

# Curriculum Vitae

(last updated: July, 2018)

## Steven Jones

Assistant Professor, Mathematics Education  
Brigham Young University  
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### EDUCATION

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

- Dissertation topic: Students' understanding of the definite integral

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

- Masters project topic: Hopf bifurcations and horseshoes in differential equations
- Minor in mathematics education

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

- Minor in music

### ACADEMIC POSITIONS

#### **Assistant Professor of Mathematics Education**

Brigham Young University. August 2013—current

- Research Foci: Calculus learning/instruction; Applying math to science/engineering
- Courses Taught: Calculus I, II, & III, The Teaching and Learning of Calculus, The History and Philosophy of Mathematics, Teaching Statistics and Probability, Critical Review of School Mathematics

#### **Professor of Mathematics**

Sierra Community College. August 2009—August 2013

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

#### **Mathematics Instructor**

- Johns Hopkins University, CTY, July 2007—August 2007. (Mathematical Logic)
- LDS Business College, June 2005—August 2005. (College Algebra)
- Brigham Young University, August 2003—April 2005. (Calculus I, Trigonometry, Quantitative Reasoning)

#### **High School Mathematics Department Assistant**

Provo High School. November 2001—January 2004

- Substitute teaching and tutoring
- Data collection and statistical analysis for ASSIST program

## RESEARCH

### ***Peer-reviewed journal publications***

- Jones, S.R. (*accepted*). Students' Application of Concavity and Inflection Points to Real-world Contexts. *International Journal of Science and Mathematics Education*.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Jones, S.R. (2013/14). Adding it all up: Reconceiving the introduction of the integral. *Mathematics Teacher*, 107(5), 372-377.
- Jones, S.R. (2013). Understanding the integral: Students' symbolic forms. *The Journal of Mathematical Behavior*, 32(2), 122-141.

### ***Invited book chapter***

- Jones, S.R. (*in preparation*). What research on understanding derivatives in real-world contexts, generally, might say about understanding derivatives in the field of chemistry. In M. Towns,

K. Bain, and J. Rodriguez (Eds.), *It's just math: Research on students' understanding of chemistry and mathematics*. Washington, DC: American Chemical Society.

***Peer-reviewed published conference proceedings***

Jones, S.R. (2018, forthcoming). 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*. San Diego, CA: SIGMAA on RUME.

Thembinkosi, M.P. & Jones, S.R. (2018, forthcoming). 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*. San Diego, CA: SIGMAA on RUME.

Jones, S.R. & Probst, J.M. (2018, forthcoming). 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*. San Diego, CA: SIGMAA on RUME.

Naranjo, O. & Jones, S.R. (2018, forthcoming). 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*. 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). Pittsburg, 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). Pittsburg, 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). Pittsburg, 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). Pittsburg, 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). Pittsburg, 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). Pittsburg, 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.

### ***Non-proceedings research presentations***

- Jones, S. R. (2017). *Toward a comprehensive definite integral framework: Fits and starts, overreaches, collaborations, and adding the pieces together*. Invited colloquium at Oklahoma State University. Stillwater, OK.
- 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.
- Dorko, A., Weber, E., & Jones, S.R. (2014). *Some ideas about how calculus students generalize from single to multivariate contexts*. Colloquium at University of Maine's Center for Research in STEM Education. Orono, ME.
- 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.

### ***Invited book reviews***

- 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.

### ***Other research experiences***

- Doctoral Dissertation: Jones, S.R. (2010). *Applying mathematics to physics and engineering: Symbolic forms of the integral*. Unpublished doctoral dissertation. University of Maryland.

NSF Physics Education Research Project Member  
University of Maryland, Sep 2008—Aug 2010  
Analyzed data of engineering students' understanding of mathematics equations.

NSF MAC-MTL Research Project Member  
University of Maryland, Aug 2005—Aug 2010  
Conducted data collection and data analysis of teachers in urban schooling contexts.

Non-Euclidean Geometry Curriculum Development  
University of Maryland. Sep 2005—Dec 2005  
Assisted in creating lesson modules for a discovery-based undergraduate Non-Euclidean geometry class.

## STUDENT MENTORING IN RESEARCH

### Masters Student Thesis Advisor:

- Haley Jeppson: Sep 2017–current; Coherence among calculus concepts
- Tamara Stark: Sep 2017–current; Authenticity of applied mathematics problems
- Kia Hall: Aug 2016–Jun 2018; Pre-service teachers' understanding of inferential statistics
- Omar Naranjo: Nov 2015–Aug 2017; Students' understanding of differential equations
- Stephen Scott: Nov 2013–Dec 2017; Mathematical modelling and tasks

### Masters Student Thesis Committee:

- Joelle Keliiliki: Jan 2016–Aug 2017; Gestures and teaching integration
- Anand Bernard: Jan 2015–July 2017; Influences on curricular reasoning
- Steve Lauzon: Jan 2015–Aug 2016; Students' developing proof schemes

### Graduate student research mentoring:

- Haley Jeppson: Apr 2018–current; Taylor Series instruction; Multivariational reasoning
- Omar Naranjo: Apr 2016–Feb 2018; Student understanding of line and vector integrals
- Anand Bernard: Apr 2015–Aug 2017; Problem solving with volumes of revolution
- Kevin Watson: Apr 2014–Jun 2017; Target understanding of the derivative

### Undergraduate student research mentoring:

- Brianna Leiva: May 2017–current; College Algebra influence on understanding limits
- Navy Borrowman: Jun 2018–current; College Algebra influence on understanding limits
- John Mitchell Probst: Jan 2017–Feb 2018; Student understanding of convergence tests
- Perry Nielson: Aug 2017–Dec 2017; Education research's use of p-values
- Cache Thompson: Apr 2016–Oct 2017; Students' understanding of integrals
- Brianna Jones: Apr 2015–July 2015; Data analysis for several studies
- Trevor Johnson: Apr 2015–July 2015; Data analysis for several studies
- Michael Gundlach: May 2013–Feb 2015; Understanding of concavity and inflection pts
- YaeRi Lim: Oct 2013–Aug 2014; Instruction on, and learning of, the definite integral
- Katie Chandler: Oct 2013–Aug 2014; Instruction on, and learning of, the definite integral

## PROFESSIONAL CITIZENSHIP (SELECTED ITEMS ONLY)

Member of the North American Chapter of the International Group for the Psychology of Mathematics Education. Oct 2013—current

Member of the Mathematical Association of America (in particular, a member of its special interest group, RUME). Oct 2013—current

Organizer for Education Research at the Interface of Mathematics and Physics working group  
Feb 2018—current

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

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

Department Colloquium and Writing Group, chair  
Brigham Young University, Aug 2016—current

Graduate Committee  
Brigham Young University, Aug 2013—current

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

Statistics Course Development Committee  
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 Selection Committee  
Sierra College, Aug 2011—Mar 2012

## AWARDS and GRANTS

High Impact Teaching Support Award for physical materials for multivariate calculus  
BYU, College of Physical and Mathematical Sciences  
Nov 2017—Oct 2018: \$1350

Travel Support for Mentored Undergraduate Students  
BYU, College of Physical and Mathematical Sciences  
Fall 2014: \$800, Fall 2016: \$750, Fall 2017: \$900

MAC-MTL Doctoral Student Fellowship  
National Science Foundation  
Aug 2005—Aug 2009, \$25,000/year

Goldhaber Travel Award  
University of Maryland, College Park  
Nov 2006: \$350