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***Sustaining Excellence in STEM Undergraduate Education:
Toward a Community of Practice***

**Science, Technology, Engineering, and Mathematics
Talent Expansion Program (STEP)
2012 Grantees Meeting**

March 14-16, 2012
Crystal Gateway Marriot
Arlington, VA

Abstract Packet

Abstracts submitted by February 24, 2012 are included in the printed packet. They are arranged by Poster ID (see "Poster Sessions" handout for the complete list). Abstracts submitted after February 24 will be included with other meeting materials on the STEPcentral.net.

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Poster Abstracts

Poster #: 1 - 01 Session: A Lead Institution: Middle Tennessee State University

Authors: **Tom Cheatham**
 Ginger Rowell
 Don Nelson
 Chris Stevens
 Elaine Tenpenny

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 2	Type 1B	0969571	TN

Poster Title: **Mathematics as a FirstSTEP to Success in STEM**

Keywords: Math Preparation, Introductory Courses, Peer Mentoring, Underrepresented Students

Poster Abstract: Mathematics provides the foundation for all STEM majors. Unfortunately, in Tennessee, according to ACT data, only one-third of the high school graduates test ready for college algebra. However, most STEM majors require at least one semester of calculus. Difficulties in passing their required math classes often discourage young STEM majors, leading them to change to non-STEM majors early in their college career. This STEP 1-B proposal will focus on interventions that address math deficiencies that put new STEM majors at risk. Specifically, “Mathematics as a FirstSTEP to Success in STEM” will work with majors from all STEM disciplines whose math ACT scores are between 19 and 23 inclusive. A cohort of 50 such STEM majors will be recruited into a summer math bridge before their freshman year. After an assessment of their math skills, each student will follow an individualized remediation plan using technology and human interventions. Cohort members will be prepared to enroll in pre-calculus in the fall semester and Calculus I in the spring of their freshman year. To help them succeed in freshman mathematics, the cohort will enroll in a one-credit seminar during the academic year providing intrusive advising, tutoring and mentoring. In the summer between their freshman and sophomore year, FirstSTEP students will engage in a one month intensive, inquiry-based exploration to provide a strong connection to and some depth in their major and to learn how mathematics is connected to their major. In their sophomore year, through the common seminar, the cohort will learn to mentor freshman STEM majors and develop skills that will prepare them for undergraduate research in the future. Alternative pedagogies piloted during the summer math bridge will be evaluated for a larger pilot in the pre-calculus course, and then will be considered for implementation in all pre-calculus courses. Currently, over 40% of the 1700+ students enrolled in pre-calculus each year either withdraw (“W”) or earn a “D” or “F.” These DFW students are likely to change to non-STEM majors. By determining which alternative pedagogies work best in pre-calculus at MTSU, FirstSTEP plans to reduce the percentage of DFW in pre-calculus by 50% by the end of the grant. This intervention alone will enable an additional 680 STEM majors to succeed in pre-calculus each year, giving them one less reason to leave STEM. Pedagogies that work in pre-calculus will be piloted in calculus the next semester with a similar goal of reducing the DFW rate in Calculus I by 50% by the end of the grant, impacting another 140 students each year. In a real sense, every student in pre-calculus (3,500+ each year) and Calculus I (700+ each year) benefit from alternative pedagogies that help students learn.

Poster #: 1 - 02 Session: B Lead Institution: University of Central Oklahoma

Authors: **John Barthell**
 Charlotte Simmons
 Gregory Wilson
 Beverly Endicott
 Wei Chen

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 3	Type 1B	0856396	OK

Poster Title: **A student-centered, faculty-driven mechanism to institutionalize STEP bridge activities**

Keywords: Faculty Development, Peer Mentoring, UG Research/Internship, Institutional Change

Poster Abstract: Undergraduate research and faculty development are two key elements of academic success in public PUIs. Summer Bridge, one component of our current NSF STEP grant, is a student research-based program. A successful Summer Bridge program requires financial support beyond the STEP grant. With the continued decline of state appropriations, it is crucial to design effective mechanisms to provide needed support for faculty and students. The University of Central Oklahoma’s College of Mathematics and Science has established a new model for supporting student research and faculty development: The Center for Undergraduate Research and Education in Science, Technology, Engineering, and Mathematics (CURE-STEM). The Center aims at the professional development of STEM faculty through student-centered undergraduate research. The Center developed an effective mechanism to utilize both internal and external support, including the NSF STEP program, to provide faculty members teaching reassignment time, travel funds, student wages, and other academic support. Currently, more than one-third of full-time faculty in the College of Mathematics and Science participate in CURE-STEM as undergraduate faculty mentors. CURE-STEM provides an avenue for students to continue the same or different lines of research with faculty CURE-STEM Scholars. The relationship between Summer Bridge and CURE-STEM has also resulted in numerous CURE-STEM Scholars applying to participate in our Summer Bridge Program. CURE-STEM represents a feasible mechanism for institutionalizing the programs currently supported by our STEP grant.

Poster #: 1 - 03
University

Session: C

Lead Institution: James Madison

Authors: **Bob Kolvoord**
Roman Miller (Eastern Mennonite University)
Kenneth Phillips (Blue Ridge Community College)
Robyn Puffenbarger (Bridgewater College)
Jennifer Sowers
Raymond McGhee (SRI International)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 4	Type 1A	0756838	VA

Poster Title: **Bridging the Valley: A STEP Ahead for STEM Majors**

Keywords: Recruitment, Math Preparation, Faculty Development, Peer Mentoring, Program Evaluation

Poster Abstract: Bridging the Valley: A STEP Ahead for STEM Majors brings James Madison University, Blue Ridge Community College, Bridgewater College, Eastern Mennonite University, and SRI International together to support growing and sustaining the number of STEM majors at the four higher education institutions. We combine a summer "bridge" workshop with school-year learning communities and upperclass mentors to help students transition from high school to collegiate STEM study. We also offer support for student internships and job placements, and we've engaged in a broad faculty development effort to help institutionalize change. We are currently in Year 4 of our project and we'll share our efforts and evaluation results to date.

Poster #: 1 - 04
Main Campus

Session: A

Lead Institution: University of Cincinnati -

Authors: **Anant Kukreti**
Urmila Ghia
Latiera Evans

Kenneth Simonson
Jeffrey Johnson

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 4	Type 1A	0756921	OH

Poster Title: **Enhancing Recruitment and Retention of Undergraduate Underrepresented Engineering Students at University of Cincinnati**

Keywords: Recruitment, Program Evaluation, UG Research/Internship, Student Tracking, Supplemental Instruction

Poster Abstract: The University of Cincinnati's (UC) College of Engineering and Applied Science and Applied Science (CEAS) is committed to: Increasing and retaining to completion the number of female and underrepresented minority students in the fields of Engineering and Computer Science; and creating the best environment for studying and performing engineering research so that these students become well-prepared for the rigors of graduate education and obtaining the best jobs in a global economy. Because of this commitment, the goal of this Type 1 STEP project are: to increase and retain to completion the number of women and underrepresented underrepresented students in the fields of Engineering and Computer Science in the College of Engineering and Applied Science (CEAS) at the University of Cincinnati (UC), and to create the best environment for studying and performing research, so that they become well prepared for graduate education and the rigors of the ever-changing global market. To achieve the above goal, the objectives of the project are: 1) Develop Grade 4-12 pathway activities to build a steady supply of students interested in engineering. 2) In five years, relative to UC's fall 2008 enrollment, increase the percentage of female (non-minority and minority) engineering students from 16% to 24% of all freshmen engineering students in five years. 3) In five years, relative to UC's fall 2008 enrollment, increase the percentage of underrepresented ethnic (female and male) engineering students from 6% to 12% of all freshmen engineering students in five years. 4) In five years, relative to spring 2008, graduate 74% of students from these targeted populations in five years. 5) Achieve the above enrollment targets for underrepresented engineering students to begin bringing UC's CEAS into parity with the numbers these groups represent in the State of Ohio. 6) Upon graduation, place 100% of these targeted students in technical jobs or graduate school; and 7) Develop a pathway program that encourages and prepares underrepresented ethnic engineering students to compete for graduate school admission and financial support, as well as succeed in graduate school. In Year 2 (2009-2010), we obtained additional funding from the Choose Ohio First Scholarship Program (COFSP) of the Ohio Board of Regents (OBR), which provided 5-year scholarships to two cohorts of STEP students who started in 2009-2010 and 2010-2011. In addition to including underrepresented (women and underrepresented ethnic) engineering students in the STEP program, the COFSP expanded the program to include economically disadvantaged and/or First Generation College Bound ((FGCB) majority (white) men engineering students. Starting from the 2009-2010 cohort, we have two groups of students participating: 1) Bridge Students: underrepresented ethnic (men and women) and a few majority women students recruited to start the program with the Summer Bridge Program prior to the start of their freshman year; and 2) Non-Bridge Students: majority women and FGCB majority men who directly start their freshmen year. All STEP students, Bridge and Non-Bridge students, take Freshmen Learning Community Courses during the freshmen year. Additionally, the Bridge students take Supplemental Cooperative Learning Courses (SCLC's) for their freshmen Calculus, Physics classes and a Blacks in Science Course which serves as a strategy for increasing their self-efficacy as it relates to persistence in engineering. All STEP students (Bridge and Non-Bridge) participate in the following key activities: Advisory Component; student-lead Monthly Socials; Community Engagement outreach program (10 hours per quarter when in school); Summer and Academic-Year REU Programs; and required Co-Op Program in which they alternate between school quarters and paid co-op work quarters during their sophomore, pre-junior and junior years. These activities have had the greatest impact on our project and the University as many of these activities have been adopted by the University or the college. These are also the activities within the grant that we have direct control over and can monitor closely. As previously mentioned, one goal of the project is to increase and retain to completion the number of women and underrepresented minority in the fields of Engineering and Computing Science. To date, the project includes 93 underrepresented students, which include 56 ethnic minority men and women and 37 majority women students. It also includes 47 FGCB majority men students. Thus, a total of 139 participants have participated since the inception of the program in 2008. Academically, STEP students have performed much better than their non-project peers. The data for Years 2, 3 and 4, up to fall of 2011, show a retention rate for the STEP students over 82%, which is greater than the 74% average for UC CEAS engineering students. Despite our successes in the retention area, we have identified two main challenges. Our first challenge is that additional efforts and strategies are needed to increase the recruitment yield of underrepresented ethnic students admitted to the college to participate in the Summer Bridge Program. The second challenge is how to integrate into one STEP program the retention and advancement needs of two diverse student populations, Bridge and Non-Bridge students, for whom the learning community is developed very differently to start with.

Poster #: 1 - 05 Session: B Lead Institution: CUNY New York City College of Technology

Authors: **Janet Liou-Mark**
AE Dreyfuss
Sunghoon Jang
Candido Cabo
Roman Kezerashvili

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 5+	Type 1A	0622493	NY

Poster Title: **New York City College of Technology (City Tech) - CUNY, Metropolitan Mentors Network (MMNet): Growing an Urban STEM Talent Pool Across New York City**

Keywords: Introductory Courses, Peer Tutoring, UG Research/Internship, Supplemental Instruction, Learning Communities

Poster Abstract: New York City College of Technology (City Tech) of The City University of New York (CUNY) is the largest public college of technology in New York State. City Tech is a comprehensive college, offering both associate and baccalaureate degree programs. The central goal of this project is to increase the number of students receiving degrees within science, technology, engineering, and mathematics through: 1) The development of two credit-bearing, pre-freshman summer bridge courses (one focused on science and mathematics and the other focused on engineering technologies), providing academic preparation through a combination of theory and hands on experience, and exposure trips to local industries and government labs to provide career information; 2) The promotion of academic support and student involvement on campus, through expansion of peer-led team learning, learning communities, research opportunities and career oriented activities. A unique component of the program is that City Tech alumni, currently in graduate school, work as teaching assistants and mentors to current undergraduates, while they themselves experience mentoring from the institution's STEM faculty; 3) The development of literature and strategies to promote recruitment. Results are disseminated through the project web page, regional and national conference presentations, and publications. The enrollment trend of the summer bridge courses have been positive: Enrollment was 22 in summer 2007 and 36 in 2008, 31 in 2009, 43 in 2010, and 35 in 2011. The summer 2007, 2008, 2009, 2010 bridge cohorts showed: (1) One-year retention surpassed the college average for first-time freshmen in bachelor's programs associate programs and overall; (2) One-year same program retention exceeded the college's average one year same program retention for first-time freshmen in bachelor's programs and associate programs. This suggests that knowledge about majors and career options before prior to the freshman year decreased changes in majors, which could lead to loss of contributory credits and disenchantment. The promotion of academic support and student involvement resulted in: (1) Over 110 student research presentations at the fall 2011 City Tech research poster presentation, up from fewer than 20 prior to the grant period. There is an increase in the number of students presenting at national and regional STEM and undergraduate research conferences; (2) Four City Tech graduate students serve as teaching assistants and mentors for about 120 students each semester; (3) Peer-led team learning has been expanded to ten courses in math, two in chemistry, one in physics, one in biology, one in developmental writing, and one in civil engineering technology (previously offered in only one math course), with a structure for student and faculty training in place; (4) Learning communities are being expanded to STEM disciplines. The successful outcomes of the program are as follows: • STEM enrollment increased by 615 students (23.3%) in four years (2005-6 to 2009-10) • STEM bachelor's degrees conferred increased 18.2% from 203 in 2005-6 to 240 in the same four-year period. • STEM associate's degrees conferred increased 7.1% from 226 in 2005-6 to 242 in the same four-year period.

Poster #: 1 - 06 Session: C Lead Institution: Northern New Mexico College

Authors: **Anthony Sena**
Ivan Lopez
Virginia Salas
Jorge Crichigno
Brenda Linnell

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 4	Type 1A	0757088	NM

Poster Title: **ASPIRe Project**

Keywords: Math Preparation, Peer Tutoring, Learning Communities

Poster Abstract: By the end of the 2011 academic year Northern's ASPIRe services have been offered to more than 300 students. Northern's STEM programs have targeted freshmen students who are at-risk of not completing a STEM degree and have provided with a summer accelerator program to students interested in STEM. Continued mentoring, peer tutoring, learning communities development, advisement services and resource provisioning are facilitating matriculation, recruitment and enhancing retention. The ultimate goal is to increase graduation completion and motivate students towards consideration of advanced STEM degrees.

Poster #: 1 - 07
University

Session: A

Lead Institution: Louisiana Tech

Authors: **James Nelson**
Kelly Crittenden
Galen Turner
Jane Petrus

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0622462	LA

Poster Title: **LaTechSTEP: Louisiana Tech's STEM Talent Expansion Program**

Keywords: Recruitment, Math Preparation, Introductory Courses, Peer Tutoring, Peer Mentoring

Poster Abstract: Louisiana Tech University's STEM Talent Expansion Program (LaTechSTEP) has two major components designed to increase the number of STEM graduates. A high school partnership program focuses on recruiting new students into our STEM programs, and a freshman enrichment program focuses on increased retention of first-year STEM students. The recruiting component includes development of partnerships with key feeder high schools. These partnerships have been developed through a series of Teacher Workshops where we build collaborative teams of university faculty and high school teachers. Together we develop engineering and science explorations and design projects for a series of Discovery Weekends for students. Students who participate in this program gain a broader exposure to applications of mathematics and science and are more likely to choose STEM careers. Teachers learn additional practical applications of the mathematics and science fundamentals they already teach, thereby expanding the impact of our program to all of their classes. After five years, the TechSTEP program has directly impacted 17 high schools, 74 teachers, and over 300 high school students. Pre- and post-surveys conducted with both students and teachers show increased understanding and interest in STEM topics. In particular, teachers are finding ways to incorporate engineering topics in their math and science classes. On average there has been a 39% increase in the number of students enrolling in STEM majors at Louisiana Tech from participating high schools. The retention component of LaTechSTEP includes a Freshman Enrichment Program (FrEP) specifically targeted toward students who do not have the math background to immediately begin our Integrated Engineering or Integrated Science Curriculum. To date, FrEP has impacted 315 students (17% of those are female, 19% are minority, and 90% are from Louisiana representing a mix of urban and rural areas). FrEP also includes enrichment topics and academic-year mentoring throughout the freshman year. The program has been very successful in building a cooperative learning community among these students. Retention in STEM disciplines and academic performance in mathematics and engineering classes have been significantly higher for FrEP students than for students in a comparable cohort.

Poster #: 1 - 08 Session: B Lead Institution: Angelo State University

Authors: **Connie Russell**
KitPrice Blount
Paul Swets

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 3	Type 1A	0856657	TX

Poster Title: **Science Partnership for Undergraduate Recruitment, Retention and Success (SPURRS)**

Keywords: Recruitment, Introductory Courses, Peer Tutoring, Peer Mentoring, Underrepresented Students

Poster Abstract: Angelo State University (ASU) was funded in 2009 to implement the "Science Partnership for Undergraduate Recruitment, Retention, and Success" (SPURRS) to develop strategies that will assist students to reach their academic and career potential. At ASU, there is a significant difference between the number of students initially majoring in STEM fields and the number of STEM degrees awarded. Although the one-year retention rate for first-time full-time freshmen STEM majors is better than the university-wide retention rate, retention in a STEM major is markedly lower. At the onset of the project, fewer than 40% of incoming STEM students retained at the university remain in STEM at graduation. This migration from STEM to non-STEM majors occurs primarily during the freshman year and is likely a result of difficulty in, and a lack of preparation for, the introductory course sequences in these majors. The SPURRS program is directly addressing gaps in STEM majors' college readiness by placing STEM students in STEM-specific cohorts initially formed during a Critical Thinking Boot Camp designed to develop skills and strategies for succeeding in introductory STEM coursework. Piloted during the Fall 2010 semester, our first summer Critical Thinking Boot Camp hosted 28 incoming freshman. This year, we hosted 39 incoming STEM majors. Held the week before the Fall semester, students attending in the Boot Camp participated in activities designed to help them start to make the transition between high school and college level math and science classes. Following the week-long boot camp, students are required to enroll in one of three sections of a semester long SPURRS specific "Critical Thinking" course. Concurrently, SPURRS participants are required to attend tutoring sessions for introductory sequence STEM courses and participate in a peer mentoring program. Success in STEM data indicate that SPURRS students match or exceed the performance of students in the Non-SPURRS control group with one exception. Retention data indicate that SPURRS cohorts are retained in STEM at higher rates than the control (see table below). USTD Course (Fall 2010 and Fall 2011) Total Retention 2nd Semester Retention 3rd Semester Retention 4th Semester Major Change All Students 876 79% 28% 25% 18% Non SPURRS 808 78% 28% 25% 18% Non SPURRS and Non STEM 791 78% 28% 24% 17% Non - SPURRS but Eligible (Control Group) 129 81% 67% 60% 38% STEM Course 16 88% 69% 63% 31% All SPURRS 68 82% 28% 24% 19% SPURRS 2010 29 72% 66% 55% 34% SPURRS 2011 39 90% 0% 0% 8%

Poster #: 1 - 09
University

Session: C

Lead Institution: Louisiana State

Authors: **Summer Dann**
Warren Waggenpack
Roger Seals
Kelly Rusch

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 5+	Type 1A	0622524	LA

Poster Title: **Engineering Engagement for Student Success, ENG²**

Keywords: Introductory Courses, Faculty Development, Peer Mentoring, Bridge Programs

Poster Abstract: The Louisiana State University College of Engineering's ENG² Project was designed to increase the number of engineering and construction management graduates through retention programs aimed at developing and maintaining a sense of community among the students and faculty, enhancing academic skills of the students, and providing a framework for interactions between faculty, students and industry personnel. The ENG² personnel implemented the 5th year of the programs in 2011. A no cost extension is being used to offer the STEP programs for a sixth year in 2012. To date over 125 faculty and instructors have attend the Faculty Development Workshop (FDW), Participants from the Colleges of Engineering, Basic Sciences and Arts and Sciences have developed new learning strategies to improve their STEM courses and brainstormed ways to engage students in their classes. Facilitators of the program rotate throughout the years: Dr. Ron Miller (2007), Dr. Karl Smith (2007, 2010) Drs. Richard Felder and Rebecca Brent (2008, 2011); Dr. Michael Prince (2009, 2012) The Encounter Engineering (E²) Bridge Camp expanded from the 45 participants in 2007 to 140 freshmen in 2011. Additionally, the peer mentors increased from 5 in 2007 to 65 in 2012. In conjunction with teamwork and leadership development activities, the 2011 academic program included physics and math preparation classes, based on the students' entry placement. Other activities included a design project, an Industry Luncheon, the Ropes Adventures Training, "Discipline Chats" and a Student Organization Night. Incoming freshmen unable to join the E2 Camp received similar benefits through the freshman course, Introduction to Engineering (ENGR 1050). The 2011 course had 70 students. The course requires two projects, one math based and one engineering design project, and two presentations at the conclusion of the team projects. Peer mentors were introduced to the class in 2009 as project design captains. In 2011, peer mentors hosted the design competition, gave presentations on summer activities and student organization events. Industry representatives facilitated project management and lesson learned sessions. Assessment includes tracking the graduation and attrition rates of students, obtaining attitudinal and perception feedback from student surveys and independent observations of faculty. Comparative t tests between STEP students and non STEP students and regression analysis show that 1) preparation in calculus 2) participating in a STEP program and 3) having a trained faculty member are the significant factors in retention in the College of Engineering and LSU. Overall, students who participate in a STEP program have a higher retention in the College of Engineering and in STEM programs than those who do not participate. The first cohort (AY 07/08) of STEP students graduated approximately 18% higher rate than their peers who did not participate in a STEP program. Analysis also indicated that those students who became peer mentors have a significantly higher retention rate than those who participated in the freshmen programs only.

Poster #: 1 - 10

Session: A

Lead Institution: Ohio State University

Authors: **David Tomasko**
Susan Olesik
Judy Ridgway
Larry Mayer (Columbus State Community College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	All STEM	Year 4	Type 1A	0756986	OH

Poster Title: **Ohio's Sustainable Science & Engineering Talent Expansion Program (OSTEP)**

Keywords: Recruitment, Peer Tutoring, Peer Mentoring, Underrepresented Students

Poster Abstract: The OSTEP program builds bridges to success in STEM disciplines in three distinct socio-economic regions of the State of Ohio. Three community colleges (Columbus State Community College, Stark State College, and Washington State Community College) are partnered with the state's land-grant comprehensive research university, Ohio State University, to recruit and serve a wider population of potential STEM majors. All STEM disciplines are represented to ensure an increase in new STEM majors as opposed to redistribution among the disciplines. Centered around effective summer bridge programs with curricular and industrial or research internship components, the program will house pre-college initiatives to introduce students to career options and funnel them into STEM programs at the college and university level. Finally, peer-mentoring and academic support structures will be housed at multiple points within the colleges and university to maintain continuous support through to graduation

Authors: **James Becvar**
Ann Darnell
Benjamin Flores

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0653270	TX

Poster Title: **Boosting STEM Graduation Rates Through Peer-Led Team Learning**

Keywords: Introductory Courses, Peer Tutoring, Peer Mentoring, Program Evaluation, Student Tracking

Poster Abstract: Using the nationally recognized Peer-Led Team Learning (PLTL) model, the University of Texas at El Paso engages every student enrolled in introductory Science, Technology, Engineering and Mathematics (STEM) physics, mathematics, and chemistry courses through a guided-process and inquiry-based strategy utilizing small groups. Many of today’s STEM educators recognize the need for an improved pedagogical approach to replace the traditional large lecture course that most entering students encounter during their first college year. Entering STEM students are frequently not only under-prepared in mathematics and science but in “soft skills” such as team work, oral communication, organization, presentation skills, and leadership skills. The large lecture format found in most introductory classes does nothing to address these needs and fails to meet students at their current level of understanding. Students become discouraged and leave the discipline, or university altogether, before ever gaining an adequate grounding for success. Motivated by a successful experience in the first General Chemistry course begun in 2000, “Two Plus Two” (TPT) circumvents the credit system, which does not allow scheduling zero-credit hour workshops, by replacing one hour of large-group lecture with two hours of small-group, peer-led, team-based, active learning guided by an advanced undergraduate science, engineering, or mathematics student (the Peer Leader) who successfully completed the course with an A or B. Peer leaders are trained using three strategies: annual pre-semester training, end of semester workshops, and weekly sessions where peer leaders and professor meet together. Annual training generally lasts three days and involves learning specialists engaging peer leaders in collaborative, cooperative-style learning, where student peer leaders practice engaging students using different learning styles and constructivism. These pedagogical activities are reinforced during the end of semester workshop. Weekly trainings cover workshop content and pedagogy practice where professors meet with their peer leaders to emphasize important content material. Assessment of the TPT model is based around two fundamental research questions: a) To what extent can a systematic implementation of a pedagogical approach in gateway courses impact the retention of students in the early years? b) How does the intentional early development of leadership skills influence learning and career decisions by peer leaders? Analysis of quantitative and qualitative data will support the expansion of a longitudinal model to track students enrolled in these courses, as well as the peer leaders. Survey results from peer leaders and students report that students learn more in workshops, increasing their analytical skills and engaging at a higher lever than through the traditional large lecture mode. Teamwork, organization, communication, goal setting, new techniques and approaches, and ideas for conducting a workshop are all important learned outcomes. An internal and external advisory board is instrumental in the periodic evaluation of this model. Strengths, weaknesses, opportunities, and threats have been identified by these boards for future analysis and potential model modifications necessary to achieve the desired outcome of more entering students retained and graduating in STEM disciplines, resulting in UTEP leading the continental United States as a top producer of Mexican-American STEM graduates.

Authors: **Barrett Rock**
 Linda Hayden (Elizabeth City State University)
 Karen Graham
 Stephen Hale

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	Science	Year 5+	Type 1A	0525433	NH

Poster Title: **Watershed Watch: A Partnership of Diverse Institutions Working to Recruit and Retain Early Underclassmen into STEM Majors**

Keywords: Recruitment, Introductory Courses, UG Research/Internship, Underrepresented Students

Poster Abstract:

The Watershed Watch (NSF STEP-#0525433) project is a curriculum model that was designed by the partnership of two 4yr universities, University of New Hampshire (UNH) and Elizabeth City State University (ECSU) an HBCU in NC; and two Community Colleges, College of the Albemarle (COA; NC) and Great Bay Community College (GBCC; NH). The Watershed Watch partnership is a freshman level science course designed to attract and retain undeclared students into STEM majors. The model curriculum was designed to incorporate field and laboratory based research into a freshman level science course. Elements of the Watershed Watch curriculum include student-driven inquiry and research pedagogy, faculty mentoring of students, research and seminar Academic Year follow-up, and student research presentations. Watershed Watch has directly reached 101 undeclared/undecided early underclassmen and students that may have been STEM majors, but considering a major change. Student tracking has revealed considerable year-to-year changes among the student participants. After 2011, Watershed Watch reported that 49% of students declared or were likely to declare a STEM major. After 2012, tracking the same students, we now report that 36% (36 of 101) were declared or likely to declare a STEM major. As we near the end of the undergraduate cycle for most of the students, the changes hereafter are likely to be small. Therefore, Watershed Watch still had a measurable impact on students, because the baseline data for undeclared students declaring STEM majors was 20% (baseline data only available from UNH). Although Watershed Watch still had gains for recruiting and retaining students, our results show that 19% of our student gains were subsequently lost as students switched out of STEM majors (or left college) and that treatments may need to be maintained beyond one year. The project has moved into its sustainability, institutionalization, and dissemination phases. In these phases, the two universities are working to institutionalize aspects of Watershed Watch either in Discovery coursework for early undergraduates, or as part of larger efforts in community engagement.

Poster #: 2 – 03 Session: C Lead Institution: University of Illinois at Urbana-Champaign

Authors: **James Lisy**
Deanna Raineri
Gretchen Adams
Jennifer McNeilly
Tracey Hickox

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0622573	IL

Poster Title: **MIST: Merit-Based Immersion Project for Students and Teachers**

Keywords: Recruitment, Introductory Courses, Student Tracking, Underrepresented Students

Poster Abstract: This project permits the expansion and integration of the highly successful Merit Program, which has been used at the University of Illinois at Urbana-Champaign for over a decade. The original target population in the mathematics, chemistry and integrative biology departments includes "high-potential but at-risk" students from among traditionally under-represented as well as rural students. The MIST project has three objectives: 1) To broaden the student base to include the large proportion of students who have not declared their major (undeclared), as well as increasing access among the original target group. 2) To train current and future teachers at the college and high school levels to implement their own Merit-style programs. 3) To develop readily accessible on-line resources and discussion boards for Merit students, and for professionals trained by the project. This online resource, at www.merit.illinois.edu, also includes information for prospective students and their parents. Our first cohort included 204 undeclared freshmen that entered the Merit program in Fall 2007. Within Cohort 1, 186 declared a major and 104 (55.9%) of those chose a STEM major. In contrast, within our comparison group of non-Merit participants, 481 out of the 533 undeclared freshmen have declared a major, but only 192 (39.9%) of those chose a STEM major. Furthermore, a higher percentage of Cohort 1 undeclared Merit students graduated with STEM degrees (55.2%) than their non-Merit counterparts (37.9%). Cohort 2 includes 226 undeclared freshmen that entered the program in Fall 2008. Within Cohort 2, 212 have declared a major and 113 of those (53.3%) chose a STEM major. Within our comparison group of 555 undeclared freshmen that did not participate in Merit, 497 have declared a major but only 199 (40.0%) chose a STEM major. Cohort 3 includes 232 undeclared freshmen that entered the program in Fall 2009. Within Cohort 3, 160 have declared a major and 82 of those (51.2%) chose a STEM major. Within our comparison group of 624 undeclared freshmen, 416 have declared a major but only 172 (41.3%) chose a STEM major. All three cohorts exceed our expectations and differences among the groups were significant ($p < 0.001$) for Cohorts 1 and 2. Merit students, regardless of their cohort, ethnicity, and gender accrued significantly more credit hours total and in STEM courses than those students who were not in Merit. In the undeclared-major sample from Cohort 1, the mean number of STEM courses for Merit students (16.84) was statistically higher ($p < 0.001$) than the average of non-Merit individuals (10.54). For Cohort 3, the mean number of STEM courses for Merit students (9.53) was statistically higher ($p < 0.001$) than the average of non-Merit individuals (8.34). Merit students also earned higher grade point averages in STEM courses than non-Merit students. STEM GPAs for Cohort 1 undeclared students were 2.97 versus 2.89; Cohort 2 GPAs were 2.84 versus 2.77; and Cohort 3 GPAs were 2.85 versus 2.80. In the most recent surveys of MIST students, the key influences motivating participation in Merit were: better performance in their courses, small group setting using collaborative learning techniques, and additional structured study time. We also learned that 80% of the students credited the worksheets, created by the Merit TAs, for their improved understanding of the course content. Over 85% of the students indicated that the Merit Program resulted in better exam scores. We have held four Summer Teacher Workshops (2008, 2009, 2010, & 2011) with 138 total participants. The results from the follow-up survey for the July 2010 workshop participants were extremely encouraging. With 19 of the 37 participants responding, 82.2% of the teachers reported that they had changed the instructional strategies used in the classroom, and most credited the 2010 Merit Summer Teacher Workshop as the catalyst for their pedagogical adjustments (including using more critical thinking questions and small groups). Teachers also reported an increased confidence or comfort level

Poster #: 2 - 04 Session: A Lead Institution: Indiana University Purdue University Indianapolis

Authors: **Jeffrey Watt**
Kathy Marrs
Stephen Hundley
Howard Mzumara
Mariah Judd

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 2	Type 1A	00969500	IN

Poster Title: **Central Indiana-STEM Talent Expansion Program (CI-STEP)**

Keywords: Math Preparation, Introductory Courses, Peer Tutoring, Peer Mentoring, UG Research/Internship

Poster Abstract: The Central Indiana STEM Talent Expansion Program at IUPUI, funded by the NSF, is creating a central Indiana pipeline and a university culture change to increase the number of IUPUI students obtaining STEM degrees. Our project addresses initiatives needed for transforming undergraduate STEM education by propagating, expanding, and creating new research-based educational innovations in undergraduate STEM education at IUPUI. The primary goal of our project is to employ and assess the impact of several intervention strategies on student success, leading to higher numbers of students graduating with STEM degrees. These intervention programs/activities fall into 4 main categories: •Student-centered pedagogies •Career services •Student Success •Articulation with 2yr colleges Through a close collaboration between the School of Science, the School of Engineering and Technology, University College, and local community colleges, our shared goals are to increase the numbers of students of all demographic groups who pursue STEM academic and career pathways; participate in STEM research, industry internships, and honors activities; graduate with an undergraduate degree in STEM fields; and transition into industry, graduate and professional programs. While there are many of the factors leading to student persistence and degree completion, our program has these targets for each of the next 5 years: •10% increase in the number of new and transfer students admitted to STEM majors, •10% increase in the number of minorities admitted to STEM •10% decrease in the DFW rates for targeted •15 additional students participating in internship and research experiences, •50 graduating seniors will have participated in honors seminars, •10% increase in the number of students completing a STEM degree at IUPUI. This increase in degrees, over 5 years, will result in almost 800 additional STEM degrees during the course of the grant, which can then be sustained by the STEM programs established in each department in future years.

Poster #: 2 - 05 Session: B Lead Institution: Bridgewater State College

Authors: **Thomas Kling**
Matthew Salomone
Jennifer Mendell
Stephen Waratuke
Jeffrey Williams

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 2	Type 1A	0969109	MA

Poster Title: **Increasing Student Success Through Improved Instruction, Student Support**

Keywords: Introductory Courses, Supplemental Instruction, Articulation & Transfer Issues

Poster Abstract: Student Retention Enhancement Across Mathematics and the Sciences (STREAMS) at Bridgewater State University implements best practice approaches to improve student retention in biology, chemistry, computer science, geological sciences, mathematics and physics. These include (1) a three-week, residential summer bridge program focusing on early undergraduate research (16 participants per year); (2) course development grants and faculty development programming that promote group, inquiry-based pedagogy in introductory STEM courses; (3) peer-led, group and inquiry-oriented Structured Learning Assistance (SLA) in nearly all introductory courses (about 750 students per year); (4) improved transfer advising and recruitment through partnerships with two local community colleges; (5) a science and math residential learning community (about 40 students); and (6) a networking program for new native or transfer STEM majors. Attitudinal assessments of the summer bridge program show high levels of satisfaction, and bridge students are student leaders and strong undergrad research participants. The retention rate of the 2010 summer bridge cohort is 80% after four semesters. Transfer students in STEM are up substantially, with strong attendance at recruitment events at local community colleges. Fall 2011 saw the first near full implementation of pedagogical changes and added Structured Learning Assistance in biology, chemistry, physics and calculus courses. The headcount weighted composite rate of D, F, W, or I grades in these introductory courses fell from 36.7% (2 year average prior to STREAMS) to 23.2% in fall 2011. At the same time, the headcount weighted composite AB rate in these courses rose from 41.1% (2 year prior average) to 54.2% (fall 2011). With 449 enrolled students in supported classes, STREAMS interventions prevented 63 D, F, W, or I grades and helped students earn 58 additional A or B grades. STREAMS measures annual retention rates within each STEM major and overall for both native and transfer students. It is too early to look at most STEM major retention rates, but in biology, where SLA and course changes were piloted in fall 2010 (grant year 1), biology major freshmen to sophomore retention rose from a historic average of 57% (5 year average) to 69% (fall 2010 freshmen cohort). We will look to see if this increase becomes a trend and replicates in other departments for fall 2011 freshmen.

Poster #: 2 – 06

Sessions: C

Lead Institution: Wright State University

Authors: **Nathan Klingbeil**
Kathy Koenig
David Goldstein
George Sehi (Sinclair Community College)
Richard Jones (Sinclair Community College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0622466	OH

Poster Title: **Gateway into First Year STEM Curricula: A Community College/University Promoting Retention and Articulation**

Keywords: Math Preparation, Introductory Courses

Poster Abstract: This project is a collaboration between Wright State University (WSU) and Sinclair Community College (SCC) to develop a common first-year STEM experience, which aims to increase first-to-second year retention at both SCC and WSU, as well as articulation of STEM majors from SCC to WSU. While STEM attrition is a problem throughout the 4-6 years of college study, the first-year experience (FYE) is most critical to retention of students in STEM disciplines. The primary barrier to success in Engineering/Technology is the traditional “gateway” calculus sequence; the barrier to success in Science/Mathematics is general innumeracy and scientific illiteracy. Prior NSF support of WSU’s National Model for Engineering Mathematics Education has shown that the introduction of EGR 101 “Introductory Mathematics for Engineering Applications,” coupled with a significant restructuring of the early engineering curriculum, has significantly increased first-to-second year retention, as well as student motivation and confidence in math and engineering. Based on this prior success, the current NSF STEP initiative will: 1) Implement EGR 101 and the associated engineering curriculum reforms at SCC. 2) Develop a companion lab-based class for science majors (Scientific Thought and Method), SM 101/ASE 101, for instruction at both WSU and SCC. 3) Provide professional development opportunities for faculty at both institutions. 4) Train STEM seniors/graduate students to serve as lab/recitation assistants and peer tutors for any introductory STEM classes. 5) Disseminate the curriculum and associated first-year experience. The above educational treatments will make the curriculum substantially more accessible to all incoming students, and particularly to those who have been historically underrepresented in STEM. Resulting increases in retention and articulation are expected to yield 50 additional STEM graduates per year by the close of the project. This model is intended to be readily transferable to other metropolitan university/community college dyads with comparable open admissions policies.

Authors: **Pamela Lockwood**
Emily Hunt
Raymond Matlack
David Craig

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 5+	Type 1A	0622442	TX

Poster Title: **NSF 0622442, PI-Pamela Lockwood, Co-PIs-Emily Hunt, Raymond Matlack, David Craig, West Texas A&M University, Step Phase 1: Increasing Numbers, Connections, and Retention in Science and Engineering (INCRSE)**

Keywords: Learning Communities, Articulation & Transfer Issues

Poster Abstract: Increasing Numbers, Connections, and Retention in Science and Engineering (INCRSE) at West Texas A&M University (WTAMU) is a type I Science, Technology, Engineering, and Mathematics Talent Expansion Program. This program focuses on increasing the quantity, quality, and diversity of all STEM majors at WTAMU through recruitment and retention strategies. INCRSE has utilized learning communities in first year mathematics, engineering, and science courses to improve success and retention of first year STEM majors. In this learning community model, two first year STEM courses are linked by enrollment, requiring all students to dual enroll in the two learning community courses. Mathematics and engineering learning communities use problem-based learning projects to integrate course objectives and promote student learning and engagement. Focus groups indicated linked courses helped students develop long-term study cohorts and helped establish connections between mathematics and engineering. The INCRSE goal of increasing the number of STEM majors by 25% over five years has been exceeded with a 50% increase in new STEM majors between fall 2005 and fall 2010; university enrollment increased by only 13.6% during this time. The number of female STEM majors has increase by 41.8% (294 to 417). This increase has been observed in all disciplines. From 2005 to 2010, Hispanic STEM majors increased by 125% (103 to 232), while University Hispanic undergraduate enrollment increased by 29%. This increase in STEM majors at WTAMU has been achieved in part through the development of relationships between INCRSE faculty and faculty at regional community colleges. Community College (CC) transfer STEM majors increased by 24% during the five years of INCRSE. The INCRSE model for community college outreach was adopted by the university as a whole in 2009. With the implementation of this model, the university has seen significant increases over the last year in CC transfers. Relationships between faculty at WTAMU and CCs have resulted in important achievements including: 1) establishing pre-engineering programs at two local CCs where faculty from WTAMU will TTVN an engineering course to CC campuses in the fall 2009; 2) students at CCs working on undergraduate research projects with faculty at WTAMU; 3) field trips from CCs to WTAMU; 4) sharing of laboratory equipment between WTAMU and CCs; 5) faculty development opportunities with faculty from WTAMU and CCs.

Poster #: 2 - 08 Session: B
University

Lead Institution: Tennessee Technological

Authors: **Allan Mills**
Sally Pardue
Steve Robinson
Holly Anthony
Chris Wilson

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 2+	Type 1A	0969618	TN

Poster Title: **Math Success for STEM Majors**

Keywords: Math Preparation, Introductory Courses, Student Tracking, Institutional Change

Poster Abstract: The Math Success for STEM Majors (MSSM) project at Tennessee Tech is in its second year. The goal of the MSSM project is to increase the number of STEM graduates at Tennessee Tech by (1) redesigning introductory STEM mathematics courses; (2) implementing just-in-time academic support for students enrolled in all introductory STEM mathematics courses, (3) integrating the STEM disciplines through context-driven math applications within a new introduction to university life course for entering STEM freshmen, (4) articulating mathematics skill-level expectations with selected high schools sending large numbers of STEM freshmen to TTU; (5) implementing a uniform mathematics course placement policy, and (6) developing a data system that tracks individual student performance and status across the STEM disciplines.

Poster #: 2 - 09
University

Session: C

Lead Institution: Valparaiso

Authors: **Gary Morris**
Delphina Gillispie
Robert Clark
Gina Doneske

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 1	Type 1A	1068346	IN

Poster Title: **Mobilizing the troops: First-year STEP experience of the MSEED Program at Valparaiso University**

Keywords: Recruitment, Program Evaluation, UG Research/Internship, Institutional Change

Poster Abstract: Although we are only in the initial year of our STEP grant, we have learned a great deal about ourselves as an institution and about the strategies we proposed pursuing as part of our Mathematics and Science Education Enrollment and Development (MSEED) Program. MSEED recruits 15 scholars per year who begin a 4-year program, at the end of which, they graduate with a B.S. in mathematics or their chosen science field and a teaching license. Several value-added activities, including summer scientific and educational research as well as a multicultural immersion experience, are included in the program. We developed several recruiting strategies in Year 1, including a brochure, web site, All-Star Math and Science Day, and Scholarship Day. In this poster, we review the process by which these strategies were developed as well as preliminary analysis of their effectiveness. We also present institutional data that helps define the baseline of STEM at Valparaiso University as well the admission standards we apply to select students for enrollment in the program. Finally, we reflect on the ways, even in the first year, the presence of this grant is transforming the institution itself.

Poster #: 2 – 10

Session: A

Lead Institution: **Morehouse College**

Authors: **Lycurgus Muldrow**
Shondrieka Lamb

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	Science	Year 4	Type 1A	0756918	GA

Poster Title: **Enhancing Success in STEM by Building Skills and Intervention**

Keywords: Introductory Courses, Underrepresented Students

Poster Abstract: The National Science Foundation Science, Technology, Engineering, and Mathematics (STEM) Talent Expansion Program at Morehouse College aims to increase the number of students in the Division of Science and Mathematics who receive baccalaureate degrees. The two major project activities are first, creating a Scientific Literacy course for STEM freshmen, and second, providing a comprehensive support program for STEM majors within the Division. Major successes have been accomplished in the first four years of this project, including: the acceptance of the Scientific Literacy courses into the Morehouse College curriculum and teaching these courses for three years; developing a comprehensive Cyber Village for the Division of Science and Mathematics; creating and implementing an innovative team learning program; conducting training seminars for faculty and students; and promoting extensive internal collaboration to provide synergistic activity among programs within the Division of Science and Mathematics.

Poster #: 2 - 11
University-Northridge

Session: B

Lead Institution: California State

Authors: Vicki Pedone
Werner Horn
Diane Schwartz
Cristina Cadavid

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0622466	OH

Poster Title: **STEPS at CSUN: Increasing Retention of Engineering and Physical Science Majors**

Keywords: Math Preparation, Learning Communities, Institutional Change

Poster Abstract: Increasing the retention rate of first-time freshman in engineering, math, and physical science majors from 42% to 52% is primary goal of STEPS at CSUN. Three approaches are employed: 1) fostering success in lower-division math by improving initial placement and first-time pass rate, 2) mentored team-based investigations of regionally relevant problems through the Summer Interdisciplinary Team Experience, and 3) STEM Career Seminars designed to inspire students to graduate and follow STEM careers. A STEPS at CSUN website provides information about the program. In Year 1, we focused on institutional changes related to the math sequence from College Algebra to Calculus II. We made changes to the administration of the Mathematics Placement Test (MPT), used by the campus to assign students to the appropriate course in the math sequence, and provided practice problems and tutoring support. The number of students who take and pass the test has increased. We changed the mathematics curriculum by designing and implementing supplemental labs for Trigonometry and Calculus I and II. The labs are open to all students, but are required for at-risk students, as defined by prerequisite grades and/or placement test scores. Initial analysis shows that at-risk students who took the first Calculus I lab in Spring 2011 did significantly better in lecture than a comparable group who took Calculus I in Fall 2010 without the lab. Full implementation of all labs in AY 2011-2012 has great potential for major positive impact on student success: 875 (55%) of 1593 students enrolled in Trigonometry, Calculus I and II also enrolled in one of the labs. In Year 2, we launched SITE. Thirty students, mostly sophomores, from eight majors in engineering, math, and physical sciences were divided into three teams. The faculty project leaders created challenging and interesting projects and were wonderful mentors to the students. The students formed strong team bonds and engaged fully in the project goals and learning outcomes. Challenges and opportunities also have arisen. In the fall semester of Year 2, we initiated the STEM Career Seminars. Although the speakers were excellent, the audiences were very small. We have decided to try several field trips to local STEM industries and government agencies, such as Raytheon and JPL, in the spring semester to see if we get a better response from students. We are so pleased with the early results from the mathematics labs that we are brainstorming ideas that might allow future institutionalization of similar pedagogy into introductory physics classes.

Poster #: 2 - 12
University

Session: C

Lead Institution: **Eastern Michigan**

Authors: **Ellene Tratras Contis**
Jose Vites
Theodora Katsika
Santita Campbell
Jacinda Lisi
Ebaa Saad

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 5+	Type 1A	0525514	MI

Poster Title: **The Creative Scientific Inquiry Experience (CSIE) Program at Eastern Michigan University (EMU): Positive Impact in recruitment and retention of STEM Students**

Keywords: Recruitment, Introductory Courses, Faculty Development, Student Tracking, Service Learning

Poster Abstract: The Creative Scientific Inquiry Experience (CSIE) program uses an innovative approach to address the decreasing success rates of undergraduate students in STEM (Science, Technology, Engineering, and Mathematics) fields. CSIE started in 2005 with a grant from the National Science Foundation (NSF 05-519 DUE 0525514). In this study, we evaluate the impact of CSIE strategies with respect to retention and graduation rates of STEM students. We identified 71 CSIE students enrolled in STEM classes in the fall of 2006. We compared them with 882 non-CSIE students enrolled in the same classes. The CSIE cohort had higher chances of remaining in a STEM major and had overall higher graduation rates. Interestingly, CSIE students were more likely to convert to a STEM major by the time of graduation. Qualitative and quantitative results will be presented to support the success of the CSIE program in improving recruitment and success rates for EMU STEM students.

Poster #: 2 -13 Session: B Lead Institution: **California State Polytechnical University-Pomona**

Authors: **Edward Walton**
 Barbara Burke
 Winnie Dong
 Michael Page

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 2	Type 1A	0969520	CA

Poster Title: **THREE STRATEGIES TO IMPROVE STEM GRADUATION RATES**

Keywords: Introductory Courses, Faculty Development, Underrepresented Students

Poster Abstract: Cal Poly Pomona is one of only six polytechnic universities in the country and attracts a large, diverse student body to its well-regarded science and engineering programs. Cal Poly Pomona has no problem attracting students to STEM majors...the difficulty is in keeping them! For First Time Freshmen who enter Cal Poly Pomona in STEM disciplines, only 28.7% persist and graduate as STEM majors within six years. This STEP project “Three Strategies to Improve STEM Graduation Rates” employs research-based methods and proven strategies that Motivate, Nurture, and Engage students with the goal to have both higher graduation and retention rates by STEM Students. This work is redesigning our calculus, chemistry, and physics courses, enhancing our first year experiences courses, and offering apprenticeships to STEM students in order to increase the retention rate of participating STEM students by 50%, and improve their academic performance. Our Course Redevelopment targets course strategies that include more interactive teaching and learning. The Enhanced First Year Experiences will offer all STEM students innovative orientation courses that will promote community, engage them in problem-solving activities, stimulate their interest in STEM careers, and facilitate the learning of college survival skills. Our Apprenticeships/Professional Development Opportunities will involve students early in their major, and establish relationships between them and other STEM students and faculty, so as to bring them into the scientific community.

Authors: **G. Donald Allen**
Michael Pilant
Sandra Nite
Jeff Froyd
Jennifer Whitfield

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Math	Year 3	Type 1B	0856767	TX

Poster Title: **Retention through Remediation: Enhancing Success in Calculus I**

Keywords: Math Preparation, Introductory Courses

Poster Abstract: Texas A&M University is a large state land grant university with an engineering program with more than 5,000 majors. For many years now there has been a less than desirable calculus success rate for incoming majors. The principle cause surrounds their mathematics preparedness, particularly with algebra skills. Our STEM 1B project seeks to use an array of technology-mediated strategies to identify new STEM students who are weak in pre-calculus/algebraic skills (and hence are at high risk of doing poorly in Calculus I) and then to intervene to strengthen those skills before and during their first college semester. Using the results from a Calculus Readiness Assessment developed on Texas A&M's STEP 1A project, we propose to identify incoming students who are mathematically at risk, providing to each student a technology-mediated Personalized Study Program (PSP) of highly focused mathematical tasks to strengthen their pre-calculus skills and position them for success in college mathematics. This individualized program of study will be delivered to the student before attending college, while they are still at home during the summer, and will be mediated via four principal technologies: (1) Conferencing software for direct synchronous contact with an experienced instructor; (2) Videos of importance topics in pre-calculus and solved problems; (3) Applets to enhance student visualization abilities and for added interactivity and depth of understanding; and (4) An online course management system to monitor the student's progress through the PSP. Complementing the PSP will be the "Just-in-Time" fall program, which will reinforce algebraic concepts as they are needed in the Calculus I course. When fully operational this project will impact at least 600 of the incoming 3,100 STEM students in both the summer intervention and the fall Just-in-Time program. It is anticipated that it will increase success in Calculus I and Calculus II by 15% and overall STEM graduation rates by at least 6% resulting in at least 100 additional STEM graduates annually. The intellectual merit rests with the spectrum of new knowledge about the remediation of algebraically weak students prior to exposure to the collegiate environs but after their high school experience. It is a bridging-type program. It will allow the tracking of students with a new option of obtaining additional mathematics experience in a non-credit, non-threatening learning community environment while pursuing a personalized study plan. A large amount of highly useful data will be collected through the online interface as well as through program assessment efforts regarding student learning and study behavior. The team producing the materials has individually and collectively been involved in numerous large scale technology-mediated projects from professional development, to course remediation, to high school technology projects, to applet and course management system development. The broader impacts of this proposal include an effective and cost-effective remediation program in pre-calculus available to large numbers of students who need it, prior to taking Calculus I. This, in turn, will increase success rates for Calculus I and II, which are de facto STEM-gateway courses. Furthermore, because underrepresented students often leave STEM fields in higher numbers, increasing retention will likely increase the diversity of STEM graduates. The products generated under this grant will be turn-key software-content packages available to all campuses and would also be licensable in the commercial sector. This model for remediation-prior-to-college may well become an important standard for collegiate success by giving students on the brink of their collegiate experience a realistic assessment of the skills they need to succeed in calculus and offering to them a high quality program personalized to their precise needs. This program will eventually be self-supporting, and with scholarships available, it may be especially suited to students in need, enhancing and encouraging a diverse population of potential STEM students.

Poster #: 3 – 02
Southern Indiana

Session: B

Lead Institution: University of

Authors: **Shelly Blunt**
Scott Gordon
Allison Grabert

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 2	Type 1A	0969280	IN

Poster Title: **Expanding the STEM Pipeline in Southern Indiana**

Keywords: Introductory Courses, UG Research/Internship

Poster Abstract: The SwISTEM Initiative at the University of Southern Indiana seeks to address a number of goals outlined in the NSF's STEP Grant Program, including: increasing the number and quality of students selecting STEM majors, providing opportunities to engage students early in hands-on research opportunities, developing a more nurturing and team-oriented approach to STEM education, providing enhanced academic and career advising for students majoring in the STEM areas, improving the retention and graduation rates for STEM students, improving the success rates in key introductory mathematics and science courses, providing professional development for regional K-16 STEM teachers, developing community partnerships to generate additional interest in STEM careers, and increasing community awareness of the need and importance of a STEM focused education.

Poster #: 3 - 03
Community College

Session: C

Lead Institution: Piedmont Virginia

Authors: **Ali Bouabid**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Engineering	Year 5+	Type 1A	0622443	VA

Poster Title: **Expanding Engineering Opportunities - E-Mentoring initiative**

Keywords: Recruitment, E-Mentoring

Poster Abstract: This grant enhances the PVCC engineering program and helps to increase the number of students who enter the program and ultimately transfer to four-year institutions to complete a Bachelor's degree. To date, PVCC has seen a significant increase in the number of students entering the engineering program, from 34 new students in fall 2006 semester to 67 new students in fall 2010. This is significantly greater than the grant's target increase for entering students of 10% each year. The year-to-year retention rate for students in the engineering program has also grown from 53% for fall 2006 to 64% for fall 2010. Additionally, the number of PVCC engineering students who transfer to a four-year institution has grown from 14 students in fall 2006 (baseline) to 26 in fall 2007, 31 in fall 2008, 33 in fall 2009 and 30 in fall 2010. One activity designed to enhance the experience of the engineering students is the E-Mentoring Initiative. PVCC developed this program to provide students with an avenue to learn more about the field of engineering and receive career and academic advice and support. Engineers from a variety of disciplines across industry and academia have served as e-mentors for over 150 new PVCC engineering students as part of this program. By eliminating the need for scheduled meetings, e-mentoring affords students and mentors greater flexibility than traditional face-to-face mentoring, while still providing for valuable interaction and communication. Surveys completed by the student participants in e-mentoring for fall 2010 help illustrate the effectiveness of this new program: • 89% of participants stated that their mentor provided good support and guidance • 68% indicated that participating in the program helped give them a better sense of the job they may want to pursue in the future • 24% changed the school to which they plan to transfer or the major they plan to pursue as a result of participating in the program.

Poster #: 3 - 04
University

Session: A

Lead Institution: Northern Kentucky

Authors: **Bethany Bowling**
Maureen Doyle
TJ Murphy

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 2	Type 1A	0969280	KY

Poster Title: **Project FORCE: Focus on Occupations, Recruiting, Community, and Engagement at Northern Kentucky University**

Keywords: **Recruitment, Career Counseling, Introductory Courses, Peer Tutoring, Peer Mentoring**

Poster Abstract: This STEP Type 1A project is in its second year. The project is STEM-wide, with an emphasis on balancing discipline and department cultures with implementing system-wide processes. Project activities include: deliberate and pro-active Linked-In-STEM activities, pushing horizontal and vertical networking through events and web-based social networking tools; a cadre of STEM Ambassadors, undergraduates who represent the STEM disciplines as peer tutors, recruiters, and emissaries at events; STEM-specific recruitment activities, including on-campus events with high schools students, parents, and teachers; undergraduate research opportunities, dubbed UR-STEM, restricted to students who have not yet participated in research, with the hope of getting them involved sooner (e.g., freshman/sophomores); a Learning Community targeting pre-calculus students and centered around a new course introducing students to a breadth of STEM degree and career trajectories; and the expansion of a STEM residential learning community initiated by a S-STEM grant (PI Haik, NSF DUE award #0806915). The selection of activities is based largely on research results in Tinto (1993), Braxton (2000), Seymour and Hewitt (1997), and Murphy, Shehab, Rhoads, et al (2007). Specifically, this project is an effort to adapt to NKU some of the findings from the ethnographic study, Why Does It Work? A Study of Successful Gender Equity in Industrial Engineering at the University of Oklahoma (NSF GSE award 0225228, PI Murphy).

Authors: **Janice Margle (Pennsylvania State University)**
Catherine Cohan
Yu-Chang Hsu (Boise State University)
Jill Lane (Clayton State University)
Amy Freeman
Javier Gomez-Calderon (Pennsylvania State University)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 4	Type 1A	0756992	PA

Poster Title: **STEM Students Introduced to One or More Intervention Strategies**

Keywords: Math Preparation, Introductory Courses, Underrepresented Students

Poster Abstract: The Penn State University Toys and Mathematical Options for Retention in Engineering (Toys'n MORE) project has completed five semesters of data collection. This poster presents preliminary data for the first four semesters. This project is based upon work supported by the National Science Foundation under STEP grant #0756992. The goal of Toys'n MORE is to increase the retention of Science, Technology, Engineering, and Mathematics (STEM) students enrolled at 14 geographically-dispersed regional campuses in the Penn State system. These campuses offer associate and bachelor STEM degree majors. The study is comprised of three intervention strategies and an assessment strategy. The strategies include: (a) enhanced tutoring programs for foundational math courses in algebra, trigonometry, and calculus; the central goal of the math tutoring strategy is to maximize success in math courses so students (i) do not repeat math courses and (ii) stay on track for the completion of a STEM major. (b) a freshman toy-based design course called Toy FUN-damentals that involves the dissection and re-design of toys through implementation of an active, collaborative, project-based approach in freshmen engineering design courses; the goal of Toy FUN-damentals is to enhance retention by engaging students in a fun, non-threatening, team-based environment. (c) math-intensive summer bridge programs at three regional campuses to assist incoming underrepresented engineering students as they make the transition from high school to college; the advantage for students attending a summer bridge at their local campus rather than at the University Park campus is that the students at a local campus can more readily form cohort groups and learning communities that will carry over into the fall and future semesters. (d) and the assessment and evaluation of the intervention strategies. This paper has three goals. First, it provides the most current information about STEM degrees offered, updating the information presented in our 2011 NSF Grantees Conference paper. Second, it examines the number of students in the three interventions and their math final exam performance when engaged in one versus two interventions. Reported is the number of students in the targeted math courses who participated in tutoring, the toy-design courses, and the regional summer bridge programs as well as the number of students engaged in two of the three interventions (e.g., math tutoring and a toy-design course). And third, math course grades are presented for the pre-intervention (baseline or comparison) sample and the intervention sample (to date) at each of the participating campuses.

Other Authors: Dhushy Sathianathan, California State University, Long Beach Renata Engel, Pennsylvania State University, University Park.

Poster #: 3 – 06
Community College

Session: C

Lead Institution: Kapi'olani

Authors: **Louise Pagotto**
Herva Collin
Charles Sasaki
Maria Bautista

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Science	Year 5+	Type 1A	0653292	HI

Poster Title: **Building talented students capacity through summer bridges, student mentoring, Undergraduate Research Experience (URE), and Peer-Led-Unit-Study.**

Keywords: Math Preparation, Peer Mentoring, UG Research/Internship Opportunities, Supplemental Instruction, Institutional Change

Poster Abstract: KCC is in its final year of its STEP grant, Science Talent Expansion Program in Urban Polynesia (STEP-UP). This year's focus is to present the grant's cumulative outcomes. The goals of KCC STEP-UP are to: 1. Increase the number of students in the College's STEM pipeline 2. Increase the number of Associate in Science in Natural Science (ASNS) degree completers 3. Increase the number of students matriculating to two four-year institutions in Hawaii 4. Institutionalize STEP initiatives and to provide ongoing support for STEM students. STEP initiatives include a Summer Bridge program; Undergraduate Research Experience (URE) for STEP students, Peer Mentoring, and Peer-Led-Unit-Study (PLUS) to support STEM gatekeeper courses in life and physical science. Approximately 180 students participated in four three-week summer bridge programs focused on math preparation needed for STEM majors and engaging students in STEM related activities such as computer building, Computer-Aided Design (CAD), underwater robotics (UROV), and DNA extraction. Students enhanced their math skills through the ALEKS program, which tailors the math lessons and problems to the needs of each individual student and allows each student to work at his/her own pace. The outcome of this approach has shown to help students improve their math placement exam performance up to three course levels. As a direct result of the success of the STEP summer bridge approach to math instruction, the College has made an institutional change to adopt this model for students in its remedial/developmental math program. Undergraduate Research Experience (URE) projects have shown to be a significant "best-practice" activity for student retention. The KCC STEM program provides URE for students in a variety of fields: physics, physiology, engineering, biotechnology, botany, biology, and ecology. Each year, several student teams are presenting quality research at national conferences and contending in national competitions. Many students reported that their URE experience has been the highlight of their experience at our College. Peer mentorship and PLUS activities have proven successful for retention. PLUS is a program based on the national Peer-Led-Team-Learning model. These activities are aimed at STEM gatekeeper courses - courses with high enrollment and low success rates, including physics, biology, chemistry and math. Data confirm that PLUS participants have a high success rate, not only in the class in which PLUS is offered, but also in the following semester. We have also institutionalized the outreach efforts to the local community by hosting and sponsoring yearly science fairs (elementary through high school), physics Olympics (high schools), and STEM fairs and undergraduate research expos (at our own college). A STEM internship/career expo highlighted STEM internship and career opportunities in the community, and introduced community organizations to the STEM students at our College. In this final year, we are assessing our recruitment and retention efforts, identifying best practices for our students, and institutionalizing those best practices. Data will be presented to support the efficacy of our major initiatives.

Poster #: 3 - 07
Wolfson Campus

Session: A

Lead Institution: Miami-Dade College

Authors: **Guillermina Damas**
Cynthia Conteh

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 5+	Type 1A	0653098	FL

Poster Title: **Tools for Success Miami Dade College NSF-STEP Type 1 Grant**

Keywords: Recruitment, Peer Mentoring, Learning Communities, Underrepresented Students, Articulation & Transfer Issues

Poster Abstract: Tools for Success is a program designed to increase the number of students completing degrees in science, technology, engineering and mathematics (STEM) at Miami Dade College's Wolfson and Kendall campuses. The goals of the project are to (1) attract and recruit underrepresented students in STEM majors, (2) ensure graduation rates in A.A. programs and (3) promote student transfer to four-year institutions and assure student success in their respective careers. We use proven techniques, such as learning communities, specialized advisement, technological tools, forums, field trips, faculty and peer mentoring. Tools for Success brings together the faculty, administrators, and scientists from the community to nurture underrepresented students who may otherwise not be able to succeed in STEM fields. The project boasts a total of 140 STEM graduates. Of these 132 have transferred to upper division STEM programs, as of spring 2012. TFS Alumni not only attend 6 of the 10 state funded universities in Florida, as is the trend for most MDC graduates, they also have matriculated to various prestigious out-of-state institutions that include Columbia University, Cornell University, The University of Pennsylvania, Vanderbilt University, the University of North Carolina-Chapel Hill, and the Georgia Institute of Technology. Tools for Success has demonstrated an arsenal of successful practices that include proactive recruitment, specialized curriculum development, and a robust offering of extracurricular activities. The program is innovative in that it is not merely a scholarship program, but a program that truly aims to prepare students for success.

Poster #: 3 - 08
Arlington

Session: B

Lead Institution: University of Texas at

Authors: Lynn Peterson
James Epperson
Ramon Lopez
Kevin Schug
Carter Tiernan

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 3	Type 1A	0856796	TX

Poster Title: **AURAS: The University of Texas at Arlington Undergraduate Research-based Achievement for STEM Collaboration**

Keywords: Recruitment, Math Preparation, Introductory Course, Peer Mentoring, UG Research/Internship

Poster Abstract: The University of Texas at Arlington (UTA) is implementing AURAS, the Arlington Undergraduate Research-based Achievement for STEM collaboration, as a combined effort of the Colleges of Science and Engineering to increase retention of incoming first-time first-semester freshmen in these colleges by 15%. The goal of AURAS is to use research-based approaches and best practices to increase the retention of STEM majors, particularly women and other students historically underrepresented in STEM. Specific objectives dovetail to meet this goal, with program components linked to one or more of these objectives. Objective 1: Pedagogical reform in high-loss courses to provide intensive intervention to target students. Objective 2: Authentic learning experiences to increase STEM interest and offer financial support. Objective 3: Discipline-based research and evaluation to verify results and foster long-term change. Program components include (1) implementation of the recognized best-practice "Emerging Scholars" program in high-loss courses in mathematics (specifically, Precalculus and Calculus I & II) and chemistry (Chemistry for Engineers and General Chemistry) courses, and (2) undergraduate research opportunities ("authentic experiences") pairing first- and second-year undergraduates with faculty mentors in lab experiences. The authentic experiences component began in Spring 2010 and the first Emerging Scholars programs in mathematics and chemistry began in Fall 2010. Positive results related to the impact of these efforts and planning toward sustainability will be reported.

Poster #: 3 – 09
Memphis

Session: C

Lead Institution: **University of**

Authors: **Donald Franceschetti**
Rachel M (Arthur)
Alastair Windsor
John Haddock
Stephanie Ivey

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 4	Type 1A	0756738	TN

Poster Title: **MemphiSTEP: A Stem Talent Expansion Project at the University of Memphis**

Keywords: Recruitment, Math Preparation, Learning Communities

Poster Abstract: MemphiSTEP (MSTEP) is a five-year project designed to increase the number of majors and graduates across the STEM areas at the University of Memphis (U of M). The project implements a number of core strategies designed to increase persistence to graduation, including a summer Mathematics Bridge Bootcamp, research experiences for undergraduates, peer and faculty networking, grants for on-campus professional student organizations such as the Society of Women Engineers or the Math Cantor Sect club to help increase active membership, and STEM learning communities. Analyses of project impact for the first three years of the project (2008-09 through 2010-11) suggest MemphiSTEP is helping to foster increased STEM graduation numbers at the U of M. Both U of M STEM graduation and persistence (retention plus graduation in STEM) numbers have increased since the onset of the MemphiSTEP project in 2008. Further, of the STEM students enrolled at the U of M, 5.9% were impacted by the project in Year 1 compared to 11.2% in Year 2 and 13.5% in Year 3. Finally, comparative analyses indicated that students who participated in Years 1 through 3 MemphiSTEP activities were more likely to persist in STEM (be retained or graduate) than other, non-participating students enrolled in STEM at the U of M during Years 1 through 3.

Poster #: 3 - 10
College Park

Session: A

Lead Institution: **University of Maryland-**

Authors: **Paige Smith**
William Fourney
Gary Pertmer

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 2	Type 1A	0969232	MD

Poster Title: **The Successful Engineering Education and Development Support Program (SEEDS)**

Keywords: Recruitment, Math Preparation, Peer Mentoring, Student Tracking, Learning Communities

Poster Abstract: The vision of the SEEDS Program is to build on the Clark School of Engineering's recent recruiting success and focus on improving the retention and graduation of undergraduate engineering students. Two key measures of success will be: the number of students retained and ultimately, the number of students graduating from engineering. The goals of the SEEDS program include: (1) facilitate the first year students' and new transfer students' transition into the school of engineering; (2) increase students' commitment to engineering majors through career clarification and goal setting; (3) reduce the barriers to success that students may face, particularly those for women and underrepresented students; and (4) enhance the positive personal and environmental factors for students in engineering. The SEEDS program is composed of five different components. First Year Summer Experience (FYSE) is a three week math intensive summer orientation program for incoming engineering students. All students who successfully complete the program receive a \$500 stipend in the fall if they are enrolled in the engineering school. The peer mentoring program connects over 400 first year and new external transfer engineering students to small groups that meet regularly with a mentor to talk about relevant issues. Flexus: The Dr. Marilyn Berman Pollans Women in Engineering Living & Learning Community and Virtus: A Living and Learning Community for Success in Engineering provide 117 first and second year students access to engineering, gender based, living and learning environments. Students are introduced to a diverse range of mentors/ role models along with professional opportunities. The Transfer Student Seminar touches on topics of concern for transfer students, such as transfer shock, acclimation to the university, connecting with engineering departments, as well as basic study and time management skills. Lastly, the SEEDS Research Fellowships are sponsored research experiences for students who have participated in any SEEDS program. Engage in research with a faculty mentor while enhancing knowledge, skills and practical experience in conducting engineering research. Each component of SEEDS provides critical support at key junctures in the students' academic career and provides reinforcing experiences so that the students can begin to see themselves in an engineering career. A key broader impact of the proposed SEEDS program is the focus on the participation of underrepresented groups, because the SEEDS program is deliberately designed based on the literature of successful interventions for female and underrepresented populations. As a direct result of all aspects of the SEEDS program, students will develop intellectual confidence as they form close alliances with other students who share their commitment to engineering and expand their network of support. Preliminary results from the first year will be revealed as a part of the presentation.

Authors: **Michael Georgiopoulos**
Cynthia Young
Melissa Dagley

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0525429	FL

Poster Title: **UCF STEP Pathways to STEM: From Promise to Prominence**

Keywords: Recruitment, Math Preparation, UG Research/Internship, Supplemental Instruction, Learning Communities

Poster Abstract: The STEP 1A grant at UCF is known as the EXCEL program at UCF. The UCF EXCEL Program has the goal of increasing the number of US citizens and permanent residents receiving a B.S. degree in a STEM field. EXCEL's target population is the group of FTIC's (First Time in College) students that choose STEM as their major and whose math SAT scores are in the 2nd and 3rd quartiles of all incoming STEM Majors (at UCF that range has consistently been 550-650). To increase the retention of these FTIC's, which results in an increase in STEM B.S. degrees, EXCEL developed two primary objectives: (1) recruit 200 students per year into the EXCEL program and (2) retain these students in STEM at higher rates than the students in the control (non-EXCEL) group (STEM FTIC's with math SAT scores in the 2nd and 3rd quartiles who did not participate in the EXCEL program). In the six years of EXCEL the number of applicants has steadily increased (from 350 in 2006 to 700 in 2011) and the EXCEL class sizes have consistently achieved the 200 student goal. Furthermore, EXCEL has been able to recruit underrepresented minorities at a 5% higher rate than the minorities attracted to the control group at UCF. EXCEL students (2006-2010 cohorts) experience an overall retention rate of 61.60% whereas non-EXCEL students (2006-2010 years) have a 44.65% retention rate, corresponding to a 16.95% (17%) retention difference, or a retention improvement of almost 40% (16.95/44.65%). The retention improvements for blacks, Hispanics, and women are 58%, 45%, and 48%, implying that EXCEL is performing exceptionally well with groups underrepresented in STEM disciplines. Furthermore, the 2006 EXCEL cohort, five years after entering UCF as freshmen, has graduated 34.6% of its students, while the 2006 non-EXCEL cohort, five years after entering UCF as freshman, has graduated 24.20% of its students; the expected graduation rate of the 2006 EXCEL and non-EXCEL (control-group) cohorts is 48.11% and 33.58%, respectively; note that most universities report cohort graduation rates within a six year time span after the cohort's entrance to the university as freshmen.

Poster #: 3 – 12
University

Session: C

Lead Institution: Northern Illinois

Authors: **Earl Seaver (Northern Illinois)**
Promod Vohra (Northern Illinois)
Chris McCord (Northern Illinois)
Denise R. Hayman (Northern Illinois)
Mansor Tahemeznadi

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 4	Type 1A	1068463	IL

Poster Title: PROMISE (Providing Resources and Opportunity to Maximize Interest in STEM Education)

Keywords: Career Counseling, Math Preparation, Introductory Courses, Peer Tutoring, Faculty Development

Poster Abstract: The PROMISE Scholars Program is a campus-wide effort that encourages new freshmen and sophomore students to select STEM as a career choice. It targets several populations of students at risk of not being recruited or retained in STEM majors including: students from underrepresented groups, undecided and STEM freshmen and sophomore students, and economically, culturally, socially and educationally disadvantaged students. PROMISE is developing five key components to increase retention and graduation rates: 1) a summer pre-college program; 2) academic support structures in STEM courses; 3) research and peer opportunities with faculty and students; 4) career, job readiness and/or graduate school preparation for STEM majors and; 5) faculty development opportunities that integrate best practices in STEM. The program utilizes strong institutional student support services already in place, and is also developing a number of new intervention strategies that are designed to increase first and second-year retention rates of targeted students, establish STEM learning communities in academic and residential settings, and expand the opportunities for targeted students to engage in interdisciplinary research with faculty mentor. By recruiting undecided students to major in a STEM discipline and by increasing the first and second year retention rates, the PROMISE Scholars Program will increase the number of U.S. citizens who are completing STEM baccalaureate degrees at Northern Illinois University.

Poster #: 3 – 13 Session: A Lead Institution: **Daytona State College**
 Authors: **Karen Petersen**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 2	Type 1A	0968970	FL

Poster Title: **STEM Community Scholars Daytona State College Type 1 NSF-STEP Grant**
 Keywords: **Recruitment, Introductory Courses, Peer Mentoring, Learning Communities, Underrepresented Students**

Poster Abstract: The STEM Community Scholars Program at Daytona State College is an academic-based program that focuses on student success in STEM (Science, Technology, Engineering and Mathematics) programs of study. STEM Community Scholars has five target activities that are designed to promote student success: high expectations, continual and intrusive advising, strong social ties, financial assistance and transfer assistance. High expectations: The program coordinator meets with students and faculty to ensure that each student is regularly attending class, completing assignments on time, participating in scheduled activities, and maintaining satisfactory grades (overall maintaining a cumulative Grade Point Average of 2.75 or above). Students sign a Student Success Contract once accepted into the program, and are made aware of the program’s expectations at initial advisement. Continual and intrusive advising: Students develop an Individual Learning Plan with the program coordinator to ensure they are on track to complete their Associate of Arts or Associate of Science, and meet every semester before Early Registration to discuss the next semester’s courses and schedule. Students’ academic performance is also monitored to ensure they are progressing satisfactorily. Monitoring helps ensure that any at-risk behaviors (decline in grades, excessive absences, behavioral problems and such) are caught and can be remedied in a timely manner. Students are given opportunities for academic assistance if they volunteer for it (ask for it), or if they are falling below a B in a course; they are provided assistance through Daytona State’s Academic Support Center, and with STEM Community Scholars peer tutoring. Strong social ties: Students are asked on the application for STEM Community Scholars what social activities and hobbies appeal to them, with the intent that the program provides additional activities outside of academics, and opportunities for the students to develop positive working relationships and have proper networking abilities. When available, students will be placed into the same sections of the same course so that students will have fellow Scholars in their classes, and can form study groups and help each other. In addition, students will be provided with workshops and opportunities to learn successful job-placement skills. Financial assistance: Students receive a stipend, and obtain information on scholarships, grants, and opportunities for employment, if interested. Students may use their stipends to offset educational costs, such as books, childcare, supplies and transportation to and from school. Transfer assistance: Students’ Individual Learning Plan is based off their college or university of choice’s Program Guides, to ensure that they have met all requirements for acceptance into their school of choice, and into the academic program they intend to complete their baccalaureate studies in. Students have the opportunity to visit various colleges and universities within the state of Florida, and to interact with academic staff, participate in campus tours, and learn the schools’ admissions and transfer requirements. Workshops: The STEM Community Scholars Program hosts various activities throughout the academic year to fulfill the objectives of the program. There is an annual Success in STEM symposium, which is a series of workshops and activities focused on skill-building and aptitude testing to measure students’ particular STEM-focused knowledge and abilities. The symposium also has a motivational speaker from the STEM field to inspire students. There is also the STEM Orientation (also known as the STEM mini-mester), which is an event that takes place the week before the Fall semester. The orientation gives incoming STEM Community Scholars an overview of the program and expectations, and hosts several guest speakers, from the college and the community, to discuss various facets of college life, student success skill-building (time management, goal setting and such), career resources and academic planning. The purpose of the workshops, symposiums and orientation is to provide students with a range of resources and activities to enhance their abilities and to find any skills gaps and fill them. Activities: The STEM Community Scholars Program’s activities are intended to fulfill key objectives pertaining to student success: retention, recruiting students into STEM fields and to study at Daytona State College, to prepare students for successful transition into baccalaureate studies (either at Daytona State College, colleges and universities in the Florida public college system or elsewhere) and develop skills to become gainfully employable. Students are also involved in service learning projects, which are community-based activities, intended to further strengthen ties between students in the program as well as in the community. STEM Community Scholars also has a mentoring program in which students pair up with faculty members to discuss goals, objectives, academic experiences, share insight, and continually work on building strong relationships between STEM faculty and students. STEM Community Scholars utilizing existing campus resources to assist students academically. Such resources are: The Academic Support Center, The College Writing Center, learning-based labs, computing commons, the Career Placement office, the Library Resource Center, Financial Aid, and our STEM faculty mentors. The program matches students with mentors, tutors, and fellow students in specific target courses for the sake of improving the students’ success academically. Additionally, allocations are made for students based on their availability, and proper resources are utilized to fit the students’ schedules. Such allocations are: taking advantage of Instructor Hours, Supplemental Instruction, and Course-Specific lessons (to supplement the material covered in the respective courses) scheduled through the Academic Support Center at all six of Daytona State College’s campuses. The program also hosts social and extra-curricular activities, both on-campus and in the community. These activities vary by semester, and are based off of what the students have specifically identified as interests on their application into STEM Community Scholars.

Poster #: 3 – 14

Session: B

Lead Institution: **St. Edward's University**

Authors: **Richard Kopec**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	Science	Year 2	Type 1A	0969153	TX

Poster Title: **Community for Achievement in Science, Academics, and Research (CASAR)–
Science LLC**

Keywords: UG Research/Internship, Supplemental Instruction, Learning Communities, Underrepresented Students

Poster Abstract: The St. Edward's University (SEU) Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP): CASAR (Community for Achievement in Science, Academics and Research) – Science Living Learning Community (LLC) Project is increasing the numbers and retention of students, particularly women and underrepresented minorities, in the STEM disciplines through an interdisciplinary academic living learning community comprised of faculty, staff and students that supports the academic success of students as they move into, through and beyond SEU. The project (1) attracts, (2) retains, and (3) transitions students into advanced courses and post-graduate success in STEM disciplines. The LLC students enrich their research skills by working in multicultural teams on scientific projects that include cross-disciplinary laboratory experiences. Students begin with a one-week Freshman Accelerated Research Methods (FARM) summer program prior to the start of the regular academic sessions, followed by a year residing in the CASAR LLC. At the end of the first year, interested CASAR students participate in a summer undergraduate research program on campus, mentored by the faculty. During the second year, the students have the option of continuing in the CASAR-Science LLC. In their junior and senior years, students are encouraged to participate in other existing summer undergraduate research projects both locally and at off-campus sites, and serve as mentors to incoming freshmen and sophomore LLC participants. Faculty are intimately involved at all stages of the program along with support staff, such as academic advisors, residence life personnel, counselors, tutors, and the Office of Graduate Fellowships.

Poster #: 3 – 15

Session: C

Lead Institution: **University of Utah**

Authors: **Karen Krapcho**
Cynthia Furse

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 5+	Type 1A	0652982	UT

Poster Title: **Fayetteville State University (FSU) Opportunities for Talent Expansion in Interdisciplinary Education for Minorities and Women in Undergraduate Mathematics and Science (OpTIMUM)**

Keywords: Recruitment, Peer Tutoring, Peer Mentoring

Poster Abstract: The State of Utah has targeted growth in engineering graduates as key to economic success for over a decade. Initial funding from the state expanded the capability of our local universities to educate engineers, and NSF STEP funding is now helping to provide the students to fill this capacity. Our enrollments in the College of Engineering at the University of Utah are up ~150 % since we started this project in the fall of 2007. This is due to active and extensive recruiting. Now we are working to keep these students and help them be successful in the program. This paper describes recruiting and retention efforts for a sustainable pipeline in the College of Engineering at the University of Utah. Undergraduate engineering students are involved in departmental outreach teams that visit local high schools to increase awareness about engineering as a major and career field. Outreach teams develop demonstration projects which are presented to high school students across the state, and some high schools have implemented engineering programs with and without our direct assistance. The outreach team concept allows students to develop close mentoring relationships with faculty and to work with peers in ways that support their academic success. Additionally, talking to high school students about the benefits and challenges of majoring in engineering allows college students to learn more about their own department as well as the College of Engineering generally. Because the teams also include students from Salt Lake Community College (SLCC), the program also seeks to provide a smoother transition for students who transfer into the College of Engineering from SLCC. College students also facilitate a summer camp experience for high school students, engaging them in hands-on projects and teaching them basic engineering concepts. Working in teams provides opportunities for academic and social growth both for college students and high school students. These programs are all based on empirical college student retention research, which focuses on engaging students both academically and socially to enhance their college experience, and this is clearly being a success for this program. Additional retention efforts include more effective advising (assisted by improved university-wide advising policies), tutoring (early volunteer programs have been only marginally successful, so this is being revamped at this time), facilitation of study groups, student-moderated communication websites, additional support in the labs (all student-driven initiatives), and educational/social events (open lab night). In addition, we are assessing the impact of high school guidance counselors in students' decisions to choose or not choose engineering. This paper will present continued findings (year 4) from both quantitative and qualitative data exploring the ongoing impacts that involvement in the outreach teams and other retention efforts are having on students' commitment to and attainment of Bachelors' degrees in engineering fields. The key focus for this year has been retention, and each departmental team has chosen a set of efforts they believe will have an impact on their freshman retention. We will report on these initial results as well as cumulative results from our project to date.

Poster #: 3 - 16
Houston

Session: A

Lead Institution: **University of**

Authors: **Stuart Long**
Frank Claydon
Katherine Zerda
Diana Rosa-Pohl

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 3	Type 1B	0855730	TX

Poster Title: **STEP Forward: STEM Talent Expansion Program for Women and Under Represented Group Recruitment and Retention Development at the University of Houston**

Keywords: Recruitment, Introductory Courses, UG Research/Internship, Underrepresented Students

Poster Abstract: The continuation of the technology explosion of the second half of the 20th Century requires the availability of a diverse and highly capable, technical workforce. Students often do not recognize the opportunities and rewards of a career in science, technology, engineering, or mathematics (STEM) because they have never met a STEM professional, have no idea what one does, or perhaps perceive that they cannot pursue a STEM degree based on their gender, ethnic background, or stage of life. Many young men and women have the skills and qualifications to study in one of the STEM fields, but choose careers in business, social science, or the humanities without ever considering more "technical" careers. Furthermore, students who do enter the STEM fields may not succeed, due to insufficient knowledge about how to study effectively or lack of resources to support them throughout their academic careers. For these reasons the STEP Team at the University of Houston has developed new retention and recruitment programs built upon our previously successful ones aimed at increasing the number of students obtaining STEM undergraduate degrees. For retention efforts we have created new freshmen Project Based Learning (PBL) courses, WIE-UH, a support system for entering female STEM students, and HURN, a student group focusing on research activities. The recruiting programs include STEP Forward, a summer residential camp for 11th and 12th graders, information for high school math and science teachers, and freshman level undergraduate research opportunities. We believe that we have expanded the concepts from our successful existing programs and created an inclusive undergraduate retention and recruitment program that achieves the goals of the STEM Talent Expansion Program for students from the 11th grade in high school through their graduation from the University of Houston. One of the dominant themes of our proposed strategies is the inclusion of the research aspects of the University into the retention and recruiting programs. The women's program will include presentations by female faculty members to describe their research efforts. The student research group allows a larger number of undergraduates to learn about discovery based programs in a broad spectrum of fields, while the freshman undergraduate research program gives a smaller number of them the opportunity for one-on-one mentored research experiences with our faculty. In addition a new undergraduate research program that is focused on what is statistically a much greater at-risk population, freshmen female engineering majors, has begun. This group traditionally suffers a higher dropout rate, and it is anticipated that our intervention here will result in an increase in persistence toward graduation. Women in non-PBL freshman engineering computer courses were selected to participate in this new pilot program. Each participant selects one of the National Academy's Grand Challenges and investigates some aspect of the problem under the direct supervision of a STEP faculty team member. Even though the University of Houston is already one of the most diverse urban research institutions in the nation, we will continue our efforts to recruit more students from under represented groups into STEM areas. Our principal target audience includes females, Hispanics, African Americans, and students who represent the first generation in college for their families.

Poster #: 3 – 17
University-Camden

Session: B

Lead Institution: Rutgers

Authors: **Robert Evans**
Daniel Bubb
Benedetto Piccoli
Alex Roche
Joseph Martin

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 3+	Type 1A	0856435	NJ

Poster Title: **Q-STEP: Community of Quantitative Scholars at Rutgers-Camden**

Keywords: Math Preparation, Peer Mentoring, UG Research/Internship, Learning Communities, Service Learning

Poster Abstract: The Q-STEP project began in 2009 as a result of efforts by the faculties of the science and mathematics departments in the Camden College of Arts and Science at Rutgers University to enhance the retention and successful graduation of science, technology, engineering and mathematics (STEM) majors. Part of the NSF STEM Talent Expansion Program (STEP), the Rutgers program is named Q-STEP to underscore a heavy emphasis on the enhancement of student quantitative skills. To increase the retention of STM majors, a major aim of the project is to create a community of scholars in the quantitative sciences. To achieve this goal we recruited incoming freshmen – 12 students in 2009, 9 in 2010, and 18 in 2011 --who indicated they are majoring in math or one of the sciences. These students, called Q-STEP Scholars, participate in a weekly group-mentoring program tailored to focus not only on advice in navigating academic careers but also on specific topics covered in their science and math courses. The Scholars also attend a Wednesday luncheon/workshop meeting designed to increase quantitative skills and provide various types of information related to science and math. We have a dedicated two-room complex in the Campus Center that is used for mentoring sessions, meetings, studying, and socializing. Another goal of the project has been to enhance the experiential aspects of STEM education. Consequently, during the past two summers selected Scholars spent seven weeks working in research laboratories or on computational projects with Rutgers-Camden faculty. An experiential activity begun this year has been math and science tutoring by Scholars in neighboring high/middle schools. A final goal has been to redesign the undergraduate curriculum through a collaborative effort involving all of the STEM departments. Since 2009, the Computer Science, Chemistry, and Biology Departments have made significant changes to their course offerings and major requirements. In addition, the Q-STEP PIs successfully fashioned and obtained Faculty Senate approval for a proposal to create B.S. degrees with lower general education requirements than the previously existing B.A. degrees. The lower general education requirements of B.S. degrees give science majors the ability to take more courses in science/math areas to enhance their background. More importantly for the Q-STEP project, the reduced general education requirements allowed the creation of a new major in Computational and Integrative Biology which is interdisciplinary in nature and thus has a large course requirement. Furthermore, the CIB major will prepare students for admission to the graduate program offered by the recently created Center for Computational and Integrative Biology (CCIB) at Rutgers Camden. The CCIB offers the first doctoral program in the sciences on this campus.

Authors: **Rabi Ann Musah**
Denise McKeon
Hua Shi
Dianne Jester

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 4	Type 1A	0756985	NY

Poster Title: **Importance of Identifiers in Determining Optimal Intervention Strategies for “At Risk” STEM Majors**

Keywords: Introductory Courses, Peer Tutoring, Program Evaluation, Student Tracking

Poster Abstract: The Center for Achievement, Retention, and Student Success (CARSS) is a collaborative effort to increase the number of State University of New York at Albany (UAlbany) STEM graduates. In the course of implementing the Center’s various programmatic elements, the necessity of early identification of STEM students who were “at risk” of not being retained in their major became very apparent. To investigate this, we sought to: (a) Evaluate various early indicators that could be used to identify “at risk” STEM majors at UAlbany; (b) Determine the correlation between student course grades and their use of CARSS services (i.e. frequency of visit, duration of each visit and time in the semester of first visit); (c) Determine the extent to which CARSS has served “at risk” students. The data used in this study were derived from students enrolled in General Chemistry I and II, and Organic Chemistry I and II, over the course of two academic years. These are critical gateway courses in the majors under study. In summary, we found that:

1. A grade of B- or below on exams taken early in the semester for a given introductory two-semester course was a faithful indicator of students who are “at risk”.
2. A cumulative GPA of <2.5 is a strong indicator that a student is at risk of not successfully completing the chemistry course.
3. SAT math scores are not a good indicator of how well a STEM major will perform in university-level chemistry courses.
4. CARSS participants who attended five or more CARSS study group sessions during a given semester earned a better final grade in the chemistry course (C- or higher) than students who attended less than five.
5. General Chemistry I and II students who participated in CARSS study group sessions during the first half of the semester were more likely to earn a final grade of A or A-, than those who began participating during the second half of the semester.
6. Students who participated in CARSS study sessions were more likely to earn a final grade of A or A- than non-CARSS participants.

Our findings add to the valuable pool of knowledge regarding viable indicators of “at risk” students, and can serve as an important guide to inform the types of intervention strategies that can be used to cater specifically to “at risk” student needs. The strong association between student performance and GPA, coupled with the ready availability of GPA data at most institutions, provides a means both accessible and reliable, by which “at risk” students can be identified and assisted early in the term.

Authors: **Matthew Green**
Alan Niemi
Melanie Roudkovski

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	Engineering	Year 2	Type 1A	0969382	TX

Poster Title: **First-Year Initiatives for Retention Enhancement (FIRE)**

Keywords: Introductory Courses, Peer Mentoring, Learning Communities, Industrial Mentoring

Poster Abstract: First-Year Initiatives for Retention Enhancement (FIRE) seeks to increase engineering graduation rates from a recent five-year average of 42%, to 65%; implying 1st to 2nd year retention should increase from 68% to 85%. FIRE retention efforts include all of the roughly 130 “First time in any college” (FTIAC) students in LeTourneau University’s Engineering and Engineering Technology programs. The primary goal of increasing graduation rates (and retention) includes sub-goals of: a) Supporting students academically, socially, and spiritually; b) Increasing student’s understanding of the engineering profession; and c) Increasing student’s motivation to become engineers. An internal study and best-practices literature review prompted the following initiatives in 2010: 1) implementing peer, faculty, and industrial mentoring for first-year students; 2) implementing an engineering “freshman experience” class; 3) implementing first-year engineering practice classes including professional topics and open-ended experimentation and design projects 1) Peer, Faculty, and Industrial Mentoring: First-year Interest Groups (FIGs) of 6-8 similar-major students meet weekly with peer mentors in both group and individual meetings, occasionally with faculty mentors, and 1-3 times a semester with industrial mentors. Peer mentors meet every few weeks with the project co-PI and with the faculty mentor of their FIG group. These groups synergize with existing university support structures, and we have already seen several aspects of our program adopted university-wide. In 2011-12 we piloted the industrial mentor program with 9 out of 17 FIG groups assigned to mentors, as reported in our 2012 ASEE paper. First-year students completed multiple surveys as did mentors (peer, faculty, and industrial) in addition to several focus groups. Results from both mentors and the students are relatively positive about FIG group mentoring, and included some formative guidance. When asked if mentoring had been a positive experience, 93% of peer mentors, and 81% of faculty mentors said they strongly agreed or agreed. Industrial mentors were the most enthusiastic of all with 100% wanting to continue in the mentoring program, and indicating that both they and their company benefit. While the first-year students themselves were not quite as positive, 93% strongly agreed or agreed that their peer mentor was a source of positive support to them their first semester. These early indicators from industrial mentors, faculty, peer advisors, and the first-year students themselves are extremely encouraging regarding the value and future of the mentoring program. 2) Engineering “Freshman Experience” Class: We build upon existing infrastructure to create an engineering flavor of the university’s “freshman experience” in which engineering faculty mentor 3 FIG groups (~20 students total) in a curriculum including time management and study skills, use of library engineering resources, and the autobiography of an engineering and spiritual role-model (R. G. LeTourneau). Although the 6 engineering faculty leading each section received high student evaluations, the course content did not, most likely reflecting some unpopular legacy aspects of the course partially driven by institution-wide requirements. 3) First-year Engineering Practice Classes: In 2011-12 first-year students are experiencing the full versions of the two engineering practice courses which are designed to answer the question “what do engineers do?” The first course includes interactive classroom sessions on both qualitative and quantitative aspects of engineering practice and experiential lab modules exposing students to various fields of engineering. The second course includes engineering design with platforms of LEGO robotics and Arduino microcontrollers. A Freshman Engineering Survey was designed to assess majors’ awareness of their discipline prior to completion of discipline-specific coursework. The survey was administered at the beginning and end of the first-semester engineering practice course. A paired sampling indicated a significant correlation between the pre- and post-tests. Students’ scores improved sizably on items such as, “Engineering is a fulfilling profession” and “I have a good understanding of the engineering profession.” These and other items showed statistically significant improvements, indicating that the course is positively impacting freshmen in their awareness of, and commitment to, the engineering profession. Results: In addition to the survey results above indicating progress on grant sub-goals, first-to-second semester retention has increased from 87% to 95% during the first two years of the project. While not directly resulting from project initiatives, the six-year graduation rate has increased from 33% to 41%, likely as a result of an increased awareness of retention strategies. Challenges: As the academic year progresses our busy first-year students identify with multiple groups other than “First-year Interest Groups” and peer mentors become increasingly busy and burned out. We are continually streamlining and strategizing to maximize efficiency, as well as motivating students through incentives and support from faculty and staff.

Poster #: 3 - 20

Session: B

Lead Institution: **Saint Vincent College**

Authors: **Stephen Jodis**
Mandy Raab

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	Science	Year 3	Type 1A	0856575	PA

Poster Title: **Increasing Enrollment and Retention in STEM at Saint Vincent College through a Collaborative Learning Program (CLP)**

Keywords: Peer Tutoring, Peer Mentoring, Supplemental Instruction, Learning Communities

Poster Abstract: The Collaborative Learning Program at Saint Vincent College focuses on the interdisciplinary and collaborative training of STEM students, especially in the biosciences, and the problems faced by many undergraduate institutions in capturing and maintaining a student's enthusiasm for a chosen STEM discipline long enough to reach graduation. The project is designed to increase student learning outcomes and persistence in the interdisciplinary STEM majors of Bioinformatics, Biochemistry, and Biotechnology through the use of group learning environments. The project focuses on two major problems: high attrition rates in the STEM disciplines and an increased need for interdisciplinary, collaborative training of STEM students. The project will provide a model of effective practice for other institutions to adapt. Highlights from the Collaborative Learning Program (Third Year): 1) In Fall 2011, 220 unique STEM students participated in our CLP Program as compared to 184 in Fall 2010. CLP provides supplemental instruction in the challenging courses of General Biology I & II, General Chemistry I & II, Introduction to Computer Science I & II, Organic Chemistry I & II, and Cell Biology. 2) The CLP Program expanded to include 10 upper-class facilitators, each dedicated to a single course instructor. This reduces the stress on the faculty by eliminating the need to tightly coordinate their weekly central concepts. The program expansion was supported in part by departmental funds. 3) Six new STEP scholarships have been awarded to incoming freshmen in the interdisciplinary programs of Bioinformatics, Biochemistry, and Biotechnology. 4) The CLP Program launched a new Emerging Research Scholar initiative which encourages underclassmen to get involved in scientific research early in their careers, giving them an opportunity to build strong relationships with the departmental faculty. Six Emerging Research Scholars were selected for Spring 2012. 5) Analysis of the course pass rates for all CLP courses as compared to the base-rate established in the previous five years will also be discussed.

Poster #: 3 - 21
Florida

Session: C

Lead Institution: **University of South Florida**

Authors: **Kandethody Ramachandran**
Scott Campbell
Arcadii Grinshpan
Catherine Beneteau
Gordon Fox

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 5+	Type 1A	0622329	IL

Poster Title: **University of South Florida STEP Project-abstract-2012**

Keywords: Math Preparation, Peer Tutoring, Peer Mentoring, UG Research/Internship

Poster Abstract: The STEP project at University of South Florida (USF) is based on the premise that Success in Calculus is the gateway to success in the STEM fields. This project is aimed at increasing STEM graduates through intervention programs in the Engineering and Life Science Calculus sequences (<http://www.math.usf.edu/resources/step/>). Through this project we have developed and are implementing several transportable strategies such as, one stop extended hour tutoring lab (STEM Mart), project-based teaching, peer leading, and undergraduate research. These multiple strategies have transformed the teaching of calculus at USF and are leading to increased retention and pass rates for students. Faculty are enthusiastic in implementing these strategies in their class rooms. STEM Mart is a tutoring center that provides undergraduate students in the STEM disciplines an opportunity to receive free tutoring from other successful undergraduate students selected by the program. From Fall 2008 to Fall 2011, a total of 12408 student visits are recorded. In fact for Spring 11 and Fall 11, a total of 1484 different students utilized STEM Mart recording almost 7000 visits, which is more than double of combined visits from Fall 2008 to Fall 2010. STEM Mart is now part of tutoring and learning services at USF. Over seven semesters, a total of 667 projects have been developed by the project team and completed by students. During this period, 476 engineering, 74 medical, 85 natural sciences, and 32 other projects were submitted experts and professionals in respective fields for potential future use by students. Of these, 140 projects were provided by experts external to the university. The project activities are institutionalized through the newly created Center for Industrial and Interdisciplinary Mathematics at USF. This center, serving the local industry and research, is a long term resource for the community. We developed a curriculum of inquiry-based activities, following the Process Oriented Guided Inquiry Learning (POGIL) approach for both Engineering and Life Sciences Calculus I. Every semester, we have between 13 to 17 undergraduate peer leaders, and approximately 3 engineering calculus I sections and 12 life sciences calculus I sections running peer leading in the classroom. Peer leading has received permanent funding from the University for 22 undergraduate peer leaders and four graduate teaching assistants each semester. The University of South Florida has a well developed structure supporting and promoting undergraduate research. It is expected that by engaging in the project option, students will be more interested in being involved in real life problem solving and hence undergraduate research. We have created an electronic journal called Undergraduate Journal of Mathematical Modeling: One + Two (<http://ciim.usf.edu/ujmm/>) in which selected projects are published. The analysis of the data indicates that the project methods had significant impact on success rates of our students. We have observed increased passing rates (20%) in Calculus for students who visited STEM Mart five or more times during a semester and increased pass rates (10%) and decreased withdrawal rates (between 5 – 15%) for sections that offer the project option as well as for sections that offer peer leading. Data also indicates that several peer leaders are becoming engaged in undergraduate research and seeking admissions to graduate school in STEM disciplines. Several of the project activities have been institutionalized, both within the department and at the college and university level. Several papers on our results are currently being written by the project team.

Poster #: 3 - 22 Session: A Lead Institution: **University of Northern Colorado**

Authors: **Catherine Gardiner** **Rick Adams**
Greg DeKrey **Rob Reinsvold**
Lori Reinsvold **Julie Sexton**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Science	Year 5+	Type 1A	0622421	CO

Poster Title: **Recruitment and Retention of Biology Majors at the University of Northern Colorado**

Keywords: Recruitment, Peer Mentoring, UG Research/Internship Opportunities, Underrepresented Students

Poster Abstract: The Biology Is your Opportunity to Achieve (BIOTA) program is the STEP project at the University of Northern Colorado. The program's two primary goals were 1) to increase the number of undergraduate students graduating with BS degrees in Biological Sciences, and 2) increase the number of students choosing biology as a major (especially from underrepresented groups). To accomplish these goals, the BIOTA program provided several recruitment and retention experiences including 1) undergraduate research experiences, 2) undergraduate scholarships, 3) biology freshmen seminar study skills courses, 4) tutorial-style companion courses to accompany introductory biology classes, 5) peer mentoring, 6) academic advising, 7) a dedicated living-learning community on one floor of the dorms focused on biology students, and 8) social activities to foster a sense of community.

The BIOTA program is completing its fifth year since beginning in June 2007. The number of students choosing biology as a major increased from 293 in Fall 2005 to 422 in Fall 2011 (a gain of 44%), which exceeded the project benchmark of a 25% increase. The mean % of biology majors from minorities during the five years before the project began was 13.2%. During the five years of the project, the mean % of biology majors increased to 17.6% which exceeded our proposed benchmark of 17%. The number of biology graduates increased from 32 (05-06 AY) to 44 (10-11 AY). This was a 37% increase which exceeded our proposed benchmark of 30% increase. In addition the number of minority biology graduates increased from 4 (05-06 AY) to 8 (10-11 AY). This was a 100% increase which exceeded our proposed benchmark of 40%.

Authors: **John Reisel** **Marissa Jablonski**
Ethan Munson **Hossein Hosseini**
George Hanson **Edward Beimborn**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 4	Type 1A	0757055	WI

Poster Title: **Fostering Opportunities for Tomorrow's Engineers (FORTE)**

Keywords: Math Preparation, Peer Mentoring, Supplemental Instruction, Learning Communities

Poster Abstract: The University of Wisconsin-Milwaukee (UWM) is an urban research university which has as part of its mission to be accessible to a wide range of students. Many students who enroll in the College of Engineering and Applied Science (CEAS) at UWM often are lacking the preparation necessary to successfully complete their program. The FORTE program aims to improve retention and graduation rates through three main components. (1) A peer mentoring program for incoming freshmen has been established, with all incoming freshmen students assigned to a peer mentoring study group based on their math course. This began in the Fall 2009 semester. (2) A summer bridge program to improve math placement scores for incoming freshmen has been implemented. This program targets freshmen whose success has been hindered by needing remedial math instruction, and the corresponding lack of connection with the engineering program. In the Summer 2009 program, 37 students fully participated, 47 participated in the Summer 2010 program, and 64 participated in the Summer 2011 program. In 2009, 67.6% of the students improved their math course placement, 83% improved their placement in 2010, and 88% improved their placement in 2011. (3) A living-learning community was established with a start date of Fall 2009 for students who desire to be surrounded by other engineering students in a supportive environment. Forty-one students joined the LLC for its first year, 42 students joined the LLC in 2010, and 56 CEAS students and 9 non-CEAS students joined the LLC in 2011; this makes it one of the largest LLC at UWM. This LLC and the opportunity for being peer mentors to incoming students in the future are two initiatives primarily targeted to well-prepared students who lose interest in engineering due to a lack of engineering content in the curriculum during their first year of college. One challenge which has faced the FORTE program is getting freshmen student participation in all aspects of the program, but in particular developing an effective study group program. The study groups were first used in the Fall 2008 semester, and were purely optional for the students. As a result, very few students (16) participated in any way. For the Fall 2009 entering freshmen class, all freshmen were assigned to a study group based on their schedule availability and their math course. Participation improved to 133 students, although many of those students only attended 1-3 weekly sessions during the semester. Students who attended more sessions found more success in their math courses. For the Fall 2010 semester, a specific course with numerous sections based upon math course coverage was created, and incoming freshmen were encouraged to register for this course by the advisors. Participation increased to 147, and students also had some tangible reason to commit to the program: they received a grade based upon participation and this would appear on their transcript. This continued in the Fall 2011 semester, with 192 students participating. Participation usually signaled an improvement in their course grades, but this did not hold true for the Fall 2011 Trigonometry course. Participation continues to decline for Spring semester study groups. A second challenge which has faced FORTE is ensuring the success of Bridge program students who improve their math course placement in their first math course. Results from the 2009 and 2010 Bridge program students indicate that many students struggle in their first math course, although at the same time many students do succeed in their math courses and clearly benefit from improving their math course placement through the Bridge program.

Poster #: 3 - 24

Session: C

Lead Institution: **University of Louisville**

Authors: **Christine Rich**
Thomas Tretter

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Science	Year 1	Type 1A	1068301	KY

Poster Title: **PRIMES Launch: Connecting Implementation with Institutionalization**

Keywords: Recruitment, Peer Tutoring, Peer Mentoring, Institutional Change

Poster Abstract: PRIMES is a tripartite cross-College collaboration – Arts & Sciences (A&S), Engineering, Education – that uses two complementary strategies to improve retention of our STEM undergraduate majors. The first strand develops, implements, and institutionalizes credit-bearing practicum offerings utilizing undergraduate teaching assistants (UTAs). The UTAs serve as the linchpin for a concerted effort to transform teaching and learning in introductory courses for STEM majors. The second strand focuses on community building activities... both discipline-specific and University-wide. Each strand is designed to increase faculty and student interactions and also to foster STEM students' sense of identification with their STEM home department. In this first year of our project, we took the unorthodox approach of launching the project with a coordinated effort to institutionalize the practicum courses in participating A&S and Engineering departments. The rationale was simple: intercalation of the new Practicum course into a department's curriculum serves as a visible 'buy in' by STEM faculty. It validates the value we place on peer-led mentoring and instruction and the pedagogical training in best practices that faculty and UTAs explore together. We had 100% success! Faculty in all nine departments, 5 in A&S and 4 in Engineering, approved the creation of graded, senior-level courses to house the Practicum. The respective College Curriculum Committees have followed suit and the new courses will be formally listed for Fall 2013. Interestingly, when the new courses reached the College Curriculum Committee in Engineering, the visibility of the project was heightened in an unforeseen way: engineering disciplines that opted originally not to participate expressed interest in joining this strand of the project. Despite a short timeframe, we also decided to schedule a first offering of the Practicum (as Special Topics courses) for Spring 2012. Practicum faculty members from each department recruited, the 3-day training workshop syllabus was fully developed, and 49 STEM undergraduates from both Colleges enrolled. Post-workshop qualitative feedback from UTAs was largely positive. Feedback and training is ongoing as we bring this first cohort back for bimonthly seminars throughout their term. UTAs are currently leading formal recitations, laboratory sections, and more informal peer-group tutoring sessions for the freshman and sophomore levels. Depending on their assignment, they work with from 5 to 50 students. Instruments are under development for measuring the impact the UTAs have on the hundreds of novice STEM majors with whom they work. Initial emerging data suggest that our UTAs are developing effective working and mentoring relationships with our novice STEM learners, which offers promise for positive impact on the STEM degree trajectories of these learners.

Poster #: 3 - 25

Session: A

Lead Institution: **Clemson University**

Authors: **Barbara Speziale**
Dorris Sherry
Dennis Stevenson
Calvin Williams
Matthew Ohland (Purdue University)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0525474	SC

Poster Title: **CU-STEP: Promoting Success for First-Generation College Students in STEM**

Keywords: Peer Mentoring, Student Tracking, Underrepresented Students

Poster Abstract: The goal of the CU-STEP project is to increase the numbers of students enrolled in and graduating from all STEM programs at Clemson University, South Carolina's land-grant institution. The primary target audience is Clemson University STEM students whose parents did not graduate from a 4-year college or university -- "first generation college students." Prior to the start of this project, first-generation students were not identified at Clemson. As of Fall 2010, approximately 18% of Clemson's incoming STEM freshmen and 36% of incoming transfer students identified themselves as first generation. The need for this program was based on data from educational reviews and national reports indicating that first generation STEM majors were more likely than non-first generation students to either change majors or drop out of college completely. To retain these students in Clemson University STEM majors, CU-STEP designed the First Generation Success in Research, Science and Technology program (FIRST) to include a pre-freshman year summer program, academic year proactive mentoring, and supportive student activities such as field trips, social/academic events and curriculum reforms. FIRST was established in 2006 and has since served six cohorts of first generation college freshmen. The FIRST Summer Preview began in 2007 and has served five cohorts. Approximately 30% of Clemson's first generation STEM freshmen participate in FIRST. Assessments compare retention and graduation rates for first generation and non-first generation students. Results to date show an 4-9% increase in retention rates. Students entering FIRST as freshman in 2006 began graduating in 2010. The CU-STEP project faces the challenge of how to sustain the FIRST program after NSF funding ends. In an initial move towards sustainability, Clemson University hired the FIRST coordinator as a permanent employee and has contributed to the salaries of the FIRST student mentors. Two private donors have pledged funds to continue FIRST programming. The Clemson Foundation is assisting FIRST in seeking additional private donations. Two questions we'd like to talk to colleagues about: 1) What is your experience with programs focusing on first-generation college students in STEM?; and 2) What types of support is your institution providing to either expand your STEP project or to maintain it beyond the end of NSF funding?

Poster #: 3 - 26 Session: B Lead Institution: **Michigan State University**

Authors: **Jon Sticklen**
Claudia Vergara
Daina Briedis
Mark Urban-Lurain
Thomas Wolff
Renee Degraff (Lansing Community College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 4	Type 1A	0757020	MI

Poster Title: **Engaging Early Engineering Students (EEES)**

Keywords: Introductory Courses, Peer Tutoring, Faculty Development, Student Tracking, Supplemental Instruction

Poster Abstract: Departure of students from the engineering disciplines remains a major barrier in the path towards increasing the number of engineers in the United States. Notwithstanding the central role that academic success plays in determining student persistence in engineering, the data paints a conflicting image. Several authors found no significant differences in academic performance between students who persist and students who leave [Green, K.C. (1989); Seymour & Hewitt, (1997)]. The EEES project is designed to ease the transition of early engineering students, and, by making the transition smoother, to increase the student retention rate. Our goal is to raise the matriculation-to-graduation rate in the College of Engineering by ten percentage points. We address two major overlapping categories of student leavers: (1) those who leave because of academic difficulties and (2) those who leave because they find the educational environment of early engineering to be hostile and/or not engaging. EEES consists of four content programs: (a) a program to provide formative assessments in key courses (gateway exams) with follow-on tutorials, (b) a Peer-Assisted Learning (PAL) program based on supplemental instruction (SI) model (c) a Connector Faculty (CF) program to directly engage engineering faculty with early engineering students, and (d) a program to develop and exploit course material from one key course to another thereby enabling a "program view" by our students instead of the more typical "course silo view". We are in the fourth year of our five-year project. Using the metric of retention five semesters after matriculation, we have observed an increase of 6.1 percentage points between the last cohort before EEES began (2007) and the first cohort after EEES began (2008). Below we highlight some results from specific programs. PAL at MSU and SI at LCC - At LCC, SI is well attended and appears to have significantly positive effect on learning outcomes in most pre-engineering courses. - At MSU, PAL is less well attended and appears to have little effect on learning outcomes in most pre-engineering courses. Connector Faculty (CF) program: - Participating students were admitted to the College of Engineering (COE) at a higher rate than those who did not participate. - Participating students expressed more positive attitudes about the CF program and about the likelihood of being accepted into the COE. - Student admission rate and attitude change were both positively correlated with frequency of interaction with faculty in the CF program: the more face-to-face meetings, the higher admission rate and greater attitude change. Early Diagnostics and Intervention: - Gateway exams are good diagnostic tools to predict final course grades in the target courses. One of the main challenges of our project is the objective outcomes of each of our component programs, and beyond that to systems level contribution of each. We have developed a structural equation model (SEM) that will be used to this end.

Authors: **Susan Tappero**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 4	Type 1A	0757114	CA

Poster Title: **Science, Technology & Engineering: Expanding Potential (STEEP)**

Keywords: Math Preparation, Introductory Courses, Peer Tutoring, UG Research/Internship, Learning Communities

Poster Abstract: This program seeks to interest students in STEM fields via the theme of renewable energy, and to support and retain them throughout their lower-division coursework. The Summer Energy Academy is an intensive month-long course employing project-based and service learning and utilizing a team of more advanced students as lab assistants and mentors to the student participants. During the summers and January breaks, the PREP program takes a new cohort of STEM majors through a two-week intensive in preparation for an upcoming precalculus course. These students then are enrolled as a cohort into the same precalculus course and receive ongoing peer support throughout the semester. Students who have completed either of these courses become eligible for on-campus internships, undergraduate research experiences and other pre-professional opportunities. Throughout all these phases of the project, students continue to receive tutorial, counseling and field trip support through an existing MESA community. Over the past four years, 184 students and 46 student assistants have participated in the Energy Academies, or PREP and 29 students have been placed in on-and off-campus internships. These internships have focused on conducting campus energy audits, building bicycle-powered electrical generators to donate to local high school physics departments, or to work in a middle or high school math or science classroom. Students receive stipends for participation in all of these phases of the program. Participants in the Energy Academies have been new high school graduates or continuing Cabrillo students who have undecided majors but are interested in renewable energy. Each year's participants design a final project combining hands-on engineering work with community education. Participants in PREP, the Precalculus Readiness Seminars, are students who are already decided on a STEM major, but are deemed at-risk of being successful in a precalculus course based on performance in the preceding class or a previous unsuccessful attempt. Students build and strengthen skills in college algebra through games and exploration in this month-long intensive program. The community service aspect of PREP occurs as students prepare review topics to present to each other. Data collected so far suggests that the Energy Academy is influencing students to pursue a major in STEM fields with the goal of attaining a bachelor's or graduate degree. There has also been a positive effect on students' belief that they can have successful careers in the sciences. PREP students report an increased confidence and improved approach to studying mathematics. Their retention and success rates in precalculus have been better than those of the overall college population. Opportunities: The theme of renewable energy has proven a valuable tool for recruiting students to the Energy Academies and retaining their interest in STEM majors. We have established partnerships with universities and industries connected to sustainability issues, and feel that there is the potential for far greater cooperation in the future. Students in the program report that their engagement and commitment to STEM fields are enhanced when serving the community and other students. Students who have participated in PREP continue to work together in subsequent math and science courses. Some of them have decided to go into teaching mathematics as a result of their experiences.

Authors: **Lynn Tashiro**
 Jennifer Lundmark
 Jeff Paradis
 Beth Merritt-Miller
 Ellen Berg

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	Science	Year 1	Type 1A	1068383	CA

Poster Title: **Sacramento State NSF STEP Project PASS: Peer Assisted Student Success**

Keywords: Math Preparation, Introductory Courses, Peer Tutoring, Faculty Development, Peer Mentoring

Poster Abstract: Project PASS is a comprehensive retention program designed to increase graduation rates of Sacramento State Science, Technology, Engineering, and Mathematics (STEM) majors. Project PASS targets student success in “gateway” math and science courses and implements a variety of research based strategies for improving student learning and retention. PASS is centered on three components: The Early Intervention Program, The Peer Assisted Learning Program, and the Commit to Study Program. The Early Intervention Program identifies "at risk" students in gateway STEM courses and requires these students to participate in a specific set of academic and nonacademic interventions. The Peer Assisted Learning Component improves student success with peer facilitated supplemental instruction in gateway STEM courses and the Commit to Study component motivates STEM students to achieve the University’s recommended three hours of study per one unit of math and science coursework.

Poster #: 3 – 29
Community College

Session: B

Lead Institution: **Estrella Mountain**

Authors: **Bryan Tippet**
Sylvia Orr
Jennifer Damron
Denise Garland

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Engineering	Year 5+	Type 1A	0653206	AZ

Poster Title: **Building STEM Transfer Success: A Community College Cohort Approach**

Keywords: Recruitment, Career Counseling, Math Preparation, Introductory Courses, Student Tracking

Poster Abstract: The intellectual merit of this project is embedded in an approach designed to increase the number of Estrella Mountain Community College students completing associate degrees in STEM areas and/or transferring to four-year institutions. A broader impact of this project is to expand STEM opportunities to underprepared and non-traditional students. Estrella Mountain initially developed a 2-tiered cohort program (pre-STEM and STEM). Unfortunately, the two-tier cohort approach proved impossible to implement as originally planned. Attempts to recruit pre-STEM students fell way short of projections. This challenge led the college to abandon the two-cohort model in favor of a focus on students who met eligibility for the STEM cohort. The STEM cohort is fully supported by faculty mentors who effectively address academic challenges which often limit participation in STEM degree programs. In addition, the cohort is supported through expanded student recruitment; cohort learning communities; faculty and peer mentoring; field experiences (local and distance); career exploration (discussion panels, guided resume’ and personal statement development, internship and research opportunities); financial scholarship incentives; professional networking and community awareness through STEM club participation; and a systemic change to the delivery of the math curriculum. Math curriculum improvements include a “Math Emporium” that helps increase student access to interactive online support materials as well as improve student faculty engagement. Mathematics curriculum improvements, which include modularizing the developmental mathematics sequence, are showing evidence of higher academic achievement when students are provided a greater level of hands on learning combined with increased faculty and student engagement. The Math Emporium also benefits the entire student population in addition to the STEM oriented cohort. Significant recruitment efforts by the college encourage service area high school graduates to enter into this program. Promotional materials that focus on the benefits of the cohort program and the STEM career field are used as a component of recruitment. Early results: The ongoing development of modular courses that decrease time spent in developmental mathematics provides additional time-on-task for STEM students. Further development of the “My Math Lab” online learning component has shown improved results regarding course content feedback and student and faculty interaction. To date, of 102 recent scholarship recipients, 22% have completed degree requirements (16% in the Associate of Science) and 56% continue to be enrolled making progress toward degree completion. There has also been an increase in the number of transfer students in engineering.

Poster #: 3 - 30 Session: C Lead Institution: **Western Michigan University**

Authors: **Edmund Tsang**
Ikhlas Abdel-Qader
Diane Anderson
Laura Darrah
Paul Englemann
Anetra Grice

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 2	Type 1B	0969287	MI

Poster Title: **Effective Academic and Student Affairs Collaboration to Enhance Student Success in Engineering and Applied Sciences**

Keywords: **Recruitment, Math Preparation, Peer Tutoring, Peer Mentoring, Learning Communities**

Poster Abstract: Through the first STEP award (#0336581) between 2004 and 2009, Western Michigan University (WMU) created learning community cohorts for first-time first-year students to improve their success and retention. Students in a learning community shared 3-to-5 courses together during the fall semester and 2-to-4 courses together during the spring semester of the first year. The 2nd year retention to STEM has increased by approximately 8% and the 6-year graduation and continuation to STEM has increased by approximately 10% above the historic baseline 2nd year retention rate and 6-year graduation and continuation rate, respectively. In the second STEP award (#0969287) that started in 2010, the College of Engineering and Applied Sciences and the Division of Student Affairs actively collaborate to deliver support programs and services in proximity to where the students live and study because we recognize they spend more time outside the classroom. Through the second STEP, new programs were initiated which included live-in Engineering Peer Mentors, Student Success Centers in residence halls, Summer Bridge Program, Alumni Mentoring of Female Students, Career Advising and Career Preparation, Midterm-Grade Intervention, and the Transfer Student Host program. The student target populations of the second STEP grant were expanded to include returning sophomores and community college transfer students in addition to first-time first-year students. Besides the student success and retention programs, the second STEP grant has a recruiting component targeting the traditionally underrepresented populations in engineering and applied sciences of females and ethnic minorities. Preliminary results of some the new STEP programs will be presented.

Poster #: 3 –31 Session: A Lead Institution: **Georgia Southern University**

Authors: **Christine Whitlock**
 Bret Danilowicz
 Lisa Vance
 Gus Molina

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0622460	GA

Poster Title: **ASPIRES at Georgia Southern University**

Keywords: **Introductory Courses, UG Research/Internship, Supplemental Instruction, Institutional Charge**

Poster Abstract: The ASPIRES program at Georgia Southern University is implementing five initiatives to promote student academic achievement, retention and graduation in Science Technology Engineering and Mathematics (STEM) disciplines. A comprehensive student advisement center, based on an intrusive advising model, was implemented in January 2007 for all first year STEM majors. Thirteen faculty advisors, five staff advisors, and a career services professional provide academic advisement covering degree requirements, course selection and registration, career services, information on tutoring, workshops, financial aid, admission requirements for professional programs and health assessment referrals as well as monitoring the students' academic progress. Over ninety percent of freshmen and sophomores, or 1888 students, were advised in fall 2011. STEM-based Residential Interest Groups (RIGs) for incoming freshmen majors were implemented in fall 2007. The RIGs provide internal support through academic communities in chemistry, mathematics, pre-medicine, and biology, and feature linked courses in the major, English, mathematics and Freshman Seminar. The RIGs also feature topical programming, opportunities for group projects and activities and in-house tutoring. Students participating in the RIGs had higher GPAs than their peers who did not live in a RIG. Supplemental Instruction and Guided Inquiry programs have been implemented in introductory biology, chemistry, physics, trigonometry, pre-calculus, and calculus. These programs have resulted in increased student problem-solving and critical-thinking skills. Summer research opportunities for undergraduates were implemented in summer 2008. Eight freshmen participated in 2008, 22 freshmen and sophomores participated in 2009, 20 freshmen and sophomores participated in 2010, and 9 freshmen and sophomores participated in 2011.

Poster #: 3 -32

Session: B

Lead Institution: **San Jose State University**

Authors: **Dan Walker**
Maureen Scharberg

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 5+	Type 1A	0653260	CA

Poster Title: STEP at SJSU: Improving Retention through Student Learning Communities

Keywords: **Introductory Courses, Peer Tutoring, Faculty Development, Peer Mentoring, Supplemental Instruction**

Poster Abstract: Grant award # 0653260 Dan Walker (PI) and Maureen Scharberg (Co-PI) College of Science, San Jose State University STEP at SJSU: Improving Retention through Student Learning Communities The College of Science at San Jose State University has embarked on retaining and graduating an increased number of STEM majors on our campus who currently leave our programs. We are using proven intervention strategies: 1. Entering students (both freshmen and transfer students) are receiving expanded advising and mentoring support from day one. 2. Those who are identified by our advisors as “will benefit from academic transition assistance” based on advising interviews or on their scores from mathematics and writing exams are being funneled into our existing “Success in Science ”courses (offered at both freshman and junior transfer levels). 3. We are redesigning selected courses that serve first time freshmen and transfer students to improve teaching methodologies and to introduce intensive cooperative study groups for the students. The project employs a cadre of undergraduate peer leaders, tutors, and mentors. The project is being evaluated by tracking every new College of Science or College of Engineering student in their science and math courses semester by semester, plus their subsequent graduation success, to assess increased retention and graduation rates. In this final year 5 of our project, our evidence indicates a 50% increase in retention of STEM majors to a 75% overall retention and projected graduation rate. The first of the students who were significantly impacted by our efforts are graduating during this year 5 of our STEP grant.

Poster #: 3 -33

Session: C

Lead Institution: **Towson University**

Authors: **Jane Wolfson**
Anne McMahon

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 5+	Type 1A	0653011	MD

Poster Title: Community as a Cornerstone for Excellence

Keywords: **Learning Communities, Underrepresented Students**

Poster Abstract: The TOPS Program of Towson University [Towson Opportunities in STEM] recruits and retains students from underserved and underrepresented communities in the Baltimore Metropolitan area who are interested in pursuing careers in all STEM disciplines and provide the support they might need to complete their degree. In order to achieve this goal, we have developed a range of highly effective programs and practices which contribute to the success of the students in the program, and result in the production of STEM graduates. Whereas most of our students are recruited from high schools, a small contingent of students in our TOPS community comes to us from a special STEM transfer preparation program in our partner institution Baltimore City Community College. These students are intensively mentored as they make the transition from BCCC to TU and they are integrated into the larger TOPS community while they are students at Towson. Students participating in TOPS are involved in a variety of programs that provide common academic and social experiences. These experiences greatly contribute to the development of a supportive cohort of learners and enrich their undergraduate education and their overall educational experience. Central to the program is a deep sense of community based around a set of common values. These values are passed to incoming students by current students through a variety of channels. Participation in the STEM Residential Learning Community, working with peers during outreach activities with local schools and community organizations on and off campus, tutoring sessions during introductory STEM courses, individual and group meetings, and career awareness and professional development activities all play an essential role in sustaining a culture of academic focus and high expectations for excellence that is inherited by every cohort. To date the outreach efforts of the TOPS Program students and staff have impacted over 1800 middle school and high school students in the Baltimore Metropolitan Area. Partnerships with multiple community organizations provide high school students a pathway into TOPS; the TOPS community of students, faculty, and staff, in turn, continue to nurture the growth of the students once enrolled at TU. Students in the TOPS Program are retained in STEM majors at a rate significantly higher than students in the college or in a comparison group. Overall, TOPS students [based on students who are currently in their first, second, third and fourth year] are being retained in STEM at an average rate of 82% while non-TOPS STEM majors are retained at an average rate of 60% and students in a comparison group are retained at an average of 55%.

Poster #: 3 - 34

Session: A

Lead Institution: **Boston University**

Authors: **Bennett Goldberg**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0622541	MA

Poster Title: **PROSTARS: Programs in STEM Academic Retention and Success**

Keywords: **Introductory Courses, Peer Tutoring, Faculty Development, Peer Mentoring, Program Evaluation**

Poster Abstract: PROSTARS designs and implements programs geared toward increasing retention and graduation rates of STEM students from Boston University. Activities are largely focused on underserved STEM students, including students from urban schools, women in physical sciences and engineering disciplines, and students who matriculate with test scores and other indicators that our data demonstrate lead to a higher than average STEM program attrition. The program has three structures, with (1) data analysis of a historical cohort generating indicators, (2) interventions focused on first year students, and (3) broader, infrastructure development across the University. 1. Data Analysis and Program Feedback examines the longitudinal trends of 8,500 student records in the STEM fields at Boston University between 1996-2006, focusing primarily on indicators of retention and graduation rates in the STEM areas. Initial analysis reveals a positive correlation of high math SAT scores for males, but interestingly, females revealed a bimodal distribution on a preliminary investigation, with both high and low SAT scores leaving STEM fields. This finding was later seen as inconsistent with a finding from an updated dataset, and the discrepancy is currently being investigated. Our interventions and programs reflect these indicators and can be seen in some of the feedback from 2011: • Summer Bridge participants made significant gains in all core domains. Summer Bridge students grew in their understanding of STEM, awareness of STEM at BU, improvements in participants' academic behaviors, and sustained effects in the participants' social networks. • The WISE students show a heightened degree of participation in academic life overall. WISE participants showed significantly greater numbers of credit hours and of STEM credit hours in comparison to their peers. 2. First Year Programs and Interventions PROSTARS has created four programs for first year STEM students. The Freshman Seminars are discipline-based courses for incoming students. The Freshman Seminar in Physics (PY195) is an introductory course that explores unanswered questions in modern physics as well as developing academic preparedness. The freshman seminar course was expanded to Chemistry in the fall of 2009 and is titled Freshman Seminar for Chemistry Majors (CH195). The second semester laboratory-based exploratory nanoscience course called a Directed Study in Interdisciplinary Nanoscience course (PY192) ran for the third time in Spring 2011. Evaluations of the PY195 participants have shown notable increases in STEM knowledge, confidence and social networks. The Summer Bridge Program is a two-week preparatory program in physics, calculus, writing, and numeracy at BU for incoming students who have one or more risk factors, such as lower than average Math SAT scores, greater financial need, first generation college attendants, lower than average high school GPAs or no AP credits. 17 incoming BU students participated in the Summer Bridge 2011. Students became acclimated to the expectations of college-level coursework and the campus while making lasting friendships with their peers. The Women in Science and Engineering Residency Floor at Warren Towers (WISE@Warren) is a residency hall program that blends academic and social programs. In its fifth year now, 43 female students are living and engaging in bi-monthly activities including 7 upperclassmen students that act as Peer Mentors and Peer Leaders for the floor. PROSTARS' First Summer Research Program supported 7 undergraduate research slots for the ten-week research program for underrepresented, freshman and sophomore BU STEM students in various fields including Biology, Chemistry, Astronomy and Engineering. 3. Institutional Programs PROSTARS designed, implemented, and is supporting a ten-week summer Community College program that gives 6 students from Roxbury Community College, Bunker Hill Community College and MassBay Community College the opportunity to work in BU's research facilities with faculty. These students have the opportunity to be awarded scholarships through BU for continued education at our university. PROSTARS helped design and currently supports the Educational Resource Center's Peer Tutoring Fellows, liaisons working with professors, teaching fellows, and departmental resources to help bridge the gap between class instruction and tutoring services. PROSTARS supports 2 Peer Tutoring Fellows in Chemistry and Physics. In terms of professional development, PROSTARS, in collaboration with Boston University's Center for Excellence and Innovation in Teaching (CEIT), initiated a series of faculty workshops this spring to integrate innovative methods in undergraduate STEM education to directly address ineffective modes of instruction in introductory and gateway STEM courses. These conversations led to continued collaborations and work with PhysTEC, CIRTL, and Redesigning Undergraduate Learning Experience (RULE) grants at Boston University.

Poster #: 3 - 35

Session: C

Lead Institution: **University of Virginia**

Authors: **Carolyn Vallas**
Wraegen Williams
Chad Smith (Thomas Nelson Community College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0653199	VA

Poster Title: **The Academic Community for Engineering Students (ACES)**

Keywords: **Recruitment, UG Research/Internship Opportunities**

Poster Abstract: The Academic Community for Engineering Students (ACES) is a joint partnership between the University of Virginia, School of Engineering and Applied Science's (UVA-SEAS) and Thomas Nelson Community College's Division of Mathematics, Engineering, and Technology (TNCC-MET). Together, UVA-SEAS and TNCC have set out to increase the following by 2.0% each year: SEAS year-one-to-year-two retention rate, SEAS 5-year cohort graduation rate, TNCC's three-year graduation rate, and TNCC's cohort transfer rate, defined as the number of students that transfer to a four-year school to pursue engineering degrees. UVA-SEAS and TNCC have implemented a combination of proven and innovative community-building practices to accomplish the overarching goal of increasing the number of students, especially those from underrepresented populations that earn engineering baccalaureate degrees. Since this grant's inception, TNCC and UVA-SEAS have worked together to overcome challenges often faced by two-year/four-year partnerships, learning valuable lessons through this process. As a result, a number of excellent practices can be gleaned from this partnership. For example, changes to the first year UVA-SEAS curriculum have led to an average 90% year-one-to-year-two retention rate, which is remarkably high when compared to the national average. Moreover, an annual community college day has been implemented for TNCC students to learn about the transfer process and summer research opportunities, successfully encouraging both. Specifically, this program has increased the number of applicants for transfer admissions from TNCC and to date sixteen TNCC students have participated in the eight-week summer research experience. Of these summer research students, 19% have transferred to UVA-SEAS to continue their engineering studies. One of the 2009 transfer students was able to since complete a Mechanical Engineering bachelor's degree at UVA in two years. Thus, the ACES partnership is effectively impacting the number of students that enroll, pursue, and achieve engineering baccalaureate degrees.

Poster #: 4 – 01 Session: A Lead Institution: **University of Wisconsin Colleges**

Authors: **Rebecca Abler**
Kitrina Carlson (University of Wisconsin-Stout)
Richard Hein
Michael Pickart (University of Wisconsin-Stout)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Science	Year 3	Type 1A	0856279	WI

Poster Title: **Opening the Portals of Discovery: Increasing Opportunities in STEM Through Collaborative Research**

Keywords: **Peer Mentoring, Institutional Change, UG Research/Internship Opportunities**

Poster Abstract: Portals of Discovery, a partnership between the University of Wisconsin-Manitowoc and the University of Wisconsin-Stout, engages, recruits, and retains students in STEM fields through collaborative research experiences. New curricula, developed at the high school and college levels, will help prevent the loss of STEM majors by giving them the skills needed to establish STEM career goals and to achieve success in the classroom and in a research setting. Scholarships and assistantships will allow students with real financial need to devote the significant amount of time necessary to successfully complete a STEM degree. The integration of research, coursework, and faculty and peer mentorships across institutions will ensure that STEM students have a support network which will persist throughout their undergraduate career.

We have created a model partnership which links local feeder high schools, a 2-year partner, and the baccalaureate institution through a single research project involving an investigation of Hmong medicinal plant use in Wisconsin. We support of a core cohort of undergraduate research students each institution. These students participate in research and faculty and peer mentoring across institutions, creating a seamless cohort across distances. In addition, UW-Manitowoc faculty have integrated research into the curriculum of local high schools, allowing over 200 rural students to have access to the university system in their own classroom. Support services and new classes have been added at both institutions, and STEM tutoring has been integrated into the campus communities. The complete integration of research, coursework, and mentorship across institutions ensures that STEM students have a persistent support network throughout their undergraduate career. Research activities develop critical thinking, technical skills, and confidence. Outreach and mentor support networks reach students of diverse demographic backgrounds who otherwise would be unlikely to pursue or persist in STEM education.

We are currently in Year 3 of grant funding, and have implemented strategies for expansion of the model program and sustainability of programming after the end of the funding cycle. Successful components, such as new and expanded courses, are now funded through the institutions as part of the regular curriculum, and each campus is implementing and developing expanded support for undergraduate research cohorts. In addition, the model is being developed for expansion across all twenty six UW-System two and four year campuses, resulting in a comprehensive effort to alleviate Wisconsin's need to increase the technology workforce.

Poster #: 4 - 02 Session: B Lead Institution: **Arizona State University**

Authors: **Mary Anderson-Rowland** **Armando Rodriguez**
 Bubba Hall (Cochise College) **Phil McBride (Eastern Arizona College)**
 Rakesh Pangasa (Arizona Western College)
 Clark Vangilder (Central Arizona College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Science	Year 3	Type 1A	0856834	AZ

Poster Title: **Motivated Engineering Transfer Students/Talent Expansion Program (METSTEP)**
Keywords: **Recruitment, Career Counseling, Peer Tutoring, Peer Mentoring, Program Evaluation**

Poster Abstract: The Arizona State University (ASU) Motivated Engineering Transfer Students (METS) STEP (METSTEP) Program is currently in its third year. The goal of the project is to graduate more engineers and computer scientists (Henceforth the term “engineering” will include computer science). This program is focused on five non-metropolitan community colleges (CCs) in the state of Arizona: Arizona Western, Central Arizona, Eastern Arizona, Cochise, and Mohave. Females and underrepresented students are especially encouraged to apply for this scholarship program. Before this project, no one from a university had come to speak to the students of these schools about engineering and computer science. Four of the schools are at least a 3 hour drive from ASU. Each semester a team from ASU visits each of the five schools and a group of students accompanied by the college liaison or other faculty members visits ASU. In this project we are committed to:

- Encourage CC students to consider a career in engineering or computer science
- Assist the CCs with recruiting high school students to the CC to major in engineering
- Provide scholarships in each CC to potential engineering transfer students
- Assist CC students in their transfer to ASU
- Provide \$4K scholarships for transfer students from these schools and provide \$300 scholarships to additional students who complete the assignments in a one credit Academic Success Class.
- Provide encouragement and support upon their transfer
- Enroll these transfer students in an Academic Success Scholarship (one semester credit) Class where topics include:
 - o The Guaranteed 4.0 Plan: a learning system by Donna O. Johnson
 - o Detailed Time Management Scheduling
 - o Resumes, Interviews, Career Fairs
 - o Career Planning
 - o Internships
 - o Research
 - o Scholarship, Fellowships, Research Positions
 - o Graduate School
- Graduate the transfer students in engineering
- Have the engineering graduate go right on to graduate school full-time in engineering

In spring 2012, 134 students enrolled in the scholarship class. About 80 of these students were S-STEM and STEP scholarship students required to take the class, but the other 50 students were in the course because they had heard about the class by word of mouth or were taking the class again (it is different each semester) because it was of value to them. A METS Center is also supported by the STEP grant and supports a Center Director and part-time transfer student workers. This Center provides a place with computers and free printing, a microwave, and a refrigerator, as well as a place for study, networking, seminars, and very importantly informal counseling to help transfer students with resources and the unknowns. Over 300 students enrolled in the center last semester and the daily average attendance is now up to over 40 students per day, which is at capacity. The Center also provides a conference room where most of the Academic Success Scholarship Classes are held. Each of the six 75 minute meetings is held five times to accommodate the students’ schedules and to keep the meetings small with 20-30 students. One of these sessions is videotaped and made available as a webcast for students who have to miss a meeting. Challenges: It is difficult to travel three hours or more each way to visit a school, but we are making it work because we have passion for this project. Four of the five schools have experienced administrative changes since Fall 2009 that have affected the project. The Cochise change has helped the project since liaison Bubba Hall was appointed to be the Dean of Math and Sciences. Successes: We expect that students will graduate at a 95% rate, similar to our S-STEM Scholarship program for transfer students. Enrollment from these target schools has doubled since the program began in Fall 2009. During this time Eastern Arizona has doubled their enrollment of students in engineering. Mohave has hired their first engineering professor and is offering Introduction to Engineering to students in Spring 2012 for the first time in school history with an enrollment of ten students. Cochise has increased their engineering faculty, enrollment, and classes. Central Arizona has increased their engineering faculty and Arizona Western now has more students interested in engineering.

Additional author: John Saber, Mohave College

Poster #: 4 – 03 Session: C Lead Institution: **California State University – San Marcos**

Authors: **Charles DeLeone**
Edward Price
Victor Rocha
Daniel Sourbeer (Palomar College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 1	Type 1A	1068477	CA

Poster Title: **The view after 6 months: Increasing STEM talent through regional partnerships, recruiting, and retention**

Keywords: **Recruitment, Introductory Courses**

Poster Abstract: California State University, San Marcos (CSUSM) and Palomar Community College (Palomar) are increasing the number of STEM graduates and transfers through recruiting and retention activities coordinated across both institutions. A marketing study was conducted to determine how prospective students’ perceived STEM programs and what program elements were highly attractive to prospective students. These findings have been incorporated into our recruitment plans. To increase retention in STEM courses, the project has initiated an Active-Learning Pedagogy Support (ALPS) program that provides faculty professional development and resources to implement course-specific active-learning based curricula. In addition, both campuses will open STEM centers with drop-in science tutoring during spring 2012.

Poster #: 4 – 04
NY

Session: A

Lead Institution: **CUNY City College of**

Authors: **Joseph Barba**
Feridun Delale
Mahmoud Ardebili (BMCC)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 5+	Type 1A	0525413	NY

Poster Title: **Bridges to Engineering Success for Transfers**

Keywords: **Introductory Courses, Peer Mentoring, UG Research/Internship, Articulation & Transfer Issues**

Poster Abstract: This project which is in its seventh and final year focuses on aligning the early math and science courses to produce the same student learning outcomes at CCNY and two partner CUNY community colleges, namely BMCC and Hostos. Other activities include, introducing students to research and peer-led mentoring. The assessment of the results indicate that there has been an overall increase in retention of engineering students and that undergraduate research is an effective tool in motivating students. These results are presented in the poster.

Poster #: 4 - 05

Session: B

Lead Institution: **Northeastern University**

Authors: **Christos Zahopoulos**
Claire Duggan
Thomas Cullinane
Mohamed Metghalchi
Yiannis Levendis

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	All STEM	Year 4	Type 1A	0653090	MA

Poster Title: **Northeastern University STEP-UP**

Keywords: **Faculty Development, UG Research/Internship, Supplemental Instruction, Institutional Charge**

Poster Abstract: The Science, Technology, Engineering and Mathematics Talent Expansion Program - University Partnership (NU STEP-UP) is a partnership between Northeastern University, two NSF-supported research centers and three Boston-area community colleges (Massachusetts Bay Community College, Middlesex Community College, and Northern Essex Community College) to increase the number of students receiving degrees in STEM disciplines. NU STEP-UP is focused on developing a sustainable STEM model that provides a seamless transition between two- and four-year institutions. Using research as the catalyst for engagement, NU STEP-UP is: (1) creating a sustainable STEM partnership between the university's STEM departments and local community colleges, (2) creating a Partner Faculty Network, with representatives from all stakeholders, (3) providing community college faculty the opportunity to immerse themselves in a research environment, (4) providing community college students access to extensive research experiences, (5) developing a transfer bridge program for community college students transitioning to Northeastern University; and (6) providing academic mentoring and research activities for all STEM students throughout the partnership. Participants in the Partner Faculty Network are involved in working seminars helping them implement the latest pedagogical approaches in their own classrooms. They are sharing innovative STEM instructional models and practice and collaborating to bring STEM courses at community colleges in alignment with comparable courses at four-year institutions. A multi-faceted approach to program evaluation aims to assess progress toward achieving established benchmarks, as well as to understand the contribution of various program elements. The evaluation plan includes: (1) tracking student transfer rates, retention rates and student performance, (2) surveys of stakeholders, including students, faculty and alumni, (3) focus groups with transfer students and with faculty, and (4) cohort analysis of transfer students. Results and outcomes are being disseminated through publications, a project web site, and presentations at regional and national conferences.

Authors: **Mark Filowitz**
Rochelle Woods
Martin Bonsangue
Larry Redinger (Mount San Antonio)
Carol Comeau

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	ALL STEM	Year 4	Type 1A	0757113	CA

Poster Title: **TEST:UP, Development of a 2-year/four year STEM Transfer Model Among Three Hispanic Serving Institutions**

Keywords: **Peer Mentoring, Supplemental Instruction, Underrepresented Students, Articulation & Transfer Issues**

Poster Abstract: TEST:UP is a collaborative program, initiated in fall 2008, among three Hispanic Serving Institutions—California State University, Fullerton (CSUF), a four-year, comprehensive university, and Mt. San Antonio College (Mt. SAC) and Santa Ana College (SAC), two of CSUF's feeder two-year community colleges. All three campuses are located within 23 miles of each other and have diverse student bodies with enrollments exceeding 27,000 students. Through TEST:UP, our collaborative program seeks to: 1) increase the recruitment and retention of STEM majors at Mt. SAC and SAC; 2) produce more STEM associate degrees and STEM transfers to four-year schools; 3) improve the retention and persistence of transfers and entering freshmen majoring in STEM fields at CSUF; 4) increase the number of students obtaining baccalaureate degrees in STEM disciplines at CSUF and other four-year institutions; and 5) improve mentoring and teaching skills of CSUF graduate students seeking community college teaching careers. TEST:UP programs are impacting thousands of students by: significantly improving STEM learning environments; improving STEM academic advisement at our partnering two year colleges; and facilitating the transfer of two-year STEM students from Mt. SAC, SAC and other community colleges to CSUF or other four-year institutions in the face of drastic budget cuts and impaction. Our ultimate vision is that TEST:UP will result in a collaborative and replicable model of cooperation between two- and four-year institutions that results in the production of more STEM students and graduates. As an example of establishment of best practices, the core elements of the NSF TEST:UP program were adopted to submit for and receive a Department of Education HSI-(STEM)2 grant where CSUF is collaborating with three additional HSI community college partners (Cypress, Citrus, and Santiago Canyon Colleges) to build on improvements in STEM transfer success. Therefore, CSUF is now partnering with five local community colleges to facilitate STEM awareness and success for transfer students. We are meeting our goals on increasing declared STEM transfers from and STEM AA degrees awarded at the community colleges. It is too soon to assess impact of TEST:UP on STEM transfer graduation rates at CSUF as only ~20% of STEM students historically graduate within 3 years of transfer to CSUF and only 40-50% graduate within four years of transfer to CSUF and we will not have graduation data on year four until May. We are close to meeting goals on CSUF graduate student instructors at the community colleges. Improved retention rates for STEM freshmen and transfer students have leveled off at about 70% for both groups and reflect the impact of all retention efforts. These are intermediate indicators. We have observed much improved passing rates and GPA with Supplemental Instruction (SI) at all three institutions, and significant steps have been taken to institutionalize the programs. The grant supports SI at the community college campuses and SI was supported by this grant at the CSUF campus in year 3. SI has been shown to significantly close the achievement gap for underrepresented minorities (URM's) in key STEM gateway courses. The impact on Latina women was especially large. Self-selection of participants does not appear to be a significant factor based on high school grades and cognitive reasoning factors. In year 4, the College of Natural Sciences and Mathematics (CNSM) committed to supporting 54 sections of SI in both CNSM and the College of Engineering and Computer Science (CECS) as a step towards institutionalizing the program at the CSUF campus and rooms were reconstructed for dedicated SI use in CNSM. The community college partners are using a mix of grant and baseline support for expansion of their SI programs.

Poster #: 4 - 07
Connecticut

Session: A

Lead Institution: **University of**

Authors: **Headley Freake**
Marcia Jennings (Manchester Community College)
Diba Khan-Bureau (Three Rivers Community College)
Melissa Phillion (Quinebaug Valley Community College)
Steven Zinn

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school partnership	Science	Year 5+	Type 1A	0525379	CT

Poster Title: **STRONG-CT – a dynamic partnership between two- and four-year institutions**

Keywords: **Learning Communities, Underrepresented Students, Articulation & Transfer Issues**

Poster Abstract: Science and Technology: Reaching Out to New Generations in Connecticut (STRONG-CT) is a local academic collaboration in the northeastern United States centered on the enrollment, retention, and graduation of first generation and historically underrepresented students in the life sciences in post-secondary education. Currently under a no cost extension, student membership is at approximately 125, two-thirds at UConn and the remainder spread over three neighboring community colleges. STRONG-CT generates a range of programming designed to support the academic development of its scholars, including one-credit enrichment courses, tutored learning groups centered on core science and math courses, individualized and intensive advising, mentoring relationships and large group science-based activities. Despite leaving high school with lower math and verbal SAT scores, STRONG-CT student GPAs are not different from those of other science students at UConn and are on average 0.2 points higher in overall GPA and 0.26 points higher in science GPA than those of students with similar backgrounds who declined to enroll in the program. These differences were greater in the first year of college. Membership in STRONG-CT more than doubled the rate of community college students transfer to UConn and the GPA of these students was 0.3 points greater than other transfers. An online survey constructed to assess students' standing on relevant psychological and social criteria demonstrated that STRONG-CT students have greater confidence in achievement and learning, greater commitment to attaining a degree, and greater commitment to the sciences than their peers. Learning self-efficacy improved for STRONG-CT students after 2 years in the program but not for control students. Whereas considerable success has been achieved with these program support strategies, future efforts are being directed at the pedagogical approaches used in foundational science courses as a means to improve the learning environment for all students.

Poster #: 4 – 08
at Dallas

Session: B

Lead Institution: **University of Texas**

Authors: **John Sibert**
Dave Galley (Collin College)
Gerald Suggs (Richland College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	All STEM	Year 3	Type 1A	0856549	TX

Poster Title: **The Dallas STEM Gateways Collaborative John Sibert, University of Texas at Dallas Dave Galley, Collin College Gerald Suggs, Richland College**

Keywords: **Recruitment, Career Counseling, Math Preparation, Introductory Courses, Peer Tutoring**

Poster Abstract: The University of Texas at Dallas, Collin College, and Richland College of the Dallas County Community College District have established a joint effort, the Dallas STEM Gateways Collaborative, to significantly increase the number of undergraduate students completing degrees in Science, Technology, Engineering, and Mathematics (STEM) in the North Texas region. Building upon previous cooperation among these three institutions and the remarkable concentration of high-tech businesses in the Dallas-Fort Worth Metroplex, the Collaborative has implemented best-practice methods via three major initiatives to bring about a cultural change that will lead to a sustained increase in the production of STEM-trained graduates over the five year period of the grant. First, the Collaborative has strengthened recruitment into introductory STEM courses and expanded the use of student mentoring within those courses to encourage student selection of STEM majors. Second, it has increased opportunities for internships and undergraduate research experiences for students early in their college career to encourage students to remain committed to the pursuit of STEM majors. Finally, a concerted effort of curriculum alignment across all STEM fields at the three participating institutions combined with a formal professional development program aimed at spreading effective pedagogical techniques throughout the faculty at all three institutions has been designed to enhance teaching effectiveness at the critical introductory level. The Dallas STEM Gateways Collaborative program will enhance the number, quality, and diversity of undergraduates successfully earning STEM degrees. Specific program elements include: 1. The successful 2+2 articulation program in Engineering (including important curricular alignment agreements) between Collin College, Richland College and UT Dallas was expanded to all STEM disciplines at both Collin College and Richland College. Enhanced Advising has played a key role in this effort at the community college level. 2. Direct presentations to students, parents, and counselors coupled with the offering of Technical Dual Credit coursework at local high schools has produced a collaborative recruitment effort aimed at making the 2+2 programs known to high school juniors and seniors in the diverse Dallas-Fort Worth Metroplex. 3. A significant expansion of the Peer-Led Team Learning (PLTL) program in the STEM disciplines at UT Dallas has occurred and is in the process of being leveraged to Richland College and Collin College. 4. There have been many collaborative activities among the three institutions to build a STEM student learning community. These activities have included opportunities for: undergraduate research and internships, joint student organization activities, an undergraduate research fair, and STEM mentoring career workshops. 5. Collaborative activities involving Faculty Innovation Grant Awards to promote Innovations in STEM Teaching and Learning have played a vital role at all three institutions. 6. There has been an expanded effort at Richland College to address the Math and Science Tutoring needs of STEM students in specific higher level Math, Physics and Chemistry courses. 7. An outreach effort at Collin College to build a pipeline of STEM students targeted to attend UT Dallas through Robotics Camps and College Robotics Competitions is bearing success. 8. The Collaborative has leveraged close links with the UT Dallas Gateways for Excellence in Mathematics and Science (GEMS) program to improve student retention and learning in the first and second years at the university level. 9. A significant assessment and evaluation effort to document best practices and to provide formative assessment for the program is being pursued.

Poster #: 4 – 09
University

Session: C

Lead Institution: **San Diego State**

Authors: **Eric Pamintuan**
Rafael Alvarez (San Diego City College)
Raga Bakhiet (Southwestern College)
Theresa Garcia

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	All STEM	Year 5+	Type 1A	0653277	CA

Poster Title: **STEP Partnership of San Diego (SPSD)**

Keywords: **Career Counseling, Math Preparation, Introductory Courses, UG Research/Internship, Student Tracking**

Poster Abstract: Abstract The Mathematics, Engineering, and Science Achievement (MESA) Program assists educationally disadvantaged students to graduate from four-year institutions with a math-based major. MESA focuses on student groups who historically have had low levels of attainment. The National Science Foundation (NSF)-supported STEP Partnership of San Diego (SPSD) incorporates the successful MESA model at each partner campus (San Diego State University, San Diego City College, and Southwestern College); enhancing essential services (e.g. academic support, STEM competitions, leadership development, etc.) that help students excel academically and prepare for the STEM workforce. Together, MESA and SPSD create a partnership of educational, industry, and government organizations forming a pipeline from community college to university to STEM industry. The goals of SPSD are to: increase the number of students who pursue STEM academic and career pathways, increase retention in STEM disciplines, and promote opportunities in STEM post-graduate studies. Challenges: 1) Implementing an online activity and reporting system for tracking and evaluation purposes continues to be a challenge, 2) Establishing new relationships with employers in the life and physical science fields to better support science majors has proven to be difficult 3) Matching the needs of the SPSD grant with those of industry for facilitating summer team internships (for example, companies requiring interns to work longer than 100 hours which is budgeted in the grant) remains complicated, and 4) Encouraging partner companies to guarantee future support, potentially hindering our ability to sustain the internship component is of concern. Successes: 1) 47 science and engineering companies and/or faculty hosted students in Summer 2008, 2009, and 2010 enabling us to exceed our targets prior to 5th year of grant, 2) At least 1/3 of each summer cohort were asked to stay on after their 100 hour commitment, 3) Enrollment at each partner campus has increased by at least 10% or more each academic year (2007-2011), 4) Students are highly satisfied with the activities offered by SPSD, as evidenced by evaluation results, and 5) Additional successes as a result of this project have been realized at each partner campus.

Poster #: 4 – 10 Session: A Lead Institution: University of Washington-Seattle Campus

Authors: Veronica Guajardo Lucy Casale
James Dorsey

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 3	Type 1B	0856830	WA

Poster Title: **STEP 1B: Washington MESA: The Community College Model (WA-MCCP)**

Keywords: **Student Tracking, Learning Communities, Underrepresented Students, Articulation & Transfer Issues**

Poster Abstract: The project is implementing a comprehensive, integrated, multi-layered approach for increasing the number of STEM majors across the State of Washington by coordinating articulation and matriculation between the Washington MESA Community College Program, the University of Washington, and Washington State University. The comprehensive approach is being achieved through established synergy and strong institutional support at the partner colleges and universities. The project, a follow-on to a prior STEP award (0431659), is (1) expanding its focus from engineering to all STEM disciplines while strongly emphasizing the inclusion of underrepresented students, (2) increasing the number of community colleges active in the consortium, (3) standardizing the retention and transfer services and activities by migrating towards the successful MESA Community College STEM transfer model, (4) institutionalizing the MESA academic support model for STEM transfers at participating community colleges, and (5) replicating the successful components and services of the MESA K-20 Pathway across Washington. A workforce development center at the University of Washington is monitoring progress towards the project goals by collecting and analyzing data on the number of students and their grades, retention and transfer rates, self confidence levels, and impressions of program effectiveness. PROJECT MISSION MESA Community College Program (MCCP) serves underrepresented students in STEM fields with academic support and professional development. MCCP provides rigorous science, engineering, and math enrichment to African American, Native American, Latino, Pacific Islander, community college students. The goal is that students will excel academically and transfer successfully to four-year institutions as STEM majors. OBJECTIVES OF MCCP 1. Increase the number of underrepresented students who pursue degrees in science, technology, engineering, or math, by successfully transferring to a four-year university. 2. Strengthen relationships among educators and institutions, prospective employers in business/industry, and MESA students. 3. Improve academic performance of MESA students, and facilitate a smooth transfer “pathway” to four-year universities. 4. Increase the leadership skills and raise the educational expectations of MESA students. 5. Establish new transfer patterns and mechanisms, which link community colleges with four-year universities, and improve efficiency of transfer agreements. 6. Provide students with optimum internship and scholarship opportunities through partnerships with industry, student professional organizations, and universities. SIX Model Components I. Administrative Support II. Student Study Center III. Academic Excellence Workshops (AEW’s) IV. Orientation Course V. Academic & Counseling Advising VI. Student Professional Development & LINKS to STEM Societies Current Project Results (highlight only) One hundred sixty-three students enrolled in MCCP during the first two years of the program. Eligibility criteria for MCCP registration included being a community college student intending to pursue a Bachelor’s degree in STEM while also being an underrepresented minority, female, or a first generation college student. Seventy-one percent of MCCP registrants are male, and 27% are female (2% of registrants did not report their gender.).The majority of participating students in the MCCP program are underrepresented minorities. Nearly one-quarter of students are African American, one-third report being Hispanic, and 9 percent of participants report being multi-racial. Overall, 68 percent are URM. Roughly 40% of the MCCP participants to date are students at Highline Community College (HCC). Columbia Basin Community College (CBC) registered 20% of the participants, and Yakima Valley Community College (YVCC) and Edmonds Community College (ECC) each registered about 15%. Seattle Central comprised 8% of the MCCP participants. Community college students who chose to register in MCCP come from and have diverse backgrounds and experiences. More than half of the MCCP students work in addition to attending college. Nearly three-quarters of registrants indicate they have obstacles that may interfere with obtaining a degree. The most commonly cited obstacle is financial need, followed by employment issues; others include family obligations and lack of knowledge of the educational system. The MCCP registrants also reported coming from a range of family educational background, suggesting that many of MCCP registrants are first-generation college students. It is evident from the demographic data that for many MCCP registrants, the journey into higher education will be an unfamiliar one.

Poster #: 4 - 11
California-Berkeley

Session: B

Lead Institution: University of

Authors: **Chris Lever (University of California-Berkeley)**
Lynn Huntsinger (University of California-Berkeley)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0622598	CA

Poster Title: **The Environmental Leadership Program at the University of California, Berkeley**

Keywords: **Recruitment, Faculty Development, Program Evaluation, UG Research/Internship, Underrepresented Students**

PosterAbstract: The Environmental Leadership Pathway (ELP) is a community college partnership between U.C. Berkeley and Contra Costa Community College in San Pablo, California. The program a one-year comprehensive academic enrichment fellowship targeting low income, first in the family, and/or underrepresented minority community college students who intend to transfer to competitive four year universities in science, technology, engineering, or math (STEM) majors. The goal of ELP is to improve transfer rates into STEM majors at Berkeley and to increase the graduation rates of the target populations. The activities offered through ELP consist of three academic and research components: an environmental science case studies course, a two-month research internship, and a teaching and learning environmental science course. In addition to these major program elements, participants attend a weekend field camp, and receive advising and mentoring to facilitate the transfer process. ELP helps them find opportunities for continued support and mentoring during their University education, and itself offers continual mentoring from program staff and faculty to help students cope with student life at a 4-year institution such as U.C. Berkeley. The program develops a strong peer support group throughout the year and across the years by creating a supportive cohort and connecting it to previous and future cohorts, something that participants have consistently indicated is one of the most valuable aspects of participation in ELP. ELP is currently in its sixth year. One hundred and thirty-one students have begun the program. Twenty five are in the current cohort that began in January 2012. Sixty-four of the 90 students that have completed the ELP program year have transferred to 4-year institutions, and 13 have now received Bachelor's degrees. Of the remaining 42 students 19 are currently waiting for acceptance notifications, 7 are not applying for the current 4-year transfer cycle, and 16 withdrew from the program. Eighty-nine percent of ELP participants are low income: 84% are first generation college students; 59% are female; 34% Hispanic; 11% African American; and 2% Native American. Recruiting ELP program participants remains a challenge, the number of students applying to the program has increased with program maturity, but the number of fully qualified applicants remains around 25 annually. ELP students help with recruitment at their home campuses. Identifying UC faculty labs for internships has become appreciably easier as the reputation of the students has developed among faculty. U.C. faculty have grown to appreciate the added diversity of life-experience and outlook that ELP students bring to a lab. The program emphasizes that internships must offer meaningful participation in research. Faculty and students report high levels of satisfaction with the internship program. The program has overcome many obstacles during its operation and NSF STEP funding is drawing to a close. The program changed leadership and content at midstream, due to a retirement, and in response to student and Community College Counselor feedback. Creating the final report and evaluation are major emphases for the upcoming year. A challenge for the program has been institutionalization. Significant budget cuts at the University and College level have forced the program to look outside the academy for support.

Authors: **John Idoux Daniel Spencer (Temple College)**
Angela Hochhalter (Texas A&M Health Science Center)
Sarina Swindell (Texas A&M-Central Texas)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 3	Type 1A	0855343	TX

Poster Title: **The Central Texas 2-STEP: 1) Attraction TO STEM; 2) Retention & Graduation IN STEM**

Keywords: **Career Counseling, Math Preparation, Peer Tutoring, UG Research/Internship**

Poster Abstract: The Central Texas 2-STEP project, a partnership involving Tarleton State University, Texas A&M University-Central Texas (comprehensive institutions) and Temple College (a community college), is increasing STEM graduation rates through targeted recruitment of two distinct audiences. The first audience is high school juniors and seniors studying in residence at The Texas Bioscience Institute's (TBI) "Middle College" (a unit of Temple College). Students enroll in a STEM-intensive college curriculum that also satisfies high school graduation requirements. Students are counseled and encouraged to enroll in sufficient transferable STEM courses such that they receive an Associate Degree along with their high school diploma. Upon graduation they are encouraged to pursue a STEM bachelor's degree. The second targeted audience is recent and soon-to-be veterans from the armed services. This arm of the program capitalizes on significant improvements in the GI Bill to reach veterans and/or their dependents who have expressed an interest in STEM careers. Students participating in The Central Texas 2-STEP program are being supported by a number of measures ("best practices") shown to increase student interest and persistence in STEM fields. Undergraduate research opportunities, seminars with practicing STEM professionals, and meaningful career counseling are all project components designed to retain students and to prepare them for careers in STEM. A math-readiness summer experience is also being conducted for promising STEM students who may need extra support before they begin their university studies. Some highlights of the 2011-2012 year of The Central Texas 2-STEP project are: - During Summer 2011, thirty (30) students from the targeted groups participated in a full-time, 10-week research experience. Twenty-six (26) were "Middle College" students, three (3) were AAS Biotechnology students and one (1) was an upper-level baccalaureate military-related student. Each student participant was an active member of an investigator-led research team and worked on a single project within the particular team's research program. Their summer research experience culminated with presentations of professional posters based on their work. When surveyed at the conclusion of the program, 76% of the students reported that the experience had increased the likelihood "a lot" that they would pursue a career in Science. The majority of the students strongly agreed that they had gained new knowledge, new skills, a better understanding of research ethics, and skills for communicating with colleagues from other disciplines. The research experience program will be offered again in Summer 2012. - Thirty-four rising high school juniors who wished to matriculate at the TBI in Fall 2011 participated in the Math-Readiness Summer 2011 Workshop. The Workshop was a five hour/day, four day/week, four-week experience held from early June to early July. The Workshop is designed to assure that students have the appropriate mathematical preparation to successfully 1) undertake College Algebra and/or 2) perform the mathematical requirements of the first two introductory "gatekeeper" college science courses (i.e., "freshman" Biology and Chemistry). Over 90% of the students displayed a significant post-workshop score increase on the ACCUPLACER standardized exam compared to their pre-workshop performance. Ninety-four percent (32 of 34) of the students subsequently earned an A or B in College Algebra in the Fall 2011 semester. The corresponding statistic for those students who did not participate in the summer workshop was 77% (27 of 35). The Math-Readiness Workshop will be offered again in Summer 2012. Given the success of the 2011 participants, their "word of mouth" feedback to their "rising" high school junior colleagues and the encouragement of high school counselors, an increase in attendance is anticipated. - Twelve seminar (research- and practice-based)/career counseling sessions were presented to the students during the 2011-2012 year. Practicing STEM professionals made presentations in the following areas: Applications of Engineering, Biochemistry, Biological Engineering and Materials Science, Chemistry and Chemical Demonstrations, Chemistry of the Brain, Electrical Engineering, Genetics, Geoscience, Mathematics, Mechanical Engineering, Robotics, STEM Applications in Medical Research. In addition, alums of the Summer 2011 Research Experience Program spoke to the students about their participation in the Program, their research projects and their overall academic experience in the Program. - One hundred and seventeen "Middle College" students were enrolled at The Texas Bioscience Institute during the 2011-2012 year. It is anticipated that 82% (36 of 44) of the "2nd year senior Middle College" students will receive a STEM-intensive Associate's Degree from Temple College in May 2012, while simultaneously having fulfilled all requirements to receive their high school diplomas. The other eight students will have earned between 48 and 60 credits that are transferable to a STEM BS program. During the first two years of the grant's activities (2009-2010 and 2010-2011), 52 of the 76 (69.4%) "2nd year senior Middle College" students earned a STEM-Intensive Associate degree. Interestingly, in the three years prior to the presence of the grant's activities, only 30 of the 102 (29.4%) "2nd year senior Middle College students" opted to acquire enough additional elective credits to earn a STEM-Intensive Associate degree. Approximately thirty Biotechnology students (12 in the AAS Biotechnology program and the remainder fulfilling prerequisites for the program) were enrolled at The Texas Bioscience Institute during the 2011-2012 year. It is anticipated that students from the AAS program, several of whom are military veterans or family members thereof will participate in the Summer 2012 Research Experience.

Poster #: 4 - 13 Session: A Lead Institution: **Chicago State University**

Authors: **LeRoy Jones II**
Lezlie Thompson
Karel Jacobs
Susan Kirt
Austin Ferguson (Olive-Harvey College)
Arlicia Corey (Kennedy-King College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school partnership	All STEM	Year 3	Type 1A	0856827	IL

Poster Title: **The Academic Community for Engineering Students (ACES)**

Keywords: **UG Research/Internship Opportunities, Student Tracking, Underrepresented Students, Articulation & Transfer Issues**

Poster Abstract: Chicago State University (CSU) and two City Colleges of Chicago (CCC), Kennedy-King and Olive-Harvey, have formed a partnership to increase the number of students persisting in STEM majors by focusing directly on the quality of student learning. The vision of USTEP is to significantly increase the number of first and second year CSU and CCC college students who enter, pursue and graduate from science, technology, engineering and mathematics (STEM) programs. In order to achieve this vision, these three Chicago commuter schools are implementing a student-centered academic support and research program. The goals of this program are to enhance undergraduate education and training at the intersection of the biological and physical sciences and mathematics, to prepare students to graduate, and to pursue graduate study or careers in traditional and emerging fields that integrate the sciences. USTEP aims to broaden undergraduate research capacity and experiences by utilizing CSU's local prairie garden for environmental and ecological field research and data collection. Student support will be provided through cohort class participation, faculty and peer workshops, group study, seminars, and hands-on instruction in science and mathematics. These activities will enhance our capacity to provide excellence in undergraduate research experiences for an increased number of students. Results will be provided to support the success of the recruitment, retention and transfer activities of traditionally under-represented students, and the research activities conducted in CSU's local prairie garden in the summer 2011.

Poster #: 4 - 14
Community College

Session: B

Lead Institution: Central Virginia

Authors: **Jeffrey Laub**
Kirk Gomes

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Engineering	Year 4	Type 1A	0756846	VA

Poster Title: **Providing Undergraduate Connections to Engineering Education in Virginia**

Keywords: **Articulation & Transfer Issues**

Poster Abstract: The goal of this project is to create a pathway for engineering students who will begin at a community college and transfer to a 4 year university to complete an undergraduate degree without having to leave the local service area which will meet the needs of local employers. Central Virginia Community College initiated the program in cooperation with the University of Virginia four years ago. Danville Community College and the member colleges of the Southwest consortium; Virginia Highlands, Wytheville, Southwest, and Mountain Empire Community Colleges have joined as grant partners. Several other community colleges are participating independently. The first class will be graduating this spring. Students, who have met all the requirements, have been successful and are indistinguishable from native students in terms of performance. However, the number and type of students, who are participating has varied from the original target group of existing technicians and expanded into the more traditional realm.

Poster #: 4-15

Session: C

Lead Institution: **Roosevelt University**

Authors: **Kristen Leckrone**
Steve Cohen
Vania DePaoli
Donyel Williams (Harold Washington College)
Allan Wilson (Harold Washington College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 4	Type 1A	0757053	IL

Poster Title: **Roosevelt University – Harold Washington College Partnership for STEM Education**

Keywords: **Math Preparation, Introductory Courses, Peer Tutoring, Faculty Development**

Poster Abstract: Harold Washington College (HWC) and Roosevelt University (RU) are partnering to increase the number of students matriculating in and successfully completing STEM degrees at our respective institutions through the following year 2 activities. Recruiting. Recruiting is continuing via STEM-specific recruiting materials, a website, and designated STEM admissions councilors. In summer 2011, summer math and physical science programs at HWC programs enrolled 34 students, and mathematics and chemistry bridge programs at RU enrolled 36 students. Both programs will continue in summer 2012. STEM curricular development. The RU-HWC STEP program supports faculty adopting active learning, class-based research, and civic engagement models in introductory non-majors courses at HWC, and in core STEM courses at RU. In 2011-2012, HWC offered two learning communities: “Athsma” (Spr 12, n=?) and “Science Fiction and Scientific Advancement”, each of which included a STEM class with civic engagement and research components. At Roosevelt, the STEP grant supported curricular developments including online homework, class-based research, and civic engagement modules in general chemistry (F11 pilot section, Spr 12 all sections); analytical chemistry (F11), calculus II (F11 & Sp12), and cell & molecular biology (F11 & Sp12), affecting a total of 290 students. Student support. Our major student support initiative is to implement peer tutoring in all core chemistry and biology courses at RU. In 2011-2012, 29 undergraduate tutors were assigned to 26 sections of required 100- and 200-level majors-level biology and chemistry courses enrolling 683 STEM majors. Research. Class-based research was built into many of the courses listed in the curriculum development section above. Additionally, 17 STEM majors (14 RU; 3 HWC) participated in summer undergraduate research programs at RU and HWC. Scholarships. At HWC, full or partial tuition scholarships were awarded to qualifying participants in summer programs and academic year learning communities. At both HWC and RU, book scholarships were awarded to participants in math and science readiness and bridge programs. Faculty Development. To date, HWC and RU have sent 33 biology, physical science and math faculty to national STEM education conferences to learn about best STEM teaching practices and to present the curricular development projects supported by this grant. A team of 7 faculty representing biology, mathematics and chemistry is planned for Summer 12. Evaluation. HWC and RU project directors are continue to gather internal data, and work with an external evaluator, to assess the effectiveness of each program component, and to assess the result of the combined programs in increasing the number of STEM majors, the retention of STEM majors, the number of STEM degrees awarded and graduation rates of STEM students. Evaluation data for years 1-4 will be presented.

Poster #: 4 -16

Session: A

Lead Institution: Stonehill College

Authors: **Louis Liotta**
Magdalena James Pederson
Craig Almeida
Rachel Hirst
Bonnie Troupe

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	Science	Year 5+	Type 1A	0622540	MA

Poster Title: **A Public - Private Partnership to Increase Enrollment, Retention, and Diversity in the Sciences**

Keywords: **Recruitment, Introductory Courses, Peer Tutoring, Peer Mentoring, Program Evaluation**

Poster Abstract: The Stonehill College – Massasoit Community College joint STEP grant project began in October of 2006 and is now in its sixth and final year. The goals of the project were to attract more students to science majors at Stonehill College and to the science transfer track at Massasoit, to reduce the average attrition rate of science students at Stonehill College, and to increase the number of underrepresented students in STEM degree programs at Stonehill College. The initiatives of this project were concentrated in six main areas: 1) theme-based, active-learning General Chemistry I courses; 2) early research experiences; 3) enhanced mentoring, tutoring, and advising; 4) a summer bridge program; 5) science career exploration; and 6) AP chemistry and biology laboratory enhancement. Progress to date and efforts to institutionalize and sustain the successful aspects of this project in all six areas will be reported. Emphasis will be placed on the theme-based General Chemistry courses and developments at Massasoit Community College to institutionalize student research, obtain future funding, and strengthen STEM offerings. Overall, science enrollments and retentions have improved dramatically; however, the recruitment and retention of a more diverse student body to take full advantage of these programs has been particularly challenging.

Poster #: 4 -17
Oregon -Type 1A

Session: B

Lead Institution: **University of**

Authors: **Dean Livelybrooks**
Daniele McKay
Daina Hardisty

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	Science	Year 5+	Type 1A	0622620	OR

Poster Title: **Leveraging Early-career Summer Research Projects to Recruit 4-year STEM Majors from Community Colleges.**

Keywords: **Peer Mentoring, UG Research/Internship, Learning Communities**

Poster Abstract: The University of Oregon's Type 1A NSF STEP program, Undergraduate Catalytic Outreach and Research Experience (UCORE), was established in 2007 and has brought 132 community college students, from 6 CC campuses spanning 200 miles, to the UO campus, where they undertook research in the physical sciences (primarily chemistry, geological sciences and physics). After their summer research experiences, participants ('fellows') returned to their home campuses, where they engaged other students with short research talks, one-on-one tutoring, and by serving as teaching assistants in lab courses. UCORE was a success in that: • it established that rising 'second-year' community college students can make significant contributions to science research during summer-long research experiences, • UCORE raised participant's educational goals—from completion of 2-year degrees to 4-year baccalaureates and enrollment in graduate programs, • UCORE summer research participants were effective and enthusiastic STEM career mentors for other CC students owing to their direct STEM research experiences,. • UCORE participants generated an improved sense of community within participating CC science and engineering departments. • the UCORE program changed university faculty attitudes towards community college students—faculty were effusive in their praise of UCORE fellow's performance as researchers and actively sought their participation in their research groups (UCORE evaluation, 2009, 2010). Our participants taught us that a well-developed social support network is critical to success in undertaking summer research projects and transitioning to 4-year STEM baccalaureate programs. Consequently we developed program elements to help build a scientific community among participants that supports lively scientific discourse (Donath et al., 2005) and provides a clearer vision of what lies ahead on STEM career paths.

Poster #: 4 -18

Session: C

Lead Institution: **Eastern Arizona College**

Authors: **Phil McBride**
Jack Bailey

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Engineering	Year 2	Type 1A	0856635	AZ

Poster Title: **Collaborative Research: Motivated Engineering Transfers-STEM Talent Expansion Program (METSTEP)**

Keywords: **Recruitment, Introductory Courses, Student Tracking, Articulation & Transfer Issues, Partnerships**

Poster Abstract: Eastern Arizona College (EAC) has partnered with Arizona State University (ASU) and other Arizona Community Colleges in an effort designed to increase the number of engineering majors, increase the number of students graduating with an associate's degree in engineering, and increase the number of engineering students who transfer to a university and pursue a bachelor's degree in Engineering. To increase the exposure of community college students to transfer opportunities, EAC students travel to Tempe each semester to visit with ASU Engineering faculty and students. Once each semester, ASU faculty and students travel to EAC's campus in Thatcher. An Engineering Club has been helpful in building closer comradeship among engineering students. Several outreach efforts are conducted for high school students in an effort to increase awareness of career opportunities in engineering and the transfer pathways available to them. An Engineering Program Advisory Committee was created with representatives from the local mining community (FMI), a high school math teacher, the County Engineer, and a local civil engineering firm principal. An Engineering Department website was created to increase the exposure of students to engineering as well as provide information about transferring to a university. There has been a general increase in interest and activity within the engineering program. Scholarships provided through the grant have been instrumental in encouraging students to pursue engineering. The number of students declaring engineering as their major has nearly doubled over the first three years of the grant, and we have also seen an increase in the overall engineering enrollment. The number of students transferring to a university and majoring in engineering has also increased.

Poster #: 4 - 19
University

Session: A

Lead Institution: Iowa State

Authors: **Diane Rover** **Monica Bruning**
Frankie Santos Laanan **Steve Mickelson**
Mack Shelley
Kari Hensen (Des Moines Area Community College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-School Partner	Engineering	Year 5+	Type 1A	0653236	IA

Poster Title: **SEEC: Student Enrollment and Engagement through Connections**

Keywords: **Recruitment, Career Counseling, Faculty Development, Peer Mentoring, Program Evaluation**

Poster Abstract: The Student Enrollment and Engagement through Connections (SEEC) project is a collaboration between Iowa State University and Des Moines Area Community College (DMACC). The project is in its fifth year. The goal has been to increase the number of engineering graduates at Iowa State by 100 per year during the project, to approximately 900 graduates annually by 2012. Included within this goal are increases in the percentages of women and minority graduates in engineering at Iowa State and the number of pre-engineering students at DMACC. The number of engineering graduates for 2010-11 was 853, and the number of new engineering majors shaping Iowa State's 2012 graduating class is about 1,450; thus we expect to achieve the target of 900 engineering graduates in the class of 2012. In addition, we expect graduation gains to be maintained due to record undergraduate enrollments in engineering: 4717 in fall 2008, 5086 in fall 2009, 5514 in fall 2010, and 6025 in fall 2011. The number of new transfer students from Iowa community colleges has steadily risen to approximately 150, up from about 100 at the start of the project. The percentage of women among entering transfer students rose from 7.8% in fall 2007 to 14.9% in fall 2011. Engineering has also seen a significant improvement in first-year retention of DMACC and other Iowa community college students. Project objectives are designed within the areas of learning communities, curriculum, advising, networking, and evaluation. Activities have been planned in each of these areas using a logic model approach that identifies resources, outputs, outcomes, and impact. Highlights resulting from this process include the creation of a transfer-friendly environment, a community of practice through partnerships, greater awareness about engineering and engineering careers, student-faculty interaction related to the engineer of 2020, and new datasets for research and evaluation. Transfer students are supported prior to entering Iowa State through the Engineering Admissions Partnership Program (E-APP), created in 2008 as a SEEC project initiative. A special initiative with DMACC created an engineering orientation course, EGR 100, now offered regularly at several DMACC campuses. SEEC Data Briefs, available at the project website, present findings from the development and evaluation of an engineering transfer student success model (<http://www.eng.iastate.edu/seec/resources.shtml>). Project activities and outcomes that are expected to be sustained include: DMACC's EGR 100, DMACC pre-engineering program, E-APP, transfer learning communities at Iowa State, targeted advising messaging with community college students and other stakeholders, NAE Changing the Conversation-based resource kits, engineering career awareness through ISU Extension, Engineer of 2020 curricular innovations, and new data management and reporting. Potential longer-term outcomes include: building a culture that embraces transfer student programming through professional and program development; leveraging learning community best practices to retain students at the second- and third-year levels, ultimately contributing to higher graduation rates; and using synergistic partnerships (e.g., with ISU Extension) to develop new resources and create interest in engineering study and careers. Continuing challenges include: recruiting and retaining women to make up at least 20% of engineering graduates at Iowa State; and measuring and documenting outcomes to improve and sustain effective practices and promote a culture of evidence.

OTHER AUTHORS: Iowa State University: Marcia Laugerman, Mary Darrow, Andrew Ryder Des Moines Area Community College: Kim Linduska, Michael Lentsch, Randy Mead, James Stick, Dave Kissinger

Poster #: 4 - 20
Area Technical College

Session: B

Lead Institution: Milwaukee

Authors: **Aparna Sen**
Kimberly Farley
Zach Shana

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Science	Year 2	Type 1A	0969360	WI

Poster Title: **BEST Efforts at Milwaukee Area Technical College: A Dual Bridge Initiative Between High Schools and 4-year Colleges**

Keywords: **Recruitment, Introductory Courses, UG Research/Internship Opportunities, Articulation & Transfer Issues**

Poster Abstract: Milwaukee Area Technical College (MATC) is addressing local and national initiatives to increase the number of students transitioning to baccalaureate degrees in STEM disciplines through the Biochemical Excellence in Science and Technology (BEST) program. The BEST program provides a model for integrating student learning and research through development of curriculum and key partnerships with research institutions. This five-year project offers an array of recruitment, academic support and enrichment activities to ensure academic success and stimulate interest as students explore career pathways in science – most notably in the biochemical sciences, and technology when education and research are integrated. It includes development of two Associate in Science (A.S.) degree programs in Biotechnology and Chemical Technology, summer workshops for high school students, research internships for college students in cooperation with four-year institutions and businesses, and a STEM-focused professional development course for high school teachers and counselors. Year 1 activities began in Fall 2010 with development and approval of the new A.S. degrees in Biotechnology and Chemical Technology. Both degrees were open to students beginning in Fall 2011. Since that time, 36 students have enrolled in the Biotechnology degree and 9 students in the Chemical Technology degree. One goal of the BEST program is to increase the number of graduates in the A.S. degree (including the two new degrees), as well as the Chemical Technician A.A.S. degree, by at least 10 percent each year. Fall 2010 also saw the creation of three new courses: 1) Internship in Biochemical Sciences; 2) Lab Techniques in Biochemical Research; and 3) STEM Applications in Biochemical Sciences. Year 2 activities began with the offering of the Internship course to MATC students. The course began in Summer 2011 with 14 selected students (8 Biotech and 6 ChemTech) serving in paid 8-week research internships at Milwaukee-area businesses and universities. A symposium was held at the end of the 8 weeks to allow interns to present their research to academic and business sponsors and MATC teachers and administrators involved with the BEST program. Four of the interns have since been selected to present their summer research in oral or poster presentations at the National Conference on Undergraduate Research (NCUR) and the American Chemical Society annual conferences in 2012. This course was presented in two 2-week workshops during June and July 2011 to 26 students from Milwaukee-area high schools. Students met for 5 hours each day to learn about lab techniques in biochemical sciences. They also participated in a tour of MATC's downtown campus and received information about beginning their post-secondary education at MATC. Each student received 1 college credit upon completion of the course. The STEM Applications course is being offered for the first time in Spring 2012 to 13 Milwaukee-area high school teachers and guidance counselors. This is an 8-week course in which participants will receive 3 college credits with tuition paid by the BEST grant. The course gives the teachers and counselors an opportunity to see and experience MATC's labs and other facilities so that they can promote to their students the benefits of attending MATC. One teacher course will be offered each year for the duration of the grant.

Authors: **Moira van Staaden**
Anne Bullerjahn (Owens Community College)
Tracy Huziak-Clark

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	All Stem	Year 4	Type 1A	0757001	OH

Poster Title: **On Becoming Scientists in the Big Bang Generation: Strategies for Success**

Keywords: **UG Research/Internship Opportunities, Learning Communities**

Poster Abstract: SETGO is a 2-/4-year partnership which aims to foster academic success across all STEM fields, and to facilitate students' transition from Associate programs at Owens Community College to Baccalaureate degree programs at Bowling Green State University. Primary program components are threefold: Owens Ready Bridge (ORB) - a non-residential summer bridge program designed to mitigate poor academic preparation and address issues related to transitioning to college. SETGO Summer Research (SSR) - authentic research work in a 10-week summer program provides the peak experiences that carry students through the challenges of meeting academic standards. Art of Science Community (ASC) - parallel monthly meetings centered on 'Building a Better Environment' are a point of convergence for diverse scientific interests, highlight the value of interdisciplinary research, and provide opportunity for cascading mentor relationships. All three components have been successfully implemented. The ASC umbrella activity unifies faculty and student participants from OCC/BGSU as well as the general public with total unduplicated head counts of 518 thus far. Fifty-five percent of STEM faculty in BGSU's College of Arts & Sciences and College of Technology participate as SETGO mentors. While participation is still skewed towards the Life Sciences, student interest is driving faculty participation and the physical sciences now contribute 30% of SSR researchers. Recruitment into the ORB increased from 43% in year 1, to 61% of target in years 2 and 3, but recruiting direct from high school students in their "senior summer" remains a challenge for the summer bridge program. We previously showed a measurable impact of program mentoring on student attitude change (specifically, enhanced student confidence in their ability to master academic content, in their decision to complete a degree in STEM, and in their identification with the institution). These early indicators are translating in year 4 into sustained increases in retention, performance, and graduation. The one-year retention rate of BG freshman in STEM disciplines was 78.8% immediately prior to SETGO. Compared to control groups (matched for age, sex, ethnicity, ACT, and major) SETGO participants have a higher retention rate, lowered rate of switching to non-STEM areas, better performance as judged by cumulative GPA, and a higher graduation rate than comparison students. There are also notable indirect effects on STEM recruitment, retention, graduation, and transfer to BGSU. In particular, 6-Yr graduation rates in STEM have risen from 44 to 62% over the course of this project. Qualitative analyses have identified several successful practices to be sustained and implemented community-wide. The Art of Science Community is recognized as (i) creating an interdisciplinary culture among STEM students, and (ii) by the administration as a sustainable element for inclusion in planned modifications of the undergraduate experience. Likewise, structured SSR activities (e.g. weekly group meetings, lab tours) and incorporation of students in authentic research teams create a learning community acknowledged as essential for maintaining both positive affect and academic success in the sciences.

Poster #: 4 –22

Session: B

Lead Institution: **CUNY Kingsborough**

Authors: **Arthur Zeitlin**
Ronald Eckhardt (CUNY Brooklyn College)
Loretta Brancaccio-Taras
Patrick Lloyd
Theodore Markus

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Science	Year 5+	Type 1A	0525370	NY

Poster Title: **“The Brooklyn Gateway-A Collaboration of a Two-Year College and a Four-Year College to Improve Undergraduate Student Retention in STEM Programs”**

Keywords: **Peer Mentoring, UG Research/Internship Opportunities, Supplemental Instruction, Learning Communities**

Poster Abstract: The Brooklyn Gateway attempts to improve student retention in Biology 1 and 2, and Chemistry 1 and 2 (Gateway Courses) at the 2-year College, and Comparative Physiology (Gateway Course) at the 4-year college, and to improve graduation rates in STEM programs. It is a collaborative project between Kingsborough Community College (KCC) and Brooklyn College (BC), two units of the City University of New York. The program's keystone is the use of Peer-Led Team Learning (PLTL) and small class sections. Student stipends, tutoring, field-trips to local science facilities, and available research projects for team leaders constitutes our Immersion Program. The PLTL technique is used in biology and chemistry sections at Kingsborough and was used in comparative physiology and organic chemistry I at Brooklyn College during the regular fall and spring semesters. Due to a change in curriculum at BC, comparative physiology is no longer being offered. The program began during the 2006 winter module. Both peer leaders and gateway students have been engaged in faculty-directed independent research projects. The results of these projects have been presented at both regional and national scientific conferences, with many of our students receiving awards for their presentations. Analysis of our results indicate improvement in student retention, increased enrolment in advanced biology elective courses at both the community and senior colleges and a significant increase in graduation rates of STEM students at the community college level. There has also been a definite increase in the transfer rate of STEM students to senior colleges.

Poster #: 5 - 01
College

Session: A

Lead Institution: **Salt Lake Community**

Authors: **Craig Caldwell**
James Price
Jean Bower
Colleen Hough

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	Science	Year 3	Type 1A	0856770	UT

Poster Title: **A distributed genomics project for recruiting students into STEM degree paths**

Keywords: **Recruitment, UG Research/Internship Opportunities**

Poster Abstract: We are currently in our third year of a distributed genomics project that aims to attract high school students into life science degree paths as they transition to college. The project focuses on a "teach-the-teacher" approach by training high school teachers during a week long Summer Science Institute in genomic concepts and methods. Our project is focused on a unique halophile recently isolated from the Great Salt Lake called *Halorubrum salsolis*. During the Summer Science Institute, teachers learn how genomic sequencing is done and then return to their classrooms during the school year where they involve their students in the project. The project teaches molecular methods as well as basic bioinformatics. We have successfully worked with 18 different high schools and hundreds of students on this project. In addition to the effects on students, a strong learning community has developed among the participant teachers.

Poster #: 5 - 02

Session: B

Lead Institution: Alma College

Authors: **John Davis** **Myles McNally**
David Clark **Robert Roe**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 3	Type 1A	0856613	MI

Poster Title: **Positive Routes Into Science and Mathematics - The PRISM Scholars Program: A Novel Experience for First-Year Science Majors**

Keywords: **Peer Mentoring, UG Research/Internship Opportunities**

Poster Abstract: Introduction The Alma College PRISM project (Positive Routes Into Science and Mathematics) is a program that focuses on increasing the number of STEM graduates through a positive recruitment and retention program that creates a STEM learning community. It engages students through a focus on early involvement with undergraduate research and an enhanced introductory STEM curriculum. Programmatic Elements ASPIRE: Over the past two summers, sixty-five entering students Alma College spent one week on Alma's campus working in small research teams of faculty, upper-class, and first-year researchers. Exit surveys for both years indicate that the program was well received. In year one, all of the students rated it as very good or excellent, while in the second year with a group nearly twice as large 92.5% rated it very good or excellent. More importantly, students overwhelmingly reported that the experience significantly increased their confidence in their research skills and also in their ability to succeed in graduate school and in their chosen career. Correspondingly, they reported having high career aspirations, with 95% (year one) and 90% (year two) indicating that they planned to pursue an advanced degree after college, with 43% and 22% respectively, indicating that they expect to obtain a Ph.D. Subsequently, these ASPIRE students have been tracked to determine if this activity impacts whether they are retained at a higher rate. For the 2010 ASPIRE program participants, the retention rate was 95.2% from first to second year compared to 81.2% for the rest of the campus. This could be due to self-selection bias. However, we purposefully did not use high school GPA or standardized test scores for selection. Applicants wrote an essay indicating their interest in science and research. The overall science high school GPAs for ASPIRE and Non-ASPIRE Science students were comparable. Therefore, it appears as if our selection process was successful in not picking "the best and brightest" who would tend to be retained at a higher rate anyway. FIRST-YEAR SEMINARS: Over the past three years 384 students have taken PRISM designated seminars with topics ranging from Flavor and Fragrance Chemistry to Biotechnology Industries. These seminars benefited by shared planning among the instructors and some shared experiences by the students. The PRISM seminars are now an integral part of the First-Year Seminar program. Common programmatic elements include speakers listened to by all students and career panels on science careers. FIRST-YEAR SUMMER RESEARCH PROGRAM: This 10-week research experience for first-year students (rising sophomores) has been run the past two summers. Thirty students participated over the two years. These students worked in science research labs across the STEM disciplines. Upper-class students served as peer mentors in each of the research labs. The exit survey conducted in the first year showed that all of the students rated the Summer Research Program as very good or excellent. In year two, 92.5% rated it as very good or excellent. In addition, seventeen presentations at regional and national scientific conferences and one publication came from students in the summer program. This program also had a significant impact on retention for students in the sciences. The 2nd to 3rd year retention rate for students participating in the Summer Research Program was 100% compared to 88.9% for those who did not. These two pools of students had very similar high school GPA's and ACT scores. PEER MENTOR PROGRAM: Peer mentors are a critical part of the PRISM program. They play a substantial role in the first year of STEM students' transition to the natural science community. Their participation keeps them engaged in that same community while they gain more insight into the sciences and learn leadership skills. In the first year of the PRISM program we had some challenges with the Peer Mentor program (students were not adequately trained, faculty were not sure how best to use the mentors, and mentors did not feel that they were an integral part of the seminars). To address these challenges, several focus groups with Peer Mentors and faculty from the first-year seminars were held. Changes have been implemented and these challenges have been resolved and the program now is quite successful. Recent survey data from our PRISM First-Year Seminars indicate that students have benefited greatly from their interaction with the peer mentors. Summary The number of FYS students interested in the sciences is now 220 or 56% of the first-year class up from 179(45% of the first year class) in Fall of 2009. The number of declared science majors has increased from 175 (12.6% of total enrollment) in 2008 to 244 in 2011 (17.2% of total enrollment). Students participating in our ASPIRE and Summer Research Programs were retained at a higher rate from their first to second year and had higher GPAs at Alma in spite of having the same academic credentials as the science students who did not participate in the summer activity. Beyond the statistical benefits, the program clearly has played a major role in improving the science culture at Alma, rejuvenating faculty interest in student-faculty research, and producing students qualified for national research and internship opportunities.

Poster #: 5 - 03

Session: C

Lead Institution: **Boise State**

University

Authors: **Janet Callahan**
Jude Garzolini
Doug Bullock
Susan Shadle
Joe Guarino
Gary Hunt

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 3	Type 1A	0856815	ID

Poster Title: **Idaho STEP Program**

Keywords: **Math Preparation, UG Research/Internship Opportunities, Faculty Development**

Poster Abstract: In the second year of the Boise State University Idaho STEP program the most significant achievement was raising awareness of the criticality of math preparation and the placement of incoming STEM students in the appropriate math course. The large number of incoming STEM students has increased the unmet need in terms of gateway course offerings, course staffing, and laboratory facilities. In year two, the following five activities were continued/expanded: (1) combined science, mathematics, and engineering majors summer orientation sessions with the addition of peer advisors, first day advising time, and resource fair participation, (2) student learning community (SLC) offerings to STEM majors, (3) a General Sciences course for STEM students who are underprepared in mathematics, (4) offering of an elective, non-credit bearing, mathematics online review course, ALEKS®, free of charge, to students entering the university in STEM majors (5) and expanded the Undergraduate Research cohort to 12 students. In addition, we piloted the STEM Summer Adventure, an outdoor bridge program for at risk STEM majors. We completed our first cohort of STEM Teaching Scholars, a Faculty Learning Community, and completed observations of their teaching practices as well as offering our inaugural Best Practices in STEM Teaching Symposium. We also completed our first STEP Undergraduate researcher cohort experience. Raising awareness of the unmet needs in gateway science and math service courses continued to be an initiative. The university has recognized the need to support our STEM students by including an emphasis on STEM disciplines in the updated Strategic Plan, with an explicit challenge to increase the number of STEM degrees at both the undergraduate and graduate levels. We have also learned that using our internal/external advisory committee meetings as a forum to identify and promote change to be highly effective in terms of brainstorming solutions to issues encountered. Efforts in year three are focused on 1) continuing improvement of our grant activities, 2) expanding our summer bridge pilot program to engage incoming at risk STEM majors by partnering with other campus organizations, and 3) focusing our Faculty Learning Community on math instructors. At the completion of 2 years, we are taking a hard look at what has been working and what activities need to be revised if they are not effective in making a change. Having two years of data available provides improved feedback about whether our STEM focused interactions with students is further enculturating them into the campus STEM community and moving us toward our retention goals. ALEKS® is a registered trademark of ALEKS Corporation, www.ALEKS.com

Poster #: 5 – 04
University

Session: A

Lead Institution: **DePaul**

Authors: **Chris Goedde**
Yev Lapik (Harold Washington College)
Jim Onoda (Truman College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Multi-school Partnership	Science	Year 5+	Type 1A	065319	IL

Poster Title: Building a STEM Pipeline in Chicago

Keywords: **UG Research/Internship Opportunities**

Poster Abstract: This project is a partnership between DePaul University and two of the City Colleges of Chicago, Harold Washington College and Harry S Truman College. The goals of the project are to build a supportive environment for the education of STEM majors, to expose STEM students to research opportunities early in their studies, to provide opportunities for research positions and internships at Chicago-area science museums, corporations, and institutes, and to coordinate the curriculum at the three academic institutions to aid student matriculation. To achieve these goals we have (1) designed and implemented an "Introduction to Research" summer program for selected first and second year DePaul and community college students. (2) Developed formal partnerships with local science museums and other organizations to place students in external research assistantships and educational internships. (3) Worked to build academic-year student support and community-building programs. (4) Begun formalizing articulation and dual-admission agreements between DePaul University and several Chicagoland two-year colleges. Results from recent evaluation of student internships will be presented.

Poster #: 5 – 05

Session: B

Lead Institution: **Dickinson College**

Authors: **Michael Holden**
David Kushner
R. Crouch

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	Science	Year 3	Type 1A	085670	PA

Poster Title: **A combined research/cohort model to improve retention of underrepresented minorities in the sciences at a small liberal arts college**

Keywords: **Recruitment, UG Research/Internship Opportunities, Introductory Courses, Student Tracking, Underrepresented Students**

Poster Abstract: Dickinson College (Carlisle, Pennsylvania) is a small residential liberal-arts college serving 2300 undergraduates. Anecdotal observation suggested that the majority of underrepresented minority students who came to Dickinson interested in pursuing a science major did not graduate with one. While some of this change likely was related to development and subsequent pursuit of a new non-science interest, it was believed that several students switched to a non-science major because completion of the science major was too challenging. Because other institutions had successfully implemented programs in which students improved their STEM major completion rates (e.g. via the early research opportunities and use of the cohort model - the Meyerhoff Scholars Program at University of Maryland Baltimore County), and because of the general success of students at Dickinson who were members of cohorts of the Posse Foundation, we decided to adopt a similar model in order to improve retention of underrepresented minority students in the sciences. Minority students (indicating interest in science in their admissions application) who were accepted to Dickinson were recruited to participate in the NSF-STEP program. For 4 weeks in July, prior to their first year, the students come to Dickinson and are involved in cohort building while spending about two-thirds of their time in a research lab and about one-third of the time working on math and other study skills. Starting with their return to campus in August, each student is advised bi-weekly by a science faculty member in order to monitor progress in coursework. After either the first or Sophomore year, each student spends 8 weeks in a Dickinson research lab; after Junior year, the students will be supported for an 8-week experience at a research university or government laboratory, or field station. Our first two cohorts currently are completing their Sophomore and first year, respectively; to date, 75% of the students in the first cohort and 100% of the students in the second cohort have declared/are pursuing a STEM major. Our third cohort currently is being recruited.

Poster #: 5 – 06
Carolina-Columbia

Session: C

Lead Institution: **University of South**

Authors: **Tim Mousseau**
Susan Hudson
Michael Schiliaci
Jason Katz
Briana Timmerman
Abraham Wandersman

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0653164	SC

Poster Title: **Issues and Innovations in Evaluating the Undergraduate STEM Transfer Experience**

Keywords: **Recruitment, Introductory Courses, Program Evaluation, UG Research/Internship Opportunities, Underrepresented Students Articulation & Transfer Issues**

Poster Abstract: The goal of STEPs to STEM is to increase the number of undergraduate transfer students entering or remaining in STEM disciplines. This population of students faces the challenge of transfer shock, or difficulties in adjustment that are associated with decreased academic and social outcomes. An interim outcome in STEPs to STEM’s logic model is improvement in students’ sense of community to attenuate the reductions in academic outcomes that so often accompany a college transfer experience. We will describe the approaches that we used in evaluating interventions in STEPs to STEM to improve students’ sense of community, with a summary of our findings and implications, and lessons learned to inform conceptual and methodological enhancements.

Poster #: 5 - 07 Session: A Lead Institution: **Lamar University**

Authors: **Peggy Doerschuk**
 Joseph Kruger
 Cristian Bahrim
 Jennifer Daniel
 Judith Mann
 Christopher Martin

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 4	Type 1A	0757057	TX

Poster Title: **Students Advancing through Involvement in Research Student Talent Expansion Program (STAIRSTEP)**

Keywords: **Recruitment, Peer Tutoring, Peer Mentoring, UG Research/Internship Opportunities, Underrepresented Students**

Poster Abstract: The STudents Advancing through Involvement in Research Student Talent Expansion Program (STAIRSTEP) at Lamar University is designed to increase the number of students receiving baccalaureate degrees in science. This project supports teams of 3-6 students directed by a faculty mentor in each of five disciplines: Computer Science (CS), Chemistry (CH), Earth and Space Science (ESS), Mathematics (MA), and Physics (PH). Each team works on a research project and participates in local recruiting events to increase interest in STAIRSTEP and Science, Technology, Engineering, and Mathematics (STEM) in general. This program targets “at-risk” students, including women, minorities, first-generation, and low-income students. STAIRSTEP seeks to increase the number of graduates in the short term by retaining these “at-risk” students in the STEM disciplines. STAIRSTEP seeks to increase the number of graduates in the long term by sharing information and passion for STEM with local high school, community college, and undecided Lamar students and with the community as a whole. The STAIRSTEP Program has three major goals: (1) retain and develop at risk students in CS, CH, ESS, MA, and PH through an enriched research experience that includes mentoring, tutoring, and other support, and activities that are designed to dispel some of the misconceptions that make these fields unattractive; (2) help transition these students to graduate study or careers in science; and (3) attract more students to the fields through targeted recruiting functions. Project findings reflect the documentation of movement toward these goals. Fifty-two undergraduate students participated in the STAIRSTEP program from January, 2009 through December, 2011. Of these, 94.23% (n=49) were retained in their STAIRSTEP major (all but three). Two of the 49 left Lamar University but with a stated intention of completing their STEM degrees at another university. STAIRSTEP students have consistently had significantly higher grades and lower drop rates in their major courses than cohorts of students from recent years. Six STAIRSTEP students presented their research at professional meetings and conferences in 2011. All STAIRSTEP students participate in Research Seminars, Career Forums, student professional societies for their discipline, and selected Career Center events each year. Seventeen of the fifty-two STAIRSTEP students graduated during the period January, 2009 through December, 2011. STAIRSTEP’s goal is to transition at least 80% of its graduates to advanced study or careers in STEM within six months of graduation. As of December, 2011, fifteen of the seventeen had been graduated for more than six months. All but three of the fifteen (20%) had successfully transitioned into either graduate programs or STEM related employment. The current 80% transition rate meets our goal. Since its inception, STAIRSTEP students and faculty have reached out to over two thousand students, teachers, and community leaders through a wide variety of recruitment activities, including hosting on-campus tours, workshops and demonstrations in STEM; and participating in on-campus events like Open House and New Student Orientation, and off-campus events like road shows and career days at local high schools and community colleges.

Poster #: 5 - 08
Staten Island

Session: B

Lead Institution: CUNY College of

Authors: **William Fritz**
Alex Chigogidze
Carlo Lancellotti
Alan Lyons
Deborah Sturm
William Wallace

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 5+	Type 1A	0653056	NY

Poster Title: **STEAM Outcome Assessment data**

Keywords: **Introductory Courses, UG Research/Internship Opportunities, Learning Communities**

Poster Abstract: As the STEAM project is not in its fifth year, we will present fairly comprehensive data about STEM students at the College of Staten Island, including number of majors, graduates, retention data, GPA averages and others. The data show a constant increase both in STEM majors and STEM data during the course of our STEP grant.

Other authors: Neo Antoniades; Samuel Michalowski; Warrick Bell; Heleni Tournaki

Poster #: 5 – 09
State University

Session: C

Lead Institution: **Armstrong Atlantic**

Authors: **Traci Ness**
Delana Nivens

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 3	Type 1A	0856593	GA

Poster Title: **Bridging the Gap: Using Research and Learning Communities to Increase STEM Majors at Armstrong: Years 1-3**

Keywords: **Recruitment, Math Preparation, Peer Mentoring, UG Research/Internship, Student Tracking**

Poster Abstract: Armstrong Atlantic State University is a regional, open-access, primarily undergraduate institution of ~7600 students from across Georgia, but mainly the 4-county region surrounding Savannah. In 2009, the College of Science and Technology (CST) received a STEP grant with the goals to increase STEM majors (especially low-income, minority, and rural students) and to improve CST’s freshman retention rate and six-year graduation rate of declared freshman STEM majors. Our project combines freshman living and learning communities, a summer mathematics review program, peer mentoring, and paid undergraduate research before and after the first year at Armstrong. In addition, the project is designed to initiate a culture shift among students and faculty that puts greater emphasis on undergraduate research. We are currently recruiting for the 4th year of our program and are very happy with the preliminary results. The diversity of our STEP cohorts has increased from 7 to 36% (29% in 2010) minority students. Much of this is attributed to involvement of our Admissions staff and more time for recruiting efforts. We have observed higher levels of 1st year retention at the university, in STEM majors, and in the same STEM major for STEP students when compared to all STEM majors at Armstrong. Although SAT scores are similar between all STEP groups, first semester GPA averages have increased from 2.8 to 3.5 (3.2 in 2010). Improvements to our summer Math program (the use of ALEKS) have contributed to increases in the average 1st semester Math GPA for STEP students (2009, 2010 = 3.0-3.1; 2011 = 3.6) even though students are completing more advanced math courses. Participation in Algebra has decreased from 43 to 7%, while Pre-calculus and Calculus courses (I-III) have increased from 21 to 43% and 28 to 50%, respectively. While low grades were the main factor influencing STEP retention in 2009 (29% loss), this has been eliminated and alternative job/internship opportunities are now the primary reason for students leaving STEP (14%). While Armstrong’s enrollment has gone up 6% in the last 3 years, enrollment in CST has increased 100% (5 of 6 departments have 34-400% increases). Overall participation of students in undergraduate STEM research (including non-STEP students) has increased 42% since STEP began in 2009. Although it is early for interpreting impacts of our program on graduation of STEM majors, the number of degrees conferred by the university since 2008 has increased 9% while the number of STEM graduates has increased 17%. Even though we are only in our third year, it is clear that the STEP program is having a significant impact on the College of Science and Technology at Armstrong.

Poster #: 5 - 10

Session: A

Lead Institution: **Salisbury University**

Authors: **Karen Olmstead
Brent Zaprowski
Matthew Bailey
Kristen Edwards
Michael Bardzell
Kathleen Shannon**

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 2	Type 1A	09694289	MD

Poster Title: Building clear and sustainable pathways for STEM students through Bridges to SUCCESS.

Keywords: **Recruitment, UG Research/Internship Opportunities, Learning Communities, Articulation & Transfer Issues**

Poster Abstract: Increasing enrollments in and success of STEM majors is unlikely to result from a single, large-scale change in practice. Bridges to SUCCESS (Salisbury University's Connections to Careers for Every Stem Student) employs several complementary strategies to increase the total number of graduates in selected STEM disciplines by 75%. We proposed to achieve this goal within five years by increasing outreach and better targeted recruitment; more seamlessly aligning community college and Salisbury University science and math curricula; and employing several strategies to improve retention and graduation rates. Our targeted majors are Chemistry, Computer Science, Earth Science, Mathematics, and Physics. After the first year of the project, enrollment in our five targeted majors was up 28% and up as much as 50% for some majors (Computer Science). The number of graduates was also up by more than 10%. Current data on applications from students interested in enrolling in our targeted majors indicate a 35% increase relative to the previous year. We credit this dramatic growth in student interest and enrollment in our selected majors to highly integrated marketing of our excellent outreach and retention-related programs. **Other authors: Seth Friese; Tom Jones**

Poster #: 5 – 11
Knoxville

Session: B

Lead Institution: **University of Tennessee**

Authors: **Claudia Rawn**
Elizabeth Ferguson
Richard Bennett
Margaret Russell
Veerle Keppens

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 1	Type 1A	1068103	TN

Poster Title: Research and Instructional Strategies for Engineering Retention (RISER) STEP at the University of Tennessee, Knoxville

Keywords: **Math Preparation, UG Research/Internship Opportunities, Student Tracking, Supplemental Instruction, Learning Communities**

Poster Abstract: The University of Tennessee at Knoxville’s College of Engineering has identified specific undergraduate populations where retention is low, yielding significantly lower overall graduation rates and time to graduation. RISER focuses on two at-risk populations via interventions that cover freshman and post-freshman years: 1) freshmen who do not qualify for the freshman Engineering Fundamentals (EF) program due to ACT math scores less than 28 and 2) honors women. RISER has three aims: 1) increase retention of non-EF freshmen; 2) increase retention of freshman honors women students; and 3) implement post-freshman interventions that will improve retention, increase graduation rates, and decrease time to degree for the at-risk populations as compared to their non-at risk counterparts. The long-term goals are increased graduation rates and decreased time to degree for at-risk students. The interventions will include: 1) academic and community initiatives for freshmen with ACT scores of 27 or below as a new EF program branch; 2) summer preparatory academic/community initiatives for students with math ACT scores of 27 to allow them to take and pass the math placement test, enabling immediate entry into the EF program; and 3) research assistantships and mentoring initiatives for the women honors students. Post-freshman initiatives will sustain student interest in engineering careers and facilitate academic achievement with the goal of reducing annual attrition so that graduation rate will increase.

Poster #: 5 - 12
Community College

Session: C

Lead Institution: Seattle Central

Authors: **Wendy Rockhill (Seattle Central Community College)**
Dan Poux (Seattle Community College District)
Chad Hickox (South Seattle Community College)
Peter Lortz (North Seattle Community College)
John Wiseley (Seattle Central Community College)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 2	Type 1A	0969603	WA

Poster Title: **Ready! Set! Transfer! Seattle Community College District STEP Program**
Keywords: **Recruitment, Introductory Courses, UG Research/Internship Opportunities**

Poster Abstract: Ready, Set, Transfer! (RST) is a collaboration between the three community colleges of the Seattle Community College District (Seattle Central, North Seattle and South Seattle Community Colleges). The goal of this project is to increase the number of science, technology, engineering and mathematics (STEM) majors who earn associate degrees and successfully transfer to baccalaureate institutions. Support for students falls under the umbrella of an RST Academy. The Academy targets students at three key stages in their academic careers: Ready students are in developmental math and considering a career in STEM; Set students are completing their core series in the sciences; and Transfer students are completing their Associate of Science (AS) degree and preparing to transfer to baccalaureate institutions. Our student objectives are: 1) recruiting pre-college math students into the Academy; 2) retaining students in the Academy through their transition into college-level courses; 3) supporting student persistence and academic achievement in STEM major classes; and 4) culminating students' academic experiences through the completion of Associates Degrees and providing a bridge to baccalaureate institutions. Additionally, beyond establishing RST academies at each college, the institutional objectives for the District are: 1) increasing internal and external institutional collaborations; 2) building scientific and technological capacity in the undergraduate learning environment; and 3) creating and sharing instructional resources including innovative and transportable curricula which can be integrated into core science and mathematics sequences. The Academy currently provides a number of critical support services including faculty mentoring, skill-building workshops and a series of STEM career exploration sessions and professional development workshops. Academy members also complete a capstone project in leadership, service learning, or undergraduate research as they prepare to transfer to a baccalaureate institution. These services are complemented by the ONSIGHT scholarship program for Academy members, supported by an S-STEM grant. Successes in Year Two include successful recruiting of Academy members (54 at Central, 50 at North and 73 at South) as well as a significant number of Faculty Mentors (14 at Central, 18 at North, 13 at South). A number of resources, including FAQs for students and faculty mentors, orientation materials for students and faculty, online surveys for students and mentors and a Student Progress Report template, have helped program staff to track growth and progress and identify challenges. Some challenges include recruiting sufficient faculty mentors (especially for students interested in engineering), optimizing attendance at STEM career exploration sessions (improved by scheduling speakers during specific course times and requiring Academy member attendance) and encouraging students to explore all of their options when planning to transfer, especially in competitive programs like computer science and engineering. In Year Three program staff will be focusing more directly on recruiting students at the Ready level, recognizing that students in the early stages of selecting a STEM major and completing the pre-college Mathematics coursework is where the Academy support services can be most effective. Additionally, Set students will contextualize learning with in-class Research Based Experiences and peer mentoring, both receiving from Transfer-ready students and providing to Ready students. We will continue to grow capstone experiences for Transfer ready students.

Poster #: 5 - 13
College

Session: B

Lead Institution: **CUNY Medgar Evers**

Authors: **Dereck Skeete**
Margaret A. Carroll
Edward J. Catapane

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	Science	Year 5+	Type 1A	0622197	NY

Poster Title: **STEP into Science at Medgar Evers College, Completing a Successful Strategic Plan**

Keywords: **Recruitment, Career Counseling, Faculty Development UG Research/Internship Opportunities, Peer Mentoring**

Poster Abstract: STEP into Science was designed to increase the number of students earning BS degrees in Biology and Environmental Science. Our program is an interdisciplinary effort between the Depts. of Biology and Physical, Environmental and Computer Sciences with goals to: (1) recruit new students and non-STEM students from within the college who select majors in either Biology, or Environmental Sciences; (2) improve retention of science majors by providing academic, financial and mentoring support; (3) strengthen both departments with curricula to fosters integration of research, technology and academics to better equip majors with skills and knowledge necessary to be successful applicants to graduate/professional programs; and (4) increase the number of students graduating with BS degrees in Biology or Environmental Science, and ultimately enter rewarding careers in the science enterprise. Now in our sixth year, the program has had great success implementing the use of peer recruiters to attract more high school, transfer, and non-science college students into STEM majors and places emphasis on the role of undergraduate research experiences as a successful strategy to increase the quality and retention of science majors through their BS degree. Since the inception of the program, STEM enrollment more than doubled and the number of majors actively engaged in research has risen more than 90% with a concurrent increase in student research presentations at scientific conference, and an 87% increase in the number of students receiving external research internships and travel awards to attend national conferences. STEM graduates have also increased and the program anticipates that these and future STEP into Science graduates will continue on to Masters and Doctoral programs in STEM and ultimately enter rewarding careers in the science enterprise.

Poster #: 5 - 14
Community College

Session: C

Lead Institution: **CUNY Queensborough**

Authors: **Paris Svoronos**
Melvin Gorelick
Thomas Strekas (Queens College)
Nidhi Gadura

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 1	Type 1A	0622573	IL

Poster Title: **The Queensborough Bridge STEP Grant: Its Effect on Students and Faculty**

Keywords: **Recruitment, Career Counseling, Introductory Courses, Peer Tutoring, Faculty Development**

Poster Abstract: The Queensborough Bridge Grant involves both the Biology and Chemistry departments of a community college (Queensborough Community College-CUNY) and a senior college (Queens College-CUNY) as well as a major research institution (Brookhaven National Laboratory). The project aims at increasing the number of STEM students via a seamless academic transition upon graduation from the community and transfer to the senior colleges. Undergraduate participation of freshmen in research projects have led to an annual average of 120 professional (including the ACS and MACUB) conference presentations and a total of seven publications of student research findings in peer-reviewed journals since 2007. Other activities include attending and summarizing talks of seminar speakers and group tutoring conducted by Honors Chemistry students. All these activities have created a “learning community environment” among STEM students. Participation in summer and winter programs at the Brookhaven National Laboratory, faculty mentored summer research program at Queens College as well as other internships with the Food and Drug Administration (FDA) and the Division of Environmental protection (DEP) enhance the academic grooming of students. The number of students involved has increased dramatically since the inception of the grant.

Poster #: 6 – 01
Urbana-Champaign-Type 2

Session: A

Lead Institution: University of Illinois at

Authors: **William Trent**
Lorenzo Baber
Casey George-Jackson
Lisa Dickson (University of Maryland-Baltimore County)
Blanca Rincon

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Type 2 Project	Year 3	Type 1A	0856309	IL

Poster Title: **Underrepresented Undergraduates in STEM at Large Research Universities: From Matriculation to Degree Completion**

Keywords: **Research/Projects/Type 2**

Poster Abstract: This three-year study examines the matriculation, persistence, and degree attainment of full-time, first-time women, students of color, and low-income undergraduate students in the STEM fields at a set of large, public, research universities, which are significant producers of STEM degrees. Quantitative and qualitative methods are used to examine individual factors, institutional factors, and programs that impact the (under)representation of students in a wide variety of math- and science-based fields. The first two years of the grant focused on conducting research on undergraduate students and STEM intervention programs at a set of ten universities. With the addition of a supplemental grant in the third year of the project, the research efforts have been expanded to a total of sixteen universities, increasing the amount of data available to the project, and allowing for issues of context to be explored more deeply. The project, currently in its final year, has three distinct components: 1) Longitudinal data on students who began college in 1999 allows for examination of their selection into a STEM field, movement in and out of STEM majors, and postsecondary outcomes; 2) Qualitative data gathered from administrators and directors of STEM intervention programs at sixteen universities focuses on the design and delivery of such programs; and 3) Online surveys of students at sixteen universities aids in the understanding of how choice of major impacts various undergraduate experiences. Research from the third year of the grant has focused on the use of evaluation in STEM intervention programs to increase sustainability, the use of mentoring in recruitment and retention programs, and the use of deficit-based language by administrators of STEM recruitment and retention programs. In addition, research has been conducted on differences in academic and community engagement levels by type of major, gender differences in students' science identity, racial and ethnic differences in students' perceptions of departmental climate, the effect of tuition differentials on low-income students' entrance into Engineering, and influences of student's decision to attend college and to pursue their major. Across these various topics, the research findings continue to highlight important differences by type of STEM major, as well as important differences between and within racial and ethnic groups, particularly by gender.

Authors: **Kimberly Warren**
Jae Hoon Lim

Patty Tolley
Peter Tkacik

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 3	Type 2	0969286	NC

Poster Title: **Increasing Enrollment and Retention in the College of Engineering Using a Multi-Disciplinary Motorsports Theme**

Keywords: **Recruitment, Introductory Courses, Peer Tutoring, Supplemental Instruction, Research Projects/Type2**

Poster Abstract: The goal of this educational research project is to recruit, engage, and retain undergraduate engineering students at UNC Charlotte. The University has a strong Motorsports Engineering program embedded within the Mechanical Engineering curriculum so the College has a working relationship with most (if not all) of the NASCAR teams. Additionally, the Center for STEM Education provides an avenue for the faculty to match educational research efforts with outreach to secondary schools throughout the state. The investigators have utilized these excellent resources (and others) to implement new outreach/recruitment programs and to integrate freshman academic activities in the classroom to increase 1) enrollment of high quality engineering students and 2) the retention of current undergraduate engineering students. To increase recruitment, a multi-disciplinary (i.e. mechanical, civil, and electrical engineering) motorsports theme is used to engage potential students during multiple recruitment and outreach efforts throughout the year. During the academic year, the investigators conduct outreach/recruitment events on campus to reach out to gifted high school students with an emphasis on students traditionally underrepresented in STEM disciplines. To date, project activities have interacted with over 700 high school students during these outreach events. During the summer months, the investigators conduct a week long Motorsports Engineering Summer Camp. The camp provides hands-on engineering experiences/exposure to approximately 24 rising high school juniors and seniors with the goal of introducing them to UNC Charlotte and STEM disciplines before they decide where they want to go to college. In the past three years, 61 students have participated in these camps (including 31% African American, 7% Hispanic, and 28% female students). While enrollment numbers are delayed because the students still have 1-2 years before they matriculate to college, five of the students who participated in the 2010 camp are now attending UNC Charlotte. We have collected excellent qualitative feedback regarding student camp experiences. To increase retention, the investigators have been collaborating with the engineering faculty who teach the second semester introductory engineering courses, which introduce students to discipline-specific engineering skills. This project supported the development of a classroom learning module for each discipline with the intent of providing students with engaging, “hands-on” learning experiences and the ‘big picture’ perspective of engineering. The investigators are also targeting students who have been accepted to the College of Engineering, but who lack the mathematics preparation necessary to begin the core engineering curriculum. This project is supporting a successful peer coaching and supplemental instruction (SI) program to keep these students engaged and provide them resources that they need to stay motivated and be academically successful as they work their way into the engineering curriculum. Last year, 233 students participated in the SI initiative and 147 students participated in the coaching/mentoring initiative. Additionally, this project is supporting UCOL 1200, which is freshman engineering seminar course for those pre-engineering students and students who are exploring engineering as a potential major. We are still evaluating the impact of this course. The overarching goal of this program is to increase the number of students receiving a BS in engineering by 16 students per year through extensive recruitment and retention efforts. Since the majority of students impacted from this project are incoming or current freshman students, the impact from this project on graduation rates will be quantifiable towards the end of this five year project. An extensive evaluation plan is being managed by two assessment experts to collect significant qualitative and quantitative data for all activities listed herein using a variety of assessment instruments. Additionally, three ASEE papers have been prepared and/or presented during this project.

Poster #: 6-03 Session: C Lead Institution: **Purdue University**

Authors: **Catherine Mobley (Clemson University)**
Catherine Brawner (Research Triangle Educational Consultant)
Clemencia Cosentino (Mathematica Policy Research)
Margaret Sullivan (Mathematica Policy Research)
Matthew Ohland
Russell Long

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 1	Type 1A	0969627	CA

Poster Title: **Characterizing and Modeling the Experience of Transfer Students in Engineering: Preliminary Qualitative Findings**

Keywords: **Research Projects/Type 2, Articulation & Transfer Issues, Transfer Students**

Poster Abstract: Our mixed-method study focuses on students who transfer to four-year institutions and pursue undergraduate studies in engineering. Our poster presents an overview of our design, the research questions that guide our project, and preliminary results of the qualitative portion of our study. The quantitative component of our project uses the MIDFIELD longitudinal database with over 978,000 student records to study and compare transfer to non-transfer student academic trajectories and outcomes. The qualitative component relies on a review of institutional policies and interviews of transfer students at MIDFIELD institutions to: (a) identify policies that may enhance or deter transfer student success; and (b) explore the factors that motivate students to transfer and facilitate or impede their subsequent success. Our review of institutional policies reveals a variety of practices across the eleven MIDFIELD institutions. Our poster provides information about number and types of formal transfer arrangements between the state community colleges, technical colleges and 4-year colleges and the MIDFIELD institutions. We also report on the preliminary results of 17 interviews of transfer students attending one of the MIDFIELD institutions. We discuss reasons for beginning their academic studies at the sending institution and their experiences with the applications and admissions process. We also provide insights into the “culture shock” they experienced when adjusting to the academic requirements of the receiving institution; we describe the strategies that students used to adjust to the new institution and highlight their suggestions for improving the transfer process. In years 2-4 of the grant, we will conduct qualitative interviews of 15-20 transfer students from 4-6 additional MIDFIELD institutions. **OTHER AUTHORS: Marisa Kikendall Orr, Purdue University Richard Layton, Rose-Hulman Institute of Technology**

Poster #: 6-04
Carolina-Charlotte

Session: A

Lead Institution: **University of North**

Authors: **Elizabeth Stearns**
Roslyn Mickelson
Stephanie Moller
Melissa Dancy (University Colorado)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Type 2 Project	Year 2	Type 2	0969286	NC

Poster Title: **Finding the roots: interactive influences of individual, secondary school, and college institutional factors on the success of women and underrepresented minorities in STEM majors**

Keywords: **Research Projects/Type 2**

Poster Abstract: Our two-phased study illuminates the structural and individual factors that contribute to racial and gender gaps in success in STEM majors. The first phase of the project uses a unique quantitative dataset (NC Roots dataset), which links the secondary school experiences of public school students in North Carolina with their educational records in the sixteen campuses of the University of North Carolina system. This phase focuses on the structural opportunities and constraints to mathematics and science learning in middle and high school and their longitudinal impact on post-secondary educational trajectories. We examine the barriers and opportunities to learn by students' gender, race, and SES to determine whether there are differential impacts on students from various backgrounds. The second phase of the study consists of a series of in-depth interviews with women and men who are college seniors. The interviews will probe the core findings from the quantitative phase of the study, illuminating: how STEM majors navigate social structural constraints and opportunities; how they overcome gender and racial schema that define success in STEM in masculine and "White" terms; and how female STEM majors square their occupational ambitions with prevailing norms regarding the importance of romance and family formation. We will interview three groups of White female and underrepresented minority students: those who will successfully complete a STEM major; those who transferred out of STEM majors; and those whose academic profile fits that of successful STEM majors, but who chose to major in another field. We compare the findings from these interviews with findings from interviews of White and Asian-American male STEM majors. Current Papers and Preliminary Findings In year 2 of the study, we are proceeding with quantitative analyses of the Roots dataset. Our preliminary findings indicate the importance of several aspects of high schools' resources and students' high school experiences in influencing higher rates of success in STEM: • School-level analyses reveal that: o High schools with higher teacher turnover and higher student/teacher ratios also send fewer African-American students (of both sexes) and particularly fewer African-American female students to STEM fields. o High schools with more licensed teachers tend to send more students, particularly more female students, to STEM fields. • Multi-level cross-classified models show that: o Female students who attend high schools with more female math and science teachers are themselves significantly more likely both to declare a STEM major and to graduate with a STEM major. o Students that take algebra 2 during or before their 10th grade year tend to declare and graduate significantly more with a STEM major. As well, students who take algebra 2 in 11th and 12th grade are less likely both to declare a STEM major and to graduate with a STEM major. In year 3, we will pilot and conduct interviews, while continuing with quantitative analyses.

Poster #: 6-05
Los Angeles

Session: B

Lead Institution: **University of California-**

Authors: **Sylvia Hurtado**
Kevin Eagan
Tanya Figueroa

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Type 2 Project	Year 2	Type 2	0757076	CA

Poster Title: **Becoming Scientists: Practices in Undergraduate Education that Contribute to Degree Completion and Advanced Study in STEM Disciplines**

Keywords: **UG Research/Internship Opportunities, Underrepresented Students, Research Projects/Type 2**

Poster Abstract: Our project aims to identify the factors that inhibit or enhance underrepresented racial minority (URM) students' pathways toward research careers in science, technology, engineering, and mathematics (STEM) fields. For the last seven and a half years, we have followed students who entered college as first-time students in the fall of 2004 with four national surveys: the 2004 Cooperative Institutional Research Program (CIRP) Freshman Survey, the 2005 Your First College Year survey, the 2008 College Senior Survey, and the 2011 Post-Graduate Survey. In addition to the student survey data, we have collected GPA and completion data from registrars offices and have partnered with the National Student Clearinghouse to collect enrollment and degree information to provide a more complete picture of STEM degree completion and retention. The quantitative dataset includes matched samples of URM STEM, URM non-STEM, and White and Asian American STEM majors. We have used a variety of multivariate statistical analyses to determine predictors of changes in students' aspirations for advanced degrees, institutions' efficiency at generating undergraduate degrees in STEM, STEM retention and degree completion, and student-faculty interaction, among others. In addition to this large amount of quantitative data, we also have collected a substantial amount of qualitative data. Most recently we have interviewed pioneers in STEM who broke through gender and racial barriers in their disciplines and paved the way for success for future generations of traditionally underrepresented students in STEM. The PIs are currently writing a book that describes the full breadth and depth of the project. The next several months include in-depth statistical analyses as well as writing up our findings for publication.

Poster #: 6 - 06
College

Session: C

Lead Institution: **Carleton**

Authors: **Catheryn Manduca**
Elizabeth Nagy-Shadman (Pasadena City College)
Laura Serpa University of Texas El Paso)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	Science	Year 1	STEP Centers	1125331	TX

Poster Title: **InTeGrate: Interdisciplinary Teaching of Geoscience for a Sustainable Future**

Keywords: **Introductory Courses**, Faculty Development, Program Evaluation, Underrepresented Students

Poster Abstract: Widespread geoscience literacy and a robust geoscience workforce are increasingly important in addressing grand societal challenges including resource issues (e.g. minerals, energy, water, food) and environmental issues (e.g. climate change, hazards, waste disposal, environmental degradation). The InTeGrate STEP Center is engaging a broad interdisciplinary community in developing materials and model programs in order to increase the geoscience literacy of undergraduate students, including the large majority that do not study geoscience, and to increase the number and diversity of students prepared to bring geoscience approaches into interdisciplinary teams addressing societal challenges. Inter-institutional curriculum development teams are creating and testing materials for use in geoscience courses, interdisciplinary courses, and courses in majors that address other aspects of these grand challenges (such as business, economics, and education). A set of implementation programs are demonstrating departmental, institutional and multi-campus approaches to curriculum and program structures that enroll diverse students, address the preparation of the geoscience workforce, and integrate geoscience into the general education curriculum, teacher preparation curriculum, and STEM and social science majors (including students in Environmental Studies/Sciences programs). An integrated assessment program is measuring the impact of new course materials and programs on students' 1) geoscience literacy including their understanding of the role of geoscience in addressing the grand challenges facing society, 2) ability to address interdisciplinary problems, and 3) understanding of the process of science. A professional development program integrated with activities of the On the Cutting Edge and Building Strong Geoscience Departments programs, geoscience professional societies, and the National Council for Science and the Environment is supporting widespread adaptation and adoption of course materials and program structures. Program evaluation is researching the impact of InTeGrate at the course, departmental and institutional levels, with a focus on understanding how the program is influencing changes in instruction and program design, and the subsequent impact on enrollment and learning in courses addressing the role of geoscience in solving societal grand challenges.

PIs: Cathy Manduca, Carleton College; Tim Bralower, Penn State; Anne Egger, Central Washington State University; Diane Doser, University of Texas-El Paso; David McConnell, North Carolina State Leadership Team: David Blockstein, NCSE; Sean Fox, Carleton College; David Gosselin, University of Nebraska; Ellen Iverson, Carleton College; Pam Matson, Stanford University; Elizabeth Nagy-Shadman, Pasadena City College; Laura Serpa, University of Texas-El Paso; David Steer, University of Akron; John Taber, IRIS External Evaluation: Kim Kasten, Columbia University; Sabra Lee, Independent Consultant

Authors:

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 1	STEP Centers	1125457	CA

Poster Title: **National Center for Engineering Pathways to Innovation**Keywords: **Faculty Development, Learning Communities, Institutional Change, Innovation**

Poster Abstract: Need: Preparing undergraduate engineers to be more innovative and entrepreneurial, and increasing undergraduate engineering enrollment, learning, and retention, are key national priorities. To address these critical needs, we have created the National Center for Engineering Pathways to Innovation (Epicenter) to catalyze a wave of change in undergraduate engineering education in the U.S. through initiatives that inspire students to envision possibilities and create viable, innovative products, services, and processes for lasting economic and societal contributions. Approach: The Epicenter is national in scope with four distinctive elements: - It builds upon the base of knowledge from three distinct and complementary fields: learning sciences, engineering education, and innovation and entrepreneurship education. - It draws on the content and expertise of the Stanford Technology Ventures Program (STVP), as well as a strong set of strategic partners, to create a coherent set of learning materials and methods. - It provides faculty and students with a developmental road map -Pathways to Proficiency - that takes into account their unique experiences and interests, helps them navigate the Epicenter offerings and assists them in their progress in the teaching and learning of engineering innovation and entrepreneurship. - It will build communities for educators, scholars, and students around entrepreneurship and innovation education, and develop instruments and processes to assess students' skills. The Epicenter research component will contribute to the understanding of innovation and entrepreneurship capacity development in engineering students and faculty by facilitating a national dialogue among the larger innovation and entrepreneurship educational research community, and by conducting its own selective research studies of students and faculty, using both survey and qualitative methods. Target Audience: We will target undergraduate engineering students, ranging from those who are interested in making entrepreneurship and innovation core to their undergraduate education, to those who are not yet aware of entrepreneurship and innovation concepts and practices. We will target engineering faculty – those whose teaching already has a focus on entrepreneurship and innovation, as well as those who would like to incorporate entrepreneurship and innovation education into their courses. We will also target engineering school senior administrators who are looking to incorporate entrepreneurship and innovation into their schools' curricula. Predicted Outcomes and Deliverables: Two types of programs are being developed to engage engineering faculty and students: iconic entrepreneurship experiences designed to jumpstart engagement with the Epicenter; and ongoing programs that draw them through the Pathways to Proficiency. Award Programs will be implemented to provide incentives to contribute high-quality materials and resources, and recognize students, faculty, and administrative leaders with opportunities to participate in Epicenter programs. The Epicenter will employ an open innovation approach to gathering and disseminating resources that acknowledge and leverage the diversity of experiences, ideologies, pedagogies, methods, and tools represented in the 351 engineering schools in the United States. This effort is supported by a Curation Board composed of leading entrepreneurship and innovation educators. The Epicenter website will serve as a comprehensive collection of all the Epicenter resources and a trusted source of materials for educators and students across the country. The Epicenter research will contribute to the understanding of how innovation and entrepreneurship capacity of engineering students and faculty develops over time, what factors influence this development, and how this development affects

Poster #: 6 - 08

Session: B

Lead Institution: **University of Oklahoma**

Authors:

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 1	Type 2	1068453	OK

Poster Title: **The Privilege of Student, Experiential Learning, Engineering Competition Teams (SELECT) - What factors contribute to cultures of inclusion or exclusion?**

Keywords: **Research Projects/Type 2, Cultures of Engineering**

Poster Abstract: Student, Experiential Learning, Engineering Competition Teams (SELECT) are fore-fronted as the hallmark of engineering programs and are commonly featured in materials shared with prospective students and donors. SELECT provide an opportunity for engineering students to practice engineering technical and professional skills while engaged in competitive, experiential learning, design/build projects. However, in spite of efforts to increase participation of under-represented populations (URP) in engineering programs, participation rates of URP students in many competition teams are exceptionally low, even when normalized for engineering enrollment. National conversations about changing the messages regarding engineering have focused on several aspects including the need to foreground role models of female and non-white students, so that young people can "see themselves" as engineers. The lack of diversity in SELECT very loudly counters messages of inclusion and opportunity. SELECT programs are resource intensive endeavors. From budgets of tens of thousands of dollars, access to faculty time, faculty mentoring, and space and facilities, these programs consume a significant amount of institutional resources for relatively small groups of students (each SELECT typically has fewer than 20 members). The question of whether URPs have equal opportunity to participate in SELECT is therefore one of whether URPs get equal opportunity to benefit from these resources. As preliminary evidence suggests that SELECT exclude URP, this lack of opportunity may contribute to inequities that extend into students' professional lives after college. Furthermore, SELECT have the potential to engage "hands-on" learners or the creative, abstract, non-linear thinkers who do not learn as well or as easily though textbook/classroom lecture pedagogy. This opportunity should be open to members of URP too. This research project employs a cultural constructivist theoretical framework and the theoretical model of inequality regimes to structure interpretations of interviews of SELECT team members, advisors and sponsors; students who do not participate in SELECT; and corporate recruiters. Additional data include participant observations, surveys, and artifact analysis. Our first year poster will explain our research design, data collection strategies, and our current progress.

Authors: **Daniel Udovic**
Jeremy AAsum (Concentric Sky, Inc)
Clare Strawn (International Society for Technology in Education-ISTE)

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	All STEM	Year 1	Special Project	1143572	OR

Poster Title: **Fostering Community in the STEM Talent Enhancement Program: Annual Meetings, a Community Website, and On-Line Activities**

Keywords: **Faculty Development, Servicing the STEP Community**

Poster Abstract: STEP aims to address a recognized need for substantially increasing the nation's workforce capacity in STEM fields by increasing the number of students graduating in STEM disciplines from the nation's universities, colleges and community colleges. The overall success of STEP depends on the development and implementation of "best practices," which in turn depends on the development of a community of PI's (practitioners) who share ideas, resources, and data, and who can build on each other's successes and experiences. The goal of this project is to facilitate the building of a "community of practice (COP)" among the scientists, administrators, student support specialists and evaluators involved in funded STEP projects. Project activities include: (1) continuing to plan and organize annual meetings of the STEP community (in 2013 and 2014), building on lessons learned from previous STEP Grantees' meetings; and (2) continuing to develop and expand the STEP online community by (a) increasing the usability and usefulness of the community's new website, STEP Central, (b) offering opportunities for on-line training sessions and conferencing on topics of interest to the community, and (c) encouraging the involvement of the STEP community in these online activities. We are striving to seamlessly integrate these components in the development of a community of practice. Formative evaluation of these activities will support their development, and summative evaluation will measure the increases in networking and the impact of collaboration on improvement in the implementation, dissemination and innovation of individual STEP projects. During the project's first six months we have (1) worked on developing a group of STEP community leaders, (2) planned the 2012 STEP Grantees Meeting so that it better supports the development of an on-going COP (e.g., through the formation of Special Interest Groups - SIGs), and (3) began the process of improving the design and usability of STEPcentral.net. Over the course of the next year, we envision: (1) substantial improvements in website design and content, (2) the development of a program of webinars and web conferences to support the community, (3) the development of vibrant set of SIGs, and (4) increased efforts to encourage interactive engagement in the online STEP community of practice. At the poster session, there will be a table with either laptops or iPads so that meeting participants can explore STEP Central and discuss plans for the next phase with members of our project team.

Poster #: M - 01 Session: B

Lead Institution: **Central Washington University**

Authors: **Wendy Bohrson**
Michael Braunstein
David Darda
Lisa Ely
Michael Jackson
Martha Kurtz

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 5+	Type 1A	0653094	WA

Poster Title: **CWU Science Talent Expansion Program Recruiting and Retaining the Next Generation of STEM Professionals**

Keywords: **Recruitment, Underrepresented Students, Retention**

Poster Abstract: The Central Washington University (CWU) STEP works to increase the number of students obtaining STEM degrees, with an emphasis placed on increasing the total number of traditionally underrepresented students. The main elements of our program include (1) recruitment of students in traditionally underrepresented-serving high schools and community colleges in central Washington State; (2) merit-based financial support for STEP-participating students; (3) an interdisciplinary freshman curriculum; (4) a bridging program for sophomore and transfer students that involves research, teaching, and recruiting opportunities; and (5) a unique residence opportunity for STEP students through the STEP Living Learning Community. Enrollment for Fall 2011 includes 44 students in the freshman program, 10 students in the sophomore/junior bridging program and 22 students in the transfer bridging program. Recruiting activities continue as a collaborative effort between the STEP Recruiter and CWU Admissions staff. The emphasis we have placed on maintaining positive relationships with central Washington State high schools that traditionally serve underrepresented students has clearly been productive; our 2011/12 freshman cohort is 82% underrepresented. Underrepresented students compose 67% of our entire STEP population for this year, indicating that our emphasis on diversity has also been successful with the sophomore and transfer cohorts. Our goals of improved retention and academic performance for STEM majors at CWU are also being met. STEP students declare STEM majors to a greater extent than those students who chose not to participate in STEP (40.7% of STEP students have declared a STEM major compared to 18.5% of students in the control group). Students who have participated in CWU STEP and have declared a STEM major have higher average GPAs compared to non-STEP STEM and non-STEP non-STEM students in the control group. Undeclared-major STEP students have a higher average GPA compared to the undeclared-major non-STEP students in the control group. The design of our program is to emphasize close professional ties among STEP students, faculty, and staff. For example, the STEP Supervisor meets with STEP students 2 times per quarter, thus providing advising and academic support tailored to the individual students' needs. Our experience suggests that this approach strengthens the sense of community STEP students have, thus leading to a higher rate of retention compared to the STEM control group. Our effort to implement strategies that foster positive and sustained ties among faculty, staff, and students within the CWU STEP community is one of the most positive aspects of our program. **OTHER AUTHORS: Jessica Nye, Andrew Piacsek**

Poster #: M - 02 Session: C Lead Institution: **University of Mary Washington**

Authors: **Kelli Slunt**
Dianne Baker

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 1	Type 1A	1068150	VA

Poster Title: **STEM TALENT EXPANSION THROUGH RESEARCH, ENGAGEMENT, PREPARATION AND SCHOLARSHIPS (STEREPS) PROJECT**

Keywords: **Recruitment, Introductory Courses, Peer Mentoring, Supplemental Instruction, Underrepresented Students**

Poster Abstract: ABSTRACT AND PROGRESS TO DATE In the STEM Talent Expansion through Research, Engagement, Preparation and Scholarships (STEREPS) project, the University of Mary Washington is completing a series of initiatives to recruit and retain STEM majors, particularly students who are members of groups that are traditionally under-represented in the STEM disciplines. The suite of activities in this Type 1A project provides pathways to success in the STEM disciplines by (1) enhancing an existing summer bridge program with a revised pre-calculus course and a new interdisciplinary science research course to better prepare students for STEM disciplines, (2) adding new undergraduate research experiences, particularly for first and second year students, including peer mentoring by upper-level STEM majors and early-engagement training for faculty through workshops, (3) creating a new STEM outreach program for high school students that provides opportunities to engage in research and other activities with faculty and undergraduate student research teams, (4) creating a STEM learning community by implementing a supplemental instruction program, (5) establishing a STEM diversity scholarship program to attract qualified, culturally diverse students to UMW, and (6) creating a new STEM colloquium for faculty and students to share their research with a larger STEM community. Peer mentoring is a central component of the STEM outreach program, undergraduate research opportunities, and the supplemental instruction learning community, provides a progressive mentoring sequence to engage, recruit and retain students in the STEM disciplines. Individually, each activity is working to either recruit or retain students in STEM fields; as a cohesive suite of activities, each initiative is working in concert with the others to increase the overall number of, as well as the diversity of STEM graduates at UMW. The project is in its first year of funding. The following summarizes the progress to date on the project initiatives identified above. (Initiative 1) The new interdisciplinary (IDIS) science research course has been designed and approved by the UMW curriculum committee for initial offering in summer 2012. Students participating in the Summer Transition Program (STP) who express an interest in a STEM major will complete this IDIS course and/or pre-calculus in summer 2012. (Initiative 3) A brochure for the summer outreach program has been developed and distributed to local high schools. Candidates will be applying and identified in the next month or so. (Initiative 4) Three of the PIs attended the SI training workshop in Kansas City. Courses and peer leaders are currently being identified for fall 2012 when the program will be implemented. (Initiative 5) Review of applications to UMW has occurred to identify finalists for the STEM diversity scholarship program. An email will be sent in the next few days to confirm students in the pool that intend to major in a STEM field. Offers of scholarships should occur within the next few weeks. (Initiative 6) A colloquium event on applying for graduate school was held in the fall semester. Two seminar events are planned for this semester by student researchers and an outside speaker from the FDA

Poster #: N - 01

Session: NA

Lead Institution: **University of New Mexico**

Authors: **Tariq Khraishi**
Heather Canavan
Christos Chrisotdoulou
Melanie Moses
Jerald Rounds
Susan Buffington

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Engineering	Year 1	Type 1A	1068182	NM

Poster Title: **STEPS in the Right Direction: Transforming Engineering/Computer Science Education at the University of New Mexico**

Keywords: **Peer Mentoring, UG Research/Internship Opportunities, Underrepresented Students**

Poster Abstract: The STEP-Type 1A Project at the University of New Mexico College of Engineering will address the needs of student diversity and retention and revolves around the theme of Student-Centered Teaching and Learning. Our goal is to transform the culture in our School and University. In order to reach this goal, the Project has the following 4 components: Faculty and Peer Mentoring, Internships, Financial Incentives and Targeted Retention Programs. This project has the backing of the faculty in the School of Engineering, the Administration of the School of Engineering and the University, Legislative Members of the State of New Mexico, and several agencies/companies in the State. As far as results are concerned, faculty members in each of the School of Engineering Departments have already been identified by the PIs. Eligibility requirements for student participants in the project in each SOE department have also been identified. A coordinator for the UNM STEP project has been hired and has begun coordinating activities across the School of Engineering. Mentoring sessions followed by evaluations will shortly commence.

Poster #: N - 02 Session: NA

Lead Institution: **Sonoma State University**

Authors: **Lynn Stauffer**
Lynn Cominsky
Jeremy Qualls
Nathan Rank

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Masters	All STEM	Year 1	Type 1A	1068445	CA

Poster Title: **S3: STEPping up STEM at SSU**

Keywords: Recruitment, Math Preparation, Introductory Courses, Peer Tutoring, UG Research/Internship Opportunities

Poster Abstract: Through our Type Ia STEP program, the School of Science at Technology at Sonoma State University (SSU) is working on a three-pronged approach to increase the number of STEM majors, improve retention of STEM students and improve STEM graduation rates. The first prong is the development of an interdisciplinary STEM First Year Experience (FYE) program that uses the theme of environmental sustainability in the local watershed to enhance student engagement with the process of scientific inquiry, and to attract additional undeclared students into STEM majors. Our STEM-FYE curriculum synthesizes three common general education (GE) courses (Introductory Biology, Pre-calculus and Critical Thinking) together with a multi-disciplinary laboratory component which utilizes SSU's Field Stations and Nature Preserves to provide authentic hands-on service learning activities. Peer mentors are employed to help incorporate transition elements into the curriculum, and to promote the development of learning communities within the STEM cohort. The course will be offered for the first time in the Fall 2012 semester. The second prong of our STEP program targets existing STEM majors who need additional support to succeed in beginning chemistry and physics classes. Workshop courses to supplement these gateway classes are being developed by faculty-student teams for implementation beginning in the Fall 2012 semester. The third prong expands the model used by MESA (Mathematics, Engineering, Science Achievement) providing additional advising, opportunities for undergraduate research and exposure to career opportunities to all SSU STEM majors. These efforts will begin in the summer 2012 with competitive research opportunities for selected students.

Authors: **Karen Daar**
Armando Rivera

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 1	Type 1A	1068483	CA

Poster Title: **ASSIST--Academic and Student Support to Improve STEM Transfer**

Keywords:

Poster Abstract: East Los Angeles College (ELAC) is providing the programmatic, academic and student support necessary to increase the annual number of STEM graduates and transfers by 60 students by the end of five years, which is 64% growth over baseline. The project improves articulation at both high school to college and two-year to four-year institution levels; implements faculty advisement and counseling, assigns students to faculty mentors who help design efficient educational plans and STEM pathways; expands research and internship opportunities at university laboratories; and exposes students to professional milieus, broadens their vision of career opportunities, and helps them to develop research skills. In addition, a summer bridge program attracts high school juniors and seniors who have not previously considered STEM careers. Given its large Hispanic enrollment, advancing STEM education at ELAC helps to increase Latino STEM graduates and transfers. Increased rates of graduation and transfer enable more educationally disadvantaged Latinos to enter the STEM workforce. With this project, the college's infrastructure is redesigned to focus on opportunities in STEM careers, and to smooth transfer pathways to regional universities. Faculty participation in advising, mentoring and sharing of effective pedagogical methods helps transform ELAC into a STEM transfer gateway institution. ELAC disseminates information about the project to similar types of institution, shares best practices, and encourages them to adopt procedures to increase STEM transfers and graduates.

Poster #: N - 04 Session: NA

Lead Institution: **Fort Lewis College**

Authors: **Kimberly Hannula**
Veronica Evans

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Bachelors	All STEM	Year 1	Type 1A	1068341	CO

Poster Title: **Four Corners Undergraduate STEM Success: Improving Retention and Transfer of STEM Students Between a Two-Year and a Four-Year Institution in New Mexico and Colorado**

Keywords: **Recruitment, Peer Tutoring, Peer Mentoring, UG Research/Internship Opportunities, Underrepresented Students**

Poster Abstract: Four Corners STEM Success (FOCUSS) is a collaborative STEP-1B program between Fort Lewis College (a four-year public liberal arts college in Durango, Colorado) and San Juan College (a two-year community college in Farmington, New Mexico). The two institutions are geographically nearby (51 miles apart) and have large Native American populations (27% of the student body at SJC; 20% of the student body at FLC). Fort Lewis College has a tuition waiver for all Native American students, which makes it possible for Native American students from SJC to transfer without paying out-of-state tuition. FOCUSS aims to increase the numbers of STEM students who continue in STEM after leaving SJC and who graduate from FLC through four activities: (1) a joint seminar series that brings career-oriented speakers to both institutions; (2) recruiting visits by FLC faculty and students to SJC; (3) an early undergraduate research program run jointly by both institutions; and (4) a tutor/mentor program hosted in FLC lab sections and aimed at FLC freshmen, sophomores, and new transfer students, designed to improve retention from first-year to upper-level courses. All of these activities are in early stages of implementation. One visiting speaker has visited both campuses; four of six FLC STEM programs have held recruiting visits at SJC; five early undergraduate research projects (including one collaborative project between an SJC and an FLC faculty member) have been proposed, and student applications are currently being collected; and tutor/mentors are currently working with eight freshmen and sophomore courses. It is too early in the implementation of this project to assess the successes and challenges. So far, the greatest effect has been improved communication between FLC and SJC faculty. The best example is from the Engineering programs: SJC is discussing adding an additional course to improve the articulation between the two programs, and allow students who complete Associates degrees at SJC to transfer seamlessly into the FLC Engineering program.

Poster #: N - 05 Session: NA

Lead Institution: **Georgia Perimeter College**

Authors: **Pamela Leggett-Robinson**
Margaret Major

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	All STEM	Year 1	Type 1A	1067896	GA

Poster Title: **“Building Success: One STEP at a Time”**

Keywords: **Recruitment, UG Research/Internship Opportunities, Supplemental Instruction**

Poster Abstract: GPC’s STEP Project attempts to (1) increase the number of students enrolled in all STEM fields and to (2) increase the number of students graduating and/or transferring to four-year colleges/universities to complete their STEM baccalaureate degree. Associated with these goals, are five objectives related to outreach, recruitment, persistence, academic standing and graduation/transfer rates. It is expected that the GPC STEP Project is divided into three steps: Achieving College Readiness, Deepening STEM Understanding, and Building the STEM Resume and will engage 500 pre-college students and serve 90 full-time STEM students each year. The program currently has 22 participants. Preliminary impacts of this project have been presented at local, regional, and national conferences.

Poster #: N - 06 Session: NA Lead Institution: **Edmonds Community College**

Authors: **Deann Leoni**
Rashanah Botley
Patrick Burnett
Tom Fleming
Mary O'Brien

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
Two Year	STEM	Year 1	Type 1A	1068399	WA

Poster Title: **Relationships in Science Education (RiSE)**

Keywords: **Recruitment, Peer Tutoring, Faculty Development, Program Evaluation, UG Research/Internship Opportunities**

Poster Abstract: The Relationships in Science Education (RiSE) Project at Edmonds Community aims to achieve the following goal: Increase the number of STEM majors graduating with associate degrees and/or transferring to baccalaureate institutions through personal recruitment at area high schools, transformed curriculum across the Natural Sciences and Mathematics Division, rigorous assessment of student learning and success and the construction of a suite of student services that assure high academic achievement, reduce time to degree, and ready students to thrive in their chosen STEM careers. The RiSE project will attain five main objectives: 1. Increase the number of STEM students graduating with associate degrees, 2. Increase the number of STEM students transferring to baccalaureate institutions, 3. Increase the diversity (women and underrepresented minorities) of STEM majors, graduates and transfers, 4. Increase the percentage of STEM majors progressing through gateway STEM courses, and 5. Decrease the mean time to associate degree attainment. In order to achieve these objectives RiSE will support the following activities: 1. Outreach and recruitment to local high school students and their families with an emphasis on recruiting women and underrepresented minority students. 2. Curricular redesign across all STEM disciplines based upon research in increasing student engagement and success. 3. An integrated suite of student support services that include best practices in increasing retention, persistence and success for all STEM students: faculty mentors and advisors, cohort STEMinars, study rooms with peer tutors, supplemental instruction, math support workshops, intensive early alert, a science summer start workshop, STEM service learning opportunities, undergraduate research opportunities, and transfer assistance for students transferring to local colleges and universities. 4. A rigorous evaluation and assessment that measures the success of the project validating institutionalization and broad dissemination while helping faculty and students reflect and improve on their teaching and learning.

Poster #: N - 07 Session: NA

Lead Institution: **Emory University**

Authors: **Drew Kohlhorst**
Patricia Marsteller

Inst. Type:	Disciplinary Focus:	Project Year:	Project Type:	Grant #:	State
PhD	Science	Year 1	Type 1A	1068238	GA

Poster Title: **Increasing STEM Student Retention through Residential and Online Student Bridge Program and Faculty Development**

Keywords: Faculty Development, Institutional Change, Bridge Programs; At-risk students

Poster Abstract: The Emory University STEP project is designed to address issues of retention and success in science, mathematics and computing at both the four-year college (Emory University) and the two-year college (Oxford College) level. In order to accomplish this we are actively developing several program components including: improving methods to identify at-risk students; creating a summer enrichment bridge program utilizing problem-based learning in both a residential and online delivery format; and developing workshops and resources to encourage faculty members to incorporate research-based innovative pedagogies into their course. Our key goals are to increase the number of science and math majors at both institutions by 150 per year and double the number of URM graduates with science and mathematics majors (from 55 to 110). We are particularly focus on best practices that attract and retain students in science majors, especially underrepresented minorities and women. As this project moves forward we intend to identify factors that attract new students to science majors, influence students to leave science, affect successful transitions from high school to college, improve performance in gateway courses, as well as the impact of integrating current research and new pedagogies in the introductory classes.