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HAMTE Crossroads

The Official Newsletter of the Hoosier Association of Mathematics Teacher Educators

Message from the President

Hello, HAMTE friends. What an interesting and productive year it has been, working together to prepare for PME-NA 2017. The result was an outstanding conference filled with valuable information, fruitful discussions, and great entertainment. It was so much fun watching it all come together in the company of such amazing statewide colleagues. Thank you to **Enrique Galindo** and **Jill Newton** for leading us in this successful endeavor!

While HAMTE members were busily taking on PME-NA tasks, they also had time to engage in other work. Here are some highlights:

- On March 3, HAMTE supported the **sixth annual Indiana Mathematics Research Symposium**, Participants from eight Midwestern universities gave 27 presentations and keynote speakers were Alyson Lischka from Middle Tennessee State University and Gloriana Gonzalez from the University of Illinois, Champaign-Urbana.
- On March 19, HAMTE hosted the **second annual Indiana Mathematics Teacher Leadership Conference**. In addition to six sessions led by Indiana mathematics coaches, school leaders, and mathematics teacher educators, keynote speaker Lynsey Gibbons from Boston University presented, "Organizing for Collective Learning: Transforming Practice Together."
- On May 19, HAMTE held its **first Spring Retreat**. Members from eight universities gathered for a day filled with engagement in "Math Circles for Social Justice," discussion about "Equity Within Mathematics Education Research as a Political Act: Moving from Choice to Intentional Collective Professional Responsibility," an overview of HAMTE accomplishments and initiatives, and sharing of resources for teaching content and methods courses.
- This summer, HAMTE members from four universities continued their work with 60 teachers participating in the final year of the **Creating Algebra for Teacher Communities of Hoosiers (CATCH)**, a three-year MSP grant.
- The **HAMTE EMS Task Force** met twice this summer with Rep. Robert Behning, Chair of the Indiana House Education Committee, to discuss issues related to elementary mathematics specialists.

I look forward to seeing you all at the **HAMTE business meeting**, **Sunday, November 5, 5:00-6:15 pm**, at the Marriott East Hotel in Indianapolis. Following the meeting, we will meet for **dinner at 6:30** in the Skylight Bistro (the hotel restaurant). Once again, we are holding our business meeting in conjunction with the Indiana Council of Teachers of Mathematics fall conference.

At the end of the business meeting, I will pass the presidential gavel to **Signe Kastberg**, who will breathe new life into HAMTE. In the meantime, please know that I have enjoyed serving as HAMTE President. I respect and admire the diversity of ways in which you all contribute to mathematics teacher education in Indiana.

~Sheryl Stump~

Inside This Issue:

Newsletter Editor:
Andrew Gatza,
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Mathematics Teacher Circle Working Group Forming

Colleagues, last spring during our daylong retreat at the University of Indianapolis, HAMTE members participated in a mathematics teacher circle. The goal of our mathematics teacher circle was to explore the potential of such a structure to energize and sustain mathematics educators. During the brief investigation at the retreat, members explored, made assumptions, and conjectured…we got excited about doing mathematics!

Feedback from the initial event was positive and we would like to begin a working group with the goal of hosting a series of mathematics circle events. There is some seed funding available that we could apply for.

To learn more about mathematics circles and mathematics teacher circles check out the websites http://www.mathcircles.org/ and https://www.mathteacherscircle.org/. For research on mathematics teacher circles check recent PMENA proceedings (Karakok & White, 2015; Peck et. al., 2017).

If you would like to join the working group, please email **Signe Kastberg** at skastber@purdue.edu by **December 1.**

WELCOME NEW MEMBERS!

The HAMTE board would officially like to welcome new members to the HAMTE organization. New members include:

John Somers,
University of Indianapolis

Rebekah Baker,
Anderson University

Travel Grant Opportunities for Graduate Students

The HAMTE Board is accepting applications for Graduate Student Travel Grant awards to attend either AMTE ($400) or ICTM ($100). Please consider applying if you meet these criteria:

- HAMTE member and graduate student making steady progress toward your degree;
- You have a presentation accepted for the conference;
- You do not have other funding sources available, or these funding sources do not cover all expenses.

Travel grant winners will be asked to share their experiences at AMTE or ICTM via future editions of *HAMTE Crossroads*.

If interested, **please send your CV and a brief statement (300 words or less) explaining why you should receive the award to Rachael Kenney (rhkenney@purdue.edu) and Mark Creager (macreager@usi.edu) by Saturday, Nov. 4th.**

Call for Manuscripts: *The Indiana Mathematics Teacher*

The ***Indiana Mathematics Teacher*** is the official journal of the **Indiana Council of Teachers of Mathematics (ICTM)**. It is published twice a year and is distributed by mail to all current members. The journal provides ideas and information for mathematics teachers at all levels of the curriculum (PreK-16). The Editors invite submissions from new and experienced authors and accept articles on a range of topics including innovative classroom activities and lessons, practical applications of pedagogical research and theory, thoughtful reflections on challenges faced in the mathematics classroom, strategies and stories of mathematics coaching and teacher leadership, and any other topics that support the professional learning of ICTM members. We especially encourage collaborations between PreK-12 teachers and higher education faculty.

Indiana residents whose feature articles appear in the Indiana Mathematics Teacher will be granted free membership to ICTM for one year.

Feature Articles — The journal Editors welcome submissions on a full range of topics in mathematics education. Manuscripts should be no more than 3000 words in length. Feature manuscripts are submitted to blind peer review before they are accepted into the journal.

Departments — The Department Editors welcome shorter submissions focused in specific areas. These might be in the form of interviews with classroom teachers. Department manuscripts are submitted to panel review before they are accepted into the journal.

For guidelines on manuscript preparation and submission, please see this website:
http://ictm.onefireplace.org/page-819122

HAMTE Mathematics Teacher Leadership Conference 2018

HAMTE will host the third annual Mathematics Teacher Leadership Conference on Friday, March 9, 2018, in the Schwitzer Student Center at the University of Indianapolis. Keynote speakers will be **Shannon Larsen** and **Jenny Jorgensen** from the University of Maine. Once again, morning and afternoon breakout sessions will focus on specific issues related to mathematics teacher leadership in elementary schools and middle schools. Additional information and registration will be available soon on the HAMTE website.

IMERS 2018 Call for Proposals!

The Hoosier Association of Mathematics Teacher Educators (HAMTE), including mathematics education faculty and graduate students from across the state of Indiana, will be hosting the 7th annual Indiana Mathematics Education Research Symposium (IMERS) on **Friday, March 2nd.** The symposium will be held at the IUPUI Campus Center in Indianapolis.

IMERS 2018 will feature **Dr. Nichole M. Joseph—Vanderbilt University Peabody College, and Dr. Dana C. Cox—University of Miami, Ohio,** as the keynote speakers.

We invite proposals that describe research studies at various stages - completed work, work-in-progress and studies currently under design. The symposium was designed to provide graduate students and new faculty with opportunities to share their research ideas and to network with colleagues. ***If you are looking for a conference that will allow you to practice presenting your ideas and where feedback on design and works in progress is provided, IMERS is for you!***

Proposal Guidelines:

Completed Studies

Proposals should be no more than 1000 words (excluding references) including a description of the purpose of the study, theoretical framework, research design, findings and relevance of the study to mathematics education.

Work-in-Progress

Proposals should be no more than 500 words (excluding references) including descriptions of the purpose of the study, brief literature review, research questions, methodology (i.e. participants, data sources, methods of analysis) and preliminary findings (if applicable).

Work-under-Design

Proposals should be no more than 300 words (excluding references) including rationale for the study, brief literature review, research questions, and proposed methods.

Panel Discussion

Panel discussions are 45 minutes in length and are designed to provide insights from different perspectives on a single issue, idea, or activity in mathematics education. For example, a research group exploring children's conceptions of negative numbers could propose a collection of brief reports that illuminates various dimensions of the project or could describe how different frameworks might be used to explore children's conceptions. Proposals should be no more than 1000 words (excluding references) including a description of the purpose of the session, relevance to mathematics education, potential benefit to attendees, and a brief description of the 45-minute session. At least 15 minutes should be allotted for discussion and questions.

Proposal Submission:

Proposals are due by ***Friday, January 19th***. The complete RFP will be coming soon!

Feminist and Queer Perspectives on Mathematics and its Teaching and Learning

Elizabeth (Betsy) Kersey
Purdue University—West Lafayette

Two critical perspectives that are lacking in much mathematics education research are feminism and queer theory. In this article, I discuss how these perspectives could provide new insight into existing issues in mathematics education research and what new issues these perspectives might call into consideration. I discuss the impact of feminism on how we conceive of mathematics, the implications of feminism for mathematics classrooms, how queer theory addresses issues of gender differently than feminism, and conclude by discussing how queer theory can help address lesbian, gay, bisexual, transgender, and queer (LGBTQ) issues in the mathematics classroom. This provides an overview of some of the more influential pieces in mathematics education on these subjects and is intended to provoke teachers and scholars to reflect on how they think about issues of gender, gender expression, and sexuality.

My interest in research on gender in mathematics education comes largely from my experiences as a woman in mathematics, and particularly as a woman in mathematics at the graduate level, where gender disparities are more pronounced. As a white, middle-class women, the other aspects of my identity are largely invisible, which makes me inclined to focus on gender alone rather than race, although I do my best to be self-reflective about the biases this may bring to my research and incorporate perspectives from scholars of color about race, gender, and other marginalized identities. As a woman who identifies more with the individual and competitive learning style often characterized in feminist research as masculine, I have been driven to look for research on gender that goes beyond essentialism and includes more nuanced analyses of gender and gender expression, particularly that which I have found in queer theory. I also have a lot of friends who are transgender and conduct research with transgender students, so this makes it particularly important for me to question assumptions about the gender binary and clarify definitions surrounding sex and gender.

There is a persistent desire among mathematicians to consider mathematics as culture-free and objectively true. This is evident from the efforts of the Foundationalists to derive the whole of mathematics from a small set of axioms, particularly in set theory and basic arithmetic. Even among those who do not consider the project of the Foundationalists to be tenable, mathematics is often seen as pure, context-free, universal, and independent of the knower. Shulman (1996) traces this ideology back to the Greeks, particularly Plato, who has given us the persistent Platonic view of mathematics and mathematical objects. Shulman (1996) notes that Plato's rules of logic and the arguments in which they were used to defeat his opponents arose during a time "where a nostalgia for traditional values led to fears of anyone alien or other" (p. 434), much like our own times, and his style of argumentation was meant to coerce agreement and alienate those who could not follow or replicate this rhetorical technique. He used this form of logic and argumentation to defeat his political opponents without appearing to be political. Since Plato's time, the attempts to base mathematics on a logical foundation have been dealt several blows, such as Cantor's paradoxes of infinity and Gödel's Incompleteness Theorem. Some progress has been made in constructing alternatives to Platonic reasoning, such as fuzzy logic, m-valued logic (statements have m possible truth values, rather than Plato's insistence on truth or falsehood), and modal logic, but as a style of reasoning, Plato's legacy has been extraordinarily long-lived in the mathematical sciences. In order to produce a truly equitable mathematics, we must overcome this legacy of using logical argumentation to exclude

others and coerce them to concede our point. It persists primarily because that which challenges it is considered political and labeled nonmathematical, and thus invalid. For instance, pointing out that the Western style of argumentation is considered rude and impolite by Japanese standards (Sekiguchi, 2002) and that the purpose of a proof or mathematical argument should be to convince rather than to coerce agreement is dismissed as irrelevant. Thus, mathematics and logic have never been apolitical; it is merely in the interest of those in power to have them appear that way.

With more recent developments in attempting to portray the mathematics of the infinite as universally true, mathematicians and philosophers, such as Kant, Poincaré, and Brouwer, have claimed that the basis of our mathematics (e.g., linearity and continuity) are based on universal experiences of rational beings (Shulman, 1996). However, since mathematicians and philosophers do not conduct fieldwork, this claim is pure conjecture. What's more, studies of the mathematics and languages of other cultures have shown this to be patently false. Shulman (1996) points out that the Navajo concept of space is "neither subdivided or objectified" (p. 446), and the Kaluli of Papua New Guinea view the function of language as "to manipulate and control the behavior of others" (p. 438) rather than to describe and classify. Other feminist scholars have argued for a cyclical conception of time that would be truer to women's experiences than the masculine conception of time as linear (Damarin, 1995), and for a theory that allows for partially open spaces and a fluctuation of the borders of unclearly delineated wholes (Irigaray, 1987).

In the realm of the sciences, there is a great deal more literature questioning the methods of experimentation and scientific inquiry, from which we can draw some lessons for mathematics. Harding (1986) suggests that the model for the paradigm of scientific knowledge should be biology rather than physics. Feminists critiquing biological research find fault with the hierarchies of organization and mutually exclusive categories (Shulman, 1996). These are traits that are very much inherited from mathematics. Perhaps mathematicians could lead the way in developing theories where organization is less hierarchical and and categories are less dichotomous and discrete. After all, not all seemingly self-apparent binaries are always applicable. Non-integers cannot be classified as even or odd. Imaginary numbers cannot be easily classified as rational or irrational. Exploring the implications of these failures might lead to a more interesting, more feminist mathematics.

Burton (1995) drew upon the work of feminist critiques of science to propose a feminist epistemology of mathematics. This is an epistemology that is inclusive and accessible, and more compatible with the goals of critical pedagogies in mathematics education. An absolutist view of mathematics tends to encourage a transmission mode of teaching; Burton (1995) offers an alternative. Specifically, she proposes that knowing mathematics should be defined in terms of its cultural and social nature, the aesthetics of mathematical thinking it invokes, its nurturing of intuition and insight, its recognition of different approaches particularly in styles of thinking, and the holism of its applications. Recognizing the personal and cultural nature of mathematics and accepting different styles of thinking would be well at home in an epistemology based in any critical framework, but the emphases on intuition and aesthetics are more unique to a framework focused on the experiences of women.

Fortunately, the idea that mathematics is a social construct is widely accepted in the field of mathematics education. We also acknowledge that the logically ordered presentation of mathematical proofs does not necessarily correspond to the way mathematicians come to write proofs or otherwise convince themselves of mathematical facts. Mathematics progresses through a dialogue between mathematicians, as demonstrated by Lakatos (1976). Altering the way proofs are presented, in classrooms and in textbooks, would help to make mathematics more accessible, more equitable, and illuminate the position of the knower. Given the sharp drop in women's participation in mathematics at the graduate level (Damarin, 2008), broadening the definition of what counts as mathematics and how it should be presented is also desirable at the professional level, in conference presentations and journal articles.

The majority of feminist studies in mathematics

education are feminist empiricist studies, which means they use traditional experimental or analytical methods, but ask questions relevant to the experiences of women and girls in mathematics. This includes the many studies that examine the mathematical achievement or ability of women and girls and the impact of factors such as math anxiety or a poor self-concept in mathematics. While these are important studies, my focus here is on more radical feminist texts that go farther to interrogate how the way in which mathematics is taught can be informed by feminist theories.

Boaler (1997) conducted a feminist analysis of gender in a mathematics classroom, concluding that boys and girls performed equally well when the teaching style was student-centered and project-based, but that girls fell behind and lost interest when speed and competition were emphasized at the cost of understanding. Her conclusion was that allowing a more feminine way of learning and teaching would benefit all students, but especially the girls. It would also promote understanding, rather than emphasizing performance. In particular, she emphasized that rather than looking solely at how we can help girls to learn traditional mathematics, we should consider how mathematics can be made more feminine. This more feminine mathematics would include more collaboration and room for creativity.

Anderson (2005) designed a feminist classroom for female secondary students in a summer program. She emphasized that individual voices and experiences, intuition, and a supportive environment for solving challenging problems were all highly valued. She reported that the students experienced the classroom as a site of empowerment. As with Burton's feminist epistemology of mathematics, the focus on the individual experience and the support for problem solving are common to other critical perspectives, but the emphasis on intuition is fairly unique to feminist theory. Kellermeier (1996) described the feminist pedagogy he used to teach mathematics courses to general education courses. He draws parallels between survivors of sexual abuse and students that have suffered *math abuse* (not claiming that the two are equal in severity or trivializing sexual abuse, but finding useful parallels in the strategies used in recovery). Kellermeier focuses on how to make his students feel safe enough to take mathematical risks in his classroom. This includes having his students talk about their affective experiences with mathematics, developing a trusting relationship in which the students are given more power than in a traditional classroom, and modeling risk taking by taking problem suggestions from the students rather than preparing examples ahead of time. Most of these strategies seem beneficial to a classroom based on any critical perspective, but the emphasis on students' emotions and affective experiences may be more conducive to a feminist perspective.

While these studies and classroom designs are certainly a step in the right direction, they are not without their flaws. Partially due to when they were written, they draw on a simpler, more outdated brand of feminism. In particular, they have a fairly static, essentialist view of femininity. This femininity is a very white, middle-class, heterosexual way of performing a female gender. They do not allow for variations in how femininity can be performed for those of other races and classes (Damarin, 2008). In particular, Gholson (2016) points out how there is very little research on Black girls and women, and that their existence is primarily used to justify a focus on white women and girls or Black men and boys. Intersectionality and other perspectives such as Black feminism have rich bodies of literature that could be drawn on to interrogate this issue, but even basic essentialist feminism is largely lacking in the literature on mathematics education.

Another issue with this work on gender and mathematics is that it tends to valorize femininity, rather than trouble the alignment of femininity with femaleness or girlhood, and they tend to focus exclusively on girls, rather than how femininity or masculinity can be performed by those of any gender. There is also a tendency to conflate sex with gender, without clearly defining either term (Damarin & Erchick, 2010). Progress in this direction often draws from queer theory, a post-structural cousin of feminism. Mendick (2006) used queer theory to examine mathematical experiences of secondary students in the UK to illustrate how our culture aligns doing mathematics with masculinity, which poses a challenge for women and girls

seeking to identify with mathematics. She also examines representations of people doing mathematics in popular culture, such as Willow in *Buffy the Vampire Slayer*. Mendick (2006) describes the goals of queer theory to be troubling binaries, stopping all of the binaries from lining up, and telling stories. This means questioning how we classify students as male/female, gifted/challenged, logical/illogical, or masculine/feminine, and demonstrating that these categories don't always align by telling stories that provide counterexamples to prevailing stereotypes. Walls (2009) conducted a longitudinal study to see how gendered attitudes affect boys and girls and their career aspirations throughout their schooling career. She also found that her participants considered mathematics to be a masculine activity, which became more problematic for her female participants as they grew older.

Esmonde (2011) addressed the issue of boys in education and how they are often overlooked, adding that we need to work towards an anti-genderist mathematics education. She defines *genderism* as "the valuing of people who are seen as locally gender normative (*e.g.*, people with female bodies who look, act, and speak like women are supposed to in that particular context) over people who are seen as non-normative" (p. 29). Anti-genderism means working to move beyond a binary conception of gender, dismantling gender stereotypes, and examining the tensions behind different kinds of masculinities and femininities.

Queer theory grew out of gay and lesbian studies. Working towards equity in all areas includes not just race, gender, and class, but also sexuality and nonbinary genders. There are only a limited number of articles to date that discuss how we could address LGBTQ issues in the mathematics classroom. Esmonde (2011) gave some suggestions, such as interrogating word problems that mention married couples and assume that they are composed of a man and a woman. Rands (2009) called for more than just including problems with non-heteronormative characters, suggesting that teachers should actively question problems that deal with topics such as family, since families can come in many different forms. They[1] call this approach *Mathematical Inqu[ee]ry*. They also recommend questioning where mathematical rhetoric can or should be used and rethinking how time is used to structure classrooms. Rands (2013) also described gender-complex education, which explicitly addresses gender diversity within and outside of the binary and teaches children to be respectful of such variation. They described a mathematics project for middle school students that used data from GLSEN's National School Climate Survey (Kosciw, Greytak, Palmer, & Boesen, 2014) about harassment of transgender students.

There are many options for directions that future research can take to broaden the base of literature reviewed here. One could take Burton's (1995) feminist epistemology of mathematics and the feminist work in science education as a basis to propound epistemologies of mathematics based on Black feminism, intersectionality, queer theory, or other more current and nuanced feminist perspectives. There is a great need for empirical studies of LGBTQ students and teachers, and how their identities impact their experiences in the mathematics classroom. While there is a need for both theoretical and empirical work on feminism and queer theory, empirical studies that utilize queer theory are particularly lacking. To my knowledge, Mendick (e.g., 2006) is the only one who has conducted a study in mathematics education that explicitly uses queer theory. Finally, for anyone who is doing research on gender, I recommend clearly defining terms such as sex and gender and clarifying which is considered relevant. Damarin and Erchick (2010) provide several possible models that could be used. Additionally, any survey or questionnaire that asks about sex or gender should provide more options than *male* and *female*, even if that is simply a third option that says *other*.

Mathematics teacher educators can also utilize feminism and queer theory in their everyday teaching practice. They can question assumptions made about people based on gender, such as assuming boys like competing and girls like collaborating. Future teachers should be inclusive of competitive and collaborative learning styles, regardless of student. One of the fundamental tenets of queer theory is questioning what counts as normal. This can be used to disrupt thinking about the qualities that make someone good at mathematics, the power dynamic between teachers

and students, and the time management process in the classroom. It should also be applied to family norms such as whether students have two parents and whether those parents might be of the same gender. In other words, teachers should be cognizant of the fact that defining what counts as *normal* is a political act that can do emotional harm and sometimes lead to physical violence to those who are excluded from that category.

Adding feminism and queer theory to the collection of critical perspectives we use in our research can help us paint a clearer picture of the factors influencing our students, particularly women and LGBTQ students. Feminism can be used to address a wide variety of topics, from the epistemology and philosophy of mathematics, to the experiences of students in learning mathematics, to how we design our mathematics classrooms. It has not yet been used to its full potential, especially considering the many branches of feminism that offer complex, nuanced perspectives. The most promising research on gender is currently being done with queer theory rather than feminism, though queer theory is even more underutilized. Queer theory also has the added advantage of being readily applicable to LGBTQ issues, as well as gender. No matter what theoretical perspective you use in your research going forward, I urge you to think carefully about the impact of gender, gender expression, and sexuality and how they might intersect with other factors such as race and class.

Recommended Reading

In addition to the references listed for this article, I would also recommend the following resources for further reading on this topic:

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About the Author

Elizabeth (Betsy) Kersey (ekersey@purdue.edu) is a fifth-year doctoral student in mathematics education at Purdue University. She is currently working on her dissertation on the experiences of transgender students in postsecondary STEM fields. Her research interests include the impact of gender and LGBTQ issues in STEM education; feminism, queer theory, and other critical perspectives; equity in mathematics education; and sociological perspectives on mathematics history and mathematics education.

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Gholson, M. L. (2016). Clean corners and algebra: A critical examination of the constructed invisibility of black girls and women in mathematics. *The Journal of Negro Education, 85*(3), 290-301.

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Kellermeier, J. (1996). Feminist pedagogy in teaching general education mathematics: Creating the riskable classroom. *Feminist Teacher, 10*(1), 8-11.

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Notes

1. Rands prefers the pronouns they/them.

Upcoming Events

- ICTM Conference: November 5-6, Indianapolis
- NCTM 2017 Regional Conference: November 29-December 1, Chicago
- AMTE Conference: February 8-10, Houston
- Indiana Mathematics Education Research Symposium (IMERS): March 2nd, Indianapolis
- Mathematics Teacher Leadership Conference: March 9th, Indianapolis
- NCTM National Conference: April 23-28, Washington, D.C.
- AERA Conference: April 13-17, New York City
- *TODOS: Mathematics for All* Conference: June 21-23, Phoenix
- PME-NA 2018 Conference: November 15-18, Greenville, SC

PME-NA 2017 is in the Books!

Wow, it's hard to even know where to begin to talk about this great HAMTE success, but most important is a huge thank you to all who contributed!

It was an amazing team effort – thanks to the HAMTE Local Organizing Committee: Amber Simpson, Amy Hackenberg, Andrew Gatza, Andrew Hoffman, Ayfer Eker, Betsy Berry, Brooke Max, Cetin Bilir, Christine Taylor, Craig Willey, Doris Mohr, Elizabeth Suazo, Enrique Galindo, Erol Uzen, Gina Yoder, Jean Lee, Jerry Woodward, Jill Newton, Jodi Frost, Jose Contreras, Kathy Shafer, Laine Bloome, Laura Bofferding, Mahtob Aqazade, Mark Creager, Mi Yeon Lee, Mike Daiga, Murat Akarsu, Rachael Kenney, Rebecca Borowski, Rick Hudson, Robin Jones, Sheryl Stump, Sue Mau, Travis Miller, Tuyin An, and Winnie Ko.

We heard so many positive comments about communication, food, plenary speakers, poster session, etc. and it only happened because of all the volunteers who showed up to make it such a memorable event!

PME-NA 39 2017
Synergy at the Crossroads

Photos courtesy of Andrew Hoffman.

Connect with HAMTE!

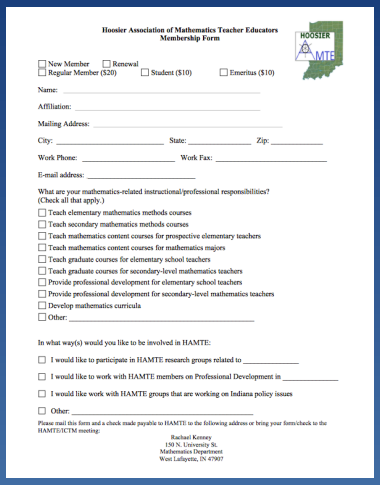
- ***Visit our website:*** Please checkout out our new website at https://hamte.wildapricot.org. This site will replace our current site at hamte.org, so please bookmark our new home. With our new page, we can now accept ONLINE MEMBERSHIP ENROLLMENT! There are options to enroll for one year, or for three-years at a time at a slight discount. Current (and some past) members have already been entered into the system and should be receiving emails from WildApricot telling you it is time to renew your dues. Another email will go out one week before the business meeting. The link sent in this email will help you create a password and join the site. Then you can pay for membership using the "Join Us" link. If you do not receive this email, you can still Join Us with this link at any time! Please share our new site!

- **Join a Working Group** or suggest a new topic to connect and collaborate with others across the state in order to address crucial issues in the field of mathematics education!

    - **Elementary Math Specialists Task Force**
        - **Facilitator**: Sheryl Stump, sstump@bsu.edu

- ***Submit an article and/or teaching methods or ideas to the newsletter***, *HAMTE Crossroads*. You can also ***write a special article for*** *the new newsletter section called "Thinking Equity in Mathematics Education."* Email your submission or questions to Andrew Gatza, Newsletter Editor, at agatza@iupui.edu. We publish Fall and Spring editions.

BECOME A HAMTE MEMBER!



Hoosier Association of Mathematics Teacher Educators
Membership Form

☐ New Member ☐ Renewal
☐ Regular Member ($20) ☐ Student ($10) ☐ Emeritus ($10)

Name: _____

Affiliation: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Work Phone: _____ Work Fax: _____

E-mail address: _____

What are your mathematics-related instructional/professional responsibilities?
(Check all that apply.)
☐ Teach elementary mathematics methods courses
☐ Teach secondary mathematics methods courses
☐ Teach mathematics content courses for prospective elementary teachers
☐ Teach mathematics content courses for mathematics majors
☐ Teach graduate courses for elementary school teachers
☐ Teach graduate courses for secondary-level mathematics teachers
☐ Provide professional development for elementary school teachers
☐ Provide professional development for secondary-level mathematics teachers
☐ Develop mathematics curricula
☐ Other: _____

In what way(s) would you like to be involved in HAMTE:
☐ I would like to participate in HAMTE research groups related to _____
☐ I would like to work with HAMTE members on Professional Development in _____
☐ I would like work with HAMTE groups that are working on Indiana policy issues
☐ Other: _____

Please mail this form and a check made payable to HAMTE to the following address or bring your form/check to the HAMTE/ICTM meeting:

Rachael Kenney
150 N. University St.
Mathematics Department
West Lafayette, IN 47907

Become a new member or renew your existing HAMTE membership at

https://hamte.wildapricot.org

Membership Cost:

Regular Member: $20

Student, Emeritus Faculty: $10

You can also pay by cash or check at the annual HAMTE business meeting.

The membership year runs October 15 to October 15 (to coincide with our annual fall meeting).

What's the Word on Campus?

University of Indianapolis

Teach Today: Transform Tomorrow Elementary Education STEM program was awarded $262,801 through the 2017 Indiana STEM Teacher Recruitment Fund Grant. This award was possible through the collaborative efforts of faculty from three schools: the School of Education, Shaheen College of Arts and Sciences, and the College of Applied Behavioral Sciences. This grant will provide the UIndy Elementary Education STEM program additional funding to recruit and retain highly-qualified STEM elementary pre-service teachers in Indiana during the 2017-18 and 2018-19 academic years.

Indiana University -- Bloomington

Amy Hackenberg and a team of graduate students continue to work on project IDR²eAM, http://www.indiana.edu/~idream/. IDR²eAM stands for **I**nvestigating **D**ifferentiated Instruction and **R**elationships between **R**ational Number Knowl**e**dge and **A**lgebraic Reasoning in **M**iddle School and is funded by the National Science Foundation.

The purposes of this project are to investigate how to differentiate mathematics instruction for middle school students at different levels of reasoning and to understand how students' rational number knowledge and algebraic reasoning are related. In the first two years of the project (Phase I) they conducted three iterative, after school design experiments with cognitively diverse middle school students. In the third year (2015-2016, Phase II), they conducted retrospective analysis and co-led a Teacher Study Group (TSG) with 15 middle school mathematics teachers from around the state.

They are currently in Phase III, in which three teachers from the TSG are participating. Amy is co-teaching a unit with each of these classroom teachers to study how to differentiate instruction in classrooms, and to study how teachers learn to differentiate instruction. They completed the first of these whole classroom design experiments in spring 2017 with a class of 8th grade students and their teacher, Marie Johannisson. They are just starting their second experiment in October 2017 with a class of 7th grade students and their teacher, Patti Walsh. The project will run through the 2018-2019 academic year.

Indiana State University

The Duke Energy Power of Math Summit on November 21, 2017 is made possible by a generous grant from Duke Energy. The one-day summit is hosted by ISU and is intended for teachers and math coaches who work with students in grades K-3. The summit is free and lunch is provided. For registration details, speaker information, and daily topics, please go to:

https://www.indstate.edu/education/ess/third-annual-power-reading-summitfirst-annual-power-math-summit-2017

Seating is limited, so please register today!

Indiana University - Purdue University Indianapolis

The mathematics education community at IUPUI would like to welcome doctoral student **Weverton Pinheiro** to campus.

Erik Tillema and graduate students **Andrew Gatza** and **Weverton Pinheiro** continue to work on the project Generalization Across Multiple Mathematical Areas (GAMMA), a project funded by the National Science Foundation. GAMMA, now in its forth year, is a multi-site project that is investigating the kind and quality of generalizations that middle grades through collegiate level students make in the domains of combinatorics, algebra, geometry, and advanced algebra, and the instruction necessary to support these generalizations. Erik is the PI for the Indianapolis site. In the first year of the project they interviewed 32 middle and high school students four times each in order to determine the kind and quality of generalizations that students made. During the 2015-2016 school year they conducted two teaching experiments. The teaching experiments were run with pairs of 10th and 8th grade students in order to understand how the quality of student generalizations develop over time and support their learning. The third year the project included two design experiments with 8th and 10th graders, respectively. Currently, they are analyzing data from the previous three years and preparing data for presentations and publications, with their most recent presentation at PME-NA 2017 in Indianapolis.

Recent Publications:

Tillema, E.S., & **Gatza, A.** (2017, July). Helping students explore the Cartesian coordinate system. *The Indiana Mathematics Teacher, Summer 2017, 8-12.*

Ball State University

The *Ball State Undergraduate Mathematics Exchange* is free to all libraries both electronically and in print. This journal, started in 2003, contains articles of interest to all types of mathematics undergraduates (e.g., pure, applied, actuarial, and education). Undergraduate students typically write articles, either individually, working in teams, or working with faculty. On occasion we also include articles written solely by faculty as long as they are accessible to undergraduates.

The types of articles in a given issue often vary in many respects, but the common theme is that the activities, which are not necessarily original research, go beyond standard classroom material. Typical submissions include senior thesis abstracts, extracurricular projects, reflections on internship experiences, and seminar and colloquium papers. In particular, expository papers are welcome.

Please feel free to view the latest volume, as well as all past volumes, of the *Mathematics Exchange* at http://www.bsu.edu/libraries/beneficencepress/mathexchange/. Enjoy these articles, and please this with your students and, when suitable, encourage your students to work on projects that might make nice submissions for this journal.

For a promotional flyer, please see: http://www.bsu.edu/libraries/beneficencepress/mathexchange/MathematicsExchangeFlyerA.pdf. These articles are sometimes extensions of projects done for a class. Again, please share this with your colleagues elsewhere as well as encourage them to offer their students this opportunity to both enjoy these articles and perhaps publish their own.

Purdue University—West Lafayette

It's been a busy summer and fall at Purdue West Lafayette; here are some highlights:

Laura Bofferding and her family welcomed a new baby girl, Zoe Renee Gleich, on October 13, 2017.

Tuyin An graduated in 2017; she is now Assistant Professor in the Department of Mathematical Sciences at Georgia Southern University (GSU). She teaches College Geometry and Foundation of Data and Geometry. Her research interests include mathematical reasoning and proof; geometric theorems; teachers' reflection and practice; and curriculum analysis and comparison.

Murat Akarsu is working as a Research Assistant in Engineering Education at Purdue. He is responsible for an epistemic research lab, particularly, the EngrTEAMS project, including strategic initiatives in P-12 STEM education (e.g., data gathering and analysis, literature reviews) and supporting the dissemination and outreach of the epistemic research lab (e.g., participating in teacher professional development). He has several publications and presentations.

Publications:

- Aranda, M., Lie, R., Guzey, S., Akarsu, M., & Moore. (2017). Connecting classroom discourse to students science learning in a reform-based curriculum unit. *Journal of Research in Science Teaching (Under Review).*
- Johnston, A., Akarsu, M., Guzey, S., & Moore, T. (2017). An exemplary middle school life-science teacher talk about engineering during an engineering design-based STEM integration unit. *Journal of Pre-College Engineering Education Research (J-PEER).* (Under Review).
- Chen, L., Akarsu, M., & Bofferding, L. (2017). Pre-service teachers' assessment of kindergarten students' understanding of subtraction problems. *School Science and Mathematics (In progress).*

Presentations:

- Miller, H., Moore, T. J., Glancy, A. W., Silverling, E. A., Guzey, S. S., Johnston, A. C., Merzdorf, H. E., Souze-Flores, E., & Akarsu, M. (2017). *Mineral Mayhem: Using Engineering to Teach Middle School Earth Science. American Society for Engineering Education (ASEE),* Columbus, OHIO, USA.
- Akarsu, M., (2017). *Pre-service Teachers' Understanding of Geometric Reflections. International Conference on Education in Mathematics, Science and Technology (ICEMST),* Ephesus Kusadasi, Izmir, Turkey.

Javier Castillo graduated in 2017 and is currently a mathematics assessment specialist with The College Board in Chicago, IL. He works in the development of math items primarily for the SAT and PSAT exams. This new role also allows him to research current teaching practices in high schools to ensure college entry exams stay current and are assessing what is being taught in classrooms today.

Purdue University—West Lafayette … continued.

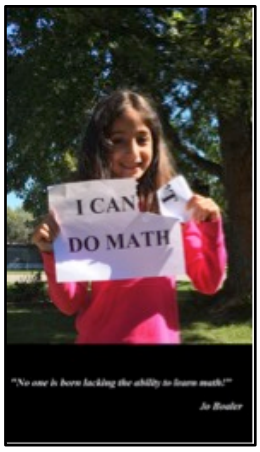
Andrew Hoffman graduated in 2017 and started this fall as an Assistant Professor of Mathematics at Huntington University. His primary responsibility will be teaching undergraduate mathematics courses, both upper- and lower-division. He will teach an occasional methods course and continue to participate in the mathematics education community in Indiana. He and his wife bought a house in Fort Wayne and are expecting a son in February.

Brooke Max published an article in *AMTE Connections* with national survey results on the mathematics preparation of elementary teachers – this article can be retrieved at https://amte.net/connections/2017/09/mathematics-preparation-elementary-teachers-results-national-survey. She also presented results from a phenomenology on teachers' lived experiences related to confidence and insecurity at PME-NA with Molly Amstutz, Lizhen Chen, and Mahtob Aqazade.

Sue Ellen Richardson presented a brief research report at PME-NA: *Dewey on Early Childhood Teachers' Experiences Learning and Teaching Mathematics*. She also presented a poster with a graduate student research team, including Soo Jung Kim, & Qingli Lei: *A Multidisciplinary Team's Emerging Views of Mathematics Learning: Developing a Digital Mathematics Game.*

Elizabeth Suazo presented *A Mathematics Teacher Educator's Learning Experience: Unpacking Relationships, Mathematics, and Emotions* at the Mid-Western Educational Research Association 2017 conference. She will also present *Two Mathematics Teachers Working Together: Unpacking our Collaborative Relationship* at the ICTM Fall 2017 conference. She will begin work as a Postdoctoral Research Associate in the Biology Education Research Department of Biological Sciences at Purdue starting in January 2018. In this position, she will be implementing research related to undergraduate students' use of graphs in biology contexts.

Hanan Alyami's daughter, Reema Almakrami, shreds a common myth about math as seen in the photo below.



Indiana University - Southeast

Growing Tomorrow's STEM Teachers (GTST): Science, Technology, Engineering and Mathematics Teacher Recruitment Grant

IU Southeast School of Education was awarded a $240,000 two-year grant by the Indiana Commission for Higher Education (ICHE) to enhance recruitment, preparation and education of highly qualified pre-service and in-service STEM teachers in Indiana school corporations. The GTST Grant:

- awards 18 graduate credits, for free, to 20 candidates enrolled in either IU Southeast's Master of Science in Secondary Education or the Advance to Teaching post-baccalaureate program in a STEM area. Additional support money is available for travel, conferences, release time, materials, and dependent care. Candidates can obtain their master's or initial teaching license while still working.
- offers professional development workshops and seminars for K-12 teachers that has direct relevance to all STEM teachers' classrooms.
- updates current Dual-Credit high school teachers who do not meet the new Indiana's Higher Learning Commission requirements to qualify for the new requirements through a Master of Secondary Education program with a Concentration in a STEM content.
- develops future Dual-Credit high school teachers that will be attuned to State requirements through a Master of Secondary Education program with a Concentration in a STEM content area with 18 hours in content and 18 hours in content pedagogy.
- recruits new, highly-qualified post-baccalaureate candidates into an initial teaching license in secondary education STEM areas through a State-approved Advance to Teaching licensure pathway.
- provides long-term mentoring from education, natural science and industry personnel, to assist these candidates to stay in the classroom.

GTST School Supporters: West Clark Community Schools, Greater Clark County Schools, Lanesville Community School Corporation, and South Harrison Community School Corporation

GST Business Partners: SAMTEC, Maker 13, Floyd County Soil & Water Conservation, Amatrol and Johnson and Johnson

Please contact Dr. Alan Zollman at alanzoll@ius.edu for GTST program information, or immediately fill out an initial interest form at https://webdata.ius.edu/forms/se-view.php?id=147214