

**MATHEMATICS EDUCATION  
GRADUATE PROGRAM AREA**

**STRATEGIC PLAN**

**MISSION STATEMENT**

The graduate program of Mathematics Education at Purdue University prepares mathematics educational professionals, prospective mathematics teachers and graduate students - with an understanding of contemporary research issues and directions in mathematics education. Faculty and graduate students form a dynamic community of scholars who conduct research grounded in classroom practice through implementing, testing and revising their ideas in rural, suburban and inner-city K-12 schools and in interdisciplinary settings within the university community.

The Graduate Faculty of the Mathematics Education Program Area has identified *mathematics for teaching* as foci for future collaborations. Mathematical knowledge for teaching (MKT) has been defined as the mathematical knowledge, skill, and habits of mind entailed by the work of teaching. MKT is composed of several subsections of knowledge which are found within the overlap of subject matter knowledge and pedagogical content knowledge<sup>1</sup>. These areas of knowledge inform teachers as they engage in the tasks of teaching: unpacking and decomposing mathematical ideas, sequencing ideas, choosing and using representations and examples, explaining and guiding explanation, using mathematical language and notation, analyzing errors, interpreting and evaluating alternative solutions and thinking, analyzing mathematical treatments in textbooks, making mathematical practices explicit, and attending to issues of equity. Such a focus is a critical next step and we plan to develop and conduct research that examines how teachers develop and implement the mathematics needed for teaching. This strategic focus and development of a research program also includes securing funding that supports graduate students.

Graduate students often enter our program area with a strong background in mathematics – a fact not surprising given that Purdue University is an engineering and science intensive institution. Yet, these students would greatly benefit from an increased concentration on educational issues. Thus, we embrace this opportunity as we design research and engage in teacher development. We propose the development of a sequence of courses, Mathematics for the Development of Teaching, that are especially relevant to education professionals. These courses will both be an opportunity for mathematical educators to develop and hone their craft, and serve as research sites for the development of mathematics for teaching.

Five courses have been identified that specifically address mathematics for teaching. These courses, or perhaps a subset of these courses, will be offered at both the masters and doctoral level of graduate study.

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<sup>1</sup> CPTM. (January 24-25, 2007). *Developing Teachers' Mathematical Knowledge for Teaching, Part 2*  
Paper presented at the CPTM AMTE 2007 Pre-Session.

Mathematics for Teaching in the Elementary School

Mathematics for Teaching in the Middle School

Mathematics for Teaching in the High School

Problem Solving in Mathematics

Technology, Teaching and School Mathematics

Further, we propose the development of two additional courses that are appropriate for both Master's level and Ph.D. students. The purpose of the courses is to develop background knowledge in crucial mathematics education areas.

Curriculum in Mathematics Education

Teaching and Learning in Secondary School Mathematics

Faculty members in the Mathematics Education Program Area are committed to:

- Creating and disseminating knowledge relevant to the discipline;
- Preparing scholars, educators, and leaders in mathematics education on the international, national, and local levels;
- Developing our faculty and students into a community of learners whose ideas are mutually discussed, supported, and valued.
- Promoting social equity through access to mathematics for all learners.

### **THE SCHOLARSHIP OF DISCOVERY**

GOAL: To establish and maintain research funding and interdisciplinary scholarship.

ACTION STEPS:

- Develop collaborative, large scale research projects with faculty in other disciplines.
- Hire new faculty members in mathematics education allowing for collaborative, large-scale research projects. It would be optimal to hire two more mathematics educators with emphasis on middle grades/secondary as well as the elementary level. Hiring an educator with an interest/expertise in policy is also desirable.
- Increase publications in peer-reviewed journals through informal mentoring.

### **THE SCHOLARSHIP OF LEARNING**

GOAL: To establish and support avenues for faculty and graduate students to engage in scholarly activities.

ACTION STEPS:

- Establish and maintain high-quality graduate courses that span classic research, the development of major research programs, and the identification, design, and implementation of research that attends to current issues in the field.
- Incorporate opportunities for graduate students to begin engaging in research activities early in their program.
- Recruit and provide financial support for high-quality doctoral students.
- Hire new faculty members in mathematics education.

### **THE SCHOLARSHIP OF ENGAGEMENT**

GOAL: To impact mathematics programs, locally and nationally.

ACTION STEPS:

- Develop collaborations with local practicing teachers to effectively meet the need of K-12 students.
- Design and implement professional development courses and programs that support the current standards of mathematics reform for K-12 teachers.
- Promote critical awareness of political issues of mathematics education and the need for educators to advocate for policy that is consistent with current theory and research through teaching, presentations, and publications.
- Hire new faculty members in mathematics education.

### **MATHEMATICS EDUCATION FACULTY**

Lecretia A. Buckley, Assistant Professor  
Andrew M. Tyminski, Assistant Professor  
Ron Tzur, Professor  
Terry Wood, Professor