Brothers, Sheila C

From: Swanson, Hollie
Sent: Tuesday, December 07, 2010 8:07 AM
To: Denison, Dwight V
Cc: Brothers, Sheila C
Subject: RE: STEM proposal approved by SAOSC

From: Denison, Dwight V
Sent: Monday, December 06, 2010 12:59 PM
To: Swanson, Hollie
Subject: FW: STEM proposal approved by SAOSC

Hollie,
As you see from this email the SAOSC committee approved the STEM department proposal for advancement to the Senate Council. We ask a few clarifications of the proposal but none of them are significant enough to delay the advancement of proposal. Let me know if you need anything else from me.
-Dwight

Dwight V. Denison, PhD
Professor of Public and Nonprofit Finance
Director of Graduate Studies, MPA and MPP programs
Martin School of Public Policy and Administration
University of Kentucky
415 Patterson Office Tower
Lexington KY 40506
Email: dwight.denison@uky.edu
Phone: 859.257.5742

From: Denison, Dwight V
Sent: Monday, December 06, 2010 12:27 PM
To: Wilhelm, Jennifer; Swanson, Hollie; Brothers, Sheila C
Cc: Denison, Dwight V; 'Bill Smith'; Debski, Elizabeth A; Ederington, Josh; Farrell III, Herman D; Jasper, Samuel J; Lee, Brian D; Maynard, Leigh; Saatman, Kathryn; Scutchfield, Douglas
Subject: STEM proposal approved by SAOSC

Jennifer,
I appreciate you and your colleagues attending the SAOSC meeting this morning. The STEM department proposal was approved to advance to the Senate Council. However, we ask that you modify the proposal to reflect a few points that came up in our discussion this morning before going to the full Senate.

1. In table 1 please list faculty rank (not just junior /senior)
2. In Figure 2, list the chair position but not your name in the chart and indicate that the position will be filled following college protocols. The same would be true for any other position were a name is “proposed”. Alternatively you could footnote the chart stating the individuals for indicated positions have been discussed (proposed) but the actual appointment would follow college protocols.
3. Provide a statement summarizing the points made in our meeting about the roles and responsibilities of joint faculty. For example, joint faculty will have input on curriculum issues related to their expertise and may be appointed to STEM faculty search committees.
4. The points on page 51-52 are important. We suggest that these points be moved up as an appendix to the main document with a brief statement of the context and then identify who (Dean, chair, provost? Etc.) is responding to the questions.

Congratulations on a very fine proposal and let me know if you have questions on these four points.

Sincerely,
Dwight

Dwight V. Denison, PhD
Professor of Public and Nonprofit Finance
Director of Graduate Studies, MPA and MPP programs
Martin School of Public Policy and Administration
University of Kentucky
415 Patterson Office Tower
Lexington KY 40506
Email: dwight.denison@uky.edu
Phone: 859.257.5742

Proposal for a STEM Education Department within the College of Education

We propose to form a Department of Science, Technology, Engineering, and Mathematics [STEM] Education within the University of Kentucky [UK] College of Education. First and foremost, our proposed department aims to increase and retain Commonwealth and national participation of individuals in the STEM pipeline pre-K through their time in the workforce. Ultimately, our efforts will help fulfill the recent efforts made by President Lee Todd when he joined three other university leaders – University of Kansas' Chancellor Bernadette Gray-Little, University System of Maryland's Chancellor and UK alumnus Brit Kirwan, and University of Colorado's Chancellor Philip P. DiStefano – in presenting President Obama with a letter (see letter and media documents in Appendix C, page 29) signed by leaders from 79 public research universities "to substantially increase the number and diversity of high-quality science and mathematics teachers we prepare, and to build better partnerships among universities, community colleges, school systems, state governments, business and other stakeholders." To achieve these ambitious and urgent goals requires the concerted efforts of those with a common vision who share focused, relevant expertise in STEM education.

The proposed Department will expand and enhance STEM Education at UK and for the Commonwealth in significant ways. Along with strengthening teacher preparation programs already in place (e.g., Elementary, Middle School, Master's with Initial Certification, and Advanced Master's in STEM Education) in continued collaboration with the Department of Curriculum and Instruction, the STEM Education Department will build new bachelor's and doctoral programs in science, technology, engineering, and/or mathematics education. Our proposal is directly in line with President Barack Obama's "Educate to Innovate" initiative and his movement to reduce the national shortage of science and mathematics teachers. We believe we can take center stage and serve as a model for other universities in moving the "Educate to Innovate" project forward.

In addition, the new department will lead the Commonwealth in STEM Education research by attracting graduate students as well as future STEM faculty researchers pursuing cutting edge research in these disciplines. We seek to help position the UK College of Education alongside its peers nationally with respect to STEM education research, doctoral education, and STEM teacher education, especially at the undergraduate level. Our plan is to become the top program for preparing future STEM Education faculty members, researchers, and both undergraduate and graduate students. Immediately upon becoming a department, we will submit an undergraduate degree program, which will give STEM and STEM Education majors the opportunity to be certified to teach within four years. This opportunity currently does not exist at UK. Over the long term, the creation of a PhD within the STEM Education Department would be nationally ground-breaking and place UK on the cutting edge among benchmarks. Given the national shortage of PhD graduates to fill vacant faculty positions in STEM education disciplines, UK has the strong potential to fill an important market niche. Thus, we believe this proposal supports UK's Top 20 goals. This effort would increase the number of doctorates that UK produces and would elevate productivity in the College of Education.

Why a Science, Technology, Engineering, and Mathematics Department?

Since the launch of Sputnik and the passing of the National Defense Education Act of 1958 in its wake (Carney, Chubin, & Malcom, 2008), the U.S. government and non-government organizations have continued to increase their funding of endeavors meant to improve K-20 STEM education, mostly with the ultimate goal of swelling the pipeline of individuals that will, eventually, grow the national STEM workforce (Carney et al., 2008; Kuenzi, 2008). More recent reports such as *A Nation At Risk* (National Commission on Excellence in Education, 1983) and *Rising Above the Gathering Storm* (Committee on Science, Engineering, and Public Policy, 2006) have kept the concern for STEM education reform paramount in the nation's psyche. In recent years, the principal federal agencies charged with distributing funds meant to improve STEM education have been The National Institutes of Health (NIH) and The National Science Foundation (NSF) (Kuenzi, 2008).

Given the main focus of many of these grants and others' required attention to *broader impacts* concerning society at large, the current reality for many postsecondary faculty is that if they wish to compete for federal funding in the current economic climate they need to demonstrate involvement in K-20 STEM education improvement endeavors. This is an especially salient reality for faculty working at research universities where the pressure to secure federal funding is at its greatest and the carrot of funding is especially motivating of faculty (Holley, 2009; Rhoten, 2004). This reality often requires interdisciplinary collaborations, across the natural and social sciences as well as within these umbrella areas. Still, economic realities are just a set of motivations driving interdisciplinary faculty collaborations and the common passions and goals regarding an envisioned collaboration can serve as powerful motivators too (Eddy, 2010). Regardless of the initial motivations, successful interdisciplinary collaborations can allow for great strides with respect to STEM education reform in allowing for postsecondary environments to foster greater understanding of, and solutions for, inadequately addressed by single disciplines' knowledge and practices (Aram, 2004; Holley, 2009; Lattuca, 2001; see also Caruso & Rhoten, 2001).

To help UK meet the call to be more entrepreneurial

None of our benchmark institutions are forming STEM Education departments, precisely one of the reasons why UK should. As President Lee Todd, the provost, and various other stakeholders have endorsed, UK must find ways to be entrepreneurial, lest it be outcompeted or rendered less relevant. According to Schuster and Finkelstein's pivotal work (2006), major changes across the academy nationally are occurring more rapidly than at any other time since the birth of higher education. These changes are driven, mostly, by technological advances and demands of the market. To compete, UK must be open to changes to better meet the need of its citizenry in the modern environment, including changes regarding the restructuring of faculty work in way that capitalizes on market forces (Schuster & Finkelstein, 2006).

To better secure leadership of STEM education research and teaching resides with those trained in STEM education

"The cultural implications of an autonomous interdisciplinary program are significant for an institution. Such programs are afforded the independence granted to traditional colleges and disciplines; they are also granted the autonomy to determine academic policies, faculty hiring, student admissions, and curricular decisions" (Holley, 2009, p. 93). Most research at universities is externally supported (Slaughter & Leslie, 1997) and secured grants now serve as a main organizing factor at research universities, just behind the institution itself and the department (Geiger, 2004; Holley, 2009). Besides the obvious affordances granted an academic department at a university, and including the means to control external research dollars, our proposed STEM Education department will allow for greater oversight of STEM Education, and all that this encompasses, by those that have been training in STEM Education. We recognize the necessary and incredibly important involvement of others in the STEM Education initiative and, in fact, plan to organize our department with its joint appointments of faculty from Arts & Sciences, PIMSER, and Engineering. We also recognize the necessity to secure STEM Education as a department within the College of Education since it is intimately connected to other social sciences through institutional structure at the University of Kentucky.

To better focus on undergraduate and graduate student learning

Recognizing the need to prepare students for their "modern interdisciplinary futures" (Holley, 2009), interdisciplinary programs of study are being offered at most institutions of higher education. Yet interdisciplinary programs move beyond a simply economic model regarding student benefits. They also allow for greater student-centered pedagogy; this occurs with respect to engaging students in practices and knowledge that unite disciplines and in meeting students' interests in their education pursuits, allowing for more well-rounded, practical, education applicable in an ever-changing world (Haynes, 2002; Holley, 2009). More universities, including our benchmarks, now encourage students' co-development of interdisciplinary majors. These include the Program In Individualized Studies at the University of Washington, the Gallatin School of Individualized Studies at New York University, the University of Alabama's New College, and the Interdisciplinary Studies Program at Michigan State. Students in these programs work with an advisor or committee in planning their interdisciplinary program of study that cater to student interest, with, of course, faculty being responsible for making sure student focus is appropriately broad and measurable. Ongoing assessment is measured often in portfolios and culminating projects (Holley, 2009). A department made up of faculty with background in STEM and STEM teacher education within their areas of training, and supported by the structures of a department, secures informed assessment of interdisciplinary, and even transdisciplinary, student work.

Theoretical Framework of the Science, Technology, Engineering, and Mathematics Education Department

All endeavors will be framed with a transdisciplinary design. We define *transdisciplinary* as engagement, investigation, innovation, and praxis addressing present-day issues and problems in a way that explicitly highlights discipline commonalities while respecting disciplinary expertise and practice within and across STEM (Thompson Klein et al., 2001; Nicolescu, 2002).

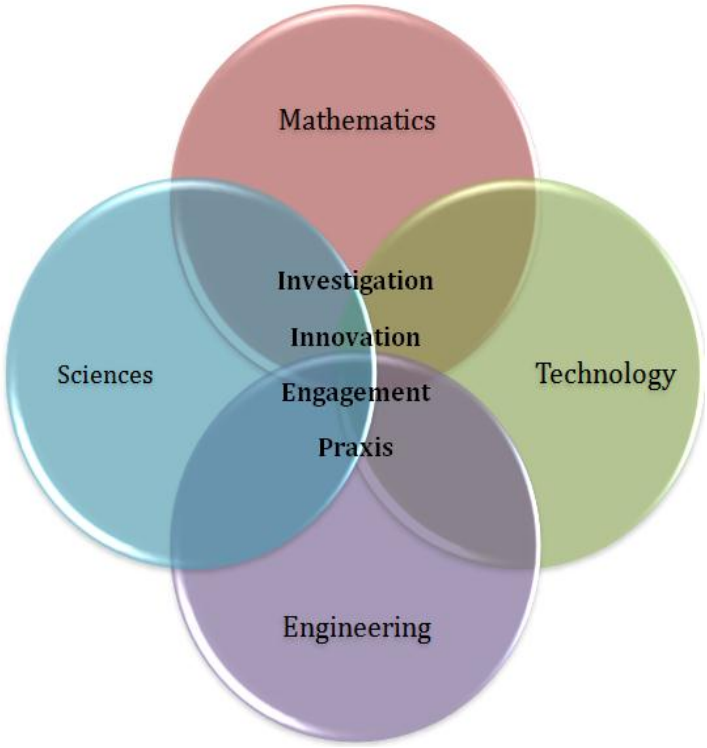


Figure 1: Transdisciplinary approach uniting UK STEM Education Department endeavors

How can we foster these much-needed interdisciplinary and transdisciplinary collaborations with respect to STEM education with the current academic and financial realities in mind? Some of our benchmark institutions are attempting to figure this out, such as The University of Wisconsin–Madison, Duke University, the University of Southern California, and the Pennsylvania State University, who all have an explicit goal to hire interdisciplinary faculty. Some do so as *cluster hires*, or groups of faculty with promise of informing an interdisciplinary topic but still with main affiliation within a department (Holley, 2009; Sa, 2008). While such practice has promise to work within the historical structure of the postsecondary institutions and the all-powerful department, an improvement to this tactic is undoubtedly the creation of a transdisciplinary department, with all the protections and affordances, to its students and faculty, that departments allow.

Our unique, timely, and focused department will be grounded in our college-wide framework of *Research and Reflection for Learning and Leading* and related to national accreditation standards through NCATE (National Council of Accreditation of Teacher

Education). Our department-specific framework is guided by standards and recommendations from the following:

- National Research Council,
- American Association for the Advancement of Science,
- National Academy of Engineering and the American Society for Engineering Education,
- International Society for Technology in Education, and
- National Council of Teachers of Mathematics.

All six organizations stress an understanding of central discipline specific concepts as well as those that unite the disciplines, such as, the tools of inquiry, the importance of professional values/ethics, skills in the use of technology, and a commitment to multicultural competence and awareness.

Science, Technology, Engineering, and Mathematics Education Department Long-Range Plans

There are three phases to our proposed STEM Education Department plan. Below is an overview of each of the three Phases with discussions of each following.

Phase 1 (Immediate upon establishment of Department)

- The establishment of a STEM Education Department within the College of Education.
- The movement of eight education faculty (see Table 1) from the Curriculum and Instruction Department to the new unit of STEM Education.
- The transfer of the current undergraduate mathematics and science secondary education programs, the Advanced Master of Science in STEM Education program, and the Master of Arts in Education (with initial certification) in mathematics and science programs from the Department of Curriculum and Instruction to the STEM Education Department. (see Table 3)

Phase 2 (February 2011 – February 2012)

- The development, approval, and implementation of a new undergraduate certification program (called "STEM PLUS") where undergraduate students can major in STEM Education and a content area with secondary teaching certification in one or more state-certifiable STEM subjects in just 4 years. In addition, a stand-alone STEM Education major will be created to allow for greater flexibility and multiple pathways towards becoming a STEM teacher. These options currently do not exist for potential secondary mathematics, science, and/or computer science teachers.
- The establishment of no cost joint appointments between faculty from the Colleges of Arts & Sciences, Engineering, and Education.

Phase 3 (March 2012 – March 2013)

- The development, approval, and implementation of a new STEM Education doctoral program. (Prior to the development of this doctoral program, PhD students are enrolled in the Interdisciplinary Educational Science program housed at the College level.)

Phase One Discussion

Currently our STEM Education faculty consists of nine faculty lines. We have four faculty members in mathematics education, Xin Ma, Margaret Mohr-Schroeder, Molly Fisher, and Christa Jackson. Xin Ma is 50% in the Department of Curriculum and Instruction and 50% in the Department of Educational, School, and Counseling Psychology. Upon approval of the STEM Education Department, his appointment would change to 50% in the Department of STEM Education and 50% in the Department of Educational, School, and Counseling Psychology. Our four science education faculty members include, Jennifer Wilhelm, Rebecca McNall Krall, Jana Bouwma-Gearhart, and Christine Schnittka. In addition, we have one open senior mathematics education regular title faculty line.

Our STEM Education faculty is strong in both content and pedagogical content knowledge with five faculty members holding bachelors and master's degrees in the content areas of physics, engineering, mathematics, and biology and doctorates in mathematics, mathematics/science, and science education. Content and Research Expertise as well as area of teaching (currently and future) are listed in Table 1 below. All of the faculty vitas can be accessed online at: http://education.uky.edu/EDC/content/faculty. For specific current Curriculum and Instruction courses, the future of these courses, and how it will impact Curriculum and Instruction programs please see the Appendix A, page 21.

As Regular Title Tenure and Tenure-Track Faculty, all of our teaching loads are 2-2.

Table 1: *STEM Education Department Faculty Expertise*

STEM EDUCATION FACULTY	CONTENT EXPERTISE	RESEARCH EXPERTISE	CURRENT COURSES TAUGHT IN DEPT. OF C&I	COURSES TO BE TAUGHT IN DEPT. OF STEM ED
Jana Bouwma-Gearhart, Ph.D., Assistant Professor	Biology, Chemistry, Genetics, Bacteriology, Evolution	Motivation In Teaching and Learning, Educator Professional Development, Modeling-based Inquiry, Mixed Methods Methodology, Qualitative Methodology, Evaluation	Graduate STEM Education and Biology Content Classes, Secondary Science (MIC) Methods	Graduate STEM Education and Biology Content Classes, STEM PLUS courses, Secondary Science (MIC) Methods
Molly Fisher, Ph.D., Assistant Professor	Mathematics, Technology	Mathematics Teacher Retention, Teacher Stress and Burnout	Elementary Mathematics Methods, Graduate STEM Education Classes	Elementary Mathematics Methods (service course), Graduate STEM Education Classes
Christa Jackson, Ph.D., Assistant Professor	Mathematics, Chemistry	Equity in Mathematics Education, Issues of Social Justice, Qualitative Methods with Emphasis in Ethnography	Graduate STEM Education Courses, Elementary Mathematics Methods Class, Advanced Elementary Methods	Graduate STEM Education Courses, Assessment & Equity in STEM Education (STEM PLUS), Elementary Mathematics Methods (service course), Advanced Elementary Methods

STEM EDUCATION FACULTY	CONTENT EXPERTISE	RESEARCH EXPERTISE	CURRENT COURSES TAUGHT IN DEPT. OF C&I	COURSES TO BE TAUGHT IN DEPT. OF STEM ED
Rebecca McNall Krall, Ph.D., Associate Professor	Biology, Environmental Science	Preservice/ Inservice Teacher Education, Scientific Knowledge for Teaching, Distance Learning, Integration of Educational Technology in Science Instruction	Graduate STEM Education Classes, Elementary Science Methods, Advanced Elementary Science Methods	Graduate STEM Education Classes, Elementary Science Methods (service course), Advanced Elementary Science Methods
Xin Ma, Ph.D., Full Professor	Mathematics, Statistics	Attitude and Motivation In Mathematics, Comparative International Education Systems, Advanced Quantitative Methods	Graduate Mathematics Education Classes, Middle Level Mathematics Methods	Graduate Mathematics Education Classes, Middle Level Mathematics Methods (service course)
Margaret Mohr-Schroeder, Ph.D., Assistant Professor	Mathematics, Biology	Mathematics Knowledge for Teaching, Preservice Teacher Education, Quantitative, Mixed Methods Methodology, Assessment, Educational Technology	Graduate STEM Education Classes, Secondary Mathematics Methods (MIC), Survey of Secondary Mathematics Curriculum	Graduate STEM Education Classes, Secondary Mathematics Methods (MIC), STEM PLUS courses

STEM EDUCATION FACULTY	CONTENT EXPERTISE	RESEARCH EXPERTISE	CURRENT COURSES TAUGHT IN DEPT. OF C&I	COURSES TO BE TAUGHT IN DEPT. OF STEM ED
Christine Schnittka, Ph.D., Assistant Professor	Mechanical Engineering, Physics	Engineering Design-based Science Education, Educational Technology	Graduate STEM Education Courses, Elementary and Middle Level Science Methods	Graduate STEM Education Courses, Elementary Science Methods (service course), Middle Level Science Methods (service course)
Jennifer Wilhelm, Ph.D., Associate Professor	Physics, Mathematics	Project-based Instruction, Physics and Mathematics Education, STEM Integration	Graduate STEM Education Classes	Graduate STEM Education Classes, STEM PLUS courses

Four faculty members will be at the senior level (Jennifer Wilhelm, Xin Ma, Rebecca McNall Krall, and future senior level mathematics education hire) and have full time graduate faculty status, enabling them to chair doctoral committees, or act as committee co-chairs with other junior faculty members within the department. All of the junior faculty members have part-time graduate faculty status enabling them to serve on committees and/or co-chair committees with a senior faculty member. Several of the proposed department junior faculty members have already had many experiences co-chairing doctoral committees. Currently we have twenty active doctoral students chaired and/or co-chaired by STEM Education faculty (see Table 2 below).

Table 2. *Active STEM Education Doctoral Students and their Faculty Advisors*

Advisor Name	Student
Ron Atwood (Professor Emeritus)	Diane Johnson (Science Education)
Rebecca McNall Krall	Ashlie Beals (Science Education
Xin Ma	Antoinette Davis (Mathematics Education)
	Anushka Karkelanova (Mathematics Education)
	Amber Sullivan (Mathematics Education)
	April Pilcher (Mathematics Education)
	Darlene Nelson (Mathematics Education)
	Karen Heavin (Mathematics Education)
	Lori Powell (Mathematics Education)
	Michael Osborne (Mathematics Education)
Margaret Mohr-Schroeder	Amy Green (Mathematics Education)
	David Little (STEM Education)
	Jamie-Marie Wilder (Mathematics Education)
	Robin Magruder (Mathematics Education)
	Ramona Birch (Mathematics Education)
	Robin McClaran (Mathematics Education)
	Tonja Hudson (Mathematics Education)
Jennifer Wilhelm	Jodi Mills (STEM Education)
Jennifer Wilhelm & Jana Bouwma-Gearhart	Jennifer Collins (Science Education)
Jennifer Wilhelm & Molly Fisher	Jennifer Ferguson (STEM Education)

Administrative Structure of the Science, Technology, Engineering, and Mathematics Education Department

Within the new department structure (see Figure 2 below), there will only be the need to add the administrative duties of a department chair and a director of graduate studies to faculty members' current loads. These two positions will be filled following typical College of Education and University procedures. Within the current administrative structure of the College of Education and its Teacher Education Unit (TEP), there exists Program Faculties, which govern each specific program within the TEP. Specifically for STEM Education, there exists Program Faculties for Science Education and Mathematics Education. Each Program Faculty is chaired by a faculty member within the program; Jana Bouwma-Gearhart is the current Program Faculty Chair for Secondary Science Education and Margaret Mohr-Schroeder is the current Program Faculty Chair for Secondary Mathematics Education. These positions and administrative duties operate in place of "Directors of Undergraduate Studies". (For more information about the Program Faculty Structure see: http://education.uky.edu/ADeanASTC/). Drs. Bouwma-Gearhart and Mohr-Schroeder have been Program Faculty Chairs of Science and Mathematics, respectively, since their arrivals

to UK, three- and five-years ago, respectively. Therefore, this would not represent any additional administrative load to them as junior faculty members. Molly Fisher and Christine Schnittka are co-directors of the STEM Education Lab within the *Kentucky P20 Innovation Lab* (http://p20.education.uky.edu/). They have been in this position for one year, therefore this would not represent any additional administrative load to them as junior faculty members. None of the current eight faculty members hold specific administrative duties within the current Department of Curriculum and Instruction except for Jana Bouwma-Gearhart and Margaret Mohr-Schroeder. However, since their programs for which they are Program Faculty Chairs will be transferred to the new STEM Education Department, there will be no administrative effect on the current Department of Curriculum and Instruction. (For details on the effect of resources and administrative duties within the remaining Department of Curriculum & Instruction please see Dean O'Hair's responses in Appendix B, page 27).

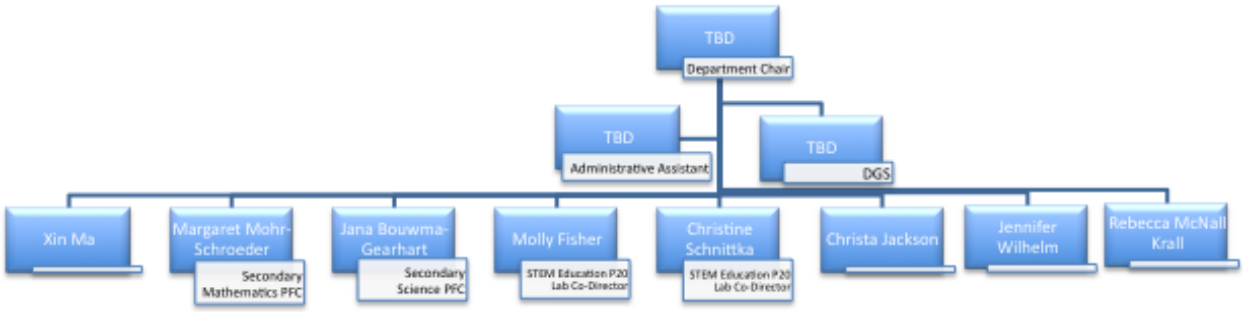


Figure 2. *Administrative Hierarchical Chart*

There are eleven committees within the College of Education in which the future Department of STEM Education would gain representation. Of these eleven committees, currently four of our eight faculty are members. There would be additional service requirements in terms of representation on these committees. The faculty DOEs would be adjusted to reflect this.

Program Structure within Science, Technology, Engineering, and Mathematics Department

Within the current structure of the Department of Curriculum and Instruction, there are 13 active degree programs at the undergraduate and graduate level. With the formation of the new STEM Education Department, five of these existing programs would be transferred to the new department. Table 3 below summarizes the current programs and enrollment and which programs would be transferred.

Table 3. *Current Programs and Enrollment*

Current Department of Curriculum and Instruction (2009-2010 enrollment)*	**Future Department of STEM Education**
Bachelor's in Elementary Education (495)	Elementary Education Mathematics and Science Methods as service courses
Master's In Elementary Education (13)	Advanced Elementary Mathematics and Science Methods as service courses
Undergraduate Secondary Education – English (101)	N/A
Ed.D. – Instruction and Administration (62)	N/A
Master's in Instructional System Design (9)	N/A
Undergraduate Secondary Education – Mathematics Education (66)	Will Transfer (66)
Bachelor's in Middle School Education (88)	Middle Grades Mathematics and Science Methods as service courses
Master's in Middle School Education (2)	N/A
Undergraduate Secondary Education – Science Education (22)	Will Transfer (22)
Master's Secondary Education (64) [includes Advanced Master's and MIC program]	Will Transfer MIC Mathematics (7), MIC Science (6), and Advanced Master's in STEM Education Programs (0)
Alternative Mathematics and Science Certification Program (0)	Will Transfer (0)
Undergraduate Secondary Education – Social Studies Education (157)	N/A
TOTAL Students (09-10): 1,079	**TOTAL Students based on 09-10: 101 (9.4% of C&I)**

*Most current available data

This chart does not include the twenty above-mentioned Ph.D. students. The program they are enrolled in is housed at the College level. They will continue in their current program of studies.

Phase Two Discussion

On February 1, 2011, the STEM Education Faculty will submit an innovative undergraduate secondary certification program (called *STEM PLUS – Preparing Leaders for rUral/Urban Schools*). STEM PLUS program participants will earn a Bachelors of Science in Education with a double major in STEM Education and their content major (i.e., mathematics, physics, chemistry, biology, earth science, physical science, computer science) with secondary teaching certification (grades 8-12) in one or more state-certifiable STEM subjects in just 4 years. In addition, a proposal for a STEM Education major will be submitted that will allow College of Arts and Sciences and College of Engineering students to add on secondary mathematics, science, and/or computer science certification to their current degree program (See page 79 for Dean Lester's support, both theoretically and financially, of the

undergraduate certification options involving computer science and engineering students and courses). The STEM Education major will serve as the secondary major within their Arts and Sciences or Engineering degree program. There currently does not exist an undergraduate certification option for secondary mathematics, science or computer science students at UK. This degree program and major will allow for greater flexibility and multiple pathways towards becoming a STEM teacher.

There will be two undergraduate secondary education programs transferred to the proposed STEM Education Department in science and mathematics. Although these are Bachelor Degree programs, they do not lead to certification. A student who is within this program must continue on to the Master's with Initial Certification (MIC) program in order to be certified. However, data from the past 10 years of these two undergraduate programs have revealed that over 60% of the graduates do not go on to the MIC program. A majority of graduates decide to pursue alternative certification routes from other colleges or universities such as Eastern Kentucky University, Morehead State University, Georgetown College, and Northern Kentucky University. The main reason for these students pursuing their certification elsewhere is the financial burden of an intensive, full-time, one calendar year, Master's degree program such as the MIC. The STEM PLUS program will replace the existing secondary mathematics and science undergraduate programs. Current students in the undergraduate mathematics and science education programs (99 total) will have the option of transferring into the STEM PLUS program or finishing out their current program which does not lead to certification. If they choose to finish out their current program, we will continue to advise and foster them into the MIC Mathematics and Science Program. In early discussions with students, juniors and seniors (approximately 35) were interested in finishing out their current programs and the remaining students were interested in transferring to the new program when it became available. Future STEM PLUS students will be the result of recruiting high school students to become STEM teachers and choose UK to pursue their bachelor's degree and certification. We will utilize an Introduction to STEM Education Course, UK Admissions Office, websites, brochures, and other additional media means to recruit for the STEM PLUS Program and STEM Education Major Option. Figure 3 below represents graduation rates for the current programs and projected graduation rates (highlighted in yellow) for the STEM PLUS program.

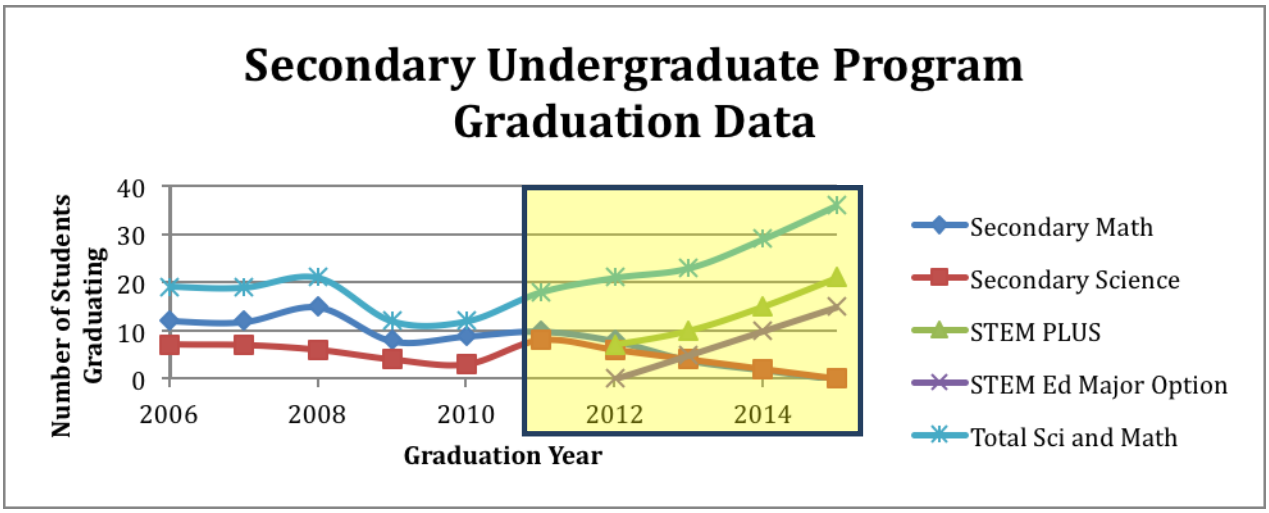


Figure 3. *Current and Projected Secondary Undergraduate Program Graduation Data*

UK is a member of the *Science and Mathematics Teacher Imperative* (SMTI) and *The Learning Collaborative* (TLC), initiated by President Lee Todd and sponsored by the Association of Public and Land-Grant Universities (APLU). SMTI/TLC commits to "transform middle and high school science, technology, engineering and mathematics (STEM) education by preparing a new generation of world-class science and mathematics teachers." The SMTI Initiative includes 125 public research universities—including 12 university systems. As part of the initiative, UK had to commit to increasing the number of STEM teachers the university produces. President Todd and College of Education Dean Mary John O'Hair committed to tripling the number of secondary STEM teachers produced by 2014 (see media clippings in Appendix D, page 39). Figure 4 below shows the current number of certified middle school and high school mathematics and science teachers graduating from UK. The highlighted yellow section represents the projected growth as a result of our undergraduate STEM Education Initiatives within our proposed new STEM Education Department. This tripling of numbers will help to meet the demand for highly qualified STEM teachers in secondary classrooms.

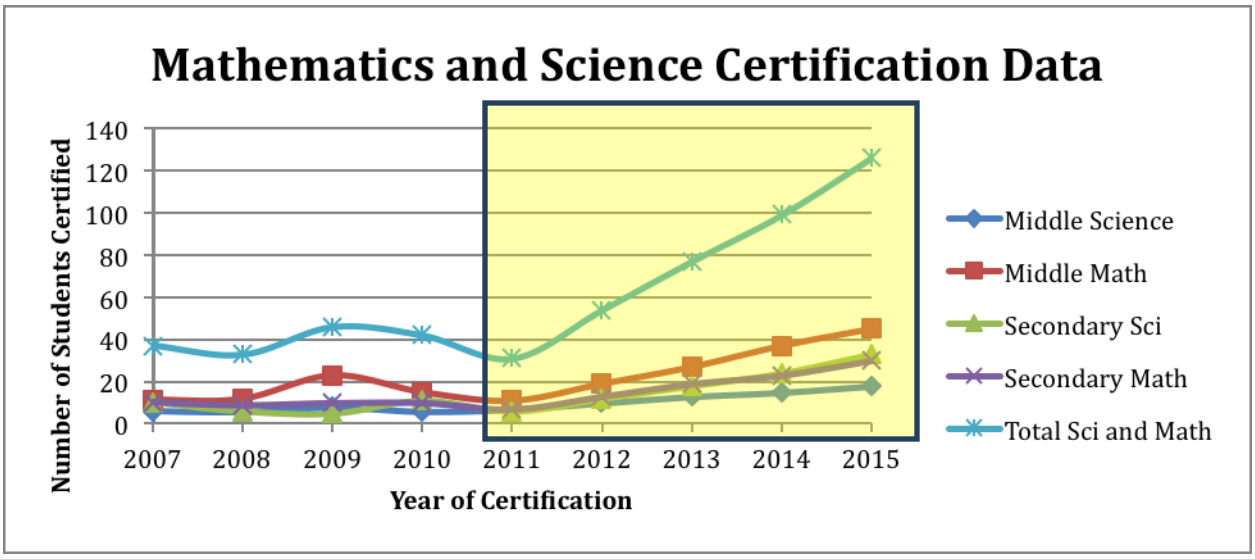


Figure 4. *Current and Projected Mathematics and Science Certification Data*

The lack of highly qualified mathematics and science teachers in middle and high school classrooms in the United States is a crisis that is well established. For example, unqualified teachers (i.e., out-of-field teachers) teach about 56% of high school students taking physical science and 27% taking mathematics. These percentages are magnified in high-poverty areas. Students enrolled in high minority schools have less than a 50% chance of having a science or mathematics teacher who has both a degree and license in the discipline taught (Darling-Hammond, 1999). Judy Jeffrey, a leader in the National Council of Chief State School Officers and the director of the Iowa State Department of Education, says, "In any given year, I have more openings for physics teachers than I can fill because I can't find highly qualified teachers in this field." This is compounded with the attrition of K – 12 teachers. Over the coming decade, approximately two-thirds of K – 12 teachers will either retire or leave the workforce. Of that, about 200,000 are secondary mathematics and science teachers (COSEPUP, 2007). The shortage of science and mathematics teachers is evident in the American Association for Employment in Education (AAEE) 2007 report, *Educator Supply and Demand in the United States* (see Figure 5 below).

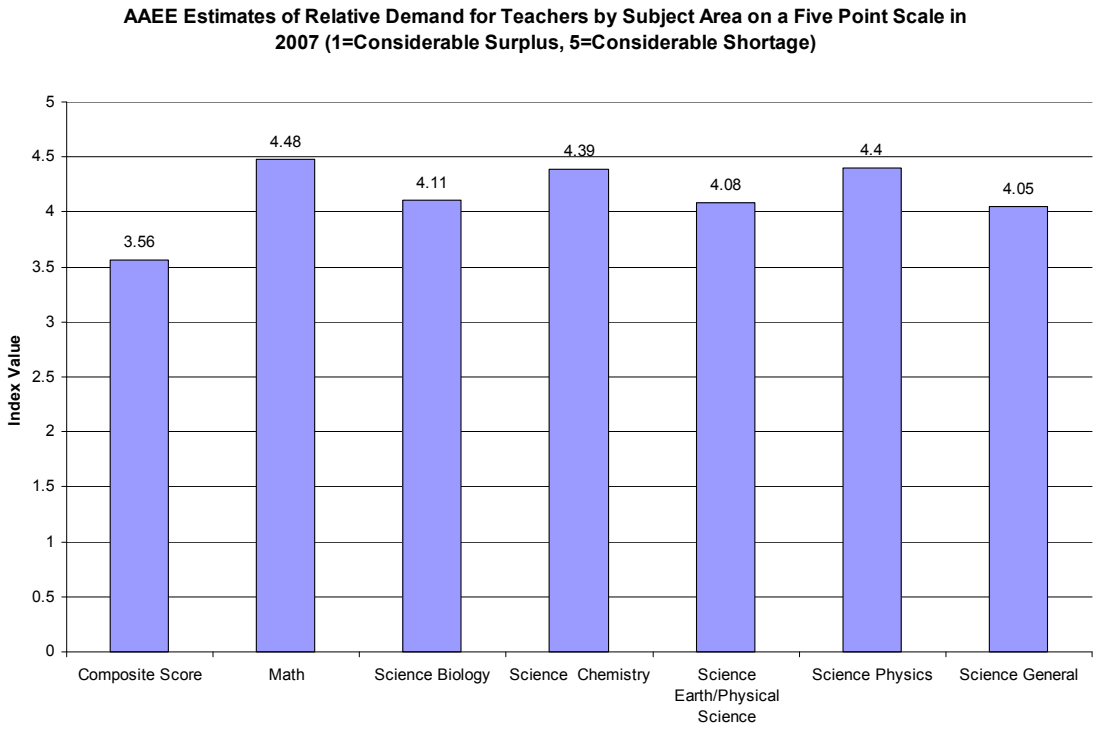


Figure 5. *Relative Demand for STEM Teachers by Subject Area*

At the state level, the Kentucky Department of Education annually compiles a list of certification shortage areas based on data provided by the Education Professional Standards Board (EPSB). Mathematics and science certification areas have been on the list since its inception in the 1990's. A review of the emergency issuances during the 2009-2010 school year indicates the reason for this inclusion. During this school year, the last for which there is a full year's set of data, the EPSB issued a total of 461 emergency certificates to districts in Kentucky. Of that number, 123 certificates were in the areas of biology, chemistry, physics, earth/space science (all grades 8-12), mathematics (grades 8-12), middle school science (grades 5-9), and middle school mathematics (grades 5-9). (see Executive Director Phil Rogers' letter of support, page 73)

The shortage and lack of qualified mathematics and science teachers has had a detrimental effect on the job market. A 2007 *Jobs for the Future* report remarks that three-quarters of students in America are not prepared for college studies in mathematics, science, engineering, and technology. Thus, employers are left to remediate gaps in knowledge and skills, as students are unable to apply their science education in a STEM work environment. Furthermore, according to a National Association of Manufacturers survey, 51% of employers state their graduates are "deficient in math and science" (Foster, 2010). If the U.S. is to be a leader in engineering, technology, and innovation in the global market, the state of science and mathematics education must be reversed.

We believe the addition of the STEM PLUS undergraduate degree program and the STEM Education Major Option will help to address state and national STEM teacher shortages. These two options, in addition to the current MIC Mathematics and Science Programs, will help to meet the SMTI/TLC commitment of tripling our STEM teachers and help meet the demand for more STEM teachers in the Commonwealth. The current draft of the STEM PLUS program has been vetted through the following departments: Mathematics, Biology, Physics, Chemistry, Civil Engineering, Mechanical Engineering, Chemical Engineering, Electrical Engineering, and Computer Sciences. All of the department chairs whole-heartedly embraced and approved the STEM PLUS initiative and the option of adding a second major to their current degree programs. In addition, Deans Lester and Kornbluh, Colleges of Engineering and Arts and Sciences, respectively, are supportive of the proposed programs and pathways.

Joint Appointments

Capitalizing on the significant contributions of our historical partnerships with faculty from the Colleges of Engineering and Arts and Sciences at UK, we plan to take these collaborations to a new level towards meeting the needs of our students who should graduate with expertise in both STEM content and STEM pedagogy. To this end, we plan to have no cost joint appointments within our proposed STEM Education Department for select STEM faculty in the Colleges of Arts & Sciences and Engineering, such as PIMSER outreach professors. Likewise, the content departments plan to grant reciprocal no-cost joint appointments to the STEM Education Department. The expectations of these joint appointments might include but not be limited to activities such as joint teaching, program development, grant writing, committee service, and research. Voting rights will be conferred to jointly appointed individuals to address curricula and programmatic changes and faculty hires.

Phase Three Discussion

Beginning in March 2012, the STEM Education Department will build upon the current redesigned STEM Education master's program and doctoral offerings in mathematics and science education to create a unique doctoral program for graduate students to pursue a PhD in science education, technology education, engineering education, and/or mathematics education. Our enrollment of Ph.D. students specializing in mathematics, science, and/or STEM education is 20 (see Table 2). We plan to increase this number by a factor of 2 by 2015. By 2015, seven of the eight current STEM Education faculty will have gone through the promotion and tenure process. The potential addition of these faculty members at the senior level in addition to the no-cost joint appointments will provide the capacity to chair the projected doctoral student growth.

Final Thoughts

Presently, we are aware of only two institutions that have STEM Education Departments (Old Dominion and University of Massachusetts – Dartmouth). None of our benchmark institutions are forming STEM Education departments, precisely one of the reasons why UK should. STEM is no longer simply an acronym for Science, Technology, Engineering, and

Mathematics; it represents not only disciplinary focus, but also a unification of the disciplines. It is its own entity and is much greater than the sum of its parts. UK needs to position itself now as the leader for STEM Education in the Commonwealth. We are formally requesting our new STEM Education Department will have a proposed January 2011 start date. The time is right, the people are here, and we are ready to make an immediate impact on innovation, investigation, engagement, and praxis in STEM Education.

References

Aram, J. (2004). Concepts of interdisciplinarity: Configurations of knowledge and action. *Human Relations, 57*(4), 379-412.

Carney, J. P, Chubin, D. E., & Malcom, S. M. (2008). Education and Human Resources in the FY 2009 Budget: Supporting the STEM Pathway. In the *American Association for the Advancement of Science's Report XXXIII Research And Development Fy 2009*. Committee on Science, Engineering, and Public Policy, Washington, DC. Retrieved online November 10, 2010 from http://www.aaas.org/spp/rd/09pch4.htm

Caruso, D., & Rhoten, D. (2001). *Lead, follow, get out of the way: Sidestepping the barriers to effective practice of interdisciplinarity.* White paper published by the Hybrid Vigor Institute. Retrieved November 11, 2010, from http://www.hybridvigor.net/interdis/pubs/hv_pub_interdis-2001.04.30.pdf.

Committee on Science, Engineering, and Public Policy (COSEPUP). (2006). *Rising above the gathering storm: Energizing and employing America for a brighter economic future.* Washington, DC: National Academies Press.

Darling-Hammond, L. (1999). *Supply, demand, and quality in mathematics and science teaching*. Briefing for the National Commission on Mathematics and Science Education for the 21st Century, Washington D.C.

Eddy, P. L. (2010). Special issue: Partnerships and collaborations in higher education. *ASHE Higher Education Report, 36*(2): 1-115.

Educator supply and demand in the United States. (2006). Columbus, OH: American Association for Employment in Education.

Foster, E. (2010). *A new equation: How encore careers in math and science education equal more success for students.* Retrieved November 18, 2010, from http://www.nctaf.org/documents/ElizabethFoster-ANewEquationpdf

Geiger, R. (2004). *Research and relevant knowledge: American research universities since World War II.* New Brunswick, NJ: Transaction Publishers.

Haynes, C. (Ed.) (2002). *Innovations in interdisciplinary teaching.* Westport, CT: American Council on Education/Oryx Press.

Holley, K. A. (2009). Special Issue: Understanding Interdisciplinary Challenges and Opportunities in Higher Education. *ASHE Higher Education Report, 35*(2): 1-131.

Jobs for the Future. (2007). *The STEM Workforce Challenge: The Role of the Public Workforce System in a National Solution for a Competitive Science, Technology, Engineering, and Mathematics (STEM) Workforce*. Prepared for the U.S. Department of Labor, Employment and Training Administration. Retrieved on November 18, 2010, from www.doleta.gov/Youth_services/pdf/STEM_Report_4%2007.pdf

Kuenzi, J. J. (2008). *CRS Report for Congress: Science, Technology, Engineering, and*

Mathematics (STEM) Education: Background,Federal Policy, and Legislative Action. Updated March 21, 2008. Retrieved online March 9, 2010 from www.fas.org/sgp/crs/misc/RL33434.pdf

Lattuca, L. (2001). *Creating interdisciplinarity: Interdisciplinary research and teaching among college and university faculty.* Nashville, TN: Vanderbilt University Press.

National Commission on Excellence in Education. (1983). *A nation at risk.* Washington, DC: Government Printing Office.

Nicolescu, B. 2002. *Manifesto of transdisciplinarity.* Albany, NY: State University of New York Press.

Rhoten, D. (2004). Interdisciplinary research: Trend or transition? *Items & Issues, 5*(1), 6–11.

Schuster, J. H., & Finkelstein, M. J. (2006). The restructuring of academic work and careers: The American faculty. Baltimore, MD: Johns Hopkins University Press.

Slaughter, S., and Leslie, L. (1997). *Academic capitalism: Politics, policies, and the entrepreneurial university*. Baltimore: Johns Hopkins University Press.

Thompson Klein, J., Grossenbacher-Mansuy, W., Häberli, R., Bill, A., Scholz, R. W., & Welti, M. (Eds.). 2001. *Transdisciplinarity: Joint problem solving among science, technology, and society: An effective way for managing complexity.* Switzerland: Birkhäuser Basel.

APPENDIX A

Current Courses Taught by STEM Education Faculty in Curriculum and Instruction and Future Courses Taught in STEM Education

There are currently 96 courses on record within the Department of Curriculum and Instruction. Twenty (21%) of these courses are taught by STEM Education Faculty Members. The following courses would be transferred to the STEM Education Department under "SEM" (as approved by registrar's office) and remain the responsibility of the STEM Education Faculty Members. Courses taught within set programs such as the MIC, Elementary, and Middle School Programs will continue to be coordinated with the Program Faculty Chair as usual. (see table 4). No existing Curriculum and Instruction courses will be cut or planned to be cut. Table 5 represents new courses to be created within the new STEM Education Department to meet the needs of STEM PLUS, current certification programs, and our graduate students. See "Forecasted STEM Education Course Offering" (table 6) for future course offerings.

Table 4: *Current Curriculum and Instruction Courses and the Future of the Course*

Course Number and Title	Responsible Faculty	Future of the Course
EDC 328: Teaching Science in the Elementary School	Christine Schnittka and/or Rebecca McNall Krall	SEM 328: Will continue to be taught as a service course to the Elementary Education Program
EDC 337: Teaching Mathematics in Elementary Schools	Molly Fisher and/or Christa Jackson	SEM 337: Will continue to be taught as a service course to the Elementary Education Program
EDC 345: Teaching Mathematics in the Middle School	Xin Ma	SEM 345: Will continue to be taught as a service course to the Middle School Program
EDC 348: Teaching Science in the Middle School	Christine Schnittka or Jana Bouwma-Gearhart	SEM 348: Will continue to be taught as a service course to the Middle School Program
EDC 421: Survey of Secondary Mathematics Curriculum	Margaret Mohr-Schroeder	SEM 421: This course will go through a major course change and become the first methods course in the STEM PLUS Program. It will be taught by Margaret Mohr-Schroeder, Jennifer Wilhelm, and/or Jana Bouwma-Gearhart.

Course Number and Title	Responsible Faculty	Future of the Course
EDC 603: Curriculum and Instruction in STEM Education	All STEM Education Faculty	SEM 603: This course was created by the STEM Education Faculty in Spring 2010 for use in the Advanced Master's STEM Education Program and the doctoral program
EDC 604: History of STEM Education	All STEM Education Faculty	SEM 604: This course was created by the STEM Education Faculty in Spring 2010 for use in the Advanced Master's STEM Education Program and the doctoral program
EDC 613: Effective Use of Technology for Modeling-Based Inquiry in STEM Education	All STEM Education Faculty	SEM 613: This course was created by the STEM Education Faculty in Spring 2010 for use in the Advanced Master's STEM Education Program and the doctoral program
EDC 631: Mathematics Pedagogy in the Secondary School	Margaret Mohr-Schroeder	The methods course for the MIC Program; will continue as SEM 631
EDC 634: Science Pedagogy in the Secondary School	Jana Bouwma-Gearhart	The methods course for the MIC Program; will continue as SEM 634
EDC 670: Advanced Study in the Teaching of Elementary School Mathematics	Molly Fisher or Christa Jackson	SEM 670: Course is taken by graduate students in elementary, middle, STEM Education, and doctoral programs
EDC 674 Advanced Studies in Teaching Elementary School Science	Rebecca McNall Krall	SEM 674: This course was created by the STEM Education Faculty in Spring 2010 for use in the Elementary, Middle, Advanced Master's STEM Education Program and the doctoral program

Course Number and Title	Responsible Faculty	Future of the Course
EDC 701: History of Mathematics Education	Molly Fisher or Xin Ma	SEM 701: Course is taken by graduate students in Advanced Master's STEM Education Program and doctoral program
EDC 702: Theoretical Foundations of Mathematics Education	Xin Ma or Margaret Mohr-Schroeder	SEM 702: Course is taken by graduate students in Advanced Master's in STEM Education Program and doctoral program
EDC 703: Advanced Research in Mathematics Education	Xin Ma	SEM 703: Course is taken by graduate students in Advanced Master's in STEM Education Program and doctoral program
EDC 704: Designing Project-Based Environments in STEM Education	Jennifer Wilhelm	SEM 704: This course was created by the STEM Education Faculty in Spring 2010 for use in the Advanced Master's STEM Education Program and the doctoral program
EDC 706: Research in STEM Education	All STEM Education Faculty	SEM 706: This course was created by the STEM Education Faculty in Spring 2010 for use in the Advanced Master's STEM Education Program and the doctoral program
EDC 708: Engineering in STEM Education	Christine Schnittka	SEM 708: This course was created by the STEM Education Faculty in Spring 2010 for use in the Advanced Master's STEM Education Program and the doctoral program

Course Number and Title	Responsible Faculty	Future of the Course
EDC 746: Subject Area Instruction in the Secondary School	Margaret Mohr-Schroeder and Jana Bouwma-Gearhart	EDC/SEM 746: This course is the student teaching credit for students in the MIC Program. In addition, there is a seminar built within the course. This course will not be transferred, but rather the course will be cross-listed as EDC/SEM 746.
EDC 770: Special Topics in STEM Education	All STEM Education Faculty	SEM 770: This course was created by the STEM Education Faculty in Spring 2010 for use in the Advanced Master's STEM Education Program and the doctoral program

Table 5: *Courses to be created in the STEM Education Department*

Courses to be Created	Responsible Faculty	Reason
SEM 110: Introduction to STEM Education (2 hrs)	All STEM Education Faculty	This will be the introductory course to STEM Education and will be used as a recruiting tool for increasing our potential pool of STEM teachers. It will be a required course within STEM PLUS and will contain a field experience component.
SEM 422: STEM Methods II (3 hrs)	Jennifer Wilhelm, Margaret Mohr-Schroeder, and/or Jana Bouwma-Gearhart	The second in a sequence of two methods courses for the STEM PLUS program. Specific sections will be created based on the current student population.
SEM 423: Assessment and Equity in STEM Education (2 hrs)	Christa Jackson, Margaret Mohr-Schroeder, Jennifer Wilhelm, or Jana Bouwma-Gearhart	A required course within the STEM PLUS Program. Taken concurrently with SEM 435.

Courses to be Created	Responsible Faculty	Reason
SEM 435: STEM Student Teaching in the Secondary School (10 hrs)	Jennifer Wilhelm, Margaret Mohr-Schroeder, and/or Jana Bouwma-Gearhart	Student credit for student teaching experience. Will include 4 observations, midterm and final assessment reviews, and final project review.
SEM 501: Teaching Internship (1-12 hours)		This course is a supervised practice teaching course under competent leadership. It is part of the Alternative Certification Program in Mathematics and Science and also serves as a general practicum course for students in special circumstances. It can be taken by undergraduate and graduate students.
SEM 767: Dissertation Residency Requirement	DGS/Advisor	Residency credit of dissertation research after the qualifying exam. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.
SEM 781: Independent Study in STEM Education	All STEM Education Faculty/Consent of DGS	An independent study course for graduate students.

Table 6: *Projected STEM Education Department Courses Schedule*

	Fall 2010	Spring 2011	Fall 2011	Spring 2012	Fall 2012	Spring 2013	Fall 2013	Spring 2014	Fall 2014	Spring 2015	Fall 2015	Spring 2016
EDC 328: Teaching Science in the Elementary School	2 sections - Becky Krall & Chris Schnittka	2 sections - Becky Krall & Chris Schnittka	2 sections - Becky Krall & PTI or GA	2 sections - Becky Krall & Chris Schnittka	2 sections - Becky Krall & GA	2 sections - Becky Krall & Chris Schnittka	2 sections - Becky Krall & Chris Schnittka	2 sections - Becky Krall & Chris Schnittka	2 sections - Chris Schnittka & GA	2 sections - Becky Krall & Chris Schnittka	2 sections - Becky Krall & GA	2 sections - Becky Krall & Chris Schnittka
EDC 337: Teaching Mathematics in the Elementary School	2 sections - Christa Jackson & Bev Dean	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & GA	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & GA	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & Molly Fisher	2 sections - Christa Jackson & Molly Fisher
EDC 345: Teaching Mathematics in the Middle School	Xin Ma		Christa Jackson		Xin Ma		Christa Jackson		Xin Ma		Christa Jackson	
EDC 348: Teaching Science in the Middle School	Christine Schnittka		Christine Schnittka		Christine Schnittka		Christine Schnittka		Christine Schnittka		Christine Schnittka	
EDC 421: Survey of Secondary Mathematics Curriculum	Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder	
EDC 603: Curriculum and Instruction in STEM Education	Molly Fisher		Molly Fisher		Molly Fisher		Molly Fisher		Molly Fisher		Molly Fisher	
EDC 604: History of STEM Education		Jennifer Wilhelm				Jennifer Wilhelm				Jennifer Wilhelm		
EDC 613: Effective Use of Technology for Modeling-Based Inquiry in STEM Education			Becky Krall			Becky Krall			Becky Krall			Becky Krall
EDC 631: Mathematics Pedagogy in the Secondary School	Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder	
EDC 634: Science Pedagogy in the Secondary School	Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart	
EDC 670: Advanced Study in the Teaching of Elementary School Mathematics		Molly Fisher		Molly Fisher		Molly Fisher		Molly Fisher		Molly Fisher		Molly Fisher
EDC 674: Advanced Studies in Elementary Science	Becky Krall		Chris Schnittka		Becky Krall		Becky Krall		Becky Krall		Becky Krall	
EDC 701: History of Mathematics Education	Molly Fisher				Molly Fisher				Molly Fisher			
EDC 702: Theoretical Foundations of Mathematics Education		Xin Ma				Xin Ma				Xin Ma		
EDC 703: Advanced Research in Mathematics Education			Xin Ma				Xin Ma				Xin Ma	
EDC 704: Designing Project-Enhanced Environments in STEM Education				Jennifer Wilhelm				Jennifer Wilhelm				Jennifer Wilhelm
EDC 706: Research in STEM Education			Jana Bouwma-Gearhart			Jana Bouwma-Gearhart			Jana Bouwma-Gearhart			Jana Bouwma-Gearhart
EDC 708: Engineering in STEM Education		Chris Schnittka			Chris Schnittka			Chris Schnittka			Chris Schnittka	
EDC 746: Subject Area Instruction in the Secondary School (Mathematics)		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder		Margaret Mohr-Schroeder
EDC 746: Subject Area Instruction in the Secondary School (Science)		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart		Jana Bouwma-Gearhart
EDC 770: Special Topics in STEM Education: *Insert Topic*	Jana Bouwma-Gearhart											
					Need Additional Courses:							
THIS DOES NOT INCLUDE 1 ADDITIONAL LINE THAT WAS HELD THIS YEAR DUE TO BUDGET. 1 IN MATHEMATICS.		Becky K		Becky K	Christa J	Chris S	Christa J	Becky K	Christa J	Becky K	Christa J	Chris S
				Chris S	Jana B-G	Christa J	Jana B-G	Xin M		Chris S	Jana B-G	Christa J
				Xin M		Margaret M-S		Christa J		Christa J		Margaret M-S
				Christa J				Jana B-G		Jana B-G		
				Jana B-G				Margaret M-S		Margaret M-S		
				Margaret M-S								

These questions, posed by the remaining C&I Faculty, were answered by Dean Mary John O'Hair in Spring 2010.

The following are questions generated by faculty who will be remaining in Curriculum and Instruction:

1. How will the budget be impacted? How will the allocation of funding change? *The C&I budget will not be impacted. New dollars will be allocated to the STEM department to fund department chair stipend, an administrative assistant, TAs, and operating expenses.*

2. How much money comes to the department through STEM faculty? If that money is moved to STEM education, how will this impact staffing, TA allocation, etc.?
   - *No funds would be moved from C&I to the STEM department.*
   - *The current operating expenses would remain in C&I; new operating expenses for the STEM department would be provided by the Provost's Office.*
   - *Grants and contracts awarded to STEM faculty would go to the new STEM department. We anticipate that establishment of the STEM department will lead to additional grants and contracts in the STEM disciplines. Incentive funds generated by faculty members are associated with the faculty members earning the funds.*
   - *I encourage C&I faculty members to be actively engaged in securing grants and contracts. Incentive funds from these grants and contracts would remain in C&I.*
   - *As in previous years, the travel budget would be based on $1,400 per faculty member, which comes from the college budget. In the past, C&I faculty members have received $350 from departmental funds to supplement the college's $1,400 allocation. This additional amount will remain for faculty in C&I. The STEM department would establish its own policy related to any additional travel money to supplement the college allocation.*

3. Generally, does the change impact space, TAs, and staff assistants?
   - *An attempt will be made to locate all STEM faculty in a central location. Since most are already in TEB, the plan is to relocate faculty in DH to TEB. C&I could benefit from the move since faculty office space would open up when STEM faculty are relocated.*
   - *The C&I department would not lose TA lines. Commitments from the President's Office and development funds will be used to create new TA lines in the STEM department.*
   - *No change will occur to the number of staff assistants in C&I. The Provost's Office has committed to funding a staff assistant in the new STEM department.*

4. Will faculty be teaching the science and mathematics courses embedded in EDC programs? *Yes.*

5. Who will take on supervision duties? *Supervision responsibilities will continue as they currently are. Mathematics education and science education faculty who teach in the elementary and middle school methods blocks will continue to supervise practicum students during their field placements.*

6. Who will be program chair for mathematics education and science education? *The Mathematics and Science Education Program Faculty has been divided into two program faculties: the Mathematics Education Program Faculty and the Science Education Program Faculty. Margaret Mohr-Schroeder will chair the Mathematics Education Program Faculty and Jana Bouwma-Gearhart will chair the Science Education Program Faculty.*

7. Who will serve as advisors, and how will that be allocated? *If an advising proposal that is under review by the Provost's Office is not fully funded, advising for students who have been admitted to TEP or upper division status will be advised as in the past. The faculty in Mathematics Education would advise students in mathematics education; faculty in Science Education would advise students in science education.*

8. Who will serve on committees (this is more about representatives from the STEM Education department)? *The STEM department would have representation on college-level committees and be treated as other departments in the college in this regard. Faculty from the content disciplines in Arts and Sciences who would have joint appointments in STEM could serve on doctoral committees. Given recent hires in mathematics education and science education, there will be sufficient faculty in the STEM department to serve on program faculties, including the Elementary Education and Middle School Program Faculties.*

9. Will we keep all 8.5 TA lines currently allocated to C&I? *Yes.*

10. What is the future of lecturer lines in C&I? Currently we have one as the MIC coordinator and one as the middle school coordinator. Ms. Vicki Vance has coordinated the elementary student teaching for a number of years, but is retiring in June. Will we be able to hire someone into Ms. Vance's position? *Lecturer lines are established as needs arise throughout the college. The lines do not "belong" to a specific department. Salaries to fund the lecturer lines come from vacant faculty lines. The lecturer line for the MIC program will continue into the 2010-2011 academic year because the college was not able to search for the MIC position; however, a successful search was conducted for the middle school position and that lecturer line will not be available to C&I for the coming year. The department will be able to hire an individual to replace Ms. Vance for the upcoming year.*

ASSOCIATION OF PUBLIC AND LAND-GRANT UNIVERSITIES

Science and Mathematics Teacher Imperative

January 6, 2010

President Barack Obama
The White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear Mr. President:

We write to salute your leadership and determination to revolutionize science, technology, engineering, and mathematics (STEM) education and to convey our commitment to contributing significantly to this noble goal.

As you have so eloquently stated, if we as a nation do not prepare one of the world's most educated, and scientifically and mathematically literate workforces, then we have no chance of continuing to be one of the world's most secure and competitive economies.

To educate our students to compete effectively in the global economy, we need to prepare the world's best science and mathematics teachers. As the institutions with, by far, the largest cohorts of the most capable undergraduate science, mathematics and engineering students, public research universities have a critical role to play in preparing the number and quality of teachers the nation requires. Over the past several decades, our large public research institutions have all too often stood aside and not participated as we can–and must–to the critical need for highly qualified science and mathematics teachers.

Discovery from research stimulates excitement and enthusiastic attention from young people. Learning by doing research at major research universities teaches science in the way that mere rote learning cannot. One of the needs now is to teach science in a different and more meaningful way–by prompting students to learn how to find the answers–and, perhaps more important, how to ask the questions. Even at the most basic level, teachers prepared at research universities have the opportunity to understand the world through their own explorations and thus become significantly more effective in their teaching craft. Decades of research on how people learn, studies of environments that support student learning, and successful models of teacher professional development, advocate for such approaches.

Many of our institutions have demonstrated that a whole university (colleges of science and education working together) can cast science and mathematics teaching as the critical and noble profession that it is for young people to consider.

1307 New York Avenue, NW, Suite 400, Washington, DC 20005-4722 · 202.478.6040 · fax 202.478.6046 · www.aplu.org

As presidents of major public universities, we are newly resolved to address this national challenge. We offer as a new major contribution to your Administration's efforts, our commitment to the **Science and Mathematics Teacher Imperative** (SMTI).

We deliberately define this effort as an **Imperative.** We do not take this lightly, simply issuing a statement or report, expecting others to implement. For this sustained effort, our pledge is to substantially increase the number and diversity of high-quality science and mathematics teachers we prepare, and build better partnerships among universities, community colleges, school systems, state governments, business, and other stakeholders.

Preparing more than 7,500 mathematics and science teachers annually, we are presently 121 public research universities across 41 states–including 11 university systems. We launched this new and powerful effort about a year ago, making it the nation's largest such initiative.

While each of our efforts reflects the needs in our particular states for science and mathematics teachers, and acknowledges intense fiscal challenges, 39 institutions and several systems are today committing to at least doubling the number of teachers they prepare. (A chart of our individual commitments is included below.) Together, our institutions committing to SMTI will strive to increase the number of new science and mathematics teachers we prepare to more than 10,000 annually by 2015, for an accumulated 7,500 new teachers over the five years from what we would have prepared.

We and our colleagues on science, mathematics and education faculties participating in SMTI are inspired and driven by a "can-do" attitude:

- Faced with a plethora of "one-off" innovative, exemplary and dedicated programs across the country over the past decade by universities in Texas, California, North Carolina, Georgia and Colorado with no common driving force or learning community, we created SMTI to serve as a convener and coordinating vehicle.
- Finding the nation lacks a comprehensive source of information about effective programs and practices to prepare science and mathematics teachers–we are developing one. Our "Analytic Framework," funded by grants from the Carnegie Corporation of New York and the National Science Foundation (NSF) will enable institutional benchmarking and the identification of exemplar practices, supported by evidence.
- Reaching the preparation of 10,000 new teachers annually by 2015 will require more effective institutional sharing and taking to scale exemplar practices. Such scaling has not been accomplished in the past due to a lack of effective dissemination of information, collaborative leadership and coordination, the absence of a coherent model of change, and an academic desire not to repeat anyone else's ideas. SMTI will document leading practices and, working in partnership with participating public research universities; other universities; school systems; state, local and federal governments; as well as the business community, we will greatly extend the impact of locally proven practices to major regions, underserved populations and demographically similar locations.
- Recognizing that enhancing the priority of teacher preparation at individual universities is key, we have teamed with the American Physical Society in an NSF funded Math and Science Partnership to study conditions that promote change in a test group of 26 universities.

- Realizing the strength in learning across universities, SMTI encompasses many approaches. Our coalition of institutions has lead participants in major science and mathematics teacher preparation reform programs. For example:
  - APLU institutions have awarded more than half the NSF Noyce Scholarships to their students since the program began.
  - Eleven of the fifteen UTeach sites, including the originator, the University of Texas, Austin, are SMTI participants.
  - Nine of the twelve NSF funded Physics Teacher Education Coalition (PhysTEC) sites participate in SMTI.

In sum, we are committed to addressing this critical national need for more and better science and mathematics teachers. Through the Science and Mathematics Teacher Imperative we have come together to learn from leading innovative programs, define and assess the quality of our efforts, understand how to better partner with school systems, and challenge ourselves to improve relentlessly our activities.

Mr. President, we ask that you and your Administration continue to provide dedicated leadership to the nation to address these critical concerns in new ways, forming new collaborations. We seek enhanced opportunities to work with your Executive Office on an overall approach, as well as federal agencies. We note for example that your Secretary of Education would like to make his Department a science and mathematics "powerhouse" and we would like an opportunity to help make that happen. The National Science Foundation has been seeking new ways to better integrate research and education, and assisting universities in developing a robust scholarship of science education. The Department of Energy is recognizing the urgent need to support science education, if our citizenry is to understand why and how we might seek more sustainable economy.

And finally, Mr. President, we seek your sustained challenge to us to be more creative, more innovative, and more dedicated in addressing these national challenges. We hope that each time you turn back to us with further encouragement over the course of the next several years; we are working more closely with leaders of your Administration to define how we might better meet our mutual national objectives to retain our high U.S. quality of life and global leadership.

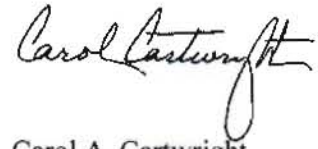
Respectfully,

Andrew Hugine, Jr.
President
Alabama A&M University

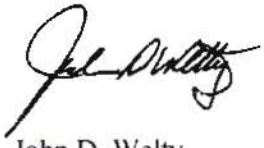
George J. Gogue
President
Auburn University

Lois B. DeFleur
President
Binghamton University, SUNY

Robert W. Kustra
President
Boise State University

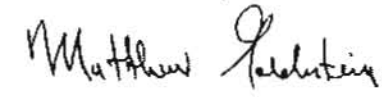


Carol A. Cartwright
President
Bowling Green State University

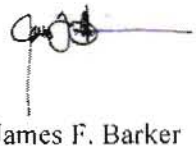


John D. Welty
President
California State University, Fresno

Milton A. Gordon
President
California State University, Fullerton

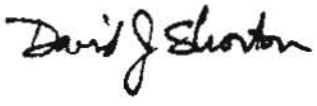


Matthew Goldstein
Chancellor
City University of New York System, The

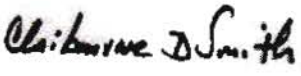


James F. Barker
President
Clemson University

Anthony A. Frank
President
Colorado State University



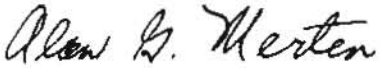
David J. Skorton
President
Cornell University



Claibourne D. Smith
Acting President
Delaware State University

Mark B. Rosenberg
President
Florida International University

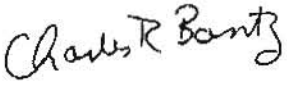
Thomas K. Wetherell
President
Florida State University



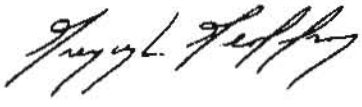
Alan G. Merten
President
George Mason University

Mark P. Becker
President
Georgia State University

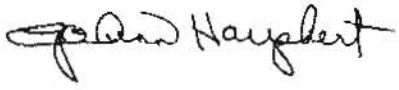
C. Alvin Bowman
President
Illinois State University



Charles R. Bantz
Chancellor
Indiana University-Purdue University



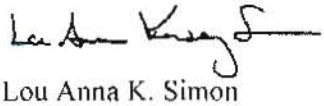
Gregory L. Geoffroy
President
Iowa State University



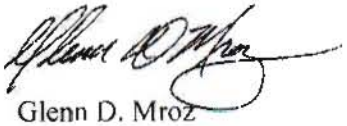
JoAnn W. Haysbert
President
Langston University

Carolyn R. Mahoney
President
Lincoln University

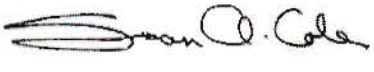
Michael V. Martin
Chancellor
Louisiana State University



Lou Anna K. Simon
President
Michigan State University

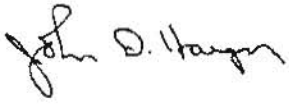


Glenn D. Mroz
President
Michigan Technological University



Susan A. Cole
President
Montclair State University

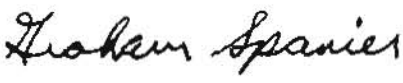
Manuel T. Pacheco
Interim President
New Mexico State University



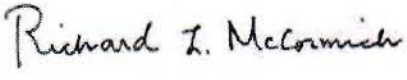
John D. Haeger
President
Northern Arizona University

E. Gordon Gee
President
Ohio State University, The

George Pernsteiner
President
Oregon University System

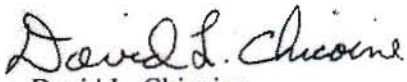


Graham B. Spanier
President
Pennsylvania State University, The



Richard L. McCormick
President
Rutgers, The State University of New Jersey

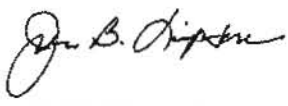
Nancy L. Zimpher
Chancellor
State University of New York



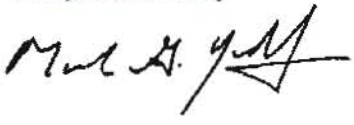
David L. Chicoine
President
South Dakota State University, The

Ann Weaver Hart
President
Temple University

R. Bowen Loftin
Interim President
Texas A&M University

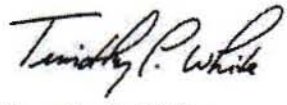


John B. Simpson
President
University of Buffalo, SUNY

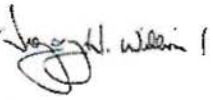


Mark G. Yudof
President
University of California

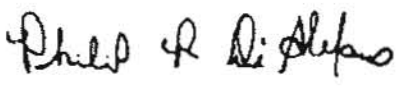
Linda P. Katehi
Chancellor
University of California, Davis



Timothy P. White
Chancellor
University of California, Riverside

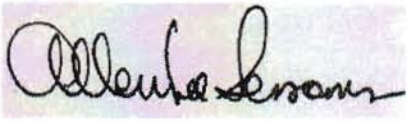


Gregory H. Williams
President
University of Cincinnati

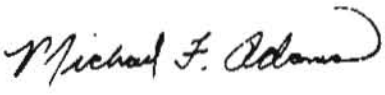


Philip P. DiStefano
Chancellor
University of Colorado at Boulder

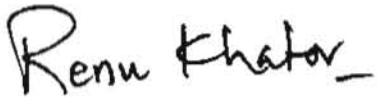
M. Roy Wilson
Chancellor
University of Colorado at Denver



Allen L. Sessoms
President
University of the District of Columbia



Michael F. Adams
President
University of Georgia

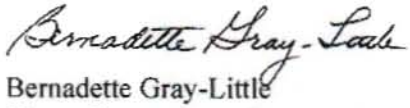


Renu Khator
Chancellor
University of Houston

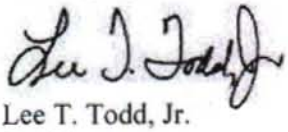
M. Duane Nellis
President
University of Idaho

Robert A. Easter
Interim Chancellor
University of Illinois, Urbana-Champaign

Sally Mason
President
University of Iowa, The

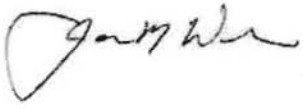


Bernadette Gray-Little
Chancellor
University of Kansas



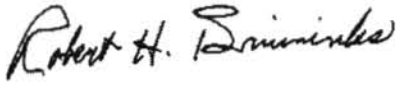
Lee T. Todd, Jr.
President
University of Kentucky

Robert A. Kennedy
President
University of Maine

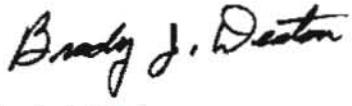


Jack M. Wilson
President
University of Massachusetts

Shirley C. Raines
President
University of Memphis



Robert H. Bruininks
President
University of Minnesota



Brady J. Deaton
Chancellor
University of Missouri

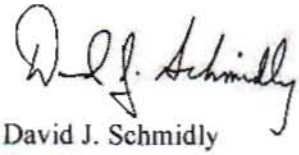
Leo E. Morton
Chancellor
University of Missouri-Kansas City

George M. Dennison
President
University of Montana, The

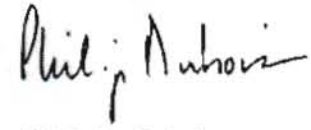
James B. Milliken
President
University of Nebraska

Milton D. Glick
President
University of Nevada, Reno

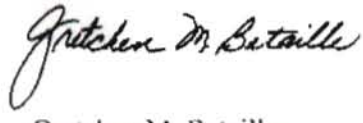
Mark W. Huddleston
President
University of New Hampshire



David J. Schmidly
President
University of New Mexico



Philip L. Dubois
Chancellor
University of North Carolina at Charlotte



Gretchen M. Bataille
President
University of North Texas

Mark A. Nordenberg
Chancellor
University of Pittsburgh

James W. Abbott
President
University of South Dakota

James D. Spaniolo
President
University of Texas at Arlington

Francisco G. Cigarroa
Chancellor
University of Texas System, The

Michael K. Young
President
University of Utah

Daniel M. Fogel
President
University of Vermont

Mark A. Emmert
President
University of Washington

Kevin P. Reilly
President
University of Wisconsin System

Thomas Buchanan
President
University of Wyoming

Erroll B. Davis
Chancellor
University of Georgia System

William E. Kirwan
Chancellor
University System of Maryland

Charles W. Steger
President
Virginia Polytechnic Institute
& State University

Elson S. Floyd
President
Washington State University

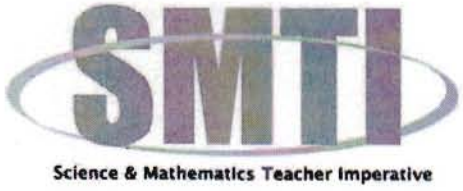
James P. Clements
President
West Virginia University

John M. Dunn
President
Western Michigan University

Donald L. Beggs
President
Wichita State University

David R. Hopkins
President
Wright State University

Attachment – Universities Intending to Double Science and Mathematics Teachers Prepared (chart)



The Association of Public and Land-grant Universities (A·P·L·U) launched the Science and Mathematics Teacher Imperative in November 2008 to increase the number and diversity of high-quality middle and high school science and mathematics teachers in the United States. To meet this goal, SMTI works to galvanize university leadership to action, strategically improve teacher preparation, develop a teacher personnel needs assessment tool, and expand the number of teachers prepared annually at public research universities.

Universities Intending to Double Science and Mathematics Teachers Prepared

Systems	Number of teachers produced*	Number of teachers to be produced*
California State University System**	768	1536
University of California System**+	188	376
University System of Maryland	106	374
Institutions		
University of Georgia	91	206
Arizona State University	70	162
California State University, Fullerton**	54	154
Georgia State University	46	150
University of North Carolina at Charlotte	70	148
University of Houston	43	140
San Francisco State University**	62	134
University of Maryland College Park	31	130
Colorado State University	33	117
California State University, Fresno*	38	103
University of South Carolina - Columbia	24	82
California Polytechnic State University, San Luis Obispo**	13	80
Northern Arizona University	33	80
University of Texas at Arlington	38	76
University of South Florida	31	75
University of North Texas	30	70
Virginia Tech	20	63
The University of Memphis	27	60
University of Cincinnati	29	60
University of Kansas	16	60
Florida State University	28	58
University of Wyoming	23	55
Ball State University	26	53
Florida International University	6	52
South Dakota State University	16	51
Boise State University	15	50
University of Colorado Denver	21	50
University of New Mexico	25	50
University of Colorado at Boulder	20	45
University of Illinois at Chicago	20	43
University of Tennessee, Knoxville	20	40
Wichita State University	16	40
University of Utah	14	36
University of Missouri - Kansas City	13	35
University of Idaho	13	34
University of Kentucky	13	32
The University of Montana	10	31
New Mexico State University	15	30
University of the District of Columbia	1	30
Cornell University	14	28
Indiana University-Purdue University Indianapolis	10	20
North Dakota State University	8	16
Alabama A&M University	5	15

Charts were updated on March 12, 2010 to include the following universities with the intent to double the number of science and mathematics teachers they prepare: Arizona State University, South Dakota State University, North Dakota State University, and the University of the District of Columbia.

+The University of California System's number of teachers credentialed was corrected. [Note: In 2003, the University of California produced 366 (or 38%) of the science & mathematics majors who went on to obtain a teacher credential by an institution that year in California. Through their CalTeach program, the UC System goal is to reach 1,000 teachers by 2011.]

*For "Number of Teachers Produced", institutions chose the year, usually 2006-2009, in which to report the number of science and mathematics teachers they produced. For "Number of Teachers to be Produced", institutions chose the year, usually 2011-2015, in which to report the number of science and mathematics teachers that they intend to produce.

**Institutions which reported the "Number of Teachers Produced" for 2003.

APPENDIX D

News - Local

Wednesday, Jan. 06, 2010 Comments (13) | Recommend (1)

UK president Todd to meet with Obama

Herald-Leader Staff Report

University of Kentucky President Lee T. Todd Jr. will be part of a delegation of university leaders who will meet with President Barack Obama on Wednesday and pledge to help reduce the nation's deficit of math and science teachers.

Todd and three others are scheduled to deliver to Obama a letter signed by 79 university leaders in which they pledge to "substantially increase the number and diversity of high-quality science and mathematics teachers we prepare," as well as to work closely with other universities, colleges, school systems, state governments and businesses to develop those teachers.

Specifically, 39 institutions and three university systems — including UK — say they plan to at least double the number of math and science teachers who graduate by 2015, according to the Association of Public and Land-grant Universities.

Similar stories:

Study: Bonuses for teachers don't boost test scores

Possible lessons in D.C.'s controversial teacher evaluation system

Teachers take charge to save ailing public schools

Teachers unions increasingly criticized, even by former sympathizers

'Waiting for Superman': an indictment of public schools

The other three university leaders joining Todd in delivering the letter to Obama will be Kansas University's chancellor Bernadette Gray-Little, University System of Maryland's chancellor William "Brit" Kirwan, and University of Colorado chancellor Philip P. DiStefano.

The meeting will take place as part of the White House's "Educate to Innovate" campaign, in which Obama will honor science and math teachers from across the country.

Obama also is expected to announce that companies, foundations and science and engineering societies will be involved in the efforts to bolster math and science education, according to a news release from the White House.

Comments

The Herald-Leader allows readers to comment on stories; the views expressed here are not those of the Herald-Leader or its staff. Readers must avoid personal attacks and libelous or inappropriate remarks, and users who violate our commenting policies can be banned from the site. See our commenting policy here. Some comments may be reprinted in the newspaper. Registered user names are posted with comments.

You must be logged in to leave a comment. Login | Register

Submit

Comments: 13 Showing: Newest first

Hints for Black Friday shopping
Madison woman dies in 1-car crash
Health care law creates concern about mergers
Traffic report, week of Nov. 22
New group hopes to unite non-Thoroughbred horse business people

Experience could mean sink or swim for Cats
Ex-Cat Johnson has last laugh vs. Bengals
Notes: Conditioning paying off for Harrellson
Madison woman dies in 1-car crash
Dunlap leads No. 9 Cats past No. 12 Irish
Buffett says rich people should pay higher taxes
Couple found dead, murder-suicide suspected
Hints for Black Friday shopping
Larry Saunders, former state Senate president, dies
Maui chief Odom doesn't mind Calipari kicking sand

Artful presentation to match artful prose
New group hopes to unite non-Thoroughbred horse business people
Larry Saunders, former state Senate president, dies
Dunlap leads No. 9 Cats past No. 12 Irish
Johnson has last laugh in Cincy
Buffett says rich people should pay higher taxes
Former coal company owner donates $1 million to Harlan County Central
eWarrants to speed law enforcement
In 2011 governor's race, candidates offer different routes to more jobs

News - Local

Wednesday, Jan. 06, 2010 Comments (0) | Recommend (0)

News briefs: Jan. 6

UK president Todd to meet with Obama

Lexington: University of Kentucky President Lee T. Todd Jr. will be part of a delegation of university leaders who will meet with President Barack Obama on Wednesday and pledge to help reduce the nation's deficit of math and science teachers.

Todd and three others are scheduled to deliver to Obama a letter signed by 79 university leaders in which they pledge to "substantially increase the number and diversity of high-quality science and mathematics teachers we prepare," and work with other schools, state governments and businesses to develop those teachers.

Similar stories:

Judge's ruling keeps death penalty as a possibility in Nunn case

Nunn's computer hard drive, child porn to be focus of July hearing

UPDATED: Box of evidence is subject of Nunn hearing

Nunn's attorneys seek to exclude much testimony

Family not satisfied with state's investigations of nursing home injury

Specifically, 39 institutions and three university systems — including UK — say they plan to at least double the number of math and science teachers who graduate by 2015, according to the Association of Public and Land-grant Universities.

Ruling on tobacco restrictions

Bowling Green: A federal judge overturned two of the marketing restrictions in a new tobacco law, including a ban on color and graphics in most tobacco advertising. Several tobacco makers sued in August to block the restrictions, and U.S. District Judge Joseph McKinley in Bowling Green agreed that two violated tobacco companies' free speech rights.

Congress could have exempted certain types of colors and images instead of banning all color and graphics in advertising that children might see, McKinley ruled. He also said the U.S. Food and Drug Administration can't bar anyone from saying the agency's regulation of tobacco makes it safe.

But he upheld most of the new marketing restrictions, including a ban on tobacco companies sponsoring athletic, social and cultural events or offering free samples or branded merchandise. McKinley's ruling, recorded Tuesday, also upholds a requirement that warning labels cover half the packaging on each tobacco product.

The Family Smoking Prevention and Tobacco Control Act, signed into law in June, lets the FDA limit but not ban nicotine. It also lets the agency ban candy flavorings and marketing claims such "low tar" and "light," require warnings be emblazoned over carton images, regulate what goes into tobacco products and publicize those ingredients.

Paper seeks Nunn records

Attorneys for the Courier-Journal have filed a motion to vacate an agreed protective order in the murder case against former state Rep. Steve Nunn.

According to a motion filed Tuesday, the newspaper wants to intervene "solely for the purpose of asserting its and the public's constitutional and common law rights of access to court records and its constitutional right to gather news." The Herald-Leader will join the Courier-Journal's filing.

The agreed protective order, filed Dec. 21, is in reference to items in the commonwealth's inventory and four items of evidence from Lexington police. The order does not provide details

Hints for Black Friday shopping
Madison woman dies in 1-car crash
Health care law creates concern about mergers
Traffic report, week of Nov. 22
New group hopes to unite non-Thoroughbred horse business people

Experience could mean sink or swim for Cats
Ex-Cat Johnson has last laugh vs. Bengals
Notes: Conditioning paying off for Harrellson
Madison woman dies in 1-car crash
Dunlap leads No. 9 Cats past No. 12 Irish
Buffett says rich people should pay higher taxes
Couple found dead, murder-suicide suspected
Hints for Black Friday shopping
Larry Saunders, former state Senate president, dies
Maui chief Odom doesn't mind Calipari kicking sand

News - Latest News

Thursday, Jan. 07, 2010 Comments (13) | Recommend (1)

UK is part of national push for more math and science teachers

By Ryan Alessi - ralessi@herald-leader.com

Amid a growing national awareness of the need for more math and science teachers, the University of Kentucky promised to triple the number of educators it produces in those fields over the next five years.

UK President Lee T. Todd Jr. delivered the pledge Wednesday to President Barack Obama as Obama announced new efforts in science, math and technology education.

"We must admit, we are now being outpaced by our competitors," Obama said, adding that the United States ranks 21st in science education and 25th in math globally. "That's not acceptable."

Similar stories:

Study: Bonuses for teachers don't boost test scores

Training better teachers

How 'Race to the Top' is rewriting U.S. education

Teachers take charge to save ailing public schools

Basic skills are barrier to success for many 2-year college students

Todd said he spoke briefly with Obama when delivering a letter in which leaders of 121 public universities pledged to increase the number of new math and science teachers to 10,000 from 7,500 by 2015.

At UK, 11 science and 12 math teachers are expected to graduate in May from its one-year program for a master's degree in secondary education with initial teaching certification.

UK leaders hope to increase those numbers to 33 and 36, respectively, by 2015 by encouraging primary and high school students to choose math and science education and by creating more spots in the master's program, said Mary John O'Hair, the dean of UK's college of education. UK also is focusing on professional development for current math and science teachers, she said.

O'Hair recently hired a new professor to bring the math and science education faculty to eight.

The pledge to cultivate more teachers is only part of the equation.

Todd and three other university leaders urged U.S. Department of Education Secretary Arne Duncan and other administration officials to focus more federal funds to continue programs that work rather than jumping from one pilot teaching program to another.

"It's all hands on deck — that's how Arne Duncan put it to us," Todd said. "One thing we told Duncan was that we really need you all to be pushing these careers from the top. We have parents who are telling their students that the (math and science) jobs are all going out of the country, so why should you go into those fields?"

And Todd said he told executives from technology companies such as Intel and Texas Instruments that they should use marketing to encourage more young people to go into math and science fields; he cited the ExxonMobil TV commercials featuring golfer Phil Mickelson, whose teaching academy focuses on math and science.

In addition, Todd has a key role with a national initiative called the Science and Mathematics Teacher Imperative.

That organization is compiling a catalog of teaching techniques, programs and approaches used to reach out to students.

Police investigate Estill murder-suicide

40 years ago, Nixon made Elvis a federal drug agent

Hints for Black Friday shopping

Larry Saunders, former state Senate president, dies

New group hopes to unite non-Thoroughbred horse business people

Experience could mean sink or swim for Cats

Ex-Cat Johnson has last laugh vs. Bengals

Notes: Conditioning paying off for Harrellson

Madison woman dies in 1-car crash

Dunlap leads No. 9 Cats past No. 12 Irish

Buffett says rich people should pay higher taxes

Couple found dead, murder-suicide suspected

Hints for Black Friday shopping

Larry Saunders, former state Senate president, dies

Maui chief Odom doesn't mind Calipari kicking sand

Also Wednesday, Obama honored more than 100 math and science educators with teaching awards, including two from Kentucky.

They are Kristen Jarboe, who teaches mathematics intervention for primary through third grade at Elkhorn Elementary School in Franklin County, and Keri Dowdy, a fourth grade science teacher at Sedalia Elementary School in Graves County.

Reach Ryan Alessi at (859) 231-1303.

Comments

The Herald-Leader allows readers to comment on stories; the views expressed here are not those of the Herald-Leader or its staff. Readers must avoid personal attacks and libelous or inappropriate remarks, and users who violate our commenting policies can be banned from the site. See our commenting policy here. Some comments may be reprinted in the newspaper. Registered user names are posted with comments.

You must be logged in to leave a comment. Login | Register

Submit

Comments: 13 Showing: Newest first

Win_with_Willard wrote on 01/07/2010 11:37:59 AM:

We need to be teachun mor of that intulechule desine, not math and siense.

Recommend (0) Report abuse

hman56 wrote on 01/07/2010 07:07:11 AM:

If I ever run for anything, remind me to tout education, public safety, new sidewalks, and free everything for everybody.

Recommend (0) Report abuse

hman56 wrote on 01/07/2010 07:04:40 AM:

Stinkykitty, I don't think it was the ring he kissed.

Recommend (0) Report abuse

frommars859 wrote on 01/06/2010 09:29:05 PM:

don't know what happened to the comments on the first article that was postbut my question is...exactly what is being proposed by Dr Todd??? Sounds like PR and BS to me.

Recommend (0) Report abuse

hman56 wrote on 01/06/2010 08:01:59 PM:

products back into this country, we will continue to lose jobs.

Recommend (0) Report abuse

More comments on this story: 1 2

Artful presentation to match artful prose

New group hopes to unite non-Thoroughbred horse business people

Larry Saunders, former state Senate president, dies

Dunlap leads No. 9 Cats past No. 12 Irish

Johnson has last laugh in Cincy

Buffett says rich people should pay higher taxes

Former coal company owner donates $1 million to Harlan County Central

eWarrants to speed law enforcement

In 2011 governor's race, candidates offer different routes to more jobs

Noninvasive technique freezes off excess body fat

SITE MAP

NEWS
Breaking News
Columnists
Counties
Bourbon
Clark

SPORTS
Auto Racing
Baseball | MLB
Reds
Legends
Basketball | NBA

ENTERTAINMENT
LexGo
Books
Celebs
Contests
Discuss

BUSINESS
Business
On the move
Create a portfolio

LIVING

EDITORIALS/LETTERS
Opinion
Columnists
Editorial
Letters
Op-Ed

BLOGS
Rich Copley
John Clay
Merlene Davis
Tom Eblen
Mike Fields

UK pledges to not be left behind in school: Will increase number of math, science teachers

January 19, 2010 by News Staff · Leave a Comment

By Genevieve Adams

UK is stepping up to a national challenge to multiply the number of math and science teachers.

Earlier this month, UK President Lee Todd traveled to Washington D.C. to deliver a letter to President Barack Obama addressing the shortage of secondary education math and science teachers. Todd pledged for Kentucky to be a role model for the rest of the nation to further the Science, Technology, Engineering, and Mathematics Education Coalition.

Secondary mathematics education chairwoman Margaret Schroeder said UK is taking the initiative to increase funding for education programs. She hopes this pledge will improve the quality and quantity of math and science teachers.

â€œThis year, we had an increase of 10 percent enrollment in mathematics and 400 percent enrollment in science,â€ Schroeder said. â€œThe numbers for next year look even more promising, with possible increases in mathematics of 60 percent or more and science improving by as much as 50 percent.â€

Schroeder isnâ€™t the only one who has high hopes for change in UKâ€™s program. Education major David Little said he believed UKâ€™s education program is in need of change.

â€œWhat has always been the case is that education changes every year because the needs and strengths of our youth change every year,â€ Little said. â€œThis state of change in the real-world arena of teaching will undoubtedly always be reflected in the modification of current educational theory.â€

However, curriculum changes and increased funding wonâ€™t solve this issue if the number of students wanting to teach math and science is scarce, Little said. Economically, teaching isnâ€™t the most appealing future for most college students.

â€œThe best and the brightest individuals from STEM fields tend to look for employment outside of education for economic reasons, as well as fewer demands and responsibilities tied to other jobs,â€ Little said. â€œWhile it is nationally recognized that teaching and education are extremely important in this country â€¦ very little is being done to entice highly qualified individuals into the field.â€

Kentuckyâ€™s plan of action began with an undergraduate program that was recently introduced to allow students to get their teaching certificate in one year. This would increase the number of students going straight into teaching and also allow those who canâ€™t afford further schooling to become qualified teachers, Schroeder said.

â€œIt is an excellent program, particularly for career changers and those graduating with non-education content BA's, because the program is designed to take only one calendar year,â€ Schroeder said. â€œFor the past five years, we have had 99.9 percent job placement rate in the Master's programs for our graduates and that's a testament to our quality all by itself.â€

Little said the goal of the pledge is easy to recognize, but not so easy to attain.

â€œThe solution to this is simple in theory but hard in practice; we must work towards making education as attractive an employment option as everything else that's within the reach of STEM majors,â€ Little said.

Share and Enjoy:

Related posts:

1. New library combines best of math, science
2. More women in science goal of new UK effort
3. Obama emphasizes science, technology
4. Exhibit highlights math, science of origami
5. Police increase campus patrols for first weeks of school

Filed under Campus News, News · Tagged with

Comments are closed.

- Search for: Search
- **UK Football vs. Vandy**

UK
UNIVERSITY OF
KENTUCKY
College of Education

Office of the Dean
103 Dickey Hall
Lexington, KY 40506-0017

859 257-2813
fax 859 323-1046

www.uky.edu/Education

November 19, 2010

Dr. Hollie Swanson
Chair, Senate Council
University of Kentucky

Dr. Kumble Subbaswamy
Provost
University of Kentucky

Dear Dr. Swanson and Dr. Subbaswamy:

On behalf of the College of Education, I fully support the faculty's proposal to create a new STEM Education Department in the College of Education. I share the STEM faculty concern as well as the general public that the United States ranks 21st in science education and 25th in mathematics globally. Nationally, almost 30 percent of students in their first year of college are forced to take remedial science and/or mathematics classes because they are not prepared to take college-level courses. At UK, 11.6 percent of the first-year students in the 2008-2009 cohort (latest data available) scored below the readiness standard in mathematics. Ensuring an adequate supply of well-prepared and highly effective STEM teachers is critically important to our nation's economic prosperity and well-being.

My decision to support the new department is based on strong support from the College of Education faculty who voted unanimously at its May 2010 meeting to support the establishment of a new STEM Education Department. In addition, faculty support is strong across UK as represented by support letters from Physics and Astronomy, Mathematics, Chemistry, Biology, and Engineering. Our students, as well as the Commonwealth of Kentucky, are in need of pioneering interdisciplinary STEM education efforts such as the faculty have proposed. These efforts represent a fundamental shift from research-driven, discipline-bound knowledge production to research that is problem-driven, highly interdisciplinary, and applied.

STEM Education currently resides in the Department of Curriculum and Instruction. The department has a very broad portfolio, offering undergraduate degrees in Elementary, Middle School, and Secondary Education and graduate programs in Elementary, Middle School, and Secondary Education, Reading, and Instructional Systems Design. The faculty of the College and I have concluded that the centrality of STEM Education in the development of an educated workforce in the 21st Century dictates that the College adopt a more targeted focus on STEM Education, beyond that which is possible in a highly variegated department. In a word, STEM Education needs its own curricular and administrative infrastructure.

Administrative costs of the new STEM Education Department represent less than two percent of UK's total investment in STEM Education educational efforts (i.e., senior and junior mathematics, science, and engineering education professors, outreach professors, etc.). As a

result of the university-level commitment to STEM Education, the Provost committed to a recurring expense of $24,626 for the new department chair's stipend and benefits.
In January 2010, Dr. Todd delivered a letter to President Obama at the White House in which 79 public research universities pledged to increase the number of mathematics and science teachers from 7,500 to 10,000 by 2015. Within the state of Kentucky, during the 2009-2010 school year, the Education Professional Standards Board issued 123 emergency certificates in the areas of biology, chemistry, physics, earth/space science (grades 8-12), mathematics (grades 8-12), middle school science (grades 5-9), and middle school mathematics (grades 5-9) (please see enclosed letter from Dr. Phillip Rogers, Executive Director of the Education Professional Standards Board). At UK last year, 11 science and 10 mathematics teachers graduated from our one-year, master's degree program in secondary education with initial teaching certification. Currently, this is the only secondary education program in science and mathematics at UK that leads to teacher certification. The new STEM Education Department pledges to significantly increase the number of teachers and provides additional proposed pathways to create options for potential secondary mathematics and science teachers at the undergraduate level as highlighted in the proposal under Phase 2.

The new STEM Education Department would serve as the focal point to significantly increase the recruitment, preparation, and retention of highly qualified STEM teachers. In addition, the new department would improve significantly student success in P-12 mathematics and science by (1) providing ongoing, internationally-recognized best practices in professional development to practicing teachers and school leaders; (2) conducting extensive educational research on learning; and (3) translating research findings into innovative practices that emphasize higher order thinking and other 21st Century Skills.

To succeed in this new information-based and highly technological society, all students need to develop their capabilities in STEM to levels much beyond what was considered acceptable in the past. I commend and support the faculty's vision to increase substantially the number and diversity of highly qualified science and mathematics teachers and believe a new STEM Education Department will unite our efforts as a university to help us achieve this important goal.

Sincerely,

Mary John O'Hair

Mary John O'Hair
Dean and Professor

UNIVERSITY OF KENTUCKY

College of Arts and Sciences
Office of the Dean
213 Patterson Office Tower
Lexington, KY 40506-0027
Phone: (859) 257-8354
Fax: (859) 323-1073
www.as.uky.edu

August 11, 2010

Dr. Hollie Swanson, Chair
Faculty Senate
University of Kentucky

Dear Chair of the Faculty Senate:

I strongly support the establishment of the new STEM education department in the College of Education. Faculty in physics and astronomy, chemistry, mathematics, and biology also support the new department's formation, as evidenced by the enclosed departmental letters of support. Faculty members in these departments have a rich history of collaboration with mathematics and science education faculty through their participation in Teacher Education Program Faculties in the College of Education and through funded research projects, such as the Appalachian Math and Science Partnership, Noyce grants, and a Toyota Foundation award.

Faculty view the new department as an opportunity for undergraduates to work seamlessly between their A&S departments and the new STEM education department. This department will ensure that our students graduate with strong content and teaching certificates, and are ready to meet state and national demands for highly qualified science and math teachers. This new department is designed to meet the demands through a student-centered, personalized learning system.

In addition to better prepared pre-service teachers, the new STEM education department will serve as a focal point for UK to (1) deepen the content knowledge and inquiry-based teaching skills of practicing science and math teachers; (2) strengthen collaborative STEM research across A&S, Education, and Engineering and translate research findings into responsive practices; and (3) develop meaningful learning experiences for school leaders, policy-makers, parents and community members.

I support the creation of the STEM education department and look forward to future collaborations.

Yours,

Mark Lawrence Kornbluh
Dean
College of Arts and Sciences

UNIVERSITY OF KENTUCKY

Office of the Dean
College of Engineering
351 Ralph G. Anderson Building
Lexington, KY 40506-0503

859 257-1687
859 257-8827
fax 859 323-4922

www.engr.uky.edu

August 11, 2010

Dr. Mary J. O'Hair, Dean
College of Education
University of Kentucky
103 Dickey Hall
CAMPUS 0017

Dear Dean O'Hair:

It gives me a great deal of pleasure to support the proposal by the College of Education to create a new Department of STEM Education. I cannot think of a more important initiative for the University to undertake than to expand the cadre of science, math, and engineering teachers in the high schools throughout Kentucky.

In our discussions over the past year, I have emphasized how important this initiative is for the future of the state. Kentucky remains mired near the bottom nationally in the per capita production of STEM graduates. In engineering, Kentucky graduates only half the number of bachelor's degrees per capita as the nation, and it remains far below the productivity of the seven contiguous states. Kentucky's engineering degree productivity is but two-thirds that of West Virginia!

Kentucky's educational system has made enormous strides in many areas since the passage of the landmark Kentucky Educational Reform Act in 1990. Unfortunately, STEM education is not one of the areas in which the state has made progress. If the next twenty years are to see marked improvement in the ability of Kentucky high school graduates to pursue undergraduate and graduate work in science, math, or engineering, a new cadre of teaching professionals must be prepared. The University of Kentucky is the only institution statewide that can marshal the resources across a broad array of academic programs to make an impact throughout the state. The Department of STEM Education will be the foundation for this effort.

I commend you and your faculty for undertaking this administrative restructuring and pledge my support in making this initiative successful.

Sincerely,

Thomas W. Lester
Dean

May 13, 2010

Dear Dean O'Hair,

I am writing to recommend the formation of a Science, Technology, Engineering, and Mathematics [STEM] Education Department. Our proposed Department will expand and enhance STEM Education at the University of Kentucky and for the Commonwealth in significant ways. Along with strengthening teacher preparation programs already in place in continued collaboration with the Department of Curriculum & Instruction, the STEM Education Department will build new bachelor's, master's, and doctoral programs in science, technology, engineering, and/or mathematics education. In addition, the new department will lead the Commonwealth in STEM Education research by attracting graduate students, future STEM faculty researchers pursuing progressive research, and funding to support research in these disciplines. Our plan is to become the top program, notably still in a college of Education, for preparing future STEM Education faculty members, researchers, undergraduate and graduate students. Over the long term, the creation of a PhD within the STEM Education Department would be nationally groundbreaking and place UK on the cutting-edge among benchmarks. Given the national shortage of PhD graduates to fill vacant faculty positions in STEM education disciplines, UK has the strong potential to fill an important market niche.

When I arrived at University of Kentucky a year ago, I came to find out that we had only one doctoral student in Science Education and a few more doctoral students in Mathematics Education. I, along with my colleagues, wished to create more innovative, STEM focused options for our current graduate students and future graduate students. We developed a master's-level degree program for the College of Education's redesigned Master of Science degree. This program was purposefully crafted as a STEM master's degree with new courses developed by the STEM Education faculty. I designed and developed two; they are *Designing Project-enhanced Environments in STEM Education* and *History of STEM Education*. As a result of this new graduate focus, we have already seen the number of our graduate students pursuing doctorates in science and mathematics education increase. Once a STEM Education Department is in place, we will proceed to create a doctoral program in STEM Education.

My personal research focus and interest have always involved the design and implementation of project-enhanced, interdisciplinary learning environments. In my case, 'interdisciplinary' is primarily concerned with the productive integration of a) mathematics and science; b) mathematics, science, and technology; or c) mathematics, science, and engineering. This research interest has been instrumental in how I teach both undergraduate and graduate classes. With this focus, I have written many research papers that report investigations concerning how people understand science and mathematics concepts as they participate in project work that demands the integration of multiple content areas. Some example projects, which are inherently interdisciplinary and fruitful for contextualized student learning, include studies of motion and rate of change; sound waves and trigonometry; and the moon's motion, the moon's phases and spatial geometry. It should be noted that I include and mentor doctoral students extensively in my research. I am a strong believer in giving doctoral students the

Curriculum and Instruction · 335 Dickey Hall · Lexington, KY 40506-0017 · (859) 257 – 4661
fax (859) 257 – 1602 · www.uky.edu/Education

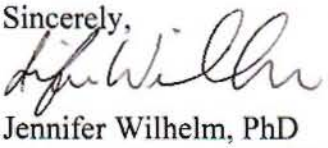
opportunity and the experience of STEM education research, which includes assisting in research design, data collection, manuscript writing, and paper presenting. I have published and presented on numerous occasions with my doctoral students while a professor at Texas Tech University (TTU). I want to continue this tradition and focus at the University of Kentucky and this can only happen if we build and bring STEM Education to the forefront.

When I arrived at my previous institution (TTU), there was not a focused mathematics and science graduate program of study and there were only a total of three doctoral students pursuing research in the areas of mathematics or science education. I wished to build a Science and Mathematics Education Program and that was exactly what my colleagues and I did. I served as the Science and Mathematics Education (SMED) Program Chair (2007 – 2009) and helped to grow our numbers to nearly thirty by the time I left Texas Tech. I expect similar and possibly even better results can happen at UK with the establishment of a STEM Education Department.

When I was a faculty member at Texas Tech University, I focused my grant writing efforts on STEM Education funding and was able to land nearly $6 million dollars of external funding. I received a $3 million grant from the Greater Texas Foundation entitled *"Middle School Math and Science (MS)^2: Understanding by Design"*; a National Science Foundation GK-12 ($2,723,642) Award (2008-2013) entitled *"Building Bridges: Integrating Mathematics, Science, Engineering Education on the South Plains"*; a NASA- IDEAS ($44,001) Award (2006-2008) entitled "*Cratering Analysis for REAL: Investigating Craters in the Solar System*," and an American Education Research Association ($25,000) Award (2003-2005) with support from the U. S. Department of Education's Institute of Education Sciences (AERA/IES) entitled "*Moon Journals: Students Forging New Mathematical and Literacy Identities*". All of these externally funded grants involved designing and implementing project-enhanced learning in STEM environments. In doing so, I have worked with colleagues across campus from the Colleges of Engineering and Art & Sciences, as well as colleagues within my own College of Education. While at UK, I have worked with the Colleges of Arts & Sciences, Agriculture, and Engineering in pursuit of external funding. I believe that by becoming a STEM Education Department, this process will be more targeted and streamlined. Funding agencies will take notice of our forward thinking ideas and our targeted initiatives.

In closing, the University of Kentucky has recently committed to President Obama to "substantially increase the number and diversity of high-quality science and mathematics teachers we prepare, and to build better partnerships among universities." Committing to such ambitious and warranted goals demands strong, organized, and aggressive actions, and can only be done with a shared vision. We, the STEM Education faculty at UK, have such a vision; we can create the right opportunities and experiences through focused STEM Education undergraduate and graduate programs and targeted STEM funding in a timely, synergistic manner.

Sincerely,



Jennifer Wilhelm, PhD
Associate Professor of Science/Math Education
Partnership Institute of Mathematics and Science Education
Reform (PIMSER) Outreach Professor
College of Education

College of Education
Curriculum and Instruction
335 Dickey Hall
Lexington, Kentucky 40506-0017
859 257-4661
fax 859 257-1602
www.uky.edu

November 17, 2010

To: UK University Senate

I am writing you to confirm general support from the Department of Curriculum and Instruction for the movement of STEM to organize into a new academic department within the College of Education and the University of Kentucky. In an effort to be as transparent as possible in providing the requested details related to this proposed departmental reorganization, I hope to respond to queries made regarding this proposal from the University Senate. As a disclaimer, I must indicate that I arrived at the University of Kentucky in July as the newly appointed department chair in the Department of Curriculum and Instruction. I was superficially aware of the discussions underway related to the STEM proposal while I participated in the interview process last spring but was not familiar with any details associated with this proposal. With that limitation acknowledged in connection to my first letter of support, in this letter I will attempt to provide more detail related to questions about this proposal.

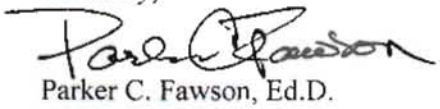
It appears from C&I faculty meeting minutes from last year that the initial discussion of the STEM department possible realignment was at the December, 2009 meeting. Minutes from this meeting indicate a review of the history of the STEM discussions that occurred in COE and across the UK campus. General concerns and advantages for this departmental realignment are listed in the minutes. For example, the concerns noted were, "The impact to Curriculum and Instruction, Teaching loads, Legal and ethical questions about advertising for positions in Curriculum and Instruction, then moving the newly hired faculty to the STEM department, The number of tenured faculty in the STEM department." The advantages listed in the minutes included, "A separate STEM department will bring in more money, The science and math education graduate programs will expand, benefitting the entire college, Students will be better prepared for a changing job market." As you can see, little in the way of detail related to these issues is apparent in the recorded minutes. An additional meeting was held in the spring to provide C&I faculty with an opportunity to vote on a silent ballot related to the STEM department proposal. This vote was conducted by Dr. Mary Shake who was serving as the interim chair of C&I at the time. This resulted in a 20-5 vote in favor of the change. I am not able to address why the COE vote was unanimous as that vote was conducted by the Dean, although that vote was conducted some time following the departmental vote.

In order to capture what C&I faculty were thinking related to their vote last spring, I invited them to write me anonymous letters describing their rationale. This invitation was extended in the November 12th C&I faculty meeting. I extended this invitation since I had no record, given the silent ballot used last year, on who voted either for the proposed STEM department or against it. As a result of this invitation, I received one anonymous letter and five signed letters. I will present summary information from these six letters to attempt to capture faculty reflections on this process. Five of the faculty indicated in their letters that they voted for the creation of the STEM department. One indicated that they had voted against the proposal. There was apparent variation present in the rationale that faculty applied to arrive at their particular votes. Some indicated that the STEM faculty clearly demonstrated the benefits of this new department and that there is evidence that this is a strong national trend to develop such departments. Additionally, organizing

such a focused department should increase the number of students in these programs and facilitate a greater success rate in funding by external sources. There was also a perception that the creation of a STEM department would generally benefit the University of Kentucky. There also seemed to be a perception that the process was a bit rushed last year and that they would have preferred more time to discuss this change. However, connected to that concern was a nearly unanimous view that both C&I and STEM would benefit by moving forward with this proposal. One concern raised in a faculty letter was a question of the rationale for having a separate STEM department that would still have programs in the ELED, Middle Level, and Secondary teacher education programs. This raises a potential challenge for C&I in how to staff these programs. However, initial conversations between myself and Dr. Wilhelm have established a process to ensure that an equitable resolution for this and other transition challenges will be resolved. Even though we have anticipated this challenge, in our conversations, it seemed premature to make final plans for articulation until we have received official approval to proceed. Once approval is provided, we will establish a subcommittee of faculty from both C&I and STEM to look at how to facilitate the details of the change to ensure program continuity with and effort to ensure no negative programmatic side effects on our combined students. It was also noted that for new programs established in STEM, the CPE and KPSB would need to provide approval. STEM faculty are committed to working through this approval process in a timely fashion. There was also a concern expressed in several of the meetings last year about how this change might impact the resource base for C&I. I have attached correspondence received from the Dean to C&I faculty responding to this and other questions. The Dean's office would need to address the specifics related to funding for C&I and STEM.

While the summary comments listed above represent letters from the six faculty choosing to provide me with information, it seems to be quite consistent with what I have heard informally from faculty since my arrival at UK. The general view expressed in all of the letters is that both STEM and C&I faculty are anxious to move forward with this proposal and allow each unit to maximize the opportunities to refine their programs and focus their research within the revised contexts.

Sincerely,



Parker C. Fawson, Ed.D.
Professor of Literacy
Editor, Literacy Research and Instruction
Chair, Curriculum and Instruction
College of Education
University of Kentucky
337 Dickey Hall
Lexington, Kentucky 40506-0017
(859) 257-0767
fax (859) 257-1602

The following are questions generated by faculty who will be remaining in Curriculum and Instruction:

1. How will the budget be impacted? How will the allocation of funding change? *The C&I budget will not be impacted. New dollars will be allocated to the STEM department to fund department chair stipend, an administrative assistant, TAs, and operating expenses.*

2. How much money comes to the department through STEM faculty? If that money is moved to STEM education, how will this impact staffing, TA allocation, etc.?
    - *No funds would be moved from C&I to the STEM department.*
    - *The current operating expenses would remain in C&I; new operating expenses for the STEM department would be provided by the Provost's Office.*
    - *Grants and contracts awarded to STEM faculty would go to the new STEM department. We anticipate that establishment of the STEM department will lead to additional grants and contracts in the STEM disciplines. Incentive funds generated by faculty members are associated with the faculty members earning the funds.*
    - *I encourage C&I faculty members to be actively engaged in securing grants and contracts. Incentive funds from these grants and contracts would remain in C&I.*
    - *As in previous years, the travel budget would be based on $1,400 per faculty member, which comes from the college budget. In the past, C&I faculty members have received $350 from departmental funds to supplement the college's $1,400 allocation. This additional amount will remain for faculty in C&I. The STEM department would establish its own policy related to any additional travel money to supplement the college allocation.*

3. Generally, does the change impact space, TAs, and staff assistants?
    - *An attempt will be made to locate all STEM faculty in a central location. Since most are already in TEB, the plan is to relocate faculty in DH to TEB. C&I could benefit from the move since faculty office space would open up when STEM faculty are relocated.*
    - *The C&I department would not lose TA lines. Commitments from the President's Office and development funds will be used to create new TA lines in the STEM department.*
    - *No change will occur to the number of staff assistants in C&I. The Provost's Office has committed to funding a staff assistant in the new STEM department.*

4. Will faculty be teaching the science and mathematics courses embedded in EDC programs? *Yes.*

5. Who will take on supervision duties? *Supervision responsibilities will continue as they currently are. Mathematics education and science education faculty who teach in the elementary and middle school methods blocks will continue to supervise practicum students during their field placements.*

6. Who will be program chair for mathematics education and science education? *The Mathematics and Science Education Program Faculty has been divided into two program faculties: the Mathematics Education Program Faculty and the Science Education Program Faculty. Margaret Mohr-Schroeder will chair the Mathematics Education Program Faculty and Jana Bouwma-Gearhart will chair the Science Education Program Faculty.*

7. Who will serve as advisors, and how will that be allocated? *If an advising proposal that is under review by the Provost's Office is not fully funded, advising for students who have been admitted to TEP or upper division status will be advised as in the past. The faculty in Mathematics Education would advise students in mathematics education; faculty in Science Education would advise students in science education.*

8. Who will serve on committees (this is more about representatives from the STEM Education department)? *The STEM department would have representation on college-level committees and be treated as other departments in the college in this regard. Faculty from the content disciplines in Arts and Sciences who would have joint appointments in STEM could serve on doctoral committees. Given recent hires in mathematics education and science education, there will be sufficient faculty in the STEM department to serve on program faculties, including the Elementary Education and Middle School Program Faculties.*

9. Will we keep all 8.5 TA lines currently allocated to C&I? *Yes.*

10. What is the future of lecturer lines in C&I? Currently we have one as the MIC coordinator and one as the middle school coordinator. Ms. Vicki Vance has coordinated the elementary student teaching for a number of years, but is retiring in June. Will we be able to hire someone into Ms. Vance's position? *Lecturer lines are established as needs arise throughout the college. The lines do not "belong" to a specific department. Salaries to fund the lecturer lines come from vacant faculty lines. The lecturer line for the MIC program will continue into the 2010 2011 academic year because the college was not able to search for the MIC position; however, a successful search was conducted for the middle school position and that lecturer line will not be available to C&I for the coming year. The department will be able to hire an individual to replace Ms. Vance for the upcoming year.*

Curriculum & Instruction
317 Dickey Hall
Lexington, KY 40506-0017

859 257-7399
fax 859 257-1602
www.uky.edu

November 19, 2010

To Whom It May Concern:

I am writing this letter in support of the establishment of a new STEM Department in the College of Education. This is an important opportunity that would situate our College and the University as a national leader focused on a timely and critical educational issue. In fact, to my knowledge, there are only two such STEM Departments in existence nationally. As the University seeks to attain a position as a "Top 20" university, it seems that a new STEM Department would only help leverage our status toward this goal.

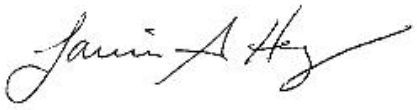
Based on President Todd's recent remarks regarding the need for increased numbers of highly qualified K-12 STEM educators in Kentucky, I feel that the College would be remiss to not move forward with creating a separate department, which would provide the opportunity for an increased emphasis on STEM education in conjunction with pre-service and in-service teacher preparedness in these areas.

I do not feel that the separation of our STEM faculty from the Department of Curriculum and Instruction would impose any hardships on our department or current programming. I will continue to pursue opportunities to collaborate with and engage in integrated projects with our STEM faculty in which we can work together to improve our current programs while planning additional, innovative approaches to teacher preparation. For example, Dr. Wilhelm and I are planning the submission of an NSF grant that would integrate science and literacy curriculum from a problem-based learning approach. Additionally, we are exploring new program ideas designed to attract military veterans from engineering battalions at Fort Knox and Fort Campbell to enter the teaching field at the middle and/or high school level as part of the P20 College & Career Readiness Lab HOMEFRONT: Honoring Our Military through Education: Flexible Recruitment of New Teachers Initiative.

I strongly believe that the development of a new STEM Department fits well within the goals of the Strategic Plans for our College and Department. Through greater, national visibility as one of only a small number of Colleges with a dedicated department for STEM education, our College will be positioned as a national leader in this area. This

increased visibility and recognition is certain to result in opportunities for the recruitment of doctoral students and access to external funding that would augment the capacity of the College "to increase the numbers of teachers it prepares to help address critical shortages in the high-need fields of science and mathematics" (Department of Curriculum and Instruction Strategic Plan, 2006-09).

Sincerely,



Laurie A. Henry, Ph.D.
Co-Director, P20 College & Career Readiness Lab
Assistant Professor of Early Adolescent Literacy

UNIVERSITY OF KENTUCKY

College of Education
Field Experiences & School Collaboration
104 Taylor Education Building
Lexington, KY 40506-0001
859 257-1857 or
859 257-7974
fax 859 257-2734
fieldx@uky.edu
www.uky.edu/Education/ofeover.html

Dr. Jennifer Wilhelm
Department of Curriculum & Instruction
College of Education
101 B Taylor Education Building
CAMPUS 0001

Dear Jennifer,

I am writing to support the proposal for you and other colleagues who specialize in areas related to Mathematics and Science Education to form a STEM department which is separate from Curriculum & Instruction (C & I) where you currently reside. As a faculty member in the C & I department and director of the field experience program for Teacher Education, I am acutely aware of the importance of highlighting the STEM areas at this juncture. Clearly, this is a time of radical transformation for our P-12 schools with the mandate to better prepare students to succeed in this highly technological, interconnected world. I believe it is vitally important for the College of Education to lead efforts to improve mathematics and science instruction, which is a key component in that transformation. Helping teachers implement strategies that emphasize real-world, problem-based learning will take considerable resources. My understanding is that having a STEM department in the College will enhance the possibility of securing funds and mobilizing the resources needed to do the job.

I hope my comments prove helpful as the proposal moves through the approval process.

With best wishes,

Sharon Brennan Ed.D
Associate Professor and Director

UK
UNIVERSITY OF
KENTUCKY

College of Education
Curriculum and Instruction
335 Dickey Hall
Lexington, Kentucky 40506-0017
859 257-4661
fax 859 257-1602
www.uky.edu

August 9, 2010

Mary John O'Hair, PhD, Professor, and Dean
College of Education
University of Kentucky

Dear Dr. O'Hair:

I am writing this letter to offer my support for the establishment of the STEM education department in the College of Education. Although for various reasons the new department will not be my primary department, I have been a supporter of this innovation since the time when Dr. Richard Millman was the interim chair of the Department of Curriculum and Instruction. I believe this is an indication of educational leadership of UK for the state of Kentucky and beyond.

I am sure good arguments have been made in plenty on the importance of the new department. Here I offer my personal experience. Part of my graduate studies at the University of British Columbia was carried out in a department called Mathematics and Science Education, a good initial effort of the now STEM education. My experience in that department was beneficial as the whole department operated its research and teaching around common and unique issues in the two school subjects more closely related than any others. Realizing and thinking about the common and unique issues in mathematics and science education brought doctoral students to a special position to understand both mathematics education in relation to science education and science education in relation to mathematics education. Unfortunately, to my disappointment, such an emphasis (even connection) was very much lost later when the Department of Mathematics and Science Education was combined with another department to form the Department of Curriculum Studies.

It is my hope that the new STEM department operates in a similar philosophy realizing that these two school subjects are both closely connected with each other and substantively unique from each other. Such a direction will, I believe from my own first-hand experience, benefit research and teaching in the new department.

Please feel free to contact me for more discussion.

Sincerely,

Xin Ma, PhD and Professor
Spencer Fellow of the (U.S.) National Academy of Education
(Former) Canada Research Chair

UNIVERSITY OF KENTUCKY
College of Education

Dr. Mary John O'Hair
Dean, College of Education
103 Dickey Hall
University of Kentucky
Lexington, KY 40506-0017

May 18, 2010

Dear Dean O'Hair,

I am writing in support of the proposed Science, Technology, Engineering, and Mathematics (STEM) Education Department in the College of Education. I believe this department has the potential for giving national prominence to the University of Kentucky in the area of K-12 teacher education in the STEM fields, as well as highlight the university's focus on professional development in STEM Education and research on strategies for improving the teaching and learning in STEM education.

During my tenure at the university, I have been a faculty member within the Department of Curriculum and Instruction. Although this arrangement has worked well in terms of elementary and middle level teacher education programs, little focus has been given to mathematics or science education, two areas of great need in schools today. Further, indirect funding from external funding agencies (e.g., National Science Foundation, US Department of Education) has been distributed across the department, leaving few funds to purchase materials and resources for the science and mathematics teacher education programs. This was a bit frustrating when considering the amount of resources brought into the department through external funding sources by mathematics and science education faculty.

The formation of the STEM Education Department offers many opportunities for collaboration among STEM Education faculty as well as faculty from STEM disciplines. The history of STEM Education faculty collaborations with faculty within the College of Arts and Sciences is rich with local, state, and regional professional develop programs in science and mathematics for K-12 teachers, graduate programs in mathematics, and partnerships with state education representatives to develop standards-based instructional materials. The organization of the STEM Education Department will provide a more focused group within the College of Education to continue these collaborations. Additional programs also will focus on modeling pedagogies for teaching science, technology, mathematics and engineering concepts, offering authentic learning experiences for K-12 teachers within these fields to foster understanding of how STEM concepts apply to real world/authentic practices in the field, and develop programs to improve the teaching of STEM concepts in institutions of higher education.

Curriculum and Instruction
335 Dickey Hall - Lexington, Kentucky 40506-0017
(859) 257-4661 - fax (859) 257-1602
www.uky.edu

The newly approved STEM Education graduate program is the first program developed under the auspices of the new department. The program offers teachers and other individuals with expertise in one or more STEM fields opportunities to extend their learning in their domain, or to develop a broad background in STEM education while earning a master's of science degree. In addition, I am beginning preliminary work developing a master's level program in math and science education for elementary and middle level teachers. Such a program will target teachers in grades 4-7, grades levels that correspond to state accountability tests, and thus of great interest for school districts within the region. In addition, I am in the preliminary stages of developing a collaborative project for teachers in grades four thought eight in collaboration with a scientist at Eastern Kentucky University. The project will begin as a professional development program focusing on a comparison of ecological issues in Kentucky and Madagascar culminating in a possible study trip to Madagascar.

Although such programs could be part of a larger STEM education program, the new department provides faculty more focus on developing such programs, and supports a community of researchers in STEM Education. As the faculty meet to discuss department issues, other topics of interest also are discussed, such as writing projects, grant opportunities, and collaboration opportunities. In addition, faculty within the STEM Education Department also have formed a writing group that meets monthly during the school year to critique manuscripts members are preparing for publication. The writing group provides another opportunity for faculty members to collaborate, assist each other in developing scholarly writing, and develop ideas for new research and writing projects.

In summary, I am delighted with the development of the STEM Education Department and look forward to its beginning in the 2010-2011 school year.

Sincerely,

Rebecca McNall Krall, Ph.D.
Phone: 257-2176
Email: rebecca.krall@uky.edu

UNIVERSITY OF KENTUCKY

College of Education
Curriculum and Instruction
355 Dickey Hall
Lexington, KY 40506

859 257-4661

May 13, 2010

Dear Dean O'Hair:

I am writing to express my interest in joining the potential new Department of Science, Technology, Engineering, and Mathematics [STEM] Education. As Mathematics Program Faculty Chair in the present Department of Curriculum and Instruction, I believe the formation of this new department is timely and of the utmost importance. It will help create a specialized focus on STEM Education at the University of Kentucky, allowing for more innovative approaches to teacher education and research in its associated fields. The investment in research on teaching and learning the new department would offer will inform the development and enhancement of STEM curricula and pedagogical approaches—a prominent need based on nationally recognized issues. In turn, investment in the new department's research and programming could lead to increased numbers of science, technology, engineering, and mathematics teachers as well as STEM teacher educators, both of which will fulfill needs in Kentucky.

I believe my mathematics content expertise and current externally funded projects in investigating mathematics knowledge for teaching, geometry knowledge for teaching, and formative assessments for secondary mathematics teachers will contribute to making UK and the College of Education a national leader in STEM Education. My P20 engagement - including Family Math Nights, Big Blue Council of Teachers of Mathematics, and partnerships with Fayette County Mathematics – and my representation of UK on numerous state committees will contribute to the ever-expanding partnership base at the University of Kentucky.

The goals of the STEM Education department represent the kind of P20 engagement our college currently states as its mission, and meshes perfectly with my research and goals for working at UK. Together, I believe we can bring our content expertise and national-level projects to bear on Kentucky reform and make a difference as a STEM Education department.

Sincerely-

Margaret J. Mohr-Schroeder, Ph.D.

Margaret J. Mohr-Schroeder, Ph.D.

UK UNIVERSITY OF KENTUCKY
College of Education

Dream · Challenge · Succeed

May 16, 2010

To Whom It May Concern,

This letter conveys my intention to become a member of the newly forming department of science, technology, engineering, and mathematics (STEM) education at the University of Kentucky. I intend to begin working in this department as soon as possible.

The new department will allow for numerous opportunities for me, professionally, as well as for my new department colleagues. Most notable will be the concentrated efforts that will allow us to help meet our ambitious goals to significantly increase our numbers of highly-qualified, highly-effective certified K-12 science and mathematics teachers. As a new department we intend to strengthen current teacher certification programs as well as to create new ones with a focus on research-confirmed best teaching and learning practices that unify the STEM disciplines.

This focus will carry over into our graduate programs, including a new PhD program in STEM education, one of only a few of its kind. The cumulative expertise of the proposed STEM education department faculty group promises to foster doctoral graduates of exceptional quality. We aim to help alleviate the shortage of postsecondary STEM education faculty currently needed to effectively train the practicing and potential K-20 educators of tomorrow. The potential of the formation of a new STEM education department, alone, has already been an effective recruiting tool for strong PhD candidates; I am already working with two new students (to being, officially, in fall 2010) in planning joint research regarding STEM teaching and learning at the postsecondary level. I am confident that our newly formed department will help our faculty to better secure external funding monies to help support our graduate students, as well as attract and support postdoctoral researchers, and to become one of the top producers of STEM education research in the country.

I wholeheartedly endorse the proposed STEM education and will do my best work to see its success as a leader in STEM education for the Commonwealth, the nation, and internationally. I humbly request the support of the various entities here to assist and subsidize its immediate creation.

Sincerely,

Jana Bouwma-Gearhart

Dr. Jana Bouwma-Gearhart
Assistant Professor of Curriculum and Instruction
Secondary Science Education

Curriculum and Instruction · 335 Dickey Hall · Lexington, KY 40506-0017 · (859) 257 – 4661
fax (859) 257 – 1602 · www.uky.edu/Education

UK
UNIVERSITY OF
KENTUCKY
College of Education

Curriculum and Instruction
355 Dickey Hall
Lexington, KY 40506
859 257-4661

May 15 2010

Dear Dean O'Hair,

When my appointment at the University of Kentucky began last summer, I did not realize I would quickly become an inaugural member of one of the first STEM Education departments in the United States. When I began, I knew I was drawn to my colleagues in mathematics and science education, but I assumed it was because of our similar content interests. I quickly realized that they were as driven and passionate as I am about improving awareness of STEM related fields and training teachers to become successful STEM educators. This common passion has driven us closer throughout this past year.

In my first year at the University of Kentucky, I have collaborated to write an NSF grant, assisted in creating a master's degree program in STEM Education, designed a graduate level course in STEM Education curriculum, written a proposal to become the co-director of a P20 STEM Innovation Lab, and offered feedback in the STEM Plus undergraduate degree program for future teachers in STEM fields. All of this was in collaboration with my STEM Education colleagues. Additionally, our relationships with the STEM related departments in the College of Arts and Sciences and College of Engineering has helped increase my personal contacts in other colleges and I look forward to working closely with our colleagues in those colleges.

I am excited about the increased collaboration and productivity our STEM Education department will produce and I fully devote my support to this endeavor. Since moving to Kentucky, I have gained friendships, but more importantly in higher education, I have made colleagues for life. As a team within the Curriculum and Instruction department, we are dynamic and driven; as our own department, we will be unstoppable.

Sincerely,

Molly H. Fisher

Molly H. Fisher, PhD

UNIVERSITY OF KENTUCKY

College of Education
Curriculum and Instruction
335 Dickey Hall
Lexington, Kentucky 40506-0017
859 257-4661
fax 859 257-1602
www.uky.edu

Dr. Mary John O'Hair
Dean, College of Education
University of Kentucky
Lexington, KY 40506

May 16, 2010

Dear Dean O'Hair,

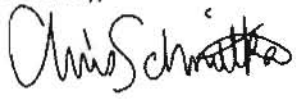
I came to the University of Kentucky because it seemed to be a place that would value my work integrating engineering design and digital technology tools into science teaching and learning. Thankfully, my first year here has demonstrated that UK is such a place. For the past 30 years, STEM education has been at the core of who I am, and to find an academic home for my pursuits with like-minded people has been very fulfilling.

It was often an isolating thing to be one of those "science math geeks" growing up- delighting in owning the first personal computer on the street back in the late 1970s, rebuilding my car engine as a teenager, leaving high school early to take calculus at the university in town, being the only female in my graduating class of mechanical engineering majors. When I eventually became a science teacher at a girls' middle school, my mission was to encourage all my students to collaborate and find their own inner engineer- to tinker, invent, take-apart, build, re-build, and apply their newfound math and science skills to solving everyday problems with the other students in their class.

Working with my new science and math education colleagues at UK has helped me experience the sense of collaboration I hoped to instill in my students. With them I find a special place where I am not a "science math geek" in isolation, but the member of a team that includes teachers in the community, members of PIMSER, and engineering faculty across the street. The STEM fields are unique, with a special language and culture of their own. While I value the contributions of faculty in other disciplines, there is a special underlying understanding amongst those involved in STEM education initiatives. To work together in our own department, I think, would only strengthen the mission we collaboratively share.

I fully support the creation of the Department of Science, Technology, Engineering and Math Education at the University of Kentucky- but not just because it's good for bringing in grant money, not just because it's good for reaching out to colleagues in other colleges on campus, not just because it's part of the larger STEM initiative to increase the number of science and math teachers who are technologically literate, and not just because it seems likely to help UK reach Top 20 status. I support the creation of the STEM Education department because it will help me be more productive and focused as I work with a team of amazing scholars who speak my language and share my goals.

Sincerely,



Christine Schnittka, Ph.D.
Assistant Professor, Science Education

UK
UNIVERSITY OF
KENTUCKY
College of Education

Curriculum and Instruction
355 Dickey Hall
Lexington, KY 40506

859 257-4661

July 1, 2010

Dear Dean O'Hair,

When I was interviewed for the Assistant Professor of Elementary/Middle School Mathematics Education position at the University of Kentucky, I was informed of the plans of creating a new STEM Education Department. Soon after my interview, I researched universities that promoted a STEM emphasis in their Colleges of Education. Needless to say, the number of universities with this focus was limited, and no university had a STEM Education Department. I am excited to be a faculty member of an innovative and cutting-edge department.

After I accepted the position at the University of Kentucky, my new STEM Education colleagues in mathematics and science education have been very supportive. I know during this short period of time, I have gained important friendships with individuals whom I will collaborate with to develop a strong department that will be recognized worldwide. I am thrilled to be part of this team in the College of Education.

Sincerely,

Christa D. Jackson

Christa D. Jackson, PhD

UNIVERSITY OF KENTUCKY

Department of Physics & Astronomy
177 Chemistry-Physics Building
Lexington, KY 40506-0055
859 257-6722
fax 859 323-2846
www.pa.uky.edu

May 10, 2010

Professor Jennifer Wilhelm
Department of Curriculum and Instruction
College of Education
University of Kentucky
Lexington, KY 40506-0017

Dear Professor Wilhelm,

On behalf of the faculty of the UK Department of Physics & Astronomy, I am writing to strongly endorse your proposal to establish a STEM Department in the UK College of Education.

The dearth of qualified physics teachers at all K-12 levels, and especially in secondary schools, is a well-known national problem that has risen to the level of a crisis in Kentucky. Our Department has long recognized this problem, but has never had the resources to address it, or even to contribute to its solution. The problem has an obvious, tangible impact on both our undergraduate and graduate programs in physics and astronomy, as well as on the ability of the state to improve the technical sophistication of its workforce, and to attract and grow high tech industries.

For the proposed STEM Department to address this problem, it will need not only strong administrative support, but also support from faculty in the STEM departments of A&S. Our Department is eager to pursue joint and adjunct appointments of faculty and new departmental curricula as required to ensure that future KY physics teachers have the core content knowledge required to be effective in the classroom. We would also like to pursue a dual major option, in which students in our recently proposed revised BA program would simultaneously seek an education degree and initial certification through the proposed STEM Department.

In summary, we fully support your proposal for a new STEM Department in the College of Education, and look forward to working with College of Education faculty to advance physics and astronomy education at UK and throughout the Commonwealth.

Sincerely,

Michael Cavagnero, Chair
UK Department of Physics & Astronomy

UNIVERSITY OF KENTUCKY

Zhongwei Shen, Professor
Chair, Mathematics

Department of Mathematics
721 Patterson Office Tower
Lexington, Kentucky 40506-0027
(859) 257-6794, FAX (859) 257-4078
zshen2@email.uky.edu

April 6, 2010

Dr. Jennifer Wilhelm
Department of Curriculum & Instruction
335 Dickey Hall
University of Kentucky
Lexington, KY 40506-0017

Dear Dr. Wilhelm:

I am writing to indicate the support from the Department of Mathematics for the formation of the new Department of Science, Technology, Engineering and Mathematics Education in the UK College of Education.

The department sees this as a very positive step in the enhancement of programs to prepare teachers of secondary mathematics for the state of Kentucky. There has been a long-time partnership between the Department of Mathematics and the College of Education in this program to prepare teachers of mathematics.

We see this as an opportunity for faculty from both departments to work together to help plan and implement new and better plans for the preparation of secondary mathematics teachers. Faculty from the Mathematics department have been helping in many ways with programs in Curriculum and Instruction as have faculty from C & I helped with planning and preparation of the courses that our future teachers need to be highly-qualified as they complete this program.

The department is very interested in the possibility of a new program for preparing more mathematics teachers through a 4-year program. We strongly support such a move. We hope that when such a program is implemented we will be able to work with the STEM Education department to make it possible that those students who are majoring in mathematics will be able do so while still getting their certification to teach mathematics in the secondary schools.

Likewise, while we foresee the opportunity for these undergraduate students to work seamlessly between our two departments, it is a very good idea to have the opportunity for our interested faculty to be able to work seamlessly with both departments. In this direction we are very interested in the plan to have joint appointments (5%) between the STEM Education Department and the Mathematics Department. We hope that the STEM Education department would take under advisement for certain mathematics faculty members, such as Paul Eakin, Carl Lee, and David Royster, to hold a 5% appointment within the STEM Education Department. At the same time the Mathematics department

is willing to entertain the proposal that certain mathematics education faculty, such as Margaret Mohr-Schroeder, Molly Fisher, and Christa Jackson might hold a similar appointment within the Mathematics Department. Having these joint appointments would more forcibly indicate to internal and external units the commitment and help to ensure successful and productive collaborations. Collaborations might include but not be limited to activities such as joint teaching, program development, grant writing, committee service, and research.

Again, we support the creation of this STEM Education department and look forward to working with you and this department in the future.

Sincerely,

Zhongwei Shen
Professor and Chair

UK
UNIVERSITY OF
KENTUCKY
College of Arts and Sciences

Department of Chemistry
Chemistry-Physics Building
Lexington, KY 40506-0055
859 257-4741
fax 859 323-1069
www.chem.uky.edu

September 1, 2010

Jennifer Wilhelm
College of Education
University of Kentucky

Dear Dr. Wilhelm:

I write as Chair of the Department of Chemistry to indicate our Department's support for the establishment of a STEM Education Department within the College of Education.

The Department of Chemistry is concerned about the nationwide shortage in qualified teachers who could teach chemistry at the high school level. As a result many students are not exposed to quality chemistry instruction in high school and may shy away from pursuing degrees in STEM disciplines at the College level. It has been our experience that several of these students are often under-prepared when taking our introductory chemistry courses.

The proposed STEM Education Department would help educate more and better prepared STEM teachers. Moreover, it would provide a collaborative environment for research in STEM education. A number of faculty members from our department are interested in participating in the research mission of the newly formed department. Consequently, the Department of Chemistry supports the establishment of a STEM Education Department.

Sincerely,

Mark S. Meier
Professor and Chair
Department of Chemistry

UNIVERSITY OF KENTUCKY

8 September 2010

Dr. Jennifer Wilhelm
Dr. Rebecca McNall Krall
University of Kentucky
College of Education
Dept. Education Curriculum and Instruction
114 Taylor Education Bldg.
Campus 0001

Dear Dr. Wilhelm and Dr. Krall,

We write to express our enthusiastic support of the initiative to establish a Department of Science, Technology, Engineering, and Mathematics (STEM) Education within the College of Education at UK. We fully appreciate the need for secondary STEM educators who have themselves been educated and trained as scientists in STEM fields. In the Earth Sciences, which are among the core content subjects for assessment in Kentucky, we see a particular need for earth scientists to teach that content, as opposed to someone broadly trained in another field or another science as is often the case at many high schools. We also foresee the potential for instructional and research collaborations between EES and the STEM Department, and even joint faculty appointments.

We look forward to the seeing the new STEM Department on campus. Please let us know if we can be of further assistance.

Sincerely,

Dhananjay Ravat

Digitally signed by Dhananjay Ravat
DN: cn=Dhananjay Ravat, o=University of Kentucky, ou=DEES, email=dhananjay.ravat@uky.edu, c=US
Date: 2010.09.08 16:48:06 -04'00'

Dhananjay Ravat, Chair

Dave Moecher, DUS

Earth & Environmental Sciences
101 Slone Building, Lexington, KY 40506-0053
+1 859 257 3758 • fax +1 859 323 1938
www.uky.edu/AS/Geology/

UNIVERSITY OF KENTUCKY

Chairman of Biology
Department of Biology
101 Thomas Hunt Morgan Building
Lexington, KY 40506-0225
859 257-6766
fax 859 257-1717
www.as.uky.edu/biology

May 14, 2010

Jennifer Wilhelm
College of Education
University of Kentucky

Dear Dr. Wilhelm,

I am writing to provide my support for the creation of a Department of Science, Technology, Engineering and Mathematics (STEM) Education. It is clear that there is a grave shortage of competent science and mathematics teachers in the Commonwealth of Kentucky as well as the nation at large. Further, the level of ignorance of scientific principles is alarmingly high throughout this country, and training of enthusiastic, competent science teachers is a necessary first step in alleviating this deplorable situation. I appreciate your willingness to work with STEM departments that will provide the scientific content for these future STEM teachers. I also appreciate your recognition that multiple paths to teacher certification for science teachers should be encouraged. As we move forward, I look forward to working with your faculty collaboratively on science education research and will authorize courtesy appointments in my department to facilitate such proposals.

Good luck with your proposal, and, should you need further information or help, do not hesitate to contact me.

Yours Sincerely,

Vincent M. Cassone, Ph.D.

Professor and Chair

EDUCATION PROFESSIONAL STANDARDS BOARD

Steven L. Beshear
Governor

100 Airport Road, 3rd Floor, Frankfort, Kentucky 40601
Phone: 502-564-4606 Fax: 502-564-7080
www.kyepsb.ky.gov

Phillip S. Rogers, Ed.D.
Executive Director

November 16, 2010

Academic Organization and Structure Committee
College of Education
University of Kentucky
166 Taylor Education Building
Lexington, KY 40506-0001

Dear Committee Members:

We have been contacted by the university to comment on the need for mathematics and science teachers across the Commonwealth. As the authorized agency for the certification of Kentucky's educators, we have first-hand knowledge regarding the shortage areas for educator certification. This belief is based on our issuance each year of emergency certifications for all content areas in K-12 education.

The Kentucky Department of Education annually compiles a list of certification shortage areas and this list is based on data provided by the EPSB. Mathematics and science certification areas have been on that list since its inception in the 1990's. A review of the emergency issuances during the 2009-2010 school year indicates the reason for this inclusion. During this school year, the last for which we have a full year's set of data, the EPSB issued a total of 461 emergency certificates to districts in Kentucky. Of that number, 123 of these certificates were in the areas of biology, chemistry, physics, earth/space science (all grades 8-12), mathematics (grades 8-12), middle school science (grades 5-9), and middle school mathematics (grades 5-9).

We believe that these data, illustrating that 27% of all emergency issuances last school year were in science and mathematics, make a strong case for the need for new and expanded programs in our state institutions for these teaching disciplines. Without going into data from previous school years, we can verify that a similar situation has existed for many years in Kentucky.

We would support any efforts to expand teacher preparation programs in the areas of science and mathematics, and we welcome any requests you may have for more information regarding this area.

Sincerely,

Phillip S. Rogers
Executive Director

PIMSER
Partnership Institute for Math & Science Education Reform

May 17, 2010

Dr. Jennifer Wilhelm
101B Taylor Education Building
University of Kentucky
Lexington, KY 40506-0001

Dear Dr. Wilhelm,

I am pleased to offer, on behalf of the Partnership Institute for Mathematics and Science Education Reform (PIMSER), strong and unequivocal endorsement of the proposal to the University Senate to establish a STEM Education department in the College of Education.

The PIMSER has worked closely over the past three years with the deans of the College of Education and the university administration as an advocate for increasing the number of STEM education faculty and the creation of a department of this nature.

The proposed department will address the compelling evidence for the critical need for the enhancement of the quality and quantity of STEM education teachers in the Commonwealth and the nation. As our state and nation continue to fall behind other nations in technological and economic development, and the quality of life they bring, this department will build new bachelor's and master's degree programs in science, technology, engineering and mathematics education. The University of Kentucky is a very active member of the Science and Mathematics Teacher Imperative (SMTI) of the Association of Public and Land Grant Universities (APLU), chaired by President Lee Todd. This national program has provided the evidence and the rationale for degree programs of the type proposed.

A specific niche in the overall need for STEM education enhancement is that of research based programs that can attract graduate students, STEM faculty researchers pursuing cutting-edge research, and graduate education and research. The University of Kentucky, as the Commonwealth's Research I flagship institution can, and should occupy that niche.

Finally, the PIMSER is the University of Kentucky's institute that provides support to STEM-related departments in their initiatives to promote pre-and in-service teacher education through engagement partnerships with K-12 teachers and administrators. It has built a network of K-12 schools and state and national stakeholders that enables this support. The Institute will be a particularly strong partner with the proposed new STEM education department.

Sincerely,

John H. Yopp

John H. Yopp
Director, PIMSER and SMTI Team Leader

187 Ralph G. Anderson Building
University of Kentucky
Lexington, KY 40506-0503

859-257-9219 859-323-6173 fax
www.uky.edu/PIMSER

April 6, 2010

Dear Dr. Wilhelm,

I am writing in support of the formation of a STEM Education Department in the College of Education and congratulate you and your colleagues for spearheading the efforts. The University's focus on science, technology, engineering and mathematics at the K-12, undergraduate and graduate levels is very timely. One can quote study after study, and commission after commission reports (national and state) indicating the lag in the nation, and particularly in this state, in K-12 student performance in mathematics and science.

The University of Kentucky has increased markedly its efforts to improve STEM education in the state over the past eight or so years. This began with the rewarding of a large grant from the National Science Foundation (NSF) to improve student and teacher performance in mathematics and science in the central Appalachian region. The program involved faculty from the Colleges of Arts and Science and Education. In addition, the University's administration is very supportive in that the President has taken lead positions at both state and national levels. He served as chair of a statewide taskforce on STEM education, serves as chair of an NSF Advisory committee in education and serves as chair of a recently formed Association of Public and Land-Grant Universities commission entitled the Science and Mathematics Teachers Imperative (SMTI) as well as serving on several forums, such as the Business-Education Forum. Further, the Provost has supported the Partnership Institute for Mathematics and Science Education Reform that evolved from the large NSF award and was approved by the University Senate [Board of Trustees]. He has lent support to the mathematics and science education efforts in the Colleges of the Arts and Science, Education and Engineering including outreach professors in mathematics, science, and science education to increase and improve the University's influence in K-12 STEM Education.

I mention the above to indicate the University is interested in taking a leadership role in STEM education and as mentioned before, it is timely that a unit be formed to assume this role, interiorly. There are other reasons for a STEM education department. The University has excellent STEM courses and STEM education courses. A unit that would assist in connecting these courses, i.e., the content and the pedagogy, would greatly enhance the quality of mathematics and science teachers produced by the University. Also, the number of teachers the University graduates needs to be increased. As it stands, a number of universities in the state graduate more teachers.

One further issue is that there are federal, and some state funds directed to the improvement of STEM education. Again, a focal point on STEM education will increase the University's potential to obtain funds for pre-service and in-service teachers as well as for research on best practices.

Finally, I mention briefly that for the past 15 years I have been involved with K-12 mathematics and science programs which have brought into the central Appalachian states over $40 million. I have found there is a great need for a four year teacher education program. Five year programs do not supply many teachers in high needs areas. Secondly, programs with high quality content and pedagogy are absolutely essential to make the impact necessary to improve student performance.

It appears to me that your new department and its program in STEM education are being proposed at the appropriate time. I wholeheartedly support them.

Sincerely,

Wimberly C. Royster,
Co-PI, Appalachian Mathematics and Science Partnership
Emeritus Professor of Mathematics

UNIVERSITY OF KENTUCKY

Dr. David Royster
Outreach Professor of Mathematics
Department of Mathematics
759 Patterson Office Tower
Lexington, KY 40506-0047

859-257-1258, (FAX: 859-257-4078)
david.royster@uky.edu
http://www.ms.uky.edu/~droyster

Dr. Jennifer Wilhelm
Department of Curriculum & Instruction
335 Dickey Hall
University of Kentucky
Lexington, KY 40506-0017

Dear Dr. Wilhelm,

I am writing to extend my support as the Outreach Professor of Mathematics for the formation of the new Department of Science, Technology, Engineering and Mathematics Education in the UK College of Education.

One of the purposes of the position of Outreach Professor of Mathematics is to enhance the teacher preparation program with which the Department of Mathematics has assisted the College of Education in the past. The formation of the STEM Department is a very positive step in advancing the preparation programs for teachers of secondary mathematics in the state of Kentucky. I come to the University of Kentucky from a university where there was a very close working relationship between the Department of Mathematics and the College of Education. I am pleased to see that it is only grower stronger here at UK. This is an opportunity for me to work together with the faculty from your department and for all of us to plan and implement new and better programs for the preparation of secondary mathematics teachers.

I anticipate the opportunity for undergraduate students to work seamlessly between our two departments, and it will be very good to have the opportunity for our interested faculty to be able to work seamlessly with both departments. In my past university position, I served as a faculty member in the Department of Mathematics with an Adjunct appointment in the Department of Middle, Secondary, and K-12 Education. In this capacity I was available to serve on department committees and direct dissertations for the department. I look forward to having similar opportunities here, if they present themselves. Having joint appointments serves only to indicate more forcefully to internal and external units the commitment of the departments and to ensure successful and productive collaborations.

Again, I support and commend the creation of the STEM Education department and look forward to working with you and this department in the future.

Dr. David C. Royster,
Outreach Professor of Mathematics
University of Kentucky

Dr. Jennifer Wilhelm
Associate Professor
University of Kentucky, College of Education
Department of Curriculum and Instruction
101 B Taylor Education Building
Lexington, KY 40506-0017

Dear Dr. Wilhelm:

I am writing this letter in support of the University of Kentucky (UK), College of Education's plan to develop a Department of STEM education. This is an important initiative for the University and the Commonwealth because it will help develop a statewide STEM pipeline and improve the STEM literacy of Kentucky's workforce.

The dominant industries of the future will be driven by advances in technology that require a workforce with strong background in information technology (IT) and a solid foundation in STEM. The next wave of the IT revolution not only will transform states, it will lead to significant new economic opportunities as IT companies find new business opportunities and create new digital environments. Unfortunately, Kentucky is facing an immediate, critical shortage in STEM-oriented labor. A 2010 Milken Institute assessment of the technical and scientific workforce of each state ranked Kentucky 47th overall, indicating that the state has limited science and technology assets. Based on the 2008 State New Economy Index, Kentucky ranks in the lowest percentile for IT professionals, high-tech jobs, science and engineering, and workforce education. The 2010 National Science Foundation's Science and Engineering Indicators show that this trend will continue as less than 1/4 of high school graduates participate in advanced placement programs. Kentucky is in the lowest quartile for number of students receiving degrees in a science and engineering field with fewer than 10% of these students pursuing graduate degrees. Currently, Kentucky is **37th** in the NAEP's standing in mathematics and under performs US students on international tests in math and science and ACT scores. The key for Kentucky and the rest of the nation is to build an educational system that keeps pace with emerging industry needs.

The proposed STEM department in the College of Education will expand and enhance STEM Education at UK and in the Commonwealth in significant ways. Along with strengthening teacher preparation programs already in place (e.g., Elementary, Middle School, and Master's with Initial Certification), the STEM Education Department will build new bachelor's, master's, and doctoral programs in science, technology, engineering, and/or mathematics education. Through these curriculum and instruction goals, the new STEM department will increase and retain Kentucky students in the STEM pipeline, from pre-K through productive adulthood in the workforce.

To achieve these ambitious and urgent goals requires the concerted efforts of those with a common vision who share focused, relevant expertise in STEM education. The new efforts in the College have already been a catalyst for bringing diverse groups of academics and professionals from across campus to talk about STEM issues. In the years to come, this new department can serve as a model for other Kentucky universities in developing STEM initiatives. As an active practitioner and researcher in STEM education, I strongly recommend the development of this department and advocate for its implementation. I will support this endeavor in any all ways possible.

Respectfully,

Carol D. Hanley, Ed. D.
Associate Director
Tracy Farmer Institute for Sustainability and the Environment
College of Agriculture, Environment and Natural Resources Initiative

UNIVERSITY OF KENTUCKY

Office of the Dean
College of Engineering
351 Ralph G. Anderson Building
Lexington, KY 40506-0503

859 257-1687
859 257-8827
fax 859 323-4922

www.engr.uky.edu

December 6, 2010

University Senate
University of Kentucky
Lexington, KY 40506

Dear Colleagues:

I am writing to provide my enthusiastic endorsement of the creation of a Department of STEM Education in the College of Education at the University of Kentucky. As dean of the College of Engineering for over twenty years, I have become acutely aware of the substantial shortfall in certified math and science teachers that encumbers all other efforts to enhance Kentucky's competitiveness in high-tech areas. In my opinion, UK is the only university in the state that has the size and breadth in its STEM programs and the strength and leadership in its College of Education to properly address the needs in this area.

A sampling of data from recent years will underscore the severity of Kentucky's problems in STEM education. In the fall of 2008, the college-enrollment in Kentucky reached 249,000 students, and engineering enrollment reached an all time high of 4,696. Accordingly, 1.9% of all college students were enrolled in engineering courses of study in Kentucky. Nationally, 3.3% of all college students were enrolled in engineering. Among the surrounding states, the comparable figures were 2.4% in Illinois, 2.6% in Missouri, 3.2% in Tennessee, 3.5% in West Virginia, 3.5% in Virginia, 3.8% in Ohio, and 4.0% in Indiana. To move Kentucky to the national average would require an increase of nearly 3,400 students beyond the current engineering enrollment!

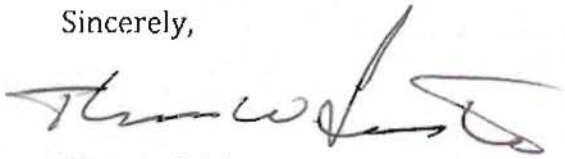
The College of Engineering has been a partner with the College of Education for a number of years in developing STEM-related initiatives. UK is the affiliate university for Project Lead the Way, the largest and most successful nationwide endeavor to increase the number of high school students who develop interest in, and persist to a degree in the STEM area. That initiative shows signs of being highly successful, but even its viability and long term prospects in Kentucky are severely limited by the shortage of qualified STEM faculty in the public schools.

A number of faculty in the College of Engineering have strong ties historically to the College of Education. In fact, the colleges have jointly appointed an assistant professor who has a PhD in Education and a BS in Mechanical Engineering. Another College of Education faculty member has been hired recently due to her similar

educational background. The College is looking forward to providing necessary coursework in engineering to assist the long-term development of the Department of STEM education and its programs. As the opportunity presents, I will work with the Dean of Education to identify and to hire additional faculty in joint positions to bolster the institution's ability to offer appropriate STEM educational degrees and to conduct educational research in the field.

I view the creation of a Department of STEM Education as the single most important initiative that the University of Kentucky can undertake to assure a higher quality education in math and science for Kentucky public school students. I commend this proposal to you as one worthy of your full support.

Sincerely,



Thomas W. Lester
Dean