

Math Education Matters

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New WMU Mathematics Education Endowment to Support Graduate Program

Dr. Christian Hirsch honored upon retirement

In celebration of Dr. Christian R. Hirsch's outstanding career accomplishments and his recent retirement, alumni have created the Christian R. Hirsch Mathematics Education Endowment. Dr. Hirsch started at WMU in 1973 and served on the faculty in the Department of Mathematics where he taught undergraduate and graduate courses in mathematics education and mathematics for teachers. His impact has been recognized and acclaimed at WMU, where he has been named a Distinguished Faculty Scholar and James H. Powell Professor of Mathematics, and more broadly, in the state of Michigan and the nation, and on the international scene.

For more than four decades, the mathematics education community has witnessed Chris Hirsch's dedication and focus on the improvement of secondary school mathematics, as well as the energy, expertise, commitment, persistence, and integrity that he has brought to his work. The endowment will support the mathematics education graduate program within the Department through scholarships and travel grants for students and funding for innovative faculty research.

Even in retirement Dr. Hirsch continues to serve the profession. He currently is Editor of the 2016 volume of *Annual Perspectives in Mathematics Education: Mathematical Modeling and Modeling Mathematics*. To be published by the National Council of Teachers of Mathematics, chapters of the book focus on research and practice-based innovative approaches to understanding and effectively incorporating models and mathematical modeling in teaching and learning school mathematics grades K–12.



Dr. Jon Davis Develops Principles for Curriculum Design and Use

NSF grant supports middle school mathematics teachers' use of curriculum to address Common Core

Dr. Jon Davis has received funding from the National Science Foundation to develop principles for supporting middle school mathematics teachers' capacity to use curriculum resources to design instruction that addresses the Common Core State Standards for Mathematics (CCSSM). This project is a collaborative that includes the University of Rochester, Michigan State University, Western Michigan University, and Washington State University Tri-Cities.

The group is interested in learning about the features of materials that support effective instructional design, the teacher and district characteristics that support effective instructional design, how teachers use materials to design instruction that addresses the CCSSM, and the design practices that lead to instruction that addresses the progressions and practices in the CCSSM.

The teachers in the project come from purposefully diverse contexts and use NSF-funded materials as well as commercially developed programs. In addition, fully digital environments as well as more conventional media are being considered.

Participating teachers are interviewed before and after they are observed teaching a lesson involving their district-adopted curriculum materials. In addition, participating teachers also engage in a staged lesson planning where they are provided with a set of curriculum materials that differ from their district-adopted programs and are asked to construct a lesson based on these materials. In both sets of lesson planning, participating teachers are asked to describe how they interact with both the student textbook and teacher resources. Participating teachers' perceptions of

the CCSSM and their mathematical knowledge for teaching in the area of proportional reasoning are also being collected and analyzed to better understand their curriculum resource interactions.

Findings from this project are intended to contribute to the field by aiding (1) curriculum developers in the design of curriculum materials; (2) professional development designers and local instructional leaders as they work with teachers to understand and better utilize curriculum materials with respect to the CCSSM; and (3) teachers so that they can use curriculum resources to design instruction that addresses the CCSSM.

For further information, contact Dr. Davis at jon.davis@wmich.edu.

Calling all former WMU math education students . . .

Math Education Matters is interested in featuring your news and recent professional accomplishments in future issues. Brief news items can be sent to Dr. Jane-Jane Lo at jane-jane.lo@wmich.edu.



WMU Has Strong Presence at CSMC Third International Conference

Mathematics educators from WMU were well represented at the conference with five faculty attending and three of those presiding at various sessions. Of particular note is that eight current or past WMU graduate students also attended.



The Center for the Study of Mathematics Curriculum (CSMC), directed by **Christian Hirsch** (Western Michigan University), Glenda Lappan (Michigan State University), and Barbara Reys (University of Missouri), held its third International Conference at the University of Chicago, November 7–9, 2014. CSMC is a collaborative involving Western Michigan University, the University of Missouri–Columbia, and Michigan State University, with the University of Chicago as an affiliate institution, since 2004 when these institutions received NSF funding for a Center for Learning and Teaching focusing on curriculum research.

Over the 10-year span of CSMC activities, numerous curriculum-related conferences have been held, with three of them focused on international issues surrounding curriculum materials, development, research, and evaluation.

The theme for this conference was Mathematics Curriculum Development, Delivery, and Enactment in a Digital World. The conference was attended by approximately 200 mathematics educators and curriculum/software developers. The international flavor of the meeting was substantial as plenary speakers were represented by curriculum leaders from numerous countries, including Great Britain, Canada, Australia, Israel, Denmark, France, and Korea, and from numerous Higher Education Institutions across the U.S. Plenary sessions focused on digital and

technology innovations in school mathematics, assessments, affordances of digital texts, particular “apps” and their potential uses, designer and developer concerns, and reports on various technology implementations from school teachers and administrators. Plenary sessions were offset by demonstration sessions of new devices and software, and informal question-and-answer sessions featuring pairs of plenary speakers.

Mathematics educators from WMU were well represented at the conference with **Christian Hirsch** serving on the Program Committee, five faculty (**Browning, Davis, Hirsch, Kim, and Ziebarth**) attending, and three of those presiding at various sessions. Of particular note is that eight current or past WMU graduate students also attended, including AJ Edson, who presented as a panel member and in a subsequent breakout session where he spoke about his dissertation work in developing deeply digital secondary materials.

All seven of the former graduate students in attendance now hold faculty or research positions at prominent institutions in various states. These include **Nesrin Cengiz-Phillips** (2007 graduate; University of Michigan, Dearborn, MI); **Dana Cox** (2008; Miami University, Oxford, OH); **AJ Edson** (2014; Michigan State University, East Lansing, MI); **Nicole Fonger** (2012; University of Wisconsin, Madison, WI); **Karen**

Fonkert (2012; Charleston Southern University, Charleston, SC); **Lisa Kasmer** (2008; Grand Valley State University, Allendale, MI); and **Kathryn Shafer** (2004; Ball State University, Muncie, IN).



The graduate work of six of these students was supported or partially supported by CSMC research assistantships as a part of the overall capacity-building goal of the Center, and all six were designated as CSMC Center Fellows during their graduate work. In addition to the opportunities this designation offered students, many also had their graduate studies supported by other NSF-funded projects, such as *Core-Plus Mathematics* (wmich.edu/cpmp), *Transition to College Mathematics and Statistics* (wmich.edu/tcms/), and *Core Math Tools* (nctm.org/coremathtools/).

Further information about CSMC activities can be found at mathcurriculumcenter.org.

Dr. Laura Van Zoest Studies Teachers' Use of Student Thinking

NSF grant supports the development of a PUMT theory

Leveraging MOSTs (Mathematically Significant Pedagogical Opportunities to build on Student Thinking) is a four-year \$1,828,814 National Science Foundation collaborative project among researchers at Brigham Young University, Michigan Technological University, and Western Michigan University. The project is developing a *Theory of Productive Use of Student Mathematical Thinking (PUMT Theory)* that articulates what the practice of productively using student mathematical thinking looks like, how one develops this practice, and how that development can be facilitated.

The collaborative began by analyzing videotapes of middle and high school mathematics classes from across the United States to better understand what student mathematical thinking

teachers have available for use in instruction. As a result of this process, they developed a conceptual framework for MOSTs and the MOST Analytic Framework—a tool for identifying MOSTs.

Their work in Fall 2014 involved identifying attributes of MOSTs and using Scenario Interviews to better understand issues around teachers' use of student mathematical thinking. In Spring 2015, they are working side-by-side in the classroom with teachers interested in improving their PUMT practice to better understand what it takes to do so. The project is currently taking applications for a MOST Research Assistant. For more information about the project or the research assistantship, go to leveragingmosts.org.



Enjoying a meal at the May 2014 MOST Research Retreat at Yarrow Conference Center near Kalamazoo. Left to right: Dan Heck (Horizon Research, External Evaluator), Blake Peterson (Brigham Young University, Principal Investigator), Shari Stockero (Michigan Technological University, PI), Keith Leatham (BYU, PI), Laura Van Zoest (WMU, PI), Mary Ochieng (WMU, Research Assistant), Naphtalin Atanga (WMU, PostDoc). Team Members not pictured: Lindsey Merrill (BYU, RA), Elizabeth Fraser (WMU, RA), and Annick Rougee (University of Michigan, RA).

WMU Math Education Faculty Serve on NCTM Editorial Panels

The Math Education group is committed to serving professional organizations in various capacities to support their work to improve mathematics teaching and learning. For example, this year alone, there are several faculty members on Editorial Panels for NCTM journals: **Jon Davis**, *Mathematics Teacher* (MT), **Kate Kline**, *Teaching Children Mathematics* (TCM), and **Christine Browning** and **Laura Van Zoest**, *Mathematics Teacher Educator* (MTE). Responsibilities include making decisions on manuscripts submitted to the journals, attending regular Editorial Panel meetings, and helping shape future directions for the journals. Not only is this an important contribution to

NCTM, but this work also benefits WMU students.

Panel members get up-to-date information on NCTM and the challenges it faces. For example, at the recent TCM meeting, a topic that was discussed was how to help make a broader audience aware of the recent NCTM publication, *Principles to Action: Ensuring Mathematical Success for All*, and support one of NCTM's main objectives of access to high-level mathematics for all students. This information can then be shared with our current students so that they become informed about the work of NCTM.

Since faculty have all been or are currently reviewers for various journals, they also work to induct graduate students into this work of the profession.



Innovative Technology Enhances Teaching in Math Education Courses

Faculty and students at WMU are fortunate to have access to classrooms with the latest technology available for teaching. The newly designed Sangren Hall, which houses the College of Education and Human Development, is impressive with its overall structure, special building features, and integrated classroom technology. Sangren 1310 is an especially interesting classroom with several technology features that provide for a great community-learning environment.

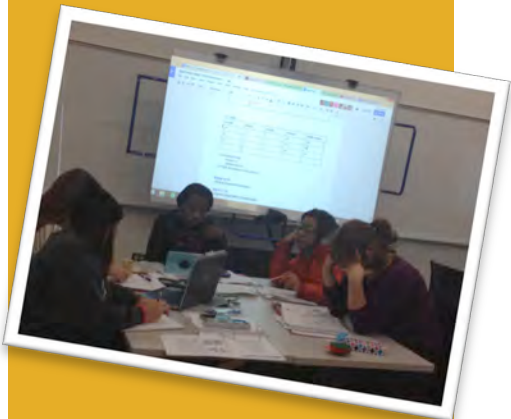
Six interactive white boards (IWBs) are placed around the perimeter of the room that allow for preservice teachers to engage with the software they are using in their learning. Once the preservice teachers download free software that allows their laptops to communicate to the projection system, they can use the IWB stylus as their "mouse" and control the software as they work from the white board itself. Working in this larger "public space" allows other groups to see what their peers are doing and thinking and make use of that information in their own group's learning.

As one student said this past semester, "I personally believe that technology in this class is a great resource, and that it helped to further my knowledge tremendously. At first, I thought of it as an inconvenience. As the class went on, however, I started seeing that the more I used the websites, such as geogebra, the better my grades became. I started to take them more seriously, and soon they aided me more than I could have imagined."

Even if not using the IWB feature, simply having the multiple displays during class is very useful for both the instructor and the students, as multiple views of student thinking can be displayed through the many projection systems and can be used as a vehicle for whole-class discussion. When you make your next visit to Western's campus, be sure to check out the new Sangren Hall, especially room 1310!



Interactive white board in a Probability and Statistics class for preservice teachers



Upcoming Presentations

AMTE
Orlando, FL – February 2015

Hillen, A. F., Smith, M., Spangler, D., Steele, M. D., **Van Zoest, L. R.**, & **Browning, C.** *Turning an AMTE Presentation into a Mathematics Teacher Educator Submission.*

Kline, K. *Supporting Preservice Teachers' Ability to Evaluate Children's Arguments.*

Ochieng, M. A., Leatham, K., Peterson, B., Stockero, S. L., & **Van Zoest, L. R.** *Teachers' Perceptions of "Use" of Student Mathematical Thinking in Whole Class Discussion.*

Webel, C., DeLeeuw, W., Empson, S., Jacobs, V., Land, T., Leatham, K., Peterson, B., Stockero, S. L., **Van Zoest, L. R.**, & Conner, K. *Defining and Developing Teaching Practices Related to Responding to Students' Mathematical Thinking.*

NCTM Research Conference
Boston, MA – April 2015

Davis, J. *Symposium on Factors Appearing in Teachers' Perceptions of the CCSSM and Their Instructional Environment.*

Van Zoest, L. R., Stockero, S. L., Peterson, B. E., Leatham, K. R., **Atanga, N. A.**, Merrill, L., & **Ochieng, M. A.** *Toward a Theory of Productive Use of Student Mathematical Thinking.*

NCSM
Boston, MA – April 2015

Davis, J. *Middle School Mathematics Teachers' Perceptions of the Common Core: Standards, Assessments, and Teacher Evaluation.*



Left to right: Isaac, Mike, Ginger, and Avritt Rohwer

Graduate Student Spotlight: Ginger Rohwer

I am a mother, a full-time college instructor, and a graduate student. These three roles provide the context for things that I love doing: spending time with my kids, working with students, and learning. I am married and have three children, a daughter who is 21 and two sons who are 16 and 14 years old.

I chose Western's Master of Arts in mathematics education program because I am interested in the teaching and learning of mathematics. I am, at heart, an educator who loves working with students.

Some memorable moments in my program include the stress of taking my first quiz as a graduate student the day after my son had spent the night in the hospital due to a concussion and temporary memory loss; Dr. Mingus's colorful, down-to-earth word pictures of complex mathematical ideas; the research project I did in Dr. Lo's class about the Van Hiele levels of students at the college where I teach in Grand Rapids; getting my mind whipped into shape in Dr. Mackey's class; the marathon six weeks this past summer in accelerated classes with Dr. Hirsch and Dr. Mingus; and rediscovering an interest in statistics education this past semester with Dr. Ziebarth. What I have enjoyed most about this program is getting to know the faculty.

My plan for the future is to continue to teach. I am giving myself at least a year to recuperate from being a student, wife, mother, and college instructor all at the same time. I will be making a decision over the next year about a future Ph.D. program!

About WMU and Our Programs

Western Michigan University (WMU), located in Southwest Michigan, is a vibrant, nationally recognized student-centered research institution with an enrollment of nearly 25,000. The Carnegie Foundation for the Advancement of Teaching has placed WMU among the 76 public institutions in the nation designated as research universities with high research activities. For more information, see wmich.edu/about.

The Department of Mathematics offers programs in mathematics and math education at the bachelor's, master's, and doctoral levels. Research strengths in math education include curriculum development and implementation, assessment and evaluation, technology, mathematical thinking (children, teachers), and teacher

education (preservice, inservice). Current mathematics education faculty are Christine Browning, Jon Davis, Theresa Grant, Ok-Kyeong Kim, Kate Kline, Jane-Jane Lo, Tabitha Mingus, Laura Van Zoest, and Steve Ziebarth. For more information, see wmich.edu/math.

Several teaching assistantships are available for the upcoming year for our graduate programs, and the deadline for application is February 15, 2015. For application procedures, see wmich.edu/apply/graduate. Also, feel free to contact Dr. Jane-Jane Lo (jane-jane.lo@wmich.edu) with any questions you might have about our programs.



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