Curriculum Vitae

Franziska Isabel Peterson
Assistant Professor of Mathematics
Department of Mathematics and Statistics
The University of Maine
5752 Neville Hall, Orono, Maine, 04469-5752
(207) 581-3923, email: franziska.peterson@maine.edu

CURRENT POSITION

2016 – present Assistant Professor of Mathematics, University of Maine
Faculty Member of the Research in STEM Education (RiSE) Center, University of Maine

EDUCATION

2016 Ph.D. Mathematics Education
University of Wyoming, Laramie, WY
Minor: Quantitative Research Methods
Thesis: *Pre-service elementary teachers' language use when interpreting box-and-whisker plots*

2011 M.Ed. Mathematics and English (Double Major)
Carl von Ossietzky University Oldenburg, Germany
Thesis: *Whales are gay livers – A diachronic corpus-based analysis of meaning shifts in the word "gay"*

2007 B.A. Mathematics and English (Double Major)
University of Osnabrück, Germany
Thesis: *Noah Webster and American Lexicography*

PROFESSIONAL EXPERIENCE

Teaching

2016 - present Assistant Professor of Mathematics

2011 – 2016 Part-time lecturer for Elementary and Early Childhood Education, Secondary Mathematics, and Mathematics, University of Wyoming

2009 – 2011 Tutor at School Evident in Oldenburg, Germany

2008 – 2009 Instructor for an afternoon enrichment program (Connecting Art and Literacy) at the Art Museum of the University of Wyoming

Spring 2008 Internship as a full-time mathematics and English teacher at the Gymnasium in der Wüste in Osnabrück, Germany (Secondary Education)

Fall 2007 Part-time mathematics and English teacher at the Gymnasium in der Wüste in Osnabrück, Germany (Secondary Education)

Spring 2006 Internship as a full-time mathematics and English teacher at the Realschule in Bad Laer, Germany (Secondary Education)

Courses Taught

Undergraduate Mathematics Courses at the University of Maine
MAT 107 – Elementary Descriptive Geometry
MAT 108 – Elementary Numerical Mathematics from a Modern Perspective
MAT 116 – Introduction to Calculus

Graduate Courses at the University of Maine
MST 500 – Educational Psychology with Applications to Science and Mathematics Teaching and Learning

Elementary and Early Childhood Education Courses at the University of Wyoming
EDEL 1410 – Elementary School Math Seminar I
EDEL 2410 – Elementary School Math Seminar II
MATH 2120 – Measurement and Geometry for Elementary School Teachers
MATH 1105 – Data, Probability & Algebra for Elementary School Teachers
MATH 1100 – Number and Operations for Elementary School Teachers

Secondary Education and Graduate Courses at the University of Wyoming
EDSE 3271 – Mathematics Methods I (Co-teaching with Dr. Hutchison)
EDSE 4271 – Mathematics Methods II (Co-teaching with Dr. Hutchison)
EDSE 4500 – Supervisor of student teaching in the state of Wyoming
EDCI 5480 – Quantitative Reasoning and Modeling in Mathematics and Science Education (Teaching Assistant)

Graduate Research Project Advising (Master of Science Teaching)

Bryn Keenhold. Assessing quantitative reasoning in a ninth grade science class using interdisciplinary data story assignments. May 2019. Co-chaired with Molly Schauffler.

Sam Ward. Expected completion December 2019. Co-chaired with Janet Fairman.

Justin Willis. Expected completion May 2020.

Research

2016 – present Member of the Research in STEM Education (RiSE) Center, University of Maine

2011-2014 Graduate research assistant for the NSF funded project *Culturally Relevant Ecology, Learning Progressions, and Environmental Literacy* focusing on quantitative reasoning in environmental science, University of Wyoming

2007-2008 Graduate research assistant for Prof. Dr. A. Bergs at the Linguistics Department of the University of Osnabrück, Germany

Professional Learning Experiences

Content Immersions

2019 Professional Learning Leader: *Number and Operations in Base Ten: A K-8 Progression*, RiSE Center, 2019 MSP Summer Opportunities, University of Maine. (In preparation)

2018 Professional Learning Leader: *Proportional Reasoning and Problem Solving: A K-8 Progression*, RiSE Center, 2018 MSP Summer Opportunities, University of Maine.
Proportional reasoning is a cornerstone in middle school mathematics and developing a deep understanding is fundamental for students since it builds the foundation for future concepts, such as functions, graphs, and algebraic equations. During the content immersion, we unpacked what is meant by proportional reasoning and focused on its different components, such as fraction interpretations, relative thinking, and quantities and change. We worked through a progression of problems ranging from kindergarten to 8th grade covering the ideas of proportional reasoning using different techniques, such as strip diagrams, ratio tables, double number lines, and graphs.

2017 Professional Learning Leader: *Expressions and Equations: A K-8 Progression*, RiSE Center 2017 Summer Opportunities, University of Maine, July 2017.
Understanding how to interpret and use expressions and equations is a key aspect for understanding algebra. During the content immersion, we investigated the progression of expressions and equations from kindergarten through 8th grade. This also included a view on the horizon looking at high school perspectives. The goal was to identify a red line of algebraic thinking and the importance of expressions and equations in K-8.

Workshops

2019 Co-Facilitator with Dr. Marisa Castronova on developing and assessing quantitative reasoning skills in the STEM classroom (in preparation). 2019 RiSE National Conference "Integrating Research & Practice: Strategies for interdisciplinary teaching and learning across the STEM+C disciplines.

2018 Co-Facilitator with Dr. Michael Wittmann: *Conceptual and quantitative reasoning about energy*, Maine STEM Partnership Fall Summit "Strengthening Research-Guided STEM Teaching & Learning for Maine Students: Community-based strategies to support educators", Point Lookout, Northport, November 17 & 18, 2018.

2018 Facilitator: *Proportional reasoning and problem solving in middle school*, 2018 RiSE National Conference "Using STEM Disciplines to Build 21st Century Workplace Skills", University of Maine.

2018 Facilitator: *Algebraic thinking in the early grades*, 2018 RiSE National Conference "Using STEM Disciplines to Build 21st Century Workplace Skills", University of Maine.

2017 Facilitator: *Proportional reasoning through the elementary grades*, Maine STEM Partnership Fall Summit "Strengthening Evidence-Based STEM Teaching for Maine PK-16+ Students", Point Lookout, Northport, November 17 & 18, 2017.

2016 Facilitator: *Applying Function Language Analysis to Investigate Students' Language Use*, 2016 RiSE National Conference "Integrating STEM Education Research and Teaching: Understanding and Strengthening Student Reasoning, Critical Thinking, and Communication Skills", University of Maine.

2014 Graduate assistant for the MSP project *Launching Astronomy: Standards and STEM Integration (LASSI)*, University of Wyoming, PI: Dr. Andrea Burrows

PUBLICATIONS

Dissertation

Peterson, F. (2016). *Pre-service elementary teachers' language use when interpreting box-and-whisker plots* (Order No. 10154317). Available from ProQuest Dissertations & Theses Global. (1836101147).

Articles in Refereed Journals

Mayes, R. L., Rittschof, K., Forrester, J. H., Schuttlefield Christus, J. D., Watson, L., & **Peterson, F.** (2015). Quantitative reasoning in environmental science: Rasch measurement to support QR assessment. *Numeracy*.

Mayes, R., Forrester, J., Schuttlefield Christus, J., **Peterson, F.**, & Walker, R. (2014). Quantitative reasoning learning progression: The matrix. *Numeracy, 7*(2), Article 5.

Mayes, R. Forrester, J. Cristus, J. Yestness, N. **Peterson, F.**, & Bonilla, R. (2014). Quantitative reasoning in environmental science: A learning progression. *International Journal of Science Education, 36*, 635-658.

Mayes, R., **Peterson, F.**, & Bonilla, R. (2013). Quantitative reasoning learning progressions for environmental science: Developing a framework. *Numeracy, 6*(1), Article 4.

Book Chapters

Mayes, R., **Peterson, F.**, & Bonilla, R. (2012). Quantitative reasoning in context. In R. Mayes & L. Hatfield (Eds), *Quantitative reasoning and mathematical modeling: A driver for STEM integrated education and teaching in context* (pp. 7-38). Laramie, WY: University of Wyoming WISDOM^{e}.

Papers in Conference Proceedings

Mayes, R., Rittschof, K., Forrester, J. H., Schuttlefield Christus, Watson, L., & **Peterson, F.** (2016). *Quantitative reasoning: Rasch measurement to support QR assessment*. 13th International Congress on Mathematical Education, Hamburg, Germany, 24-31 July 2016.

Peterson, F., & Mayes, R. (2013). *Iterative research: Developing quantitative reasoning assessments for 6th to 12th grades*. Psychology of Mathematics Education North American Conference, Chicago, Illinois, Nov. 2013.

Candelaria, M.S., & **Peterson, F.** (2013). *Comparing qualitative approaches: Two researchers, one data set, countless interpretations.* Psychology of Mathematics Education North American Conference, Chicago, Illinois, Nov. 2013.

Mayes, R. & **Peterson, F.** (2013). *Quantitative reasoning in environmental science: Learning progression for 6th to 12th grade*. 37th Conference of the International Group for the Psychology of Mathematics Education, Kiel, Germany, July 2013.

Forrester, J., Mayes, R., Schuttlefield, J. & **Peterson, F.** (2012). *Quantitative reasoning in environmental science: The development of a learning progression*. Psychology of Mathematics Education North American Conference, Kalamazoo, Michigan, Oct. 2012.

Mayes, R., Lyford, M., **Ehlers (Peterson), F.**, & Markum, C. (2011). *Wisdome: Quantitative Reasoning and Mathematical Modeling Working Group*, Psychology of Mathematics Education North American Conference, Reno, Nevada, Oct. 2011.

Mayes, R., Lyford, M., **Ehlers (Peterson), F.**, & Markum, C. (2011). *Quantitative Reasoning and Mathematical Modeling in Environmental Science*, Psychology of Mathematics Education North American Conference, Reno, Nevada, Oct. 2011.

Papers and Presentations at Professional Meetings

Keenhold, B. & **Peterson, F.** (2019). Quantitative reasoning in a ninth grade science classroom. 2020 NSTA National Conference, Boston, MA. (Submitted)

Peterson, F. & Keenhold, B. (2018). *The Role of Quantitative Reasoning in Science: Developing a Rubric for Data Stories*. The 2018 annual conference of the Northeastern Educational Research Association - October 17-19 in Trumbull, CT.

Peterson, F. (2018). *Proportional reasoning and problem solving in middle school*. 2018 RiSE National Conference, University of Maine, Orono, Maine, June 2018.

Peterson, F. (2017). *Proportional Reasoning Through the Elementary Grades*. Maine STEM Partnership Fall Summit "Strengthening Evidence-Based STEM Teaching for Maine PK-16+ Students", Point Lookout, Northport, November 17 & 18, 2017.

Peterson, F. (2017). *Pre-service elementary teachers' statistical understanding: A function language analysis*. NRMERA Annual Conference, Boulder, Colorado, October 2017.

Peterson, F. (2016). *Preservice teacher's language use when reasoning about box-and-whisker plots*. 2016 RiSE National Conference, University of Maine, Orono, Maine, June 2016.

Peterson, F. (2016). *Preservice teachers' language use when reasoning about mathematical representations*. College of Education Scholarship and Research Symposium, University of Wyoming, March 2016.

Kasemsukpipat, W., Idowu, O., Kidd, S., **Peterson, F.**, Almughyirah, S., DeWitt, R., Anderson, D. & Malik, S. (2016). *How Different Cultures Prepare Secondary Mathematics Teachers: Cases from Germany, Nigeria, Pakistan, Saudi Arabia, Thailand, and the United States* (Panel Presentation). College of Education Scholarship and Research Symposium, University of Wyoming, March 2016.

Mayes, R., Rittschof, K., Forrester, J. H., Schuttlefield Christus, Watson, L., & **Peterson, F.** (2016). *Quantitative reasoning: Rasch measurement to support QR assessment*. 13th International Congress on Mathematical Education, Hamburg, Germany, 24-31 July 2016.

Peterson, F., & Candelaria, M. S. (2015). *Comparing qualitative approaches: Three qualitative approaches, two researchers and one data set*. NRMERA Annual Conference, Boise, Idaho, Oct. 2015.

Gorham Blanco, T., **Peterson, F.**, Candelaria, M. S., & Rice, L. (2015). *Mathematical language, argumentation, and in-the-moment noticing of preservice elementary teachers*. NRMERA Annual Conference, Boise, Idaho, Oct. 2015.

Peterson, F., & Mayes, R. (2013). *Iterative research: Developing quantitative reasoning assessments for 6th to 12th grades*. Psychology of Mathematics Education North American Conference, Chicago, Illinois, Nov. 2013.

Mayes, R. & **Peterson, F.** (2013). *Quantitative reasoning in environmental science: Learning progression for 6th to 12th grades*. Psychology of Mathematics Education – North American Conference, Chicago, Il, Nov. 2013

Candelaria, M.S., & **Peterson, F.** (2013). *Comparing qualitative approaches: Two researchers, one data set, countless interpretations.* Psychology of Mathematics Education North American Conference, Chicago, Illinois, Nov. 2013.

Johnson, H., Moore, K., Mayes, R. Gaze, E, & **Peterson F.** (2013). *WISDOM^e Quantitiatve Reasoning Task Development Working Group*, PME-NA National Conference, Chicago, IL, Nov. 2013.

Gorham Blanco, T., & **Peterson, F.** (2013). *Common core state standards for mathematics in the new healthcare market.* Consumer Issues Conference. Laramie, Wyoming, Oct. 2013.

Mayes, R. & **Peterson, F.** (2013). *Quantitative reasoning in environmental science: Learning progression for 6th to 12th grade*. 37th Conference of the International Group for the Psychology of Mathematics Education, Kiel, Germany, July 2013.

Forrester, J., Mayes, R., Schuttlefield, J. & **Peterson, F.** (2012). *Quantitative reasoning in environmental science: The development of a learning progression*. Psychology of Mathematics Education North American Conference, Kalamazoo, Michigan, Oct. 2012.

Peterson, F. (2012). *Mathematics and language: Is there a communication gap?* NRMERA Annual Conference, Park City, Utah, Oct. 2012.

Peterson, F. (2012). *Summary and presentation of the quantitative reasoning working group conclusions*. Quantitative Reasoning and Learning Progressions Symposium, Georgia Southern University, University of Wyoming WISDOM^{e}, and NSF Pathways Project centered at Colorado State University. Savannah, Georgia, May 2012.

Peterson, F. (2011*). Mathematics and science: Is there a communication gap?* 2nd biannual UW/CC Research Symposium, Casper, Wyoming, Dec. 2011.

Mayes, R., Lyford, M., **Ehlers (Peterson), F.**, & Markum, C. (2011). *Wisdom^{e}: Quantitative Reasoning and Mathematical Modeling Working Group*, Psychology of Mathematics Education North American Conference, Reno, Nevada, Oct. 2011.

Mayes, R., Lyford, M., **Ehlers (Peterson), F.**, & Markum, C. (2011). *Quantitative Reasoning and Mathematical Modeling in Environmental Science*, Psychology of Mathematics Education North American Conference, Reno, Nevada, Oct. 2011.

Invited Presentation

2017 Panelist for the Community Reflection Panel at the Maine STEM Partnership Fall Summit "Strengthening Evidence-Based STEM Teaching for Maine PK-16+ Students", Point Lookout, Northport, November 17 & 18, 2017.

2016 *Preservice teacher's language use when reasoning about box-and-whisker plots*. 2016 RiSE National Conference, University of Maine, Orono, Maine, June 2016.

Reviewer

2013-present	Publication proposals for the Action in Teacher Education Journal
2017	Proposals for the 3rd AsTEN Conference (Association of Southeast Asian Teacher Education Network)
2013	Proposals for the 2013 AMTE (Association of Mathematics Teacher Educators) Annual Conference

Membership

2018-present	Northeastern Educational Research Association (NERA)

COLLEGIATE SERVICE

University of Maine

2018 – present Child Care Task Force

RiSE Center (University of Maine)

2017 – present MST Curriculum Committee Chair

2018 – present Executive Committee Member

2018 – present Maine STEM Partnership Leadership Team Member

2017 – present Maine STEM Partnership's Curriculum Modification Review Board Member

University of Wyoming

2013-2016 WYO-MESA (Wyoming Mathematics Education Student Association), Secretary

2013-2014 Technology Committee Member

2013-2014 Endowed Chair Search Committee for Mathematics Education, Graduate Student Representative

2012-2013 Diversity Committee Member

GRANT WORK

Leveraging Intelligent Informatics and Smart Data for Improved Understanding of Northern Forest Ecosystem Resiliency (INSPIRES) . EPSCoR Track II Grant Submission, $6,000,000, split evenly between 3 institutions (UM, UNH, UVM). (Senior Personnel) (Pending)

Understanding and advancing early high school Earth and physical science teachers' knowledge of mathematics and physical science. NSF – DRK12 Proposal, 2018. $3,000,000. PI: Michael Wittmann. (Co-PI) (Preparing Re-Submission)

Maine Elementary and Middle-Level Mathematics Partnership: Coordinated Community-Based Professional Learning for Teachers to Strengthen Students' Problem Solving Abilities. SEED Grant proposal, 2018, $7,489,136. PI: Susan McKay. (Co-PI) (Preparing Re-Submission)

Donne and Sue Fisher Doctoral Student Mini-Grant in Literacy, 2016. $750, University of Wyoming. (PI)

Launching Astronomy: Standards and STEM Integration (LASSI), 2014. Mathematics and Science Partnership Grant project, $114,127, University of Wyoming. Graduate assistant (PI: Dr. Andrea Burrows)

Culturally Relevant Ecology, Learning Progressions, and Environmental Literacy (Pathways), Oct 2008 – Oct 2013. NSF MSP: Pathways LTER – Culturally Relevant Ecology, Learning Progressions, and Environmental Literacy. $12,500,000. Graduate research assistant. PI John Moore, Co-PI Andy Anderson, Co-PI Allison Whitmer, Co-PI Alan Berkowitz, UW Co-PIs Robert Mayes and Mark Lyford. Develop environmental literacy learning progressions. UW focus on quantitative reasoning aspects. UW funding; $749,685.