

Curriculum Vitae

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Steven Jones

Assistant Professor, Mathematics Education
Brigham Young University
167 TMCB, Provo, UT 84602
sjones@mathed.byu.edu

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, Calculus Teaching and Learning, History of Mathematics, Teaching and Learning of 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. & Watson, K. (*in press*). Recommendations for a “target understanding” of the derivative concept for first-semester calculus teaching and learning. *International Journal of Research in Undergraduate Mathematics Education*.

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. (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. & 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.

Peer-reviewed published conference proceedings

Jones, S.R. & Thompson, C. (2017). Definite integrals versus indefinite integrals: How do students see them as the same or as different? Forthcoming in, *Proceedings of the 20th special interest group of the Mathematical Association of America on research in undergraduate mathematics education*.

Jones, S.R. & Naranjo, O. (2017). How students interpret line and vector integral expressions: Domains, integrands, differentials, and outputs. Forthcoming in, *Proceedings of the 20th*

special interest group of the Mathematical Association of America on research in undergraduate mathematics education.

- 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 38th 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 19th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 554-561). Pittsburg, PA: MAA.
- 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 19th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 917-924). Pittsburg, PA: MAA.
- Jones, S.R. (2016). Prototype images of the definite integral. In T. Fukawa-Connelly, N. Infante, M. Wawro & S. Brown (Eds.), *Proceedings of the 19th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 909-916). Pittsburg, PA: MAA.
- 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 18th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 568-573). Pittsburg, PA: MAA.
- 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 18th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 632-638). Pittsburg, PA: MAA.
- 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 18th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 639-645). Pittsburg, PA: MAA.
- 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 18th special interest group of the*

Mathematical Association of America on research in undergraduate mathematics education (pp. 1041-1047). Pittsburg, PA: MAA.

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 18th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 461-465). Pittsburg, PA: MAA.

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 38th 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 17th special interest group of the Mathematical Association of America on research in undergraduate mathematics education* (pp. 731-738). Denver, CO: MAA.

Non-proceedings research presentations

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, Minnesota.

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.

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?* Special interest group of the Mathematical Association of America 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

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

Masters Student Thesis Advisor:

- Kia Hall: Aug 2016–current; Pre-service teachers' understanding of inferential statistics
- Omar Naranjo: Nov 2015–current; Students' understanding of differential equations
- Stephen Scott: Nov 2013–current; Mathematical modelling and tasks

Masters Student Thesis Committee:

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

Graduate student research mentoring:

- Omar Naranjo: Apr 2016–current; student understanding of line and vector integrals
- Anand Bernard: Apr 2015–Mar 2016; Problem solving with volumes of revolution
- Kevin Watson: Apr 2013–Apr 2015; The derivative-analog framework

Undergraduate student research mentoring:

- Cache Thompson: Apr 2016–Oct 2016; Students' understanding of integrals
- Brianna Jones/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/Katie Chandler: Oct 2013–Aug 2014; Instruction on, and learning of, the definite integral

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.

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

Graduate Committee
Brigham Young University, Aug 2013—current

Calculus Committee
Brigham Young University, Aug 2013—current

Teaching and Learning Statistics Course Development
Brigham Young University, Jun 2014—Apr 2015

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

Curriculum Review for Statistics, Calculus, Math for Elementary Education
Sierra College, Aug 2012—Aug 2013

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

Calculus Textbook Selection Committee
Sierra College, Aug 2011—Mar 2012

Middle-School Tutoring Supervisor
University of Maryland and Buck Lodge Middle School, Sep 2006—Dec 2006

GRANTS and FELLOWSHIPS

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

Travel Grants:
National Science Foundation \$1,000/year (Aug 2005—Aug 2009)
Goldhaber Travel Award \$350 (Nov 2006)

EDCI Travel Grant \$300 (Feb 2006; Nov 2006; Oct 2007)