

Conference program for quantitative reasoning in STEM education conference

Schedule at a glance:

Thursday, January 15		
<i>Time</i>	<i>Event</i>	<i>Location</i>
2 - 3 PM	Registration	Beckman 404
3 - 4:15 PM	Conference welcome <i>Provost Michael Ibbá</i> Plenary #1: Dr. Anita Schuchardt, Associate Professor of Biology, University of Minnesota	Beckman 404
4:15 - 4:30 PM	Coffee break	Beckman 404
4:30 - 6:30 PM	Short talks #1 (6 talks in concurrent sessions)	Session 1A (Quantitative reasoning and STEM sensemaking): Beckman 404 Session 1B (Instructional Practices and Curriculum Design for Quantitative Reasoning): Argyros Forum 209C
6:30 - 8 PM	Dinner and plenary #2: Dr. Lindsey Engle Richland, Professor of Education, University of California Irvine	Beckman 404
Friday, January 16		
8- 9 AM	Breakfast and networking	Beckman 404
9 - 10 AM	Plenary #3: Dr. Marcy Towns, Professor of Chemistry, Purdue University	Beckman 404
10 - 10:25 AM	Coffee break	Beckman 404
10:30 AM - 12:10 PM	Short talks #2 (5 talks in concurrent sessions)	Session 2A (Building Quantitative Reasoning Communities and Motivation): Argyros Forum 206 Session 2B (Quantitative Reasoning in Data and Statistical Literacy and Interdisciplinary Contexts): Argyros Forum 209

12:10 - 1:10 PM	Lunch and networking	Beckman 404
1:10 - 2:10 PM	Plenary #4: Dr. Michael Loverude, Professor of Physics, Cal State Fullerton	Beckman 404
2:10 - 3:30 PM	Short talks #3 (4 talks in concurrent sessions)	Session 3A (Technology, AI, and Quantitative Reasoning): Argyros Forum 206 Session 3B (Modeling and Interdisciplinary Quantitative Reasoning): Argyros Forum 209
3:30 - 4 PM	Coffee break	Beckman 404
4 - 5 PM	Poster session <i>(one-minute flash talks followed by open session)</i>	Beckman 404
5 - 6 PM	Community reflection and discussion on next steps (e.g., white paper/meeting report, future conferences)	Beckman 404
6 - 8 PM	Dinner and plenary #5: Dr. Farshid Safi, Associate Professor and Associate Director for Teaching and Service, University of Central Florida	Beckman 404

Short talks #1 (Thursday 4:30 - 6:30 PM, 6 talks):

Session 1A: Quantitative reasoning and STEM sensemaking (Beckman 404)

- MOORE, KEVIN — Developing Evidence for Students' Quantitative Reasoning
- ARMSTRONG, AMBER — Beyond Disciplinary Silos: How Students Make Sense of Mathematical and Scientific Ideas to Understand a Model of Ocean Circulation
- FLEMING, MICHAEL — Making sense of student science and mathematics sensemaking in written quantitative biology problems
- TASOVA, HALIL — Students' Conceptions of Points and Lines in Graphing Quantitative Relationships
- STEVENS, IRMA — Students' Constructions and Interpretations of Formulas to Represent Dynamic Contexts via Covariational Reasoning
- PRATE, JOELLE — Virtual Simulations: An Approach to QR in Elementary Science

Session 1B: Instructional Practices and Curriculum Design for Quantitative Reasoning (Argyros Forum 209C)

- DAUER, JOE — Quantitative Reasoning Instruction in Biology: Goals, Strategies and Challenges
- GRUVER, JOHN — Reflections on My Experience Teaching Calculus 1 with a Focus on Quantitative Reasoning
- O'BRYAN, ALAN — Operationalizing Quantitative Reasoning Research to Impact Students' Mathematical Learning
- OLSHEFKE-CLARK, ALLISON — Characterizing Instructor Questions Intended to Support Quantitative Reasoning About the Definite Integral
- MARGOLIS, CLAUDINE — Digital Task Design Principles for Supporting Students' Construction of Quantities
- ABDO, SARAH — Dimensions on Dimensional Analysis: Honing Students' Math Application Skills with Scaffolded Dimensional Analysis Practice in General Chemistry I

Short talks #2 (Friday 10:30 AM - 12:10 PM, 5 talks):

Session 2A: Building Quantitative Reasoning Communities and Motivation (Argyros Forum 206):

- QUIROS-ARAUZ, ADRIANA — Communities of Quantitative Practice: Early Mathematics Identity Development Among Engineering-Aspiring Students

- DIAZ, JOCELYN — Empowering Students for Quantitative Success: Integrating Growth Mindset and Learning Strategies in Introductory Chemistry
- GINNETT, IZZY — Student perceptions of scalable, metacognitive homework with minimal instructor time
- BROBERG, GREGORY — Empowering Numeracy through Faculty and Student Collaboration: HSI-SHINE Initiative
- ZUCKERMAN, AUSTIN — The Debate on Integrating Mathematics and Programming in Undergraduate Biology: Insights from a Multi-Scale Study

Session 2B: Quantitative Reasoning in Data and Statistical Literacy and Interdisciplinary Contexts (Argyros Forum 209):

- AIKENS, MELISSA — At Any Rate: Biology Students' Interpretation of Rate of Change from Population Growth Graphs
- STOCZYNSKI, LAUREN — How undergraduate students use variability to make sense of raw data in scatterplots
- SABBAG, ANELISE — Quantitative Reasoning in Statistics Education: Statistical Literacy and Reasoning
- LO, STANLEY — Using the structure of observed learning outcomes taxonomy to assess quantitative reasoning in undergraduate biology education

Short talks #3 (Friday 2:10 - 3:30 PM, 4 talks):

Session 3A: Technology, AI, and Quantitative Reasoning (Argyros Forum 206):

- HERNANDEZ HOLLIDAY, KATYA — How Undergraduate Students Reason About Probability With and Without LLM Assistance: A Microgenetic Analysis
- DELANEY, VICTORIA — Using A Large Language Model to Establish Conceptual Connections between Riemann Sums and Expected Value
- ANICETO, RYAN GABRIEL — Examining Undergraduate Students' Cognitive Demand in LLM-Mediated Expected Value Tasks
- YU, SHUYUAN — Facilitating higher-order thinking talk in students' quantitative reasoning through interaction with a generative AI chatbot

Session 3B: Modeling and Interdisciplinary Quantitative Reasoning (Argyros Forum 209):

- CZOCHER, JENNIFER — Learning Modeling through the Coordination of Quantitative and Representational Reasoning
- BENNOUN, STEVE — Improving quantitative reasoning of life science students with modeling

- FACKLER, AYÇA — Styles of Reasoning Using Different Models to Learn About The Spread of The Viruses: Affordances and Challenges in Sensemaking
- KULARAJAN, SINDURA — Differential Equation Students' Quantification of Attributes While Modelling Dynamic Scenarios

Poster session

1. Puente, Andrew — Students' perceptions and awareness of the cultural differences between physical chemistry and its prerequisites
2. Sweet, Mitchell — Using Proportional Reasoning with Density Concepts in an Introductory Chemistry Class
3. Root, Philip — Developing Proportional Reasoning with Gasses
4. Tanaka, Jacqueline — The Scientific Benefits of Quantitative Reasoning REU programs Open to Justice-Impacted Students
5. Rivet, Olivia and Bentzinger, Lilliona — Groupwork when doing quantitative reasoning: Exploring social metacognition through peer-to-peer questions in undergraduate biology labs
6. Aslaner, Ebrar and Cheraghi, Maryam — The Relationship Between Relational Reasoning and Mathematical Knowledge in Preservice Teachers in Türkiye
7. Lee, Hwa Young — Characterizing STEM graphs and relevant quantitative reasoning
8. Eppich, Andrew — Predicting STEM Pathways: Machine Learning Models of Mathematics Identity, Recognition, and Belonging
9. Zhou, Steven — Teaching Psychometrics to Data Science and STEM Audiences
10. Trussell, Cindy — Quantitative PSP Monitoring in Kodiak, Alaska: A Community-Based Undergraduate Research Partnership