



**MAINE STEM
PARTNERSHIP**

Maine STEM Partnership Fall Summit

Maine STEM Partnership Moving Forward:
How do we work together to build excellence in STEM
education for all students?

The Samoset Resort, Rockport
November 18–19, 2022

@MEstempartners

#MSP2022FallSummit



ACKNOWLEDGEMENTS

We gratefully acknowledge the generous support by so many, which has made this summit possible. Participants in this event are supported in part by grants from the National Science Foundation (Grant numbers 1842359, 1849227, 1920908, 1557320, and 2148520) and the U.S. Department of Agriculture Higher Education Challenge Program (2019-70003-29082).

We also appreciate the support from University of Maine administrative offices, schools, and departments that have contributed financially to this summit:

In the amount of \$499 or less: Department of Physics and Astronomy

In the amount of \$1,000-\$2,499: Office of the Vice President for Research and Dean of the Graduate School; Maine EPSCoR

Finally, we want to thank the very generous donors to the RiSE Center Gift Account, whose support also provides funds for this event. We appreciate the ongoing gifts from RiSE members, alumni and friends that support all aspects of the Maine STEM Partnership's work.

Maine STEM Partnership Fall Summit

Meals in Bay Point Ballroom
Sessions in Knox County Ballroom

FRIDAY, NOVEMBER 18, 2022

4:00–6:00 p.m. *Check In (Lobby)*
5:00–6:00 p.m. *Cash Bar and Networking*
6:00–8:00 p.m. *Dinner and Keynote Addresses: Celebrating Community Work and Partnerships*

Marina Van der Eb, Maine STEM Partnership Coordinator, RiSE Center, University of Maine
Dr. Susan McKay, RiSE Center Director, Professor of Physics, University of Maine
Penny Benway, Teacher, Greenville Consolidated School, Greenville, Maine
Kathy Dixon-Wallace, Teacher, Penquis Valley Middle School, Milo, Maine
Maggie Wachtl, Teacher, Cony High School, Augusta, Maine
Dr. MacKenzie Stetzer, Associate Professor, Physics and Astronomy, RiSE Faculty Member, University of Maine

SATURDAY, NOVEMBER 19, 2022

7:30–8:30 a.m. *Breakfast and Networking*
8:30–8:40 a.m. *Welcome*
8:45–10:00 a.m. *Data Gallery Walk*
10:00–10:15 a.m. *Break*
10:15–11:45 a.m. *Interactive Panel Discussion: What will STEM education look like in the future? What are the challenges we will need to address?*

Moderator: Dr. Susan McKay, RiSE Center Director, Professor of Physics, University of Maine
Moderator: Beth ByersSmall, RiSE Center Teaching Fellowship Program Coordinator
Dr. Joan Ferrini-Mundy, President of the University of Maine and University of Maine at Machias, and Vice Chancellor for Research and Innovation for the University of Maine System
Dr. Mitchell Bruce, Professor of Chemistry, Founding RiSE Center Member, University of Maine
Sharon Haskell, Director of Curriculum and Instruction, RSU 63
Angela Oechsle, Program Director, Project>Login, Educate Maine
Dr. Kelley Strout, RN, Associate Professor, Director of the School of Nursing, University of Maine
Sam Ward, Teacher, Traip Academy, Kittery, Maine

11:45–12:30 p.m. *Lunch and Networking*
12:30–1:45 p.m. *Community Discussions: What can we do in STEM education to tackle the persistent problems from our morning discussion?*
1:45–2:45 p.m. *Share Out*
2:45–3:00 p.m. *Closing Remarks*

Please return your name tag at the end of the Summit.

Maine STEM Partnership at the RiSE Center

The mission of the Maine STEM Partnership is to build and sustain a diverse, statewide community that strengthens PK - 16+ STEM education by promoting rich, research-supported classroom experiences that deepen learning and engage all students. This community seeks to build STEM literacy and career competency, and to encourage students to become STEM educators and education researchers. The Maine STEM Partnership is located in the RiSE Center at the University of Maine.

Maine Center for Research in STEM Education (RiSE Center)

Integrating Education Research and Practice

The MAINE CENTER FOR RESEARCH IN STEM EDUCATION (RiSE Center) conducts research into education at all levels of instruction within the disciplines of science, technology, engineering and mathematics (the STEM disciplines). We also work to integrate education research into STEM teaching and learning through our many programs, projects, and partnerships.

Since its formation in 2001, the RiSE Center has hosted conferences annually focused on integrating STEM education research and practice. This integration is a significant part of many of the Center's initiatives, including the Maine STEM Partnership, a state-wide preK–16+ STEM education improvement community with 160 Maine schools, 100 school districts, 700 teachers, 29,000 students, and over 30 University of Maine faculty members.

RiSE Center Staff

Torey Bowser, FIG-MLA Coordinator

Beth ByersSmall, RiSE Center Teaching Fellowship Program Coordinator

Yadina Clark, Administrative Specialist

Jennifer Fronczak, Professional Learning Specialist

Gabrielle Holt, Professional Learning Specialist

Sara Lindsay, Assistant Director of the RiSE Center and Professor of Marine Sciences

Susan McKay, Director of the RiSE Center and Professor of Physics

Elizabeth Muncey, Resource and Professional Development Coordinator

Franziska Peterson, Assistant Professor of Mathematics Education and RiSE Center Graduate Coordinator

Maureen Raynes, Financial & Personnel Manager

Christina Siddons, Program Evaluation Specialist

Marina Van der Eb, Maine STEM Partnership Coordinator

Presenter Information

Dr. Joan Ferrini-Mundy, President of the University of Maine and University of Maine at Machias, and Vice Chancellor for Research and Innovation for the University of Maine System

Joan Ferrini-Mundy became the 21st president of the University of Maine in July 2018. She is also the president of its regional campus, the University of Maine at Machias. In 2021, she was appointed vice chancellor for research and innovation for the University of Maine System. In this role, she has led a formalized effort to make the University of Maine's research infrastructure accessible to and supportive of all universities and faculty in the System. In early 2022, UMaine was designated as an R1 Carnegie Classification research university, joining the ranks of the nation's top universities engaged in "very high research activity."

Prior to joining the university, she was the chief operating officer of the National Science Foundation. Her distinguished career spans the fields of mathematics education, STEM education and policy, teacher education, and research administration. Her numerous awards and recognitions include the U.S. Senior Executive Service Presidential Rank Award of Distinguished Executive, Michigan State University's University Distinguished Professorship, election as a Fellow of the American Association for the Advancement of Science and of the American Mathematical Society, and the 2020 Seaman A. Knapp Award in recognition of her leadership and contributions to food and agricultural sciences. She is the chair of the Conference Board of Mathematical Sciences and leads the Academic Advisory Team with FocusMaine. Ferrini-Mundy serves on the boards of Maine Center Ventures, Maine and Company, is chair of the America East Conference Board of Presidents, and is an *ex officio* board member of the University of Maine Foundation. She is Secretary for the Council of Presidents of the Association of Public Land-grant Universities, and Co-PI of a \$240 million gift from the Harold Alfond Foundation. She also serves on the President's Committee on the National Medal of Science and the Maine Innovation Economy Advisory Board.

Dr. Susan McKay, Professor of Physics and Director of The Center for Research in STEM Education

Susan McKay joined the faculty in the Department of Physics and Astronomy at the University of Maine (UMaine) in 1986. There she became a full professor and served as Department Chair for six years, conducted research in theoretical condensed matter physics, and taught many of the department's graduate physics courses. In 2001, she led a small group of STEM and STEM Education faculty to establish the RiSE Center and the research-based Master of Science in Teaching (MST) Program at UMaine, focused on education research to improve teacher preparation. Since then, she has served as the center's Director, building strength in STEM education research and advancing evidence-based teaching and learning in the STEM disciplines in Maine schools and at UMaine. She was the Principal Investigator of the Maine Physical Sciences Partnership and the Maine Elementary Sciences Partnership, which led to the formation of the Maine STEM Partnership at the RiSE Center, a statewide STEM education improvement community involving more than 120 Maine school districts and the Maine Department of Education as partners. She was the Principal Investigator of an NSF Teaching Fellowship Program, which has recruited, prepared, and supported new science and mathematics teachers in Maine's rural, high-need districts, tapping into the leadership and expertise of experienced Maine teachers. This program is being continued as the RiSE Teaching Fellowship Program. She is also the Principal Investigator of an NSF STEM+C award that has formed a research-practice partnership to integrate computer science into middle school science. Research done as part of this grant provides knowledge about the supports for teachers that are needed to successfully accomplish this integration. She is also the Principal Investigator of an NSF ITEST

grant, bringing authentic research experiences to students along Maine's coast and building strong community connections, and a USDA multi-institutional partnership to bring active learning and enhanced student engagement to food science and engineering courses. Under Susan's leadership, the RiSE Center has grown to include 21 UMaine faculty across multiple disciplines, 8 accomplished professional staff with expertise in STEM education, and more than 20 graduate students. Over the years, she has been awarded more than \$20 million in federal and state competitive grants to support STEM education research, which strengthens learning for students and provides professional learning experiences for current and future teachers. These accomplishments were recognized in 2019 with the University of Maine's Presidential Public Service Achievement Award.

Susan received her Bachelor's (Princeton University), her Master's (University of Maine), and her Ph.D. (Massachusetts Institute of Technology) in physics. She completed requirements for secondary teaching certification in mathematics and physical sciences through Princeton University's Teacher Preparation Program and worked as an engineer before joining the faculty at UMaine. Her research interests in teaching and learning support the goal of providing a rigorous and exciting education in the STEM disciplines for all Maine students, including those from groups currently under-represented.

Penny Benway

Penny Benway is in her 12th year teaching at Greenville Consolidated School. She teaches all content areas including math, writing, reading, science and social studies. She teaches primarily the 4th grade, but this year is team teaching science with a combined 4th and 5th grade class. Penny has been a member of the Maine STEM Partnership Leadership Team for the past 4 years and has participated in various Maine STEM Partnership communities.

Dr. Mitchell Bruce

Mitchell Bruce is a Professor of Chemistry and a founding member of the RiSE Center at the University of Maine. Mitchell earned his BS degree in chemistry from Antioch College in Yellow Springs, Ohio. He went on to earn his PhD in chemistry from Columbia University, followed by a postdoc at the University of North Carolina, Chapel Hill. As a chemical education researcher, Mitchell is interested in fostering the skill of thinking at the atomic scale and in designing teacher professional learning workshops. He is currently participating in NSF sponsored projects involving STEM+C and Reasoning Chain Construction Tools for Introductory Physics and Chemistry Courses. Mitchell plays ice hockey year-round and hopes to get back to alpine skiing this winter.

Beth Byerssmall

Beth coordinates the NSF Fellowship Program, a program to recruit, prepare, support, and retain highly-qualified STEM teachers in rural, high-need Maine schools. In this capacity, she works with a community of early career and experienced teachers. As program coordinator, Beth designs and leads professional learning opportunities, conducts classroom observations to provide feedback and support to new STEM teachers. She also develops, supports, and facilitates professional learning opportunities for teachers in the Maine STEM Partnership Community, including through statewide content discussions. Prior to taking on her position as NSF Fellowship Coordinator, Beth coordinated professional learning for K-12 teachers in the Maine STEM Partnership and MainePSP. She also has over 20 years of experience teaching students at the elementary, middle and high school. When not working Beth has tried her hand at various creative pursuits, and presently she can often be found quilting.

Kathy Dixon-Wallace

Kathy Dixon-Wallace joined the MSAD #41 community 15 years ago, as a grade 6 math and science teacher at Milo Elementary School and currently teaches grade 6 and 7 science at Penquis Valley Middle School. She did not follow the traditional path to public education, having earned degrees in Outdoor Recreation Leadership (B.S.) and Environmental Education (MA). Many years were spent in various careers working with diverse populations. These experiences continue to influence her approach to teaching and building community with her students in and out of her classroom. Kathy is an avid backpacker, runner, x-country skier and always up for adventure.

Sharon Haskell

Sharon Haskell began her educational journey at the University of Maine as a non-traditional student in the Onward Program, where in 2013, she earned a Bachelor of Science in Elementary Education, a minor in Maine Studies, and dual concentrations in Mathematics and Life and Physical Sciences. She started her career teaching math at Bucksport Middle School, shortly following she was accepted into the Educational Leadership program at the University of Maine and earned her Masters in Ed. Leadership in 2019. Sharon taught math at Bucksport Middle School until 2020, when she joined Holbrook Middle School as a grade 5 teacher. From there, she became the district Assistant Principal and Instructional Coach and is currently serving as the Director of Curriculum and Instruction. In addition to this role, Sharon is working toward an Ed.D in Educational Leadership at the University of Maine, focusing on teacher morale as it relates to their professional work. *"The work we all do can be summed up in one word: relationships. Those positive, trusting relationships are the foundation of all great schools where students and teachers learn together in an academically rich, nurturing environment. I consider myself fortunate to be part of our educational community."*

Angela Oechsle

Angela Oechsle (pronounced "Ex-Lee") is the program director for Project>Login. A program of Educate Maine, Project>Login empowers Maine educators and learners to prepare for the expanding career opportunities related to computer science and technology. Angela brings a wealth of workforce experience to her role. Through partnership and collaboration, she leads the program to meet the needs of both students and employers. Prior to joining the Educate Maine team, she was a workforce development specialist at Eastern Maine Development Corporation and Workforce Coordinator at the Tri-County Workforce Investment Board and has worked on several jobs-related federal grants programs. She is the past chair of Building Bridges, a business education partnership through the Bangor Region Leadership Institute, class of 2018. She is passionate about matching students and adults with educational programs and quality job opportunities in Maine. She also serves on Maine Technology Institute's IT Tech Board. When she is not helping connect and convene students with employers, you can find her hiking Maine trails or kayaking Maine's lakes.

Dr. MacKenzie Stetzer

I am an Associate Professor in the Department of Physics and Astronomy at the University of Maine and a member of the Maine Center for Research in STEM Education. Much of my research in physics education focuses on student reasoning and metacognition in physics –particularly the role that the (domain-general) nature of human reasoning and decision-making plays when students are answering qualitative physics questions. My colleagues and I are working to leverage dual-process theories of reasoning (from cognitive science) to gain insight into inconsistent student performance on analogous physics questions and to develop interventions to better support student reasoning. I am also deeply involved in the preparation and professional development of graduate TAs, undergraduate LAs, K-12 teachers, and college instructors.

Dr. Kelley Strout

Kelley Strout is an Associate Professor and Director of the School of Nursing at UMaine. She is responsible for developing, implementing, and evaluating the short and long-term academic and research goals to carry out the mission of the School of Nursing. In addition, she currently serves as the Principal Scientific Investigator for two federal grants from the Health Resources Services Administration to a) diversify the nursing workforce and transform nursing education to include evidence-based inclusive, and equitable teaching and learning practices and b) promote resilience and reduce burnout among nursing students, faculty, and staff. Over the past three years, she has secured more than 4 million dollars in federal funding for UMaine Nursing. Under her leadership, UMaine Nursing was ranked by U.S. News and Reports in the top 11% of baccalaureate of science in nursing programs across the country. She serves on the Board of Directors at Penobscot Community Health Care, Maine's largest Federally Qualified Healthcare Center. In 2022, she received the Presidential Award for Public Engagement at UMaine. She lives in Bangor with her husband, James, their two sons, Cameron and Maxwell, and their dog, Lottie.

Marina Van der Eb

Marina Van der Eb manages the day-to-day operations of the Maine STEM Partnership, a research-practice partnership focused on improving STEM education statewide from Kindergarten through the University level. This involves providing cost effective science resources to K-12 districts, professional learning opportunities for K-12 STEM educators, and coordinating research grants that are conducted through the partnership. Currently she is involved in multiple NSF-funded research projects focused on integrating technology into middle and high school courses and developing student quantitative reasoning in the contexts of forests and marine science.

Maggie Wachtl

Maggie Wachtl is a science teacher at Cony High School. Maggie originally obtained a degree in Genetics from Rutgers University, then taught English as a Foreign Language in Taiwan for six years. Returning to Maine, Maggie pursued a Master's degree in Teaching and Learning at the University of Southern Maine. She was chosen to be a member of the 2019 NEA Foundation Global Learning Fellowship where she contributed a lesson to the book *Creative Lessons to Open Classrooms and Minds to the World* and attended a field study in South Africa. She currently teaches Earth Science, College Prep Chemistry and AP Biology, mentors new teachers, and assists other teachers in finding ways to integrate tech in their lessons.

Sam Ward

Sam Ward is a fourth-year high school teacher at Traip Academy in Kittery. He currently teaches algebra 1, geometry, and precalculus. He is the coach of the math team and is the senior class advisor. Sam is a RiSE Center Teaching Fellow and a graduate of the Masters of Science in Teaching program. When not at school, Sam enjoys reading, being active, and going to concerts with his wife.

Opportunities to Engage with the Maine STEM Partnership

For more information, please visit the MSP or RiSE websites:

www.mainestempartnership.org (Professional Learning page)

umaine.edu/risecenter

2022–23 Professional Learning Opportunities

An Introduction to Social Emotional Learning 2022–23

January–April 2023, via Zoom

See details in the following pages.

RiSE Center Teaching Fellowship Associate Membership 2022–23

January–May 2023, via Zoom

See details in the following pages.

Summer 2023 Professional Learning Opportunities

RiSE STEM Education and Research Conference: Engaging Students in Authentic Research

June 25–27, RiSE Center, UMaine, Orono

Information will be posted on the RiSE Center website as it becomes available (maine.edu/risecenter).

K-8 Problem Solving and Sense-Making: Fun with Fractions and More

July 10–13, 2023, RiSE Center, UMaine, Orono

See details in the following pages.

STEM+C Content Immersion

July 17-20, 2023, RiSE Center, UMaine, Orono

Middle-school science teachers who want to integrate computer science into their science classes, come and experience different technologies and lessons developed by other Maine teachers. Stipends and contact hours for participating teachers. Lodging will be provided, if needed.

For more information visit:

mainestempartnership.org or contact mainestempartnership@maine.edu

Resource Rentals for K–9, 2023–24 School Year

We provide science teaching resources for grades K–9, including hands-on materials, student and teacher texts and online support. In-person trainings are part of this opportunity (Aug 14-18, 9 a.m. –3:00 p.m.).

For more information visit:

mainestempartnership.org or contact mainestempartnership@maine.edu

RiSE Center Teaching Fellowship Associate Membership 2022–23

Professional learning opportunity sponsored by the
Maine STEM Partnership at the RiSE Center, University of Maine

The Maine STEM Partnership is opening up an exciting new way to participate in the RiSE Center Teaching Fellowship program. Associate members will have access to this established community of experienced teachers, early career teachers, and RiSE Center staff, through supportive meetings, special interest groups, and collaborative relationships with fellow teachers.

Becoming a 2022–23 associate member will connect you with highly motivated teachers around the state who have a common interest in implementing research-based strategies to improve teaching and student learning. You will attend four 90-minute online meetings where you will explore teaching strategies related to the Special Interest Group (SIG) you select and discuss implementation of each strategy in your teaching environment. As you implement each strategy, you will collect evidence for your personal reflection and share your experiences with your SIG:

- Building Teacher-Student and Student-Student Relationships
- Using Active Learning Strategies to Build an Inclusive Classroom
- Using Formative Assessment to Support All Learners
- Using NGSS Standards and 3D Learning and/or CC Mathematics Standards

Current Teaching Fellowship Community members have expressed the following sentiments:

- I have gained confidence and skills by implementing new ideas shared in our meetings.
- Meetings have been useful because products were created that could easily be implemented in the classroom.
- There is value in the positive relationships formed within the small group discussions.
- Being a member has provided me with access to teachers from different schools. I find it valuable to hear from teachers that I do not interact with on a daily basis, whether to share the challenges and joys of teaching, learn from each other, or be inspired by each other.

This online community will meet on the following Wednesdays from 4:00–5:30 p.m.:

- January 18, 2023
- March 1, 2023
- April 5, 2023
- May 3, 2023

Annual associate membership is open to all middle and high school STEM-discipline teachers in Maine.

\$450 registration fee. If your school or district has agreed to pay for this professional learning opportunity, you can select "Invoice (Enter School or District Billing Info)" at checkout.

Participants will receive contact hours and a \$225 stipend (\$45 per meeting) for attending these professional learning meetings. To request a reasonable accessibility accommodation to participate, please contact the RiSE Center: risecenter@maine.edu or 207-581-4672.

To register, please visit the MSP or RiSE websites:

www.mainestempartnership.org (Professional Learning page)

umaine.edu/risecenter

An Introduction to Social Emotional Learning 2022–23

Professional learning opportunity sponsored by the
Maine STEM Partnership at the RiSE Center, University of Maine
with RiSE Center Alumna and NSF Teaching Fellows
Grace Coffe, Nick Innis, and Betsy Trenckmann

Join us for this immersive professional development opportunity to explore social emotional learning in a science and mathematics classroom setting. Take away skills to foster an inclusive classroom for you and your students through six interactive sessions!

Goals:

1. Explore Social Emotional Learning Categories
2. Develop a Repertoire of Strategies to Implement in the Classroom
3. Practice Social Emotional Learning

Session dates (all 4:00–5:30 p.m.):

- January 17, Session 1: SEL Introduction
- January 31, Session 2: Cooperative Learning
- February 13, Session 3: Productive Talk
- March 7, Session 4: Productive Struggle
- March 21, Session 5: Responsibility & Student Choice
- April 4, Session 6: Implementing SEL Conclusion

Facilitators:

- Grace Coffe, Brewer High School
- Betsy Trenckmann, Hermon High School
- Nick Innis, Mt. Ararat High School
- Beth ByersSmall, RiSE Center, University of Maine

Additional information and registration will be available soon. Please visit the MSP or RiSE websites:

www.mainestempartnership.org (Professional Learning page)

umaine.edu/risecenter

K-8 Problem Solving and Sense-Making: Fun with Fractions and More

Professional learning opportunity sponsored by the
Maine STEM Partnership at the RiSE Center, University of Maine
with Dr. Franz Peterson and Jenn Fronczak

July 10–13, 2023 (Monday–Thursday); 8:30 a.m.–4:30 p.m. with one-hour lunch break
Estabrooke Hall, University of Maine, Orono

In this 4-day mathematics content immersion we will explore how to create opportunities for students to engage in reasoning with numbers and problem-solving. We will also follow the progression of the fraction concept from early childhood through middle school.

- Reading and Writing Numbers in Base Ten
- Meaning and Models of Fractions
- Strategies for Teaching Operations through K-8 Word Problems
- Developing Fraction Operations

All throughout the content immersion we will explore tasks that promote problem solving and investigate ways to engage students in classroom discourse. We will also work with manipulatives and use many hands-on activities and draw connections to grade-level appropriate examples. Teachers will leave each day with tasks that can be used directly in classrooms.

Franziska Peterson is an Assistant Professor of Mathematics Education in the Department of Mathematics and Statistics, and Graduate Coordinator and Faculty Member of the RiSE Center. She earned her bachelor's and master's degrees in Secondary Education with double majors in mathematics and English in Germany. In 2016, she received her Ph.D. in Curriculum and Instruction (Mathematics Education) from the University of Wyoming.

Jennifer Fronczak is a Professional Learning Specialist at the RiSE Center. She works with partnering school districts, supports multiple grants, and contributes to the RiSE Center's Teaching Fellowship program. She is a National Board Certified Teacher in the area of Early Adolescent Mathematics and earned a B.S. in Elementary Education with a minor in mathematics and an M.Ed. in Literacy.

\$1,250 registration fee. If your school or district has agreed to pay for this professional learning opportunity, you can select "Invoice (Enter School or District Billing Info)" at checkout.

Participating teachers will receive a stipend of \$700, contact hours, and lunch is included!

To register, please visit the MSP or RiSE websites:

www.mainestempartnership.org (Professional Learning page)

umaine.edu/risecenter



The University of Maine is an EEO/AA employer, and does not discriminate on the grounds of race, color, religion, sex, sexual orientation, transgender status, gender expression, national origin, citizenship status, age, disability, genetic information or veteran's status in employment, education, and all other programs and activities. The following person has been designated to handle inquiries regarding non-discrimination policies: Director of Equal Opportunity, 101 Boudreau Hall, University of Maine, Orono, ME 04469-5754, 207.581.1226, TTY 711 (Maine Relay System).