

## Sarah A. Erickson

Oregon State University  
Department of Mathematics

Mailing address: 260 Kidder Hall, Corvallis, OR, 97331

Email address: saraherickson.math@gmail.com

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### Present Positions:

#### Mathematics Instructor

Sept. 2017 - Present

- Oregon State University, Corvallis, OR.
- College Algebra (MTH 111)
  - \* 2 sections with 60 students each
  - \* 1 section with 20 students enrolled for OSU's INTO program<sup>1</sup>
  - \* I am part of a team of instructors who are working to revamp OSU's College Algebra program. Each class is co-taught with a teacher assistant, and students spend much of class time working on carefully-crafted worksheets in teams. We also use Learning Catalytics to get real-time feedback on student understanding in the classroom, and we utilize personalized, adaptive homework software (ALEKS) to support student learning outside of class.
- Differential Calculus (MTH 251)
  - \* 1 section with 107 students
  - \* The class structure is three 1-hour lectures and one 1-hour recitation per week. Coordinating with the other OSU MTH 251 instructors, I help prepare recitation activities, group quizzes, and challenging written homework assignments for my students to discuss with their teaching assistant in recitation. I also engage my students during lecture by asking clicker-style questions via Learning Catalytics.

#### Adjunct Mathematics Instructor

Jan. 2018 - Present

- Chemeketa Community College, Salem, OR.
  - Integral Calculus (MTH 252)
    - \* 1 section with 15 students enrolled
    - \* I create weekly packets containing space for them to take notes as well as carefully constructed, guiding problems for them to work on in groups. Class time is roughly spent alternating between 20 minutes of time working through problems and 20 minutes of lecture. Additional learning experiences for students include weekly group quizzes.
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### Education:

#### Ph.D., Mathematics

Expected June 2020

- Ph.D. Candidate
- Oregon State University, Corvallis, OR.
- Concentration in Undergraduate Mathematics Education.
- Adviser: Dr. Elise Lockwood.

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<sup>1</sup>Oregon State University's INTO OSU GE, AE, and Pathways programs support international students' transition to college-level courses taught in English. INTO mathematics class sections have a smaller number of students than non-INTO sections, and specific attention is given to helping students learn and practice using mathematical language in English.

**Graduate Certificate in College and University Teaching**

**June 2016**

- Oregon State University, Corvallis, OR.
- This is an 18-credit certificate program that provides advanced course work and experiential learning opportunities for graduate students who plan to pursue careers in teaching in higher education settings.

**M.S., Mathematics**

**December 2015**

- Oregon State University, Corvallis, OR.
- Concentration in Undergraduate Mathematics Education.
- Thesis: *Listing as a Potential Connection Between Sets of Outcomes and Counting Processes.*
- Adviser: Dr. Elise Lockwood.

**B.S., Mathematics**

**June 2013**

- Western Washington University, Bellingham, WA.
- Magna Cum Laude.

**Associate in Arts and Sciences Degree with Honors**

**June 2011**

- Whatcom Community College, Bellingham, WA.

**Teaching Experience:**

*Oregon State University, Corvallis, OR.*

**Instructor:**

Responsibilities included creating the course syllabus; creating the course calendar, including when department-required topics would be covered; giving lectures; designing and facilitating group activities; creating and grading homework assignments; and writing and grading exams.

**College Algebra (MTH 111)**

**Fall 2017**

- 3 sections with 60 students each
- 1 section with 20 students enrolled for OSU's INTO program
- Polynomial equations and inequalities, polynomial functions and graphs, inverse functions, exponential and logarithmic functions, elementary mathematical modeling and applications.

**Elementary Functions (MTH 112) - INTO**

**Fall 2016**

- 33 students enrolled.
- Triangle trigonometry, circular functions and graphs, trigonometric equations and identities, inverse trigonometric functions, polar coordinates, vectors and applications.

**Elements of Discrete Mathematics (MTH 231)**

**Summer 2016**

- 33 students enrolled.
- Elementary logic and set theory, functions, direct proof techniques, contradiction and contraposition, mathematical induction and recursion, elementary combinatorics, basic graph theory, minimal spanning trees.

**College Algebra (MTH 111) - INTO**

**Fall 2015**

- 21 students enrolled.

**Differential Calculus (MTH 251)**

**Spring 2015, Summer 2014**

- 33 students enrolled in Spring 2015; 20 students enrolled in Summer 2014.
- 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.

## Teaching Assistant:

### **College Algebra (MTH 111)**

**Spring 2017**

- 60 students enrolled.
- I served as a co-teacher. My responsibilities included facilitating in-class group activities; monitoring student progress and understanding using Learning Catalytics; providing mini-lectures; providing feedback on the students' modeling projects; and grading worksheets, homework, and exams.

### **Introduction to Contemporary Mathematics (MTH 105)**

**Winter 2017, 2015**

- 98 students enrolled in Winter 2017; 83 students enrolled in Winter 2015.
- Elementary linear programming, combinatorics, descriptive statistics, elementary probability, exponential growth and decay, examples of major mathematical ideas and models.
- Responsibilities in both academic terms included facilitating recitations, designing exploratory activities that students completed in groups, and preparing and giving mini-lectures as needed.

### **Integral Calculus (MTH 252)**

**Fall 2014**

- 91 students enrolled.
- Definite integrals, elementary applications to area, force, and work. Integral tables and basic techniques of integration, calculus of logarithmic and exponential functions, polar coordinates, applications to areas, volumes, force, work, and growth and decay problems.
- Responsibilities included facilitating recitations and helping students complete worksheets in groups.

### **Elements of Discrete Mathematics (MTH 231)**

**Spring 2014**

- 96 students enrolled.
- Responsibilities included preparing and giving quizzes to assess student learning, answering student questions, and giving lectures when necessary.

### **Elementary Functions (MTH 112)**

**Winter 2014**

- 100 students enrolled.
- Responsibilities included facilitating recitations and helping students complete worksheets in groups.

### **Calculus for Management and Social Science (MTH 241)**

**Fall 2013**

- 71 students enrolled.
- Elementary differential and integral calculus of polynomial, logarithmic, and exponential functions and their applications to business, management and social sciences.
- Responsibilities included facilitating recitations and helping students complete worksheets in groups.

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## **Research and Scholarship:**

### Refereed Journal Articles:

- **Erickson, S. A.** & Lockwood, E. Undergraduate student listing strategies: Reinforcing the relationship between sets of outcomes and counting processes. (In preparation).
- Lockwood, E. & **Erickson, S. A.** (2016). Undergraduate students' initial conceptions of factorials. *International Journal of Mathematical Education in Science and Technology*, Vol. 48(4), pp. 499-519.

Refereed Conference Proceedings (\*denotes speaker):

- \*Erickson, S. A. (2017). Students' attitudes toward listing and subsequent behavior solving counting problems. In Weinberg, A., Rasmussen, C., Rabin, J., Wawro, M., & Brown, S. (Eds.), *Proceedings for the Twentieth Special Interest Group of the MAA on Research on Undergraduate Mathematics Education*, (pp. 588-595). San Diego, CA: San Diego State University & University of California - San Diego.
- Lockwood, E. & \*Erickson, S. A. (2016). Students' conceptions of factorials prior to and within combinatorial contexts. 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*, (pp. 1047-1054). Pittsburgh, PA: West Virginia University.

Additional Conference Presentations (\*denotes speaker):

- \*Lockwood, E., \*Erickson, S. A., & Schaub, B. "Don't Count Them Out! Helping Your Students Successfully Solve Counting Problems." 56<sup>th</sup> Northwest Mathematics Conference. Portland, OR. October 2017.
- \*Erickson, S. A. "Student Attitudes Toward Listing as a Strategy for Solving Counting Problems." 2016 Spring meeting of the Pacific Northwest Mathematics Association of America (PNW MAA) Section. Corvallis, OR: Oregon State University. April 2016.
- \*Erickson, S. A. & Lockwood, E. "Listing as a Potential Connection between Sets of Outcomes and Counting Processes. Joint Mathematics Meetings (JMM). Seattle, WA. January 2016.
- Beltran, B., Bruce, C., Burkow, D., & \*Erickson, S. A., "Secondary Aneurysm Formation due to the Effects of a Primary Aneurysm." JMM. San Diego, CA. January 2013.
- \*Beltran, B., Bruce, C., Burkow, D., & Erickson, S. A., "Secondary Aneurysm Formation due to the Effects of a Primary Aneurysm." Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) 2012 National Conference. Seattle, WA: University of Washington. October 2012.

Posters:

- McGee, S., \*Erickson, S. A., & Lockwood, E. (2017). "Student Attitudes, Beliefs, and Experiences Related to Counting Problems." Lonseth Lecture poster session. Corvallis, OR: Oregon State University. May 2017. **Best Poster Honorable Mention Award.**
- McGee, S., Erickson, S. A., & Lockwood, E. (2017). "Student Attitudes, Beliefs, and Experiences Related to Counting Problems." Twentieth Annual Conference on Research on Undergraduate Mathematics Education (RUME). San Diego, CA: San Diego State University & University of California - San Diego. February 2017.

Other Research Experience:

**Graduate Research Assistant**

**January 2016 - June 2016**

- NSF Grant 1419973 - *Generalization Among Multiple Mathematical Areas.*
- With Dr. Elise Lockwood (co-principal investigator), Oregon State University [in collaboration with Amy B. Ellis (principal investigator), UW-Madison; Kevin Moore (co-principal investigator), University of Georgia; and Erik Tillema (co-principal investigator), IUPUI].

- Duties include assisting with conducting video-taped interviews with undergraduate students, creating enhanced transcripts, and assisting with analyzing data.

**Undergraduate Student Researcher**

**June-July 2012**

- Mathematical and Theoretical Biology Institute (MTBI) summer program. Tempe, AZ: Arizona State University.
- Advised by Dr. Baojun Song.
- Duties included collaborating with three other undergraduate student researchers to run flow simulations of blood through the Circle of Willis, an important arterial structure in the brain. We used the software programs Blender and OpenFOAM to run these simulations, and using the data they produced, we quantified the risk of developing a secondary cerebral aneurysm given the presence of a primary aneurysm in the brain.

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**Professional Experience:**

**Exam Review Tutor**

**May-June 2017**

- Department of Mathematics, OSU, Corvallis, OR.
- Duties included preparing for and helping facilitate exam review sessions for students enrolled in Integral Calculus (MTH 252) at OSU.

**Private English and Mathematics Tutor**

**June 2012 - August 2013**

- Ferndale, WA.
- Duties included acting as the primary educator for a 7th-grade, home-schooled student in mathematics and English. I administered tests, explained concepts, and gave mathematics and English assignments to the student twice weekly.

**Private Mathematics Tutor**

**April-June 2012, April-June 2010**

- Bellingham, WA.
- Duties included providing instruction on linear algebra and differential equations in biweekly private tutoring sessions in 2012, and providing instruction on precalculus in weekly private tutoring sessions in 2010.

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**Awards and Honors:**

**Graduate Student Conference Subsidy**

**March 2016**

- Oregon State University, Corvallis, OR.
- \$150 conference registration fee reimbursement.

**Dean's List of Distinguished Students**

**2011/2012 & 2012/2013 Academic Years**

- Western Washington University, Bellingham, WA.
- Recognized all academic quarters.

**Mathematics Memorial Scholarship**

**June 2012**

- Western Washington University, Bellingham, WA.
- \$1,000 cash award

**Dean's List of Distinguished Students**

**2009/2010 & 2010/2011 Academic Years**

- Whatcom Community College, Bellingham, WA.
- Recognized all academic quarters.

**Outstanding Mathematics Student**

**June 2011**

- Whatcom Community College, Bellingham, WA.

## **Additional Experience:**

*Oregon State University, Corvallis, OR.*

### Department & University Service:

#### **Exam Proctor**

**May 2017**

- Responsibilities included overseeing an exam taken by high-school students competing in the Oregon Invitations Mathematics Tournament, hosted by the Mathematics Department.

#### **Graduate Student Panelist**

**September 2016**

- Responsibilities included answering questions on a panel for incoming mathematics graduate students during the Mathematics Department Graduate Student Orientation.

#### **Graduate Teaching Assistant (GTA) Mentor**

**June-September 2016**

- Responsibilities included designing a presentation, “Preparing for the First Week of Classes,” with another GTA mentor to be used for OSU’s New GTA Orientation, attending curriculum and training sessions, collaborating with other GTA mentors to help improve their presentations, and facilitating sessions at the New GTA Orientation two-day event.

*Coalition of Graduate Employees (CGE) Local 6069, AFT, AFL-CIO, Corvallis, OR.*

#### **Mathematics Department Steward**

**September 2016 - Present**

- Responsibilities include providing union representation to workers during investigatory interviews, advocating for graduate student workers, reporting worker contract violations by employer to CGE, acting as a representative of the union in the Mathematics Department workplace, and working to keep fellow workers informed about their rights.

#### **Organizing Committee Member**

**April-June 2017**

- Responsibilities included attending Organizing Committee meetings, strategizing ways to get CGE members to be more involved in the union, and serving as the sole organizer of an informational dinner for incoming CGE Stewards to learn about what being a steward entails.

#### **Budget Committee Member**

**May-June 2017, 2016**

- Responsibilities included attending Budget Committee meetings, assisting in reviewing past union expenses, and providing suggestions for improving the CGE budget for the 2016/2017 and 2017/2018 academic years.

#### **CGE Delegate at the 2017 AFT-Oregon Annual Convention**

**April 2017**

- Responsibilities included suggesting and voting on amendments for the AFT-Oregon Constitution, editing and voting on proposed resolutions to forward to AFT-National, and voting in the 2017-2018 AFT-Oregon Executive Council election.

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## **Additional Conferences and Workshops Attended:**

### **Confessions of a Former Lecturer: Evidence-Based Reform in the Introductory Physics Sequence**

**Nov., 2017**

- Department of Physics Colloquium. Event speaker: KC Walsh (Oregon State University).
- Oregon State University, Corvallis, OR.

- The speaker explained that Introductory Physics at Oregon State University has undergone substantial changes. Students now experience a flipped classroom model where lecture is no longer instructor focused. Instead, cooperative learning has been weaved throughout the curriculum to encourage actively engaged environments that aim to improve problem solving and critical thinking. The speaker explained how the course was flipped and how a Learning Assistant program was developed to help facilitate the new structure and build community in the class. Evidence for effectiveness was also presented.

**Hybrid Seminar: Effective Design and Teaching of Large-Enrollment Courses**    **Nov., 2017**

- Oregon State University, Corvallis, OR.
- Participants learned successful blended teaching methods to promote learning and student success in large-enrollment courses.

**AFT-Oregon Winter School**    **February, 2017**

- Seaside, OR.
- The Winter School is a workshop for leaders involved in AFT local unions across Oregon. I attended courses on organizing, building political capacity in my local, helping my fellow union members with the grievance process, and social justice issues pertinent to the LGBTQIA+ community.

**Mentoring and Partnerships for Women in RUME Seminar**    **February, 2016**

- Pittsburgh, PA.
- This seminar consists of: panel discussions led by women in the RUME community, group discussions between the panelists and MPWR participants, and formal/informal networking opportunities between participants and speakers.

**18<sup>th</sup> SIGMAA on RUME Conference**    **February, 2015**

- Pittsburgh, PA.
- SIGMAA on RUME provides organizational support for researchers conducting research in undergraduate mathematics education (RUME) and to those interested in using the results of RUME. It also provides organizational support for the dissemination of the results of this research.

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**Further Information:**

**Technological Skills:**

- Proficient using Maple, LaTeX, Geometer’s Sketchpad, TI graphing technology, Microsoft Office, Livescribe recording technology, MyMathLab, Gradescope, and Google Applications including Docs, Sheets, Slides, and Forms.
- Experience with MATLAB, Mathematica, Learning Catalytics, and ALEKS.

**Languages:** English. Elementary proficiency in Spanish.

**Citizenship:** United States.

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**References:**

Dr. Mary Beisiegel  
Assistant Professor of Mathematics, Oregon State University  
mary.beisiegel@oregonstate.edu  
(541)737-8397

Stephanie A. Bowers  
Senior Instructor of Mathematics, Oregon State University  
bowersss@math.oregonstate.edu  
(541)971-8348

Sara Clark  
Academic Adviser/Mathematics Instructor, Oregon State University  
clarksa@oregonstate.edu  
(541)737-5170

Dr. Elise Lockwood  
Assistant Professor of Mathematics, Oregon State University  
elise.lockwood@oregonstate.edu  
(541)737-5164