
- Jones, S.R. & Kuster, G.E. (2021). Examining students' variational reasoning in differential equations. *The Journal of Mathematical Behavior*, 64, article #100899. DOI: 10.1016/j.jmathb.2021.100899

- Williams, K.R., Wasson, S.R., Barrett, A., Greenhall, R.F., Jones, S.R., & Bailey, E.G. (2021). Teaching Hardy-Weinberg equilibrium using population-level Punnett Squares: Facilitating calculation for students with math anxiety. *CBE – Life Sciences Education*, 20(2), 1–16. DOI: 10.1187/cbe.20-09-0219
- Jones, S.R. (2020). Scalar and vector line integrals: A conceptual analysis and an initial investigation of student understanding. *The Journal of Mathematical Behavior*, 59, #100801. DOI: 10.1016/j.jmathb.2020.100801
- Jones, S.R. (2019). What education research related to calculus derivatives and integrals implies for chemistry instruction and learning. In M. Towns, K. Bain, and J. Rodriguez (Eds.), *It's just math: Research on students' understanding of chemistry and mathematics* (pp. 187-212). Washington, DC: American Chemical Society. DOI: 10.1021/bk-2019-1316.ch012
- Jones, S.R. (2019). Students' application of concavity and inflection points to real-world contexts. *International Journal of Science and Mathematics Education*, 17(3), 523-544. DOI: 10.1007/s10763-017-9876-5
- Jones, S.R. (2018). Prototype images in mathematics education: The case of the graphical representation of the definite integral. *Educational Studies in Mathematics*, 97(3), 215-234. DOI: 10.1007/s10649-017-9794-z
- Jones, S.R. & Watson, K. (2018). Recommendations for a “target understanding” of the derivative concept for first-semester calculus teaching and learning. *International Journal of Research in Undergraduate Mathematics Education*, 4(2), 199-227. DOI: 10.1007/s40753-017-0057-2
- Jones, S.R. (2017). An exploratory study on student understandings of derivatives in real-world, non-kinematics contexts. *The Journal of Mathematical Behavior*, 45, 95-110. DOI: 10.1016/j.jmathb.2016.11.002
- Jones, S.R., Lim, Y., & Chandler, K.R. (2017). Teaching integration: How certain instructional moves may undermine the potential conceptual value of the Riemann sum and the Riemann integral. *International Journal of Science and Mathematics Education*, 15(6), 1075-1095. DOI: 10.1007/s10763-016-9731-0
- Jones, S.R. & Dorko, A. (2015). Students' understandings of multivariate integrals and how they may be generalized from single integral conceptions. *The Journal of Mathematical Behavior*, 40(B), 154-170. DOI: 10.1016/j.jmathb.2015.09.001
- Jones, S.R. (2015). The prevalence of area-under-a-curve and anti-derivative conceptions over Riemann sum-based conceptions in students' explanations of definite integrals. *International Journal of Mathematics Education in Science and Technology*, 46(5), 721-736. DOI: 10.1080/0020739X.2014.1001454

Jones, S.R. (2015). Areas, anti-derivatives, and adding up pieces: Integrals in pure mathematics and applied contexts. *The Journal of Mathematical Behavior*, 38, 9-28. DOI: 10.1016/j.jmathb.2015.01.001

Jones, S.R. (2015). Calculus limits involving infinity: The role of students' informal dynamic reasoning. *International Journal of Mathematics Education in Science and Technology*, 46(1), 105-126. DOI: 10.1080/0020739X.2014.941427

Jones, S.R. (2013). Adding it all up: Reconceiving the introduction of the integral. *Mathematics Teacher*, 107(5), 372-377. DOI: 10.5951/mathteacher.107.5.0372

Jones, S.R. (2013). Understanding the integral: Students' symbolic forms. *The Journal of Mathematical Behavior*, 32(2), 122-141. DOI: 10.1016/j.jmathb.2012.12.004

### ***Edited books***

Corey, D.L., & Jones, S.R. (Eds.) (2023). Sharing and storing knowledge about teaching undergraduate mathematics: An introduction to a written genre for sharing lesson-specific instructional knowledge. Washington, DC: Mathematical Association of America.

### ***Peer-reviewed conference proceedings***

Jones, S.R. & Fonbuena, L.C. (*accepted*). U-substitution through quantitative reasoning: A conceptual analysis. In *Proceedings of the 26<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (forthcoming). Omaha, NE.

Fonbuena, L.C. & Jones, S.R. (*accepted*). A teaching experiment for u-substitution based on quantitative reasoning. In *Proceedings of the 26<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (forthcoming). Omaha, NE.

Jones S.R., & Rodriguez, J.G. (2023). Graphical Resources: Different Types of Knowledge Elements Used in Graphical Reasoning. In S. Cook, B. Katz, and D. Moore-Russo (Eds.), *Proceedings of the 25<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 172-181). Omaha, NE.

Jones, S.R., Fonbuena, L., Chambers, M., & Young, S. (2023). How Students Reason about Compound Unit Structures:  $m/s^2$ , ft-lbs, and  $(kg \cdot m)/s$ . In S. Cook, B. Katz, and D. Moore-Russo (Eds.), *Proceedings of the 25<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 182-191). Omaha, NE.

Weinberg, A., Tallman M., & Jones, S.R. (2023). Theoretical Considerations for Designing and Implementing Intellectual Need-Provoking Tasks. In S. Cook, B. Katz, and D. Moore-Russo (Eds.), *Proceedings of the 25<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 884-894). Omaha, NE.

- Jones, S.R. & Ely, R. (2022). Meanings, Reasoning, and Modeling with Definite Integrals: Comparing Adding Up Pieces and Accumulation from Rate. In S. Karunakaran and A. Higgins (Eds.), *Proceedings of the 24<sup>th</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 789-798). Boston, MA.
- Jones, S.R. & Stevens, B.N. (2022). Combining Sealey, Von Korff & Rebello, Jones, and Swidan & Yerushalmy into a Comprehensive Decomposition of the “Integral with Bounds” Concept. In S. Karunakaran and A. Higgins (Eds.), *Proceedings of the 24<sup>th</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 779-788). Boston, MA.
- Weinberg, A. & Jones, S.R. (2022). A Framework for Designing Intellectual Need-Provoking Tasks. In S. Karunakaran and A. Higgins (Eds.), *Proceedings of the 24<sup>th</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 884-892). Boston, MA.
- Jones, S.R., Corey, D.L., & Teuscher, D. (2021). Conventions and context: Graphing related objects onto the same set of axes. In D. Olanoff, K. Johnson, and S. Spitzer (Eds.), *Proceedings of the 43<sup>rd</sup> annual conference of the North American chapter of the International Group for the Psychology of Mathematics Education* (pp. 1381-1391). Philadelphia, PA.
- Rodriguez, J.G. & Jones, S.R. (2021). Identifying graphical forms used by students in creating and interpreting graphs. In D. Olanoff, K. Johnson, and S. Spitzer (Eds.), *Proceedings of the 43<sup>rd</sup> annual conference of the North American chapter of the International Group for the Psychology of Mathematics Education* (pp. 1799-1808). Philadelphia, PA.
- Jones, S.R., & Jeppsen, H.P. (2021). Students’ reasoning about multivariational structures. In A.I. Sacristán, J.C. Cortés-Zavala, and P.M. Ruiz-Arias (Eds.), *Proceedings of the 42<sup>nd</sup> annual conference of the North American chapter of the International Group for the Psychology of Mathematics Education* (pp. 1139-1147). Mazatlan, Mexico.
- Eliason, K.L., & Jones, S.R. (2021). Students’ “multi-sample distribution” misconception about sampling distributions. *Proceedings of the 42<sup>nd</sup> annual conference of the North American chapter of the International Group for the Psychology of Mathematics Education* (pp. 1322-1330). Mazatlan, Mexico.
- Weinberg, A., & Jones, S.R. (2020). A theorization of learning environments to support the design of intellectual need-provoking tasks in introductory calculus. In S. Karunakaran, Z. Reed, and A. Higgins (Eds.), *Proceedings of the 23<sup>rd</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 787-795). Boston, MA.
- Stark, T., & Jones, S.R. (2020). Undergraduate students’ perspectives on what makes problem contexts engaging. In S. Karunakaran, Z. Reed, and A. Higgins (Eds.), *Proceedings of the 23<sup>rd</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 1-9). Boston, MA.

- Jeppson, H. & Jones, S.R. (2020). A comprehensive hypothetical learning trajectory for the chain rule, implicit differentiation, and related rates: Part I, the development of the HLT. In S. Karunakaran, Z. Reed, and A. Higgins (Eds.), *Proceedings of the 23<sup>rd</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 690-698). Boston, MA.
- Jeppson, H. & Jones, S.R. (2020). A comprehensive hypothetical learning trajectory for the chain rule, implicit differentiation, and related rates: Part II, a small-scale teaching experiment. In S. Karunakaran, Z. Reed, and A. Higgins (Eds.), *Proceedings of the 23<sup>rd</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 285-293). Boston, MA.
- Jones, S.R., Jeppson, H., & Corey, D.L. (2019). Potential intellectual needs for Taylor and power series within textbooks, and ideas for improving them. In A. Weinberg, D. Moore-Russo, H. Soto, and M. Wawro (Eds.), *Proceedings of the 22<sup>nd</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 292-299). Oklahoma City, OK.
- Kuster, G. & Jones, S.R. (2019). Variational reasoning used by students while discussing differential equations. In A. Weinberg, D. Moore-Russo, H. Soto, and M. Wawro (Eds.), *Proceedings of the 22<sup>nd</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 348-356) Oklahoma City, OK.
- Leiva, B., Borrowman, N., Jones, S.R., & Teuscher, D. (2019). Influences from pathways college algebra on students' initial understanding and reasoning about calculus limits. In A. Weinberg, D. Moore-Russo, H. Soto, and M. Wawro (Eds.), *Proceedings of the 22<sup>nd</sup> annual conference on Research in Undergraduate Mathematics Education* (pp. 368-376). Oklahoma City, OK.
- Jones, S.R. (2018). Building on covariation: Making explicit four types of "multivariation." In A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown (Eds.), *Proceedings of the 21<sup>st</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 1110-1118). San Diego, CA: SIGMAA on RUME.
- Thembinkosi, M.P. & Jones, S.R. (2018). A study of calculus students' solution strategies when solving related rates of change problems. In A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown (Eds.), *Proceedings of the 21<sup>st</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 408-415). San Diego, CA: SIGMAA on RUME.
- Jones, S.R. & Probst, J.M. (2018). Students' usage of visual imagery to reason about the divergence, integral, direct comparison, limit comparison, ratio, and root convergence tests. In A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown (Eds.), *Proceedings of the 21<sup>st</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 400-407). San Diego, CA: SIGMAA on RUME.
- Naranjo, O. & Jones, S.R. (2018). Students' strategies for setting up differential equations in engineering contexts. In A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown (Eds.), *Proceedings of the 21<sup>st</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 334-341). San Diego, CA: SIGMAA on RUME.

- Jones, S.R. & Naranjo, O. (2017). How students interpret line and vector integral expressions: Domains, integrands, differentials, and outputs. In A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown (Eds.), *Proceedings of the 20<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 673-681). San Diego, CA: SIGMAA on RUME.
- Jones, S.R. & Thompson, C. (2017). Definite integrals versus indefinite integrals: How do students see them as the same or as different? In A. Weinberg, C. Rasmussen, J. Rabin, M. Wawro, and S. Brown (Eds.), *Proceedings of the 20<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 682-689). San Diego, CA: SIGMAA on RUME.
- Jones, S.R. (2016). What does it mean to “understand” concavity and inflection points? In Wood, M.B., Turner, E.E., Civil, M., & Eli, J.A. (Eds.), *Proceedings of the 38<sup>th</sup> annual conference of the North American chapter of the International Group for the Psychology of Mathematics Education* (pp. 597-604). Tucson, AZ: PME-NA.
- Bernard, A.M. & Jones, S.R. (2016). Student problem solving in the context of volumes of revolution. In T. Fukawa-Connelly, N. Infante, M. Wawro & S. Brown (Eds.), *Proceedings of the 19<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 554-561). Pittsburgh, PA: SIGMAA on RUME.
- Jones, S.R. (2016). Ways of understanding and ways of thinking in using the derivative concept in applied (non-kinematic) contexts. In T. Fukawa-Connelly, N. Infante, M. Wawro & S. Brown (Eds.), *Proceedings of the 19<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 917-924). Pittsburgh, PA: SIGMAA on RUME.
- Jones, S.R. (2016). Prototype images of the definite integral. In T. Fukawa-Connelly, N. Infante, M. Wawro & S. Brown (Eds.), *Proceedings of the 19<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 909-916). Pittsburgh, PA: SIGMAA on RUME.
- Gundlach, M., & Jones, S.R. (2015). Students’ understanding of concavity and inflection points in real-world contexts: Graphical, symbolic, verbal, and physical representations. In T. Fukawa-Connelly, N. Infante, K. Keene & M. Zandieh (Eds.), *Proceedings of the 18<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 568-573). Pittsburgh, PA: SIGMAA on RUME.
- Jones, S.R. (2015). Promoting students’ construction and activation of the multiplicatively-based summation conception of the definite integral. In T. Fukawa-Connelly, N. Infante, K. Keene & M. Zandieh (Eds.), *Proceedings of the 18<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 632-638). Pittsburgh, PA: SIGMAA on RUME.
- Jones, S.R., & Dorko, A.(2015). Students’ generalizations of single-variable conceptions of the definite integral to multivariate conceptions. In T. Fukawa-Connelly, N. Infante, K. Keene & M. Zandieh (Eds.), *Proceedings of the 18<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 639-645). Pittsburgh, PA: SIGMAA on RUME.

Watson, K.L., & Jones, S.R. (2015). Adding explanatory power to descriptive power: Combining Zandieh's derivative framework with analogical reasoning. In T. Fukawa-Connelly, N. Infante, K. Keene & M. Zandieh (Eds.), *Proceedings of the 18<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 1041-1047). Pittsburg, PA: SIGMAA on RUME.

Dorko, A., & Jones, S.R. (2015). Generalization in undergraduate mathematics education. In T. Fukawa-Connelly, N. Infante, K. Keene & M. Zandieh (Eds.), *Proceedings of the 18<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 461-465). Pittsburg, PA: SIGMAA on RUME.

Jones, S.R. (2014). The frequencies of various interpretations of the definite integral in a general student population. In S. Oesterle, P. Liljedahl, C. Nicol & D. Allan (Eds.), *Proceedings of the 38<sup>th</sup> annual meeting of the International Group for the Psychology of Mathematics Education* (Vol. 3, pp. 401-408). Vancouver, BC: PME.

Jones, S.R. (2014). Three conceptualizations of the definite integral in mathematics and physics contexts. In T. Fukawa-Connelly, G. Karakok, K. Keene & M. Zandieh (Eds.), *Proceedings of the 17<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education* (pp. 731-738). Denver, CO: SIGMAA on RUME.

### ***Book review***

Leatham, K.R., Johnson, K.R. & Jones, S.R. (2015). An introduction to research in mathematics education [Review of the book *MasterClass in mathematics education: International perspectives on teaching and learning* by P. Andrews & T. Rowland (eds.)]. *Journal for Research in Mathematics Education*, 46(4), 497-504.

### FUNDED EXTERNAL GRANTS

Conference on Building a Knowledge Base for Teaching College Mathematics (Co-PI)  
National Science Foundation, Award #1938949  
Apr 2020—Mar 2021

Calculus in Virtual Reality (Senior Personnel)  
National Science Foundation, Award #1820724  
Dec 2018—Aug 2020

### ADDITIONAL RESEARCH ACTIVITIES

#### ***Invited colloquia/presentations***

Jones, S.R. (2023). *Disjunctions between calculus learning in math classes and its usage in STEM disciplines*. Colloquium given at University of Delaware. Newark, DE.



Jones, S.R. (2023). *Examining disconnects between mathematics learning and science usage, using calculus as an example*. Colloquium given at Tufts University. Boston, MA.

Jones, S.R. (2023). *Facilitating connections between learning calculus in math classes and using calculus in science, engineering, and other disciplines*. Invited talk at Deutsche Mathematiker-Vereinigung. Ilmenau, Germany.

Jones, S.R. & Ely, R. (2023). *Summarizing “Approaches to integration based on quantitative reasoning”*. Presentation given at the CalcConf 1+5e event. (Virtual, international).

Jones, S.R. (2021). *Aligning the gap between mathematics in math classes versus science/engineering classes*. Keynote address at the annual meeting of the Utah Mathematics Association for Two Year Colleges. Ogden, UT.

Long, N.E., & Jones, S.R. (2021). *Calculus in virtual reality: Studying VR resources as lessons and manipulatives*. Colloquium given at University of Oklahoma, Norman, OK.

Jones, S.R. (2019). *Many calculus concepts are grounded in meanings in math that do not align well with how those same concepts are used in science*. Presentation given at the American Association of Physics Teachers’ Physics Education Research Conference, Provo, UT.

Kuster, G. & Jones, S.R. (2019). *Variational reasoning used by students while discussing differential equations*. Invited presentation to represent the RUME community at the Joint Mathematical Meetings, Denver, CO.

Jones, S. R. (2017). *Toward a comprehensive definite integral framework: Fits and starts, overreaches, collaborations, and adding the pieces together*, Colloquium given at Oklahoma State University, Stillwater, OK.

Dorko, A., Weber E., & Jones, S. R. (2014). *Ideas about how calculus students generalize from single to multivariate contexts*. Invited colloquium at University of Maine, Orono, ME.

### ***Other presentations***

Jones, S.R. & Rabin, J. (2023). *Education research at the interface of mathematics and science: Limits and infinitesimals across the STEM disciplines*. Presentation given as part of leading the Math-Science Working Group at the Conference for Research in Undergraduate Mathematics Education. Omaha, NE.

Stevens, B.N. & Jones, S.R. (2022). *A Learning Trajectory Based on Adding Up Pieces for an Entire Unit on Integration*. Poster presented at the 24<sup>th</sup> annual conference on Research in Undergraduate Mathematics Education. Boston, MA.

Jones, S.R. & Loverude, M. (2019). *Education research at the interface of mathematics and science: Curricular alignment between the disciplines*. Presentation given as part of leading

the Math-Science Working Group at the Conference for Research in Undergraduate Mathematics Education. Oklahoma City, OK.

Jones, S. R. (2018). *Helping STEM students understand and use calculus*. Presentation at the BYU College Volunteer Leadership Council, Provo, UT.

Jones, S. R. & Bailey, L. (2017). *STEM connections: Examples of conceptual blending between biology and mathematics*. Poster presented at the Transformation Research in Undergraduate STEM Education conference. St. Paul, MN.

Williams, K., Baek, D., Nelson, N., Quirante, T., Rice, N., Rose, S., Jones, S., & Bailey, E. (2016). *Teaching Hardy-Weinberg equilibrium using population-level Punnett squares: Emphasizing biology while facilitating calculation*. Poster presented at the Society for the Advancement of Biology Education Research. Minneapolis, MN.

Chandler, K.R; Lim, Y.; & Jones, S.R. (2014). *A new way to introduce the integral: Focusing on Riemann sums for better application in physics and engineering*. Mentored Research Conference. Brigham Young University. Provo, UT.

Jones, S.R. (2012). *Focusing on meaning in preparing elementary school teachers*. Sacramento Valley Community College Mathematics Conference. Sierra College, CA.

Fey, J.T. & Jones, S.R. (2007). *Activities that promote intuition and precision in geometric thinking*. National Council of Teacher of Mathematics Regional Conference. Richmond, VA.

Fukawa-Connelly, T. & Jones, S.R. (2006). *We know what they knew, but what do they know?* The 9<sup>th</sup> annual Conference on Research in Undergraduate Mathematics Education. Rutgers, NJ.

## AWARDS

Outstanding Teaching Award  
BYU, College of Physical and Mathematical Sciences  
June 2021—Dec 2023 (award funding duration of 3 years)

High Impact Teaching Support Award  
BYU, College of Physical and Mathematical Sciences  
Nov 2017—Oct 2018

Travel Support Awards for Mentored Students  
BYU, College of Physical and Mathematical Sciences  
Multiple years

## PROFESSIONAL CITIZENSHIP

### *Professional Citizenship outside of BYU*

Active member of the Mathematical Association of America, including the Special Interest Group on Research in Undergraduate Mathematics Education. Aug 2013—current

Editorial Board Member

International Journal for Research in Undergraduate Mathematics Education. Sep 2020—current

Guest Editor of Special Issue on Definite Integrals

International Journal for Research in Undergraduate Mathematics Education. July 2020—May 2023

Working Group Organizer

Education Research at the Interface of Mathematics and Science. Nov 2022—Feb 2023

Executive Board Nominating Committee

MAA Group on Research in Undergraduate Mathematics Education. Aug 2021—Sep 2022

Professional Development for High School Calculus Teachers

Alpine School District, UT. Oct 2019

Working Group Organizer

Education Research at the Interface of Mathematics and Science. Nov 2018—Feb 2019

Representative for Undergraduate Mathematics Education

NSF-funded Transformational Research in Undergraduate STEM Education Conference. July 2018

Manuscript Reviewer

Multiple Research Journals and Research Conferences. Aug 2013—current

### *University Citizenship within BYU*

Mathematics Education Association Advisor

Brigham Young University, Aug 2023—[current]

Graduate Committee

Brigham Young University, Aug 2013—[current]

Student Research Conference

Brigham Young University, Aug 2021—Mar 2022 + Aug 2023—[current]

Department Writing Group Organizer

Brigham Young University, Aug 2016—Aug 2019 + Aug 2023—[current]

Calculus Committee, co-chair  
Brigham Young University, Aug 2013—Aug 2021 (co-chair since Aug 2017)

College MEG/ORCA Reviewer  
Brigham Young University, Aug 2020—Aug 2022

Awards Committee  
Brigham Young University, Aug 2019—Aug 2020

Course Content Restructuring Committee  
Brigham Young University, May 2017—Dec 2017

Course Development Committee: Teaching and Learning of Statistics and Probability  
Brigham Young University, Jun 2014—Apr 2015

Math Tutoring Lab hiring process review  
Brigham Young University, Jan 2014—Mar 2014

Curriculum Review for Statistics and Calculus Classes  
Sierra College, Aug 2012—Aug 2013

College Senate Academic Task Force  
Sierra College, Apr 2012—Aug 2013

Textbook Committee  
Sierra College, Aug 2011—Mar 2012

## STUDENT RESEARCH MENTORING

### *Masters Thesis Advisor/Chair*

Alex Swindler, Sep 2023—current  
Title: [TBD, a differentials-within-limits approach to calculus]

Jeff Nair, Nov 2023—current  
Title: [TBD, using quantitative reasoning to develop ideas in trigonometry]

Leilani Fonbuena, Oct 2020—Dec 2022  
Title: Developing a Quantitative Understanding of U-Substitution in First-Semester Calculus

Brinley Stevens, Oct 2019—Jun 2021  
Title: Developing the Definite Integral and Accumulation Function through Adding Up Pieces: A Hypothetical Learning Trajectory

Nathan Smith, Oct 2018—Aug 2020

Title: Teaching the Derivative Using Quantities: An Action Research Project

Tamara Stark, Oct 2017—Dec 2019

Title: Aspects of Engaging Problem Contexts From Students' Perspectives

Haley Jeppson, Oct 2017—Aug 2019

Title: Developing Understanding of the Chain Rule, Implicit Differentiation, and Related Rates: Toward a Hypothetical Learning Trajectory Rooted in Nested Multivariation

Kia Eliason, Oct 2016—Jun 2018

Title: Addressing Pre-Service Teachers' Misconceptions about Confidence Intervals

Omar Naranjo, Oct 2015—Aug 2017

Title: Analysis of Differential Equations Applications from the Coordination Class Perspective

Stephen Scott, Oct 2013—Dec 2017

Title: The Combination of Model Eliciting Activities with Task-Based Learning to Satisfy Curricular Demands

### ***Mentored Student Research Projects***

Darryn Taylor (graduate student), May 2023—Aug 2023

Topic: Effect of different real-world contexts on introducing derivatives

Michelle Chambers (undergraduate student), Apr 2021—Aug 2021

Topics: (a) Calculus in STEM disciplines; (b) Quantitative reasoning

Leilani Fonbuena (graduate student), Apr 2021—Aug 2021

Topics: (a) Understanding multivariable graphs; (b) Quantitative reasoning

Spencer Young (undergraduate student), Apr 2021—Aug 2021

Topic: Quantitative reasoning about units

Christian Barnett (undergraduate student), Sep 2020—Apr 2021

Topic: Connections between math and biology

Alex Swindler (undergraduate student), May 2020—Dec 2020

Topic: STEM faculty perspectives on calculus concepts

Haley Jeppson (graduate student), Apr 2018—Aug 2019

Topics: (a) Multivariation and multivariational reasoning; (b) Teaching Taylor series

Tamara Stark (graduate student), Apr 2019—Aug 2019

Topic: Quantitative reasoning about derived units

Leilani Fonbuena (undergraduate student), Oct 2018—Aug 2019  
Topic: Understanding multivariable graphs

Kamalani Kaluhiokalani (undergraduate student), Jan 2019—Apr 2019  
Topic: Survey of math education research

Brianna Leiva and Navy Borrowman (undergraduate students), May 2017—Aug 2018  
Topic: Reasoning with calculus limits

Perry Nielson (undergraduate student), Sep 2017—Dec 2017  
Topic: Sense making within techniques of integration

Mitchel Probst (undergraduate student), Jan 2017—Aug 2017  
Topic: Visual reasoning in convergence tests

Cache Thompson (undergraduate student), Apr 2016—Aug 2017  
Topics: (a) Understanding definite vs. indefinite integrals; (b) STEM perspectives on calculus

Kevin Watson (graduate student), June 2014—June 2016  
Topic: Teaching derivatives in first-semester calculus

Michael Gundlach (undergraduate student), Apr 2014—Aug 2014  
Topic: Concavity in real-world contexts

Brianna Jones and Trevor Johnson (undergraduate students), Apr 2015—Aug 2015  
Topic: Understanding multivariable integrals

YaeRi Lim and Katie Chandler (undergraduate students), Oct 2013—Aug 2014  
Topic: Teaching integration in first-semester calculus