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Department of Mathematics

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PRESENT POSITION:

Graduate Research Assistant, Department of Mathematics, Oregon State University, Corvallis, OR.

EDUCATION:

Ph.D. in Mathematics, Oregon State University, Corvallis, OR. Expected June 2018.
Adviser: Dr. Elise Lockwood

M.S. in Mathematics, Oregon State University, Corvallis, OR. December 2015.
Project: *A survey of the Surface Quasi-Geostrophic Equations and its analogies to the Euler Equations.*
Adviser: Dr. Elaine Cozzi

B.S. in Mathematics, Pepperdine University, Malibu, CA. May 2013.
Graduated Summa Cum Laude.

RESEARCH:

I am currently investigating student thinking in real analysis settings and the ties of student thought to generalization at this advanced level. Real Analysis is a central mathematical field at the graduate level, and thus student success in this area at the undergraduate level is vital to graduate success. By taking a constructivist perspective, I seek to build models for student thought on different core concepts within the real analysis curriculum, such as metric spaces. I am also interested in the role that the generalization plays in the learning and understanding of advanced mathematical areas. I seek to foster productive generalization based in rich understandings of mathematical objects.

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AWARDS & HONORS:

Best Paper Award. 19th Annual Conference for the SIGMAA on Research in Undergraduate Mathematics Education. Fall 2016.

OSU Graduate School Travel Award. University-wide award for graduate student travel. Awarded \$500 for travel to speak at the 2017 Joint Mathematics Meetings in Atlanta, GA. Winter 2017.

Oregon Lottery Graduate Scholarship Academic merit award for graduate students nominated by their department. Awarded \$2430 over the course of the 2017-2018 academic year.

Graduate Student Excellence Award Department award for academic and scholarly excellence. Awarded \$500 dollars from the Oregon State Mathematics Department.

SCHOLARSHIP & CREATIVE ACTIVITY:

Publications (+ indicates submitted)

- 1) + Lockwood, E. & **Reed, Z.** Students' meanings of a (potentially) powerful generalized representation in combinatorics. Submitted.
- 2) +Lockwood, E. & **Reed, Z.** Reinforcing mathematical concepts and developing mathematical practices through combinatorial activity. Submitted.
- 3) Lockwood, E., **Reed, Z.**, & Caughman, J. S. (2016). An analysis of statements of the multiplication principle in combinatorics, discrete, and finite mathematics textbooks. To appear in *International Journal of Research in Undergraduate Mathematics Education*. doi: 10.1007/s40753-016-0045-y.
- 4) Fisher, B. and **Reed, Z.** (2014). Did Penn & Teller tell a lie? On the biased nature of spinning coins, *Pi Mu Epsilon Journal*, 13(10), 625-632.

Refereed conference proceedings

- 1) **Reed, Z.** (2017). The effects of the epsilon-N relationship on convergence of functions. To appear in A. Weinberg, M. Wawro, & S. Brown (Eds.), *Proceedings for the Twentieth Special Interest Group of the MAA on Research on Undergraduate Mathematics Education*. San Diego, CA: San Diego State University.

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- 2) **Reed, Z.** & Lockwood, E. (2016). On the variety of the multiplication principle's presentation in college texts. In T. Fukawa-Connelly, K. Keene, and M. Zandieh (Eds.), *Proceedings for the Nineteenth Special Interest Group of the MAA on Research on Undergraduate Mathematics Education*. Pittsburgh, PA: West Virginia University.
- 3) Lockwood, E. & **Reed, Z.** (2016). Students' meanings of a (potentially) powerful tool for generalizing in combinatorics. In T. Fukawa-Connelly, K. Keene, and M. Zandieh (Eds.), *Proceedings for the Nineteenth Special Interest Group of the MAA on Research on Undergraduate Mathematics Education*. Pittsburgh, PA: West Virginia University.
- 4) Lockwood, E., **Reed, Z.** & Caughman, J.S. (2015). Categorizing statements of the multiplication principle. In Bartel, T. G., Bieda, K. N., Putnam, R. T., Bradfield, K., & Dominguez, H. (Eds.), *Proceedings of the 37th Annual Meeting of the North American Chapter of the Psychology of Mathematics Education*, (pp. 80-87). East Lansing, MI: Michigan State University.

Additional presentations, not included in refereed conference proceedings (* denotes speaker)

- 1) ***Reed, Z.** "Student Generalizations from Finite to Infinite Dimensional Normed Spaces." Joint Mathematics Meetings (JMM). Atlanta, GA. January 2017.
- 2) ***Reed, Z.** "The Password Activity: An Instructional Tool for the Combinatorics Classroom." Joint Mathematics Meetings (JMM). Atlanta, GA. January 2017.
- 3) ***Reed, Z.** "Encouraging Student Ownership of Mathematics." Invited Panel at the Christian Scholars Conference. Lipscomb University. June 2016.
- 4) ***Reed, Z.** "Experiences in Graduate School and Life after Pepperdine." Pepperdine University, Department of Mathematics. March 2016. Invited colloquium.
- 5) ***Reed, Z.** & Lockwood, E. "Examining Student Generalizing Activity in an Accessible Combinatorial Task." Joint Mathematics Meetings (JMM). Seattle, WA. January 2016.
- 6) ***Caughman, J. C., Lockwood, E., & Reed, Z.** "Deconstructing and Reconstructing the Multiplication Principle." Annual meeting of the Pacific Northwest section of the Mathematical Association of America (MAA). Oregon State University. April 2016.
- 7) ***Reed, Z.** "A Beale-Kato-Majda type blow-up condition for the 2D quasigeostrophic equations." Expository talk in Analysis Seminar. Oregon State University. October 2015.
- 8) ***Reed, Z.** "Analogies between the Non-Dissipative 2D Quasi-Geostrophic Equations and 3D Euler Equations." Expository talk in Analysis Seminar. Oregon State University. January 2015.

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- 9) *Reed, Z. "An Introduction to Sobolev Spaces." Tutorial talk in Analysis Seminar. Oregon State University. November 2014.

TEACHING EXPERIENCE:

Oregon State University, Corvallis, OR

Instructor of record: Responsibilities included designing the course, syllabus, calendar, and assessments, and teaching all class periods.

- 1) Vector Calculus I (Math 254). Vectors, vector functions, and curves in two and three dimensions. Surfaces, partial derivatives, gradients, and directional derivatives. Multiple integrals in rectangular, polar, cylindrical, and spherical coordinates. Physical and geometric applications.
 - Summer 2015
 - Enrollment: 30
- 2) Mathematics for Management, Life, and Social Sciences (Math 245). Techniques of counting, probability and elements of statistics including binomial and normal distributions. Introductory matrix algebra. Elements of linear programming.
 - Spring 2016
 - Part of the INTO program at OSU, which supports international students in their transition to the university
 - Enrollment: 18

Graduate Teaching Assistant: Responsibilities included running recitations; writing and implementing quizzes and activities; grading homework, quizzes, and exams; holding office hours; and tutoring in the mathematics learning center.

- 1) College Algebra (Math 111). Polynomial equations and inequalities, polynomial functions and graphs, inverse functions, exponential and logarithmic functions, elementary mathematical modeling and applications.
 - Fall 2013, Winter 2014
- 2) Differential Calculus (Math 251). Differential calculus for engineers and scientists. Rates of change: the derivative, velocity, and acceleration. The algebraic rules of differential calculus and derivatives of polynomial, rational, and trigonometric functions. Maximum-minimum problems, curve sketching, and other applications. Antiderivatives and simple motion problems.
 - Spring 2014

Grader for Advanced Calculus (Math 311): Responsibilities included grading proof-intensive homework, writing and TeXing solutions, holding office hours, and running study sessions for exams. Fall 2015.

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OTHER EXPERIENCE:

Research Work

- 1) Research Assistant on NSF Grant # 1419973, *Generalization Among Multiple Mathematical Areas (GAMMA)*. Elise Lockwood, Co-PI [with Amy Ellis (PI), Kevin Moore (Co-PI), and Erik Tillema (Co-PI)]. Duties included collecting videotape data in undergraduate interviews, creating and enhancing transcripts of data, aiding in the analysis of the data and aiding in the dissemination of the findings. Fall 2014-Winter 2015, Fall 2016-present.

Professional Service

- 1) Referee. Reviewed conference proposals for the *Conference on Research in Undergraduate Mathematics Education (RUME)*.
- 2) Referee. Reviewed manuscripts for *Problems, Resources, and Issues in Mathematics Undergraduate Studies*.
- 3) Hired to compile the Proceedings for the 18th and 19th RUME conferences in LaTeX.

FURTHER INFORMATION:

Professional Affiliations: Member of the American Mathematical Society (AMS) and the Society for Industrial and Applied Mathematics (SIAM).

Technological Experience: Knowledge also of MAXQDA, Word, PowerPoint, Excel, LaTeX, and Prezi.

REFERENCES:

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Dr. Brian Fisher

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