

## **DIANNA J. SPENCE**

Department of Mathematics  
University of North Georgia  
Dahlonega, GA 30597

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### **EDUCATION**

M.S., Data Analytics, Georgia Institute of Technology, August 2023  
Ph.D., Mathematics Education, Emory University, May 2004  
M.S., Computer Science, Georgia State University, March 1996  
B.A., Mathematics, College of William and Mary, May 1985

### **ADDITIONAL ACADEMIC COURSEWORK**

Doctoral Coursework in Data Science, Kennesaw State University, 2017-2018

### **RANK & POSITIONS HELD**

2022-present: Professor, Department of Mathematics, University of North Georgia (UNG)  
2017-2022: Professor & Department Head, Mathematics, UNG  
2015-2017: Professor & Department Head, Computer Science & Information Systems, UNG  
2013-2015: Professor, Mathematics & Computer Science Departments (joint appointment), UNG  
2012-2013: Professor, Department of Mathematics, UNG (fka NGCSU)  
2008-2012: Associate Professor, Department of Mathematics, NGCSU  
2005-2008: Assistant Professor, Department of Mathematics, NGCSU

### **PROFESSIONAL CERTIFICATIONS**

Data Science Specialization Certificate by Johns Hopkins University (2017)  
SAS® Statistical Software Advanced Programming Certification (2017)  
SAS® Statistical Software Base Programming Certification (2016)  
Microsoft Certified Professional (2005)

### **GRANTS (FUNDED)**

National Science Foundation, CCLI Phase II Grant (2010-2015) – \$396,993 [PI]  
*Discovery Learning Projects in Introductory Statistics*

National Science Foundation, CCLI Phase I Grant (2007-2010) – \$175,756 [Co-PI]  
*Authentic, Career-Based, Discovery Learning Projects in Introductory Statistics*

### **GRANTS (INTERNAL)**

CURCA (AY 2011-2012) – \$2992.00  
(Brad Bailey, John Holliday, and Dianna Spence)  
*Mathematical Modeling and Simulation of Strategy-Based Games*  
CURCA (Spring 2010) – \$1200.00  
(John Holliday, Robb Sinn, and Dianna Spence)  
*The Seven-Card Poker Hand Problem and Graph Theory Applications*

**PUBLICATIONS*****Peer-Reviewed Papers***

Dalman, Nancy; **Spence, Dianna**; Settele, Richard; Turner, David; Shirley, Andrew; and Schulze, Jill (2023) Meiofauna Distribution Patterns on a Sandy Beach of Sapelo Island, Georgia, *Georgia Journal of Science*, Vol. 81, No. 2, Article 4.

Abegaz, Tamirat T., and **Spence, Dianna J.** (2019). Impact of Compiler's Feedback on Coding Performance. In S. Yamamoto and H. Mori (Eds.), *Human Interface and the Management of Information. Visual Information and Knowledge Management. HCII 2019. Lecture Notes in Computer Science, vol 11569* (pp. 265-279). Springer, Cham.

Hix, Sherry L., and **Spence, Dianna J.** (2018). Extending the applications of simulation-based approaches in the teaching of elementary statistics. In *Proceedings of the 2018 Joint Statistical Meetings (JSM), Section on Statistical Education* (pp. 2624-2629). Alexandria, VA: American Statistical Association.

**Spence, Dianna J.**; Bailey, Brad; and Sharp, Julia L. (2017). The impact of introducing student-directed projects in introductory statistics. *Statistics Education Research Journal*, 16(1), 240-261.

**Spence, Dianna J.**, and Bailey, Brad (2016). Technologies to facilitate each stage of student-directed statistics projects. In P. Bogacki (Ed.), *Proceedings of the Twenty-Seventh Annual International Conference on Technology in Collegiate Mathematics, March 12-15, 2015* (pp. 220-228). Pearson Education, Inc.

Bailey, Brad, and **Spence, Dianna J.** (2014). Path elongation, constructions, and a progression of PE values in a single graph. *Congressus Numerantium*, 222, 203-213.

Spence, Dianna J. (2014). CAEP, NCTM, and secondary mathematics program revisions. In J. Hall (Ed.), *Proceedings of the 8<sup>th</sup> Annual Meeting of Georgia Association of Mathematics Teacher Educators, October 15, 2014* (pp. 52-62). (GAMTE).

Bailey, Brad; Holliday, John E.; and **Spence, Dianna J.** (2013). K-Resistant colorings. *Congressus Numerantium*, 215, 115-128.

Bailey, Brad; **Spence, Dianna J.**; & Sinn, Robb (2013). Implementation of discovery projects in statistics. *Journal of Statistics Education*, 21(3) [online].

**Spence, Dianna J.**, & Bailey, Brad (2013). Technology-rich projects in statistics. In J. Foster (Ed.), *Proceedings of the 24th International Conference on Technology in Collegiate Mathematics, March 22-25, 2012* (pp. 173-177). Pearson Education, Inc.

**Spence, Dianna J.**; Sharp, Julia L.; and Sinn, Robb (2011). Investigation of factors mediating the effectiveness of authentic projects in the teaching of elementary statistics. *Journal of Mathematical Behavior*, 30, 319-332. [Also online, doi: 10.1016/j.jmathb.2011.07.006.]

Bailey, Brad, & **Spence, Dianna** (2010). The r-reduced cutting numbers and cutting powers of cycles, sequences of cycles, and graphs, *Congressus Numerantium*, 205, 47-63.

Sinn, Robb; **Spence, Dianna J.**; & Poitevint, Margaret (2010). A geometric approach to solving rate problems, *Mathematics Teaching in the Middle School*, 16, 302-307.

**Spence, Dianna J.** (2010). Extending K-8 mathematics concepts in alternate bases. In D. Gober (Ed.), *Proceedings of the 4<sup>th</sup> Annual Meeting of the Georgia Association of Mathematics Teacher Educators, October 13, 2010* (pp. 21-26). GAMTE.

**Spence, Dianna J.** (2009). Student performance on courseware assignments in statistics: A comparative analysis of long-term student progress and contributions of self-efficacy, gender, and assignment style. In *Proceedings of the TCEA Educational Technology Research Symposium, Volume 3* (pp. 81-93). DESTech Publications, Inc.

**Spence, Dianna;** Sinn, Robb; & Briggs, Karen (2009). Authentic discovery projects in elementary statistics. In J. Horn (Ed.), *Engaging Approaches: Proceedings of the 7th Annual Teaching Matters Conference, March 27-28, 2009* (pp. 107-115). Gordon Publications.

**Spence, Dianna J.** (2008). Traditional and online student reactions to the video tutor component of MyMathLab. In J. Foster (Ed.), *Proceedings of the 19th International Conference on Technology in Collegiate Mathematics, February 15-18, 2007* (pp. 192-196). Pearson Education, Inc.

Bailey, Brad; Holliday, John; Johnson, Peter; & **Spence, Dianna** (2008). Edge-cut cycles and cutting numbers of cycles and graphs, *Congressus Numerantium, 190*, 65-76.

**Spence, Dianna J.**, and Usher, Ellen L. (2007). Engagement with mathematics courseware in traditional and online remedial learning environments. *Journal of Educational Computing Research, 37*(3), 267-288.

Baggenstoss, R., Lendvay, K.C., **Spence, D.J.** (2007). *Method and System for Assessing and Deploying Personnel for Roles in a Contact Center*, US Patent Application Publication 2007/0201679 A1.

McIlwaine, J.C., Richter, S., Pulaski, K., Harman, S., **Spence, D.**, Shaffer, S. (2006). *Method and System for Prioritizing Performance Interventions*, US Patent Application Publication 2006/0233346 A1.

### ***Invited Content***

Spence, Dianna J. (2014, December 23). Using student projects in a simulation-based inference curriculum...And vice versa [Invited web log post]. In S. Roy (Ed.), *Simulation-Based Statistical Inference: A blog about teaching introductory statistics with simulation-based inference*. Available at <https://www.causeweb.org/sbi/?p=557>.

## **PRESENTATIONS**

### ***Conference Presentations***

D. Spence & G. Velatini (2022), *Real Data, Real Tools: Bringing Relevance to Your Statistics Class*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2022.

D. Spence & G. Velatini (2019), *Keys to Comprehension: Guiding Students to Derive Formulas*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2019.

D. Spence (2018), *Developing an Introductory Data Science Course in a Computer Science Curriculum*. Joint Statistics Meetings, Vancouver, BC, Canada, July 2018.

D. Spence & G. Velatini (2016). *Update Your Toolbox: Web-Based Resources for Learning Mathematics*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2016.

- D. Spence & G. Velatini (2015), *Illuminating Probability and Statistics Concepts with Concrete and Computer-Based Simulations*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2015.
- G. Velatini & D. Spence (2015), *Extending Ratios and Percentages with Bar Modeling to Solve Complex Problems*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2015.
- D. Spence (2015), *The Move toward Simulation to Facilitate Statistical Reasoning and Inference*. Georgia Association of Mathematics Teacher Educators (GAMTE) 9<sup>th</sup> Annual Conference, Eatonton, GA, October, 2015.
- D. Spence & B. Bailey (2015), *Enhancing the Benefits of Discovery Projects in Elementary Statistics*. AMS/MAA Joint Mathematics Meetings, San Antonio, TX, January 2015.
- D. Spence & G. Velatini (2014), *Research and Randomization: Tools for Meaningful Statistics*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2014.
- G. Velatini & D. Spence (2014), *Geometric Models for Algebraic Concepts*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2014.
- D. Spence (2014), *CAEP, NCTM, and Secondary Mathematics Program Revisions*. Georgia Association of Mathematics Teacher Educators (GAMTE) 8<sup>th</sup> Annual Conference, Eatonton, GA, October, 2014.
- D. Spence & B. Bailey (2014), *Researching the Effectiveness of Project-Based Learning in Elementary Statistics*. MAA MathFest, Portland, OR, August 2014.
- D. Spence & B. Bailey (2014), *Path Elongation Constructions: A Progression of PE Values in a Single Graph*. 45th Southeastern International Conference on Combinatorics, Graph Theory and Computing, Boca Raton, FL, March 2014.
- D. Spence & B. Bailey (2014), *Authentic Discovery Projects in Elementary Statistics: Implementation and Impact on Student Outcomes*. AMS/MAA Joint Mathematics Meetings, Baltimore, MD, January 2014.
- D. Spence & G. Velatini (2013), *Measuring the Impact of Discovery Projects in Statistics*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2013.
- G. Velatini & D. Spence (2013), *Using Rich Problems in Middle School Mathematics*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2013.
- B. Bailey & D. Spence (2013), *Path Elongation*. 44th Southeastern International Conference on Combinatorics, Graph Theory and Computing, Boca Raton, FL, March 2013.
- S. Hix & D. Spence (2013), *Closing the Loop: How Creating and Administering Assessments for NCATE/NCTM Program Recognition Directed Us to Data Analysis that Improved Our Program*. AMS/MAA Joint Mathematics Meetings, San Diego, CA, January 2013.
- S. Hix & D. Spence (2013), *Using the Standards for Mathematical Practice from the Common Core to Develop Mathematical Habits of Mind in Pre-Service Teachers*. AMS/MAA Joint Mathematics Meetings, San Diego, CA, January 2013.
- D. Spence & S. Hix (2013), *Combining Strategies to Promote Meaningful Learning in Statistics*. AMS/MAA Joint Mathematics Meetings, San Diego, CA, January 2013.

- D. Spence & S. Hix (2013), *Leveraging Features of Online Homework and Measuring Student Performance*. AMS/MAA Joint Mathematics Meetings, San Diego, CA, January 2013.
- D. Spence & G. Velatini (2012), *Teaching Strategies to Make Statistics Concepts Meaningful*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2012.
- G. Velatini & D. Spence (2012), *Demystify Challenging Problems with Bar Modeling*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2012.
- D. Spence & G. Velatini (2012), *Peer Mentoring to Promote Best Practices for Teaching Statistics*. Georgia Association of Mathematics Teacher Educators (GAMTE) 6<sup>th</sup> Annual Conference, Eatonton, GA, October, 2012.
- D. Spence & B. Bailey (2012), *Technology-Rich Projects in Statistics*. International Conference on Technology in Collegiate Mathematics (ICTCM), Orlando, FL, March 2012.
- D. Spence & G. Velatini (2011), *Gaining a Deeper Understanding of Place Value*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2011.
- G. Velatini & D. Spence (2011), *The Power of Bar Modeling: Applying Singapore Math Strategies at the Secondary Level*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2011.
- D. Spence & G. Velatini (2010), *Improving Problem-Solving Skills in Upper Elementary and Middle Grades*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2010.
- G. Velatini & D. Spence (2010), *Transitions in Bar Modeling: Leveraging Elementary Singapore Math Strategies in Upper Grade Levels*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2010.
- R. Sinn & D. Spence (2010), *Solving Rate Problems with Pattern Blocks*. National Council of Teachers of Mathematics (NCTM) National Conference, San Diego, CA, April 2010.
- D. Spence & R. Sinn (2010), *Authentic Discovery Learning Projects in Statistics*. National Council of Teachers of Mathematics (NCTM) National Conference, San Diego, CA, April 2010.
- D. Spence & B. Bailey (2010), *The  $r$ -Reduced Cutting Numbers and Cutting Powers of Cycles, Sequences of Cycles, and Graphs*. Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Boca Raton, FL, March 2010.
- J. Badger, D. Spence, & G. Velatini (2010), *County-Wide Implementation of Singapore Math: Findings from a Recent Study*. NGCSU School of Education Symposium, Dahlonega, GA, February 2010.
- R. Sinn & D. Spence (2010), *Training Teachers to Use Authentic Discovery Projects in Statistics*. Association of Mathematics Teacher Educators (AMTE) Annual Conference, Irvine, CA, January 2010.
- D. Spence & J. Badger (2010), *Evaluating Countywide Adoption and Implementation of K-5 Singapore Math: A Two-Year Study in 21 Elementary Schools*. Association of Mathematics Teacher Educators (AMTE) Annual Conference, Irvine, CA, January 2010.
- B. Bailey & D. Spence (2010), *Path Elongation and  $r$ -Reduced Cutting Numbers of Cycles*. AMS/MAA Joint Mathematics Meetings, San Francisco, CA, January 2010.

- D. Spence & R. Sinn (2010), *Visualizing Algebraic Relationships: Solving Combined Rate Problems with Pattern Blocks*. AMS/MAA Joint Mathematics Meetings, San Francisco, CA, January 2010.
- D. Spence, R. Sinn, & B. Bailey (2010), *Using Authentic Discovery Projects to Improve Student Outcomes in Statistics*. AMS/MAA Joint Mathematics Meetings, San Francisco, CA, January 2010.
- J. Badger & D. Spence (2009), *Evaluating the Implementation of Singapore Math: A Large-Scale Study of 21 Elementary Schools*. National Council of Teachers of Mathematics (NCTM) Regional Conference, Nashville, TN, November 2009.
- D. Spence & R. Sinn (2009), *Authentic Discovery Projects in Statistics*. Georgia Association of Mathematics Teacher Educators (GAMTE) Annual Conference, Eatonton, GA, October 2009.
- J. Badger, D. Spence, & G. Velatini (2009), *Implementing Singapore Math in Elementary Schools*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2009.
- D. Spence (2009), *Authentic Discovery Projects in Statistics*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2009.
- G. Velatini & D. Spence (2009), *Advanced Bar Modeling*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2009.
- D. Spence, K. Briggs, & R. Sinn (2009), *Authentic Discovery Projects in Elementary Statistics*. Teaching Matters Annual Interdisciplinary Conference for Teachers of Undergraduates, Barnesville, GA, April 2009.
- D. Spence (2009), *Student Performance on Courseware Assignments in Statistics: A Comparative Analysis of Long-Term Student Progress and Contributions of Self-Efficacy, Gender, and Assignment Style*. Texas Computer Education Association (TCEA) Educational Technology Research Symposium, Austin, TX, February 2009.
- D. Spence, K. Briggs, & R. Sinn (2008), *Discovering How to Discover: Collaborative Development of Discovery Learning Materials for Statistics*. Accepting the STEM Challenge Conference, Atlanta, GA, September 2008.
- D. Spence & G. Velatini (2008), *Singapore Math and Montessori Math: Parallels and Contrasts*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2008.
- G. Velatini, D. Spence, & L. Nehez (2008), *How to Use Singapore Math and Montessori Math Teaching Strategies*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2008.
- B. Bailey & D. Spence (2008), *Edge Cut Cycles and Cutting Numbers of Cycles and Graphs*. Mathematical Association of America (MAA) Annual MathFest, Madison, WI, July 2008.
- D. Spence (2008), *Authentic Discovery Learning Projects in Statistics with Constructs from Environmental and Social Science Disciplines*. Mathematical Association of America (MAA) Annual MathFest, Madison, WI, July 2008.
- D. Spence (2007), *Multiple Uses for a Student Remote Control Response System*. Southeastern Scholarship Conference on E-Learning (SSCEL). Macon, GA, September 2006.
- D. Spence (2007), *Traditional and Online Student Reactions to the Video Tutor Component of MyMathLab*. International Conference on Technology in Collegiate Mathematics (ICTCM), Boston, MA, February 2007.

D. Spence (2007), *Student Response to Instructional Software: Implications for Improving Teaching Practices with Computer-Based Mathematics Learning Environments*. Association of Mathematics Teacher Educators (AMTE) Annual Conference, Irvine, CA, January 2007.

D. Spence & G. Velatini (2006), *Combining Discovery Learning and Mastery-Based Teaching: A Unit on Logarithms and Exponents*. Georgia Council of Teachers of Mathematics (GCTM) Georgia Mathematics Conference, Eatonton, GA, October 2006.

D. Spence (2006), *Student Retention in Online and Traditional Course Settings: Motivation and Interaction between Setting and Gender*. Southeastern Scholarship Conference on E-Learning (SSECEL). Macon, GA, September 2006.

### ***Conference Workshops Facilitated***

D. Spence & G. Velatini (2013), *Facilitating Student Projects in Elementary Statistics*. Pre-conference Workshop at the United States Conference on Teaching Statistics (USCOTS), Cary, NC, May 2013.

B. Bailey, S. Hix, & D. Spence (2012), *Facilitating Student Projects in Elementary Statistics*. Pre-conference Workshop at the MAA/AMS Joint Mathematics Meetings, Boston, MA, January 2012.

### ***Webinars***

B. Bailey & D. Spence (2014), *Discovery Projects in Statistics: Implementation Strategies and Examples of Student Projects* (Webinar). Consortium for the Advancement of Undergraduate Statistics Education (CAUSE) Journal of Statistics Education Webinar Series, <https://www.causeweb.org/webinar/jse/2014-02/>, February 2014.

D. Spence & B. Bailey (2010), *Facilitating Student Projects in Statistics* (Webinar). Consortium for the Advancement of Undergraduate Statistics Education (CAUSE) Teaching & Learning Webinar, <http://www.causeweb.org/webinar/teaching/2010-12/>, December 2010.

### ***Posters***

D. Spence, G. Velatini, & K. Zuber (2020), *The Impact and Limitations of Stratified Imputation*. American Statistical Association (ASA) Conference on Statistical Practice, Sacramento CA, February 2020.

D. Spence (2018), *Predicting Corporate Credit Risk: Comparison of Logistic Regression with a Hybrid Binary Classifier*. SAS Day, Kennesaw State University, Kennesaw, GA, April 2018.

B. Bailey & D. Spence (2015), *Discovery Projects in Introductory Statistics*. UNG Faculty Research Day, Dahlonega, GA, November 2015.

D. Spence & G. Velatini (2015), *Student-Directed Statistics Projects: Resources, Examples, and Long-Term Study Results*. United States Conference on Teaching Statistics (USCOTS) Posters and Beyond Session, State College, PA, May 2015.

D. Spence (2015), *A Statistics Education Minor and A New Trajectory for Curriculum, Teaching, and Research: The Pervasive Impact of Transformative Ideas*. MAA PREP Poster Session at the MAA/AMS Joint Mathematics Meetings, San Antonio, TX, January 2015.

- D. Spence & B. Bailey (2015), *Discovery Learning Projects in Introductory Statistics*. NSF/MAA Joint Poster Session at the MAA/AMS Joint Mathematics Meetings, San Antonio, TX, January 2015.
- D. Spence & G. Velatini (2014), *Discovery Projects in Elementary Statistics: Curriculum Materials and Measurement of Student Outcomes*. 9<sup>th</sup> International Conference on Teaching Statistics, Flagstaff, AZ, July 2014.
- D. Spence & B. Bailey (2014), *Discovery Learning Projects in Introductory Statistics*. NSF/MAA Joint Poster Session at the MAA/AMS Joint Mathematics Meetings, Baltimore, MD, January 2014.
- D. Spence & S. Hix (2013), *Discovery Learning Projects in Introductory Statistics* (Poster). NSF/MAA Joint Poster Session at the MAA/AMS Joint Mathematics Meetings, San Diego, CA, January 2013.
- D. Spence, B. Bailey, & S. Hix (2012), *Discovery Learning Projects in Introductory Statistics*. NSF/MAA Joint Poster Session at the MAA/AMS Joint Mathematics Meetings, Boston, MA, January 2012.
- S. Allison, D. Spence, & B. Philip (2011), *Implementing AMR Grids on a GPU for Massive Parallelization*. Summer Research Poster Session for Faculty and Student Teams (FaST), Oak Ridge National Laboratory, Oak Ridge, TN, August 2011.
- P. Ostby, D. Spence, & B. Philip (2011), *Applications of GPUs for Parallel Algorithms in Adaptive Mesh Refinement*. Summer Research Poster Session for Faculty and Student Teams (FaST), Oak Ridge National Laboratory, Oak Ridge, TN, August 2011.
- D. Whitaker, D. Spence, & B. Philip (2011), *Adaptive Mesh Refinement Algorithms in General-Purpose GPU Environments*. Summer Research Poster Session for Faculty and Student Teams (FaST), Oak Ridge National Laboratory, Oak Ridge, TN, August 2011.
- D. Spence & B. Bailey (2011), *Discovery Learning Projects in Elementary Statistics*. NSF CCLI-TUES PI Conference, Washington, DC, January 2011.
- R. Sinn & D. Spence (2010), *Authentic, Career-Based, Discovery Learning Projects in Statistics*. MAA/NSF Joint Session at the Joint Mathematics Meetings, San Francisco, CA, January 2010.
- D. Spence (2006), *How Affective Experiences Mediate Learning in Online and Traditional Classes: Findings from Student Interviews*. The Scholarship of Teaching and Learning: The Cognitive-Affective Connection, Oxford, GA, March 2006.

## **OTHER ACADEMIC AND PROFESSIONAL ACTIVITIES**

- Spence, Dianna J., *Evaluation of Models for Prediction of Reversal Rates in Prescription Drug Claims*. [White paper for culmination of Data Science Internship.] Summer 2023.
- Pilot instructor for beta testing of online learning environments to accompany statistics textbooks, WH Freeman Publisher. Spring 2018 (Sapling) and Summer 2014 (LaunchPad).
- Author of online tutorial questions for StatsPortal, WH Freeman Publisher (2012-2013)
- Panelist, StatsPortal Advisory Panel for WH Freeman Publisher (2010-2012).
- Participant in the Faculty and Student Teams (FaST) Program – 10-week summer internship appointment at Oak Ridge National Laboratory. Research topic: Implementing Adaptive Mesh Refinement Algorithms for Partial Differential Equations in a GPU Computing Environment. June 6 – August 12, 2011.



Textbook Reviewer for D. Moore, *The Basic Practice of Statistics* (Freeman, NY)

- 6<sup>th</sup> Edition, Chapters 1-25 (June 2010 – January 2011)
- 5<sup>th</sup> Edition, Chapters 22-24 (November 2007 – February 2008)

Textbook Evaluator for Ryan & Gould, *Introductory Statistics*, for Pearson Publishing (2010).

Contributing Author to NGCSU CTLE's *The Teacher*, Volume 10: "Methods of Engagement" article, co-authored with B. Bailey & K. Briggs (2010).

Project Investigator, *Evaluation of Singapore Math in Hall County Elementary Schools*, NGCSU College of Education (2008 – 2010)

Reviewer for CrunchIt Statistics Software (December 2009).

Facilitator and Speaker, *Make It Real Statistics Workshop for Secondary Teachers*, Dahlonega, GA (January, 2009)

Panelist, Project NExT Workshop Panel on Mathematics Anxiety, Madison, WI (July 2008).

Consultant for Mathematics and Science Partnership (MSP), RFP Proposal Review Panel for Georgia Department of Education, Atlanta, GA (2007)

Consultant for Mathematics and Science Partnership (MSP), RFP Design Panel for Georgia Department of Education, Atlanta, GA (2006)

### **CONTINUING EDUCATION AND PROFESSIONAL DEVELOPMENT**

Conference on Statistical Practice, New Orleans, LA (3 days). February 2024.

Fall Analytics Day, Kennesaw State University (1 day). November 2023.

Georgia Mathematics Conference, Eatonton, GA (2 days). October 2023.

Georgia Association of Mathematics Teacher Educators (GAMTE) Annual Meeting, Eatonton, GA (1 day). October 2023.

Completed M.S. in Data Analytics at Georgia Institute of Technology. Summer 2023.

Completed full-time Data Science internship at RxSense, Inc. (15 weeks). Summer 2023.

Spring Analytics Day, Kennesaw State University (1 day). April 2023.

Fall Analytics Day, Kennesaw State University (1 day). November 2022.

Georgia Mathematics Conference, Eatonton, GA (2 days). October 2022.

Georgia Association of Mathematics Teacher Educators (GAMTE) Annual Meeting, Eatonton, GA (1 day). October 2022.

The Data Science Conference, Chicago, IL (2 days). May 2022.

Completed FLOCC Online Teaching Certification (online). July 2020.

Conference on Statistical Practice, Sacramento, CA (2 days). February 2020.

STATlanta Statistics Education Workshop, College Park, GA (1 day). February 2020.

MAA/AMS Joint Mathematics Meetings, Denver, CO (3 days). January 2020.

Georgia Mathematics Conference, Eatonton, GA (2 days). October 2019.

Georgia Association of Mathematics Teacher Educators (GAMTE) Annual Meeting, Eatonton, GA (1 day). October 2019.

Symposium on Data Science and Statistics, Bellevue WA (3 days). May 2019.

SAS Day, Kennesaw State University (1 day). April 2019.

MAA/AMS Joint Mathematics Meetings, Baltimore, MD (3 days). January 2019.

SAS Day, 1-day conference on developments in Data Science, hosted by Kennesaw State University, April 2018

American Mathematical Society (AMS) Department Chair Workshop, 1-day pre-conference workshop held at the Joint Mathematics Meetings, San Diego, CA, January 2018.

SAS Day, 1-day conference on developments in Data Science, hosted by Kennesaw State University, April 2017

Putting Big Data and Analytics to Work, online workshop sponsored by American Statistical Association (ASA), February 2017.

Presenting Data and Information, 1-day workshop by Edward Tufte, Atlanta, GA, February 2017.

Department Head Reading Group: Monthly meeting to read and discuss selections from J. L. Buller (2012), *The Essential Department Chair*. Sponsor: UNG CTLL, AY 2016-2017.

Roundtable Meeting: Data Science Post-Secondary Education (registered webcast participant), 1-day roundtable sponsored by National Academies of Science, Engineering, & Medicine with the Committee on Applied and Theoretical Statistics (CATS), December 2016.

Electronic Conference on Teaching Statistics (ECOTS), 5-day web-based conference, May 2016

Bootstrap and Permutation Methods, 1-day pre-conference workshop, American Statistical Association (ASA) Conference on Statistical Practice, San Diego, CA, February 2016

Batting for Power, 1-hour webinar sponsored by Consortium for the Advancement of Undergraduate Statistics Education (CAUSE), October 2015

Basics of Data Science in R and R-Studio, 2-day pre-conference workshop, United States Conference on Teaching Statistics (USCOTS), State College, PA, May 2015

Teaching Linear Algebra with GeoGebra: Making Connections between Algebra and Geometry, 2-day mini-course, MAA MathFest, Portland, OR, August 2014

Teaching Statistics with R and RStudio, 2-day pre-conference workshop, International Conference on Teaching Statistics (ICOTS), Flagstaff, AZ, July 2014

Teaching the Process of Statistical Investigations with a Randomization-Based Curriculum, 4-day workshop, Cal Poly, San Luis Obispo, CA, June 2014

NCTM CAEP/NCATE Reviewer Training, “Reviewer Polishing”, October 2013

NCTM CAEP/NCATE Reviewer Training, “Reviewer Polishing”, April 2013

NCTM NCATE Reviewer Training, October 2012

Desire2Learn (D2L) Training, six 1-hour sessions, NGCSU CTLE, September-October, 2012

NCTM Institute on Reasoning and Sense-Making, 3-day workshop, Los Angeles, CA, July 2012

NGCSU Teaching Circle: Using Technology for Research and Instruction (2011-2012)

Advising Transfer Students, CTLE 1-hour workshop (November, 2011)

High Performance Computing (HPC) Fundamentals Course, offered by the Oak Ridge Leadership Computing Facility, Oak Ridge, TN (June – August 2011)

R Programming Language Workshop, offered by the Oak Ridge Leadership Computing Facility, Oak Ridge, TN (July – August, 2011)

Structured Adaptive Mesh Refinement Course, 5-day course led by the Computer Science and Mathematics Division of Oak Ridge National Laboratory, Oak Ridge, TN (July, 2011)

Legacy of R. L. Moore Conference, 2½ day conference promoting inquiry-based learning in mathematics, Washington DC (June 2011)

NSF CCLI-TUES Principal Investigators Conference, 2-day conference on collaboration, grant-writing, and funding opportunities for NSF grant PIs (January 2011)

Grant Writing Skills You Need Now, 1-hour webinar, Texas Instruments (September 2010)

Mathematical Knowledge for Teaching Teachers (MKTT) 2-week workshop, University of Michigan, Ann Arbor, MI (July-August, 2010)

Advanced Math with TI-Inspire, 1½ day workshop, Atlanta, GA (July 2009)  
 Singapore Math Advanced Institute, 5-day workshop, Boston, MA (August, 2008)  
 Singapore Math Teacher Leader Training, 3-day workshop, Gainesville, GA (June 2008)  
 Singapore Math Teacher Training, 2-day workshop, Gainesville, GA (May 2008)  
 Teaching Performance Record (TPR) Training, 2-day workshop (May 2008)  
 Linking Dynamically Connected Representations and Computer Algebra Systems with the  
 TI-Nspire CAS, half day workshop, Tulsa, OK (January 2008)  
 CCLC/21<sup>st</sup> Century Grant Program Evaluation Networking Conference, Atlanta, GA (Feb. 2007)  
 USG Board of Regents Professional Development Workshop, Macon, GA (December 2006)  
 Leadership Roundtable NGCSU Faculty Summit: *How to Develop Informed, Engaged, and  
 Responsible Citizens*, Helen, GA (April 2006)  
*Geometry Across the Curriculum*, 1 day workshop, Athens, GA (March 2006)  
 NCTM/NCATE Program Reviewer Training, Tampa, FL (January 2006)  
 Mathematics and Computer Science Departmental Colloquia (September-October 2005)  
*Teaching with Sympodium, Advising Math/CS Majors, Using TI-Navigator*  
 Teaching and Learning Excellence NGCSU Faculty Retreat, Helen, GA (September 2005)

#### **UNDERGRADUATE COURSES TAUGHT**

BUSA 3110 Business Statistics  
 CSCI 1301 Introduction to Computer Science  
 CSCI 3900 Special Topics – Data Science  
 MAED 4101 Methods & Materials for Secondary Mathematics Teachers  
 MAED 4201 Mathematics Education Seminar  
 MATH 1101 Mathematical Models  
 MATH 1401 Elementary Statistics  
 MATH 2510 Discrete Mathematics  
 MATH 3345 Statistical Programming  
 MATH 3375 Introduction to Data Science Models

#### **UNDERGRADUATE/GRADUATE COURSE PAIRS TAUGHT**

MATH 2008/6100 Number Systems  
 MATH 3110/6110 Informal Geometry  
 MATH 3116/6116 Modeling in Algebra for Teachers  
 MATH 3140/6140 Data Analysis and Probability for Teachers  
 MATH 3350/6350 Probability and Statistics I  
 MATH 3500/6500 Introduction to Discrete Mathematics  
 MATH 3550/6550 Numerical Analysis  
 MATH 4700/6700 History of Mathematics

#### **GRADUATE COURSES TAUGHT**

MATH 7010 Seminar in Applications of Mathematics  
 MAED 7050 Pedagogical Techniques for Mathematics Instruction  
 MAED 7090 Advanced Pedagogy in Secondary Mathematics

## UNDERGRADUATE RESEARCH ADVISEMENT

- Spring 2024, Aidan Vick. Senior Project: *Dynamic Programming*. (Senior Project advisor)
- Fall 2023, Eddie Landino. Senior Project: *Data Analytics in Soccer*. (Senior Project advisor)
- Fall 2023 – Spring 2024, Madison Waldrep. Senior Project: *Infinitude of the Mersenne Primes*. (Senior Project advisor)
- Spring 2023 – Spring 2024, Grace Daniels. Senior Project: Handling Missing Data in Linear Regression. (Senior Project advisor)
- Fall 2020, Kristen Zuber. Honors Thesis: *Do Temperature and Particulate Matter Levels Influence the Spread of COVID-19?* (Thesis committee member)
- Spring 2020, Kristen Zuber. Research on results of stratified imputation under various conditions. (Undergraduate research culminating in professional conference poster presentation)
- Fall 2016, Eavan Thomas, Honors Thesis: *Effects of childhood allowances on adult financial success/knowledge* (Thesis committee member)
- Fall 2011, Lee Allison, Senior Project: *Adaptive Mesh Refinement Strategies for Elliptic PDEs* (Senior Project advisor)
- Fall 2011, Alexia Morris, Senior Project: *Graph Vertex Coloring and Edge Coloring* (Senior Project advisor)
- Fall 2011, David Whitaker, Senior Project: *Iterative Approximation Algorithms for PDEs* (Senior Project advisor)
- Spring 2008, Nicholas Ward, Senior Project: *J. P. C. Petersen and the Petersen Graph* (Senior Project advisor)

## FIELD SUPERVISION

Pre-service teacher supervision during secondary mathematics internship & field experience; 1 – 3 interns supervised per semester, 2006 – 2012.

## CURRICULUM DEVELOPMENT (UNG – BEYOND CLASSROOM)

- Helped to define and create 3 new courses with Data Science content (2021-2023)
  - MATH 3345 Statistical Programming
  - MATH 3365 Categorical Data Analysis
  - MATH 3375 Introduction to Data Science Models
- Helped to define and implement Data Science minor (2022-2024)
- Co-developed new undergraduate course: MAED 4000, Curriculum, with S. Hix (2012)

## CURRICULUM DEVELOPMENT (UNG – MAJOR IN-CLASS INNOVATIONS)

*Full curriculum redesign and development of new materials for following courses (includes full suite of learning activities, online question banks, and other innovations as noted)*

- CSCI 1301 – developed animated notes and scaffolded learning activities
- MATH 1101 – developed mastery-based assessments and materials
- MATH 1401 – overhauled course to use simulation-based curriculum
- MATH 2510 – created flipped classroom and fully online version of course
- MATH 3116 – authored new course materials packet as textbook alternative
- MATH 3350 – authored interactive Jupyter notebooks and D2L question banks with over 540 questions (algorithmic: values randomly change each time question is presented)
- MATH 3345 – Taught first section offered at UNG and developed all course materials
- MATH 3375 – Taught first section offered at UNG and developed all course materials
- MATH 4700 – Developed NCATE portfolio assessments and student-centered activities

**CURRICULUM DEVELOPMENT (EXTERNALLY DISSEMINATED)**

Spence, Dianna J., Hix, Sherry L., Cooper, Thomas E., & Sinn, Robb (2011). *Student Guide: Discovery Projects in Introductory Statistics*.

Hix, Sherry L., & Spence, Dianna J. (2011). *Instructor Guide: Discovery Projects in Introductory Statistics*.

**HONORS AND AWARDS ASSOCIATED WITH TEACHING**

Excellence in Undergraduate Research Award (2012)

CTLE Distinguished Professor of Teaching and Learning (2009)

SGA Faculty Recognition Award (2008)

NGCSU Teaching Excellence Award – Technology Utilization (2007)

**ACADEMIC ADVISEMENT**

- Academic advisement at orientation sessions (2015-2021)
- Review transcripts for M.A.T. secondary mathematics applications; advise additional coursework needed to meet program requirements (2017-present)
- Advise M.A.T. and M.Ed. secondary mathematics students (2012-2015; 2019-present)
- Advise undergraduate students in Secondary Mathematics Education (2006-2015)

**SERVICE TO DEPARTMENT****Department Committees**

- Mathematics Curriculum Committee, 2005-2015; 2022-present
  - Campus chair, Dahlenega and Blue Ridge, 2022-present
  - Co-chair of Statistics & Data Science committee, 2022-present
- Computer Science Curriculum Committee, 2015-2017
- Mathematics Education Faculty Search Committee, 2015-2016
- Computer Science Faculty Search Committee (2 positions), 2014-2015
- Chair, Mathematics Tournament Committee, 2007-2015
- Co-chair, Secondary Mathematics Program Committee, 2010-2015
- Mathematics Departmental Promotion and Tenure Committee
  - Chair, 2013-2014
  - Member, 2010-2011; 2012-2013
- Mathematics Instructor Search Committee, 2009-2010; 2010-2011

**Other Department Service**

- Faculty Delegate: Assist Department Head with departmental tasks (2022-present)
- Subject Matter Expert to review content of online courses (2023-2024)  
MAED 7050, MAED 7090. MATH 3500
- Mathematics Department Head (2017-2022)
- Department representative at UNG Open House (CS, 2015-2017; Math, 2017-present)
- Department Liaison for SE Section of Mathematical Association of America (2006-2018)
- NCATE Accreditation Preparations, 2007-2015, 2017
  - Assist in revising NCATE Assessments (2013-2015)  
Developed new portfolio assessments and scoring rubrics aligned with NCTM 2012 standards for MATH 4700, MAED 4101, and MAED 4201
  - Assist in preparing and revising NCATE Reports (2013-2015, 2017)
- Course content mentor for MATH 2400 (G. Velatini, S. Hix, M. Phipps, P. Wagner)

- New faculty mentor, K. Briggs, T. Cooper, S. Hix, P. Wagner (2007-2015)
- Presentation to Faculty for Departmental Colloquium: *Summer Internship Opportunities at Oak Ridge National Labs* (Fall 2011)
- Conducted faculty session on using remote clickers (Fall 2007)
- Co-conducted 2 information sessions on StatsPortal instructional software (2007)
- Presentation to Math Club: *Mathematical Applications in Computer Science: Computer Graphics and Ray Tracing* (Spring 2007)

## **SERVICE TO UNIVERSITY**

### **School Committees**

- Search Committee for Mathematics Department Head, 2022-2023
- Search Committee for Physics Department Head, 2019-2020
- Mike Cottrell College of Business Faculty Advisory Committee, 2014-2015
- School of Science and Health Professions Promotion and Tenure Committee, 2010-2011; 2012-2013
- School of Education Student Admissions and Recognitions Committee, 2007-2012

### **University/USG Committees**

- Big Bets STEM Committee, 2023-2024
- Data Science & Analytics Task Force, 2021-2022
- Search Committee for Assistant Dean, College of Science & Mathematics, 2021-2022
- USG Advisory Council on Mathematical Sciences (ACMS), 2017-2022
- Search Committee for Director of Tutoring Services, 2020-2021
- Faculty Grievance Board, 2019-2021; Chair, 2020-2021
- Search Committee for Dean, College of Science & Mathematics, 2019-2020
- Joint Conference Committee on University Post-Tenure Policy, 2019
- University Post-Tenure Review Appeals Committee, 2016
- University Promotion & Tenure Committee, 2015-2016
- Academic Planning Committee, Dahlonega Campus, 2014-2015
- Science Building Visioning Group, 2012-2013
- Discipline Committee, 2008-2009, 2010-2012
- Faculty Development Advisory Council, 2010-2012
- Academic Review and Fee Waiver Committee, 2009-2013
- Consolidation Implementation Team, 2012-2013
- Consolidation Academic Structure Working Group, 2012-2013
- Academic Activities Committee, 2009-2013
- Coordinator, Academic and Curriculum Board, 2009-2011
- Academic Integrity Council (2006-2008)
- Faculty Senate (2006-2008)

### **Other University Service**

- UNG representative on Interdisciplinary STEM team visit to JMU, 2024
- UNG representative at USG STEM Summit, Macon, GA, August 2016
- Presentation to Honors Research Methods Class, October 2015
- Safe Space Listener, 2010-2015
- CURCA Faculty Fellow, 2013
- Commencement Faculty Marshall, May 2012; August 2013

- Faculty Associate, 2011-2013
  - Organize and Schedule Academic Integrity Hearings
  - Coordinate Advance North Georgia Faculty Development Program
  - Represent faculty concerns to VPAA, follow up with appropriate parties to resolve
  - Miscellaneous work assignments designated by VPAA
- Commencement Speaker, August 2009
- Evaluator for Department of Teacher Education student work samples, 2005-2009
- Mathematics tutoring at evening study session held for Corps of Cadets, 2006 & 2007

### **SERVICE TO COMMUNITY**

- Advisory Board Member, TreadHunter, Inc. (Local business creating web-based storefront services for tire vendors), 2015-2022
- Conducted Workshop for Hall County AP Statistics Instructors, August 2012
- CCLC 21<sup>st</sup> Century Grant Program External Evaluator for Lumpkin County Schools, 2008-2010
- CCLC 21<sup>st</sup> Century Grant Program External Evaluator for Rabun County Schools, 2007-2010
- AMTE Conference Local Arrangements Committee, 2007
- Conducted in-service teacher workshops (2) for Rabun County School System, 2007
- Conducted in-service teacher workshop for Pioneer RESA, 2006

### **SERVICE TO PROFESSION**

- Curriculum Leadership Committee, SACSCOC Member Institutions in Data Science Cooperative Academic Arrangement, 2023-present
- Manuscript Reviewer for *Journal of Educational Computing Research*  
21 submissions reviewed, 2007-2023
- Manuscript Reviewer for *Journal of University Teaching and Learning Practice*  
4 submissions reviewed, 2017-2023
- CAEP/NCATE (Council for the Accreditation of Educator Preparation/National Council for Accreditation of Teacher Education) Reviewer (2006-2014), NCTM Mathematics Undergraduate and Graduate Programs
  - Lead Reviewer, 2008-2014
  - Reviewed 2 – 6 programs per year (15-30 hours per program)
  - Board of Program Reviewers, 2009-2014
- Reader/Leader for Educational Testing Service (ETS), Advanced Placement (AP) Statistics Test (*7-14 days of full-time work during summer, depending on assignment*)
  - Question Leader (2021, 2022)
  - Table Leader (2015, 2018-2020, 2024)
  - Reader (2008-2014, 2017)
- Secretary/Treasurer, Statistics Education SIGMAA Section of the Mathematical Association of America (MAA), 2017-2020.
- Proposal Reviewer for United States Conference on Teaching Statistics (USCOTS), 2014-2015.
- Treasurer, Georgia Association of Mathematics Teacher Educators (GAMTE), 2014-2015.
- Secretary, Georgia Association of Mathematics Teacher Educators (GAMTE), 2009-2011, 2015

- Manuscript Reviewer for *Indian Journal of Pure and Applied Mathematics*  
2 submissions reviewed, 2012-2013
- Manuscript Reviewer for *Journal of Mathematical Behavior*  
2 submissions reviewed, 2012-2013
- Reviewer for Educational Testing Service (ETS), PRAXIS Mathematics Pedagogy Test  
Scoring free response questions on PRAXIS exams in 4-hour online shifts scheduled  
intermittently throughout the year, 2010-2013.
- Manuscript Reviewer for *Mathematics Teaching in the Middle School*  
3 submissions reviewed, 2011-2012
- Member of the Mathematics Content Advisory Committee for the Georgia Assessments  
for the Certification of Educators (GACE) state certification test; met to review, approve,  
revise Mathematics Secondary GACE content assessment items (March 2011)
- Evaluator for McGraw Hill: evaluated middle grades mathematics assessment forms for  
alignment with Georgia Performance Standards, 2010.
- Georgia Association of Mathematics Teacher Educators (GAMTE) Nominations and  
Elections Committee Chair, 2008.

## **PROFESSIONAL ORGANIZATIONS**

### **State and Regional Organizations**

Georgia Council of Teachers of Mathematics (GCTM) (2006-present)

Georgia Association of Mathematics Teacher Educators (GAMTE) (2008-present)

Southeastern Section of Mathematical Association of America (2006-2022)

### **National and International Organizations**

American Statistical Association (ASA) (Lifetime Member from 2015)

- Statistical Computing Section member
- Statistical Graphics Section member
- Statistical Education Section member

Association for Computing Machinery (ACM) (2013-2017)

Mathematical Association of America (MAA) (2006-2022)

- Statistics Education SIGMAA Section member

American Mathematical Society (AMS) (2010-2020)

Association of Mathematics Teacher Educators (AMTE) (2005-2015)

National Council of Teachers of Mathematics (NCTM) (2005-2015)

International Society for Technology in Education (ISTE) (2002-2008)

Association for the Advancement of Computing in Education (AACE) (2002-2008)

American Educational Research Association (AERA) (2000-2007)