

MATHEMATICS EDUCATION —AND— LEADERSHIP NEWSLETTER

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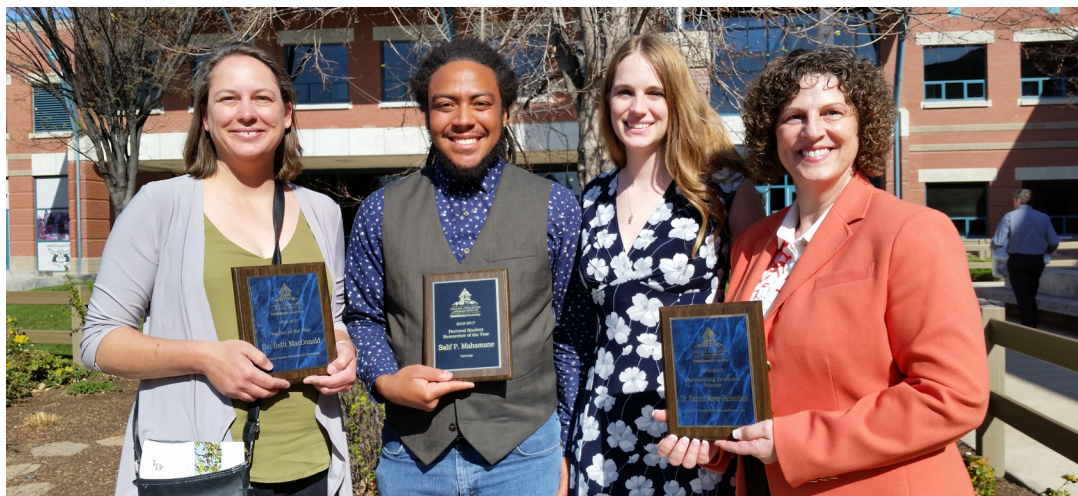
KRISTY LITSTER NAMED AERA SIG/RME GRADUATE STUDENT REPRESENTATIVE



Kristy Litster, a doctoral candidate in the Mathematics Education and Leadership concentration, was recently named the American Educational Research Association (AERA) Special Interest Group (SIG) Research in Mathematics Education (RME) Graduate Student Representative. Kristy was contacted by Ruth Heaton, the President-elect of AERA's SIG/RME and Professor

of Mathematics Education at the University of Nebraska-Lincoln. The AERA SIG in Mathematics Education has over 500 active members and is one of the largest special interest groups in the American Educational Research Association. Kristy was announced as the Graduate Student Representative at the SIG/RME Meeting at AERA on Friday, April 28 at 6:15 PM in San Antonio, Texas. In Kristy's new role, she will have a variety of important responsibilities that involve engaging with graduate students and other members of the group. Some of the most important responsibilities of Kristy's new position include: participating as one of eight Board Members in the SIG/RME Board meetings; supporting the second-year SIG/RME Co-Chair with development of the AERA Annual Meeting program; planning and facilitating graduate student programs during the AERA Annual Meeting as well as the SIG/RME Business Meeting and Reception; selecting the incoming SIG/RME Graduate Student Representative for the following year; and, designing and disseminating announcements for upcoming programs and networking opportunities. Kristy's exceptional leadership and technology skills made her the perfect person for the job. Congratulations, Kristy!

VMRG MEMBERS WIN AWARDS



Beth MacDonald, Salif Mahamane, Christina Watts, Patricia Moyer-Packenham

Five members of the Virtual Manipulatives Research Group (VMRG) earned top university awards in spring 2017. Beth MacDonald was named the Teacher of the Year for the School of Teacher Education and Leadership and for the College of Education and Human Services. Salif Mahamane was named the Graduate Student Researcher of the Year for the Department of Psychology, the College, and the University. Christina Watts was named the Graduate Student Researcher of the Year for the School of Teacher Education and Leadership and received the Lawson Fellowship. Patricia Moyer-Packenham was named

the Graduate Student Mentor of the Year for the College of Education and Human Services. Jody Clarke-Midura (not pictured) was named the Graduate Student Mentor of the Year for the Department of Instructional Technology and Learning Sciences. The Virtual Manipulatives Research Group is a multi-disciplinary research collaboration among math educators, mathematicians, cognitive psychologists, and statisticians at Utah State University. Members of the group work together to conduct large research projects which produce multiple collaborative publications and presentations each year.

SPRING 2017 GRADUATION



Patricia Moyer-Packenham, Emma Bullock, Scott Smith, Yanghee Kim

Two students from the Mathematics Education and Leadership (MEL) concentration graduated with their PhDs in this year's spring 2017 graduation ceremony: Emma Bullock and Scott Smith. Patricia Moyer-Packenham was the Chair of Emma's dissertation. Moyer-Packenham and Yanghee Kim were the Co-Chairs of Scott's dissertation. Emma's dissertation was titled: *An Explanatory Sequential Mixed Methods Study of the School Leaders' Role in Students' Mathematics Achievement Through the Lens of Complexity Theory*. Emma accepted a university position as an Assistant Professor of Mathematics Education at Sam Houston State University in Huntsville, Texas. She will teach Math 1384, Introduction to Foundations of Math I, and Math 3377,

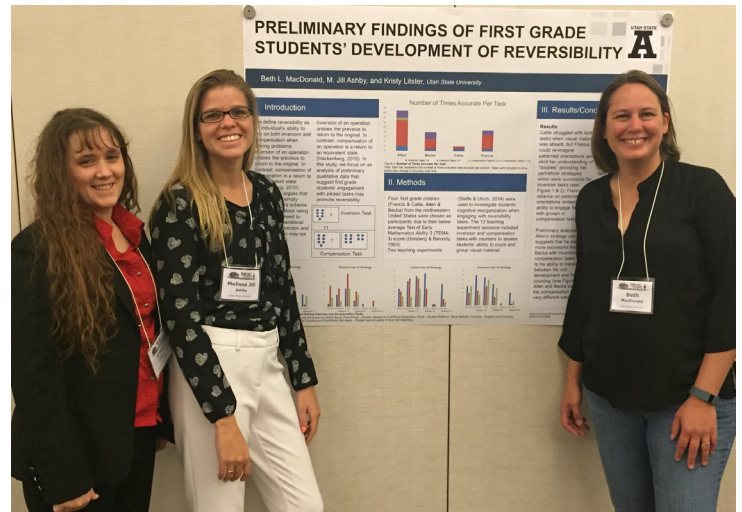
Introduction to Linear Algebra and Matrices, in her new position in the fall. Emma credits the MEL concentration with giving her a strong foundation in mathematics education theory, research, and pedagogy. She is also thankful for the opportunities she had at USU to teach undergraduate and graduate courses and conduct research with the Virtual Manipulative Research Group. Emma enjoyed her time with the research group, and stated: *"I was able to learn the research process from the inception of a new project to the publication phase."*

Scott's dissertation was titled: *An Exploratory Study of Fifth-Grade Students' Reasoning About the Relationship Between Fractions and Decimals When Using Number Line Based Virtual Manipulatives*. Scott accepted a university position as an Assistant Professor of Mathematics Education at Western New Mexico University. He is teaching Mathematics for Elementary and Secondary Education Teachers, College Algebra, Calculus, and Geometry. Scott noted the importance of the TEAL 7554 course, Mathematics Education Teacher Preparation and Pedagogy, and stated: *"The reason TEAL 7554 is so useful is that it prepared me well for my present job, because I am so deeply involved in teacher education and the School of Education here at WNMU, and knowing as much as possible about the preparation of students to become licensed as teachers is immensely valuable."* To future students Scott says: *"Persistence is the key, especially in the face of obstacles - the road to graduation may seem like it's very long, but persistence and believing in yourself makes it possible to finish."*

MATH EDUCATION RESEARCHERS PRESENT FINDINGS ON MENTAL REVERSIBILITY

Many students come to elementary school with gaps in mathematical knowledge even before beginning kindergarten, suggesting the importance of home numeracy experiences. In the hopes of closing these gaps, and developing rich numeracy experiences for young children, math education researchers investigated effects from an intervention where first grade students utilized mental reversibility (a cognitive mechanism used to understand inverse relationships). Researchers found that first grade students used "doubles" and "near doubles" when compensating between problems and solving missing addend tasks. These preliminary findings were presented as a poster by Beth MacDonald, Jill Ashby, and Kristy Litster titled: *Preliminary Findings of First Grade Students' Development of Reversibility*. This research was presented at the 38th Annual North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA) conference in Tucson, AZ.

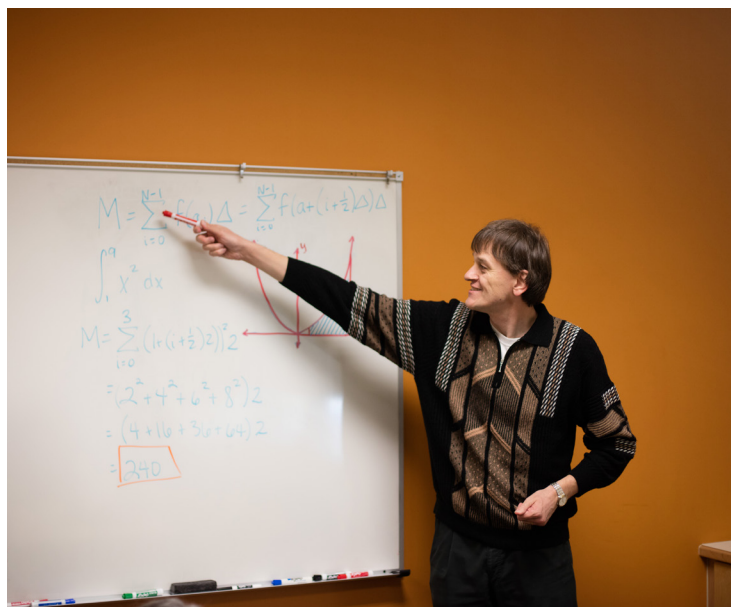
The poster provided information on student strategy development that may inform mathematics education researchers on how early forms of algebraic reasoning develop and obstacles in some of this development. For example, for students to develop mental reversibility, they first need to transition from a reliance on physical material (i.e., counters, fingers) to flexible representations that allow more abstract operations of number to develop. The impetus for this poster topic arose from MacDonald's own dissertation questions on subitizing (quick apprehension of numeracy when shown a small set of patterned items).



Kristy Litster, Jill Ashby, Beth MacDonald

Her research showed that young children engage in early forms of mental reversibility when conceptually subitizing. She then wondered if this subitizing development could be leveraged to promote early forms of algebraic reasoning in young children. MacDonald worked with Litster and Ashby to investigate these questions. The team also presented tasks developed from the findings to in-service teachers at the National Council of Teachers of Mathematics conference in San Antonio, Texas, in April 2017.

SYMANZIK NAMED AMERICAN STATISTICAL ASSOCIATION FELLOW



Jürgen Symanzik, a Professor in the Department of Mathematics and Statistics, and an active member of the Virtual Manipulatives Research Group, was named an American Statistical Association (ASA) Fellow. Symanzik is the first Utah State University scholar to receive this honor. The American Statistical Association is the nation's top professional statistical society. In a statement, the President of ASA said: "Each newly designated Fellow has distinguished him or herself through the advancement of statistical theory, methodology and applications as well as service to the ASA. (These Fellows) are now rightfully recognized as preeminent contributors to the field of statistical science and they are truly the foremost members of our field." Symanzik has done pioneering research in statistical graphics using virtual reality and contributed new methodology for exploratory analysis of spatial data. Symanzik's research interests have included work with the Virtual Manipulatives Research Group (VMRG) to explore data gathered with children using mathematics apps on iPads resulting in multiple collaborative publications with VMRG team members. Symanzik also conducts research on data visualization, visual analytics, exploratory data analysis, exploratory spatial data analysis, interactive and dynamic statistical graphics and presentation graphics, and statistical computing and graphics. Congratulations, Juergen!

USU MATH EDUCATORS WELL REPRESENTED AT NATIONAL CONFERENCES



Patricia Moyer-Packenham, Stephen Tucker, Emma Bullock, Christina Watts

American Educational Research Association Conference



Jill Ashby, Beth MacDonald, Kristy Litster, Vicki Lyons, Christina Watts

National Council of Teachers of Mathematics Practitioners Conference



Emma Bullock, Patricia Moyer-Packenham, Jessica Shumway

National Council of Teachers of Mathematics Research Conference

During the spring 2017 national conference season, a number of mathematics education faculty and graduate students from Utah State University presented to researchers and practitioners at several different conferences. Three of the major conferences where research was presented included: the American Educational Research Association (AERA) Conference, National Council of Teachers of Mathematics Practitioners (NCTM) Conference, and National Council of Teachers of Mathematics Research (NCTM-R) Conference. Christina Watts was lead presenter on an AERA poster in San Antonio titled: *Learning Progression Shifts: How Touch-Screen Virtual Manipulative Mathematics App Design Promotes Children's Productive Struggle*. This presentation emerged as part of the work of the Virtual Manipulatives Research Group. There were multiple sessions presented for K-12 classroom teachers and researchers at the NCTM conference, also in San Antonio. This is the largest gathering of mathematics educators in North America. This year's meeting featured 740 total sessions. One of those sessions was presented by

Kristy Litster who was lead presenter on a NCTM presentation titled: *Virtual Cookies: Free Virtual Resources to Increase Participation, Discussion & Collaboration*. Beth MacDonald was lead presenter on a NCTM presentation titled: *Early Elementary Algebraic Reasoning Development for Students Receiving Intervention Support*. Jessica Shumway presented two sessions at NCTM titled: *Constructing Number Relationships: Foundations for Deep Mathematical Understanding* and *Assessing Mathematics Instruction: Building ALL Students' Number Sense*. Vicki Lyons was lead presenter on a NCTM presentation titled: *Student Errors, Mistakes, Wrong Answers - OPPORTUNITY RETHINK*. Patricia Moyer-Packenham was lead presenter on an AERA research paper titled: *Affordances of Virtual Manipulative Math Apps: How They Help and Hinder Young Children's Learning*. Emma Bullock, Jessica Shumway and Moyer-Packenham presented on the same project data set at the NCTM-R Conference.



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ABOUT US

The Mathematics Education and Leadership Programs in the School of Teacher Education and Leadership in the Emma Eccles Jones College of Education and Human Services provide students with a variety of advanced study options in mathematics education at the graduate level. Students can select the Mathematics Education and Leadership Emphasis in the PhD program, the Elementary Mathematics Endorsement emphasis in the Master of Education Degree in Elementary Education, professional development credit in the online Elementary Mathematics Teachers Academy, or the Secondary Mathematics Emphasis in the Master of Education Degree in Secondary Education. The Mathematics Education and Leadership Programs at Utah State University provide students with opportunities to focus on enhancing their mathematics education expertise and develop leadership skills for positions at all levels of mathematics teaching, learning, supervision, and research. Contact the director today to begin your graduate work in Mathematics Education and Leadership at Utah State University!

PATRICIA MOYER-PACKENHAM, PHD

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