Establishing an Undergraduate Science & Math Pipeline: Enhancing K-12 Teaching and Building Connections to Higher Education

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Objective:
To increase the number and diversity of graduates with competency in STEM-related disciplines

Through current and emerging programs that **enhance K-12 teaching, engage K-12 students, and empower undergraduates**, the Center for Science and Mathematics Education (CSME) removes barriers to student success.

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**Emerging Programs**

**STEM Endorsements**

With campus and community partners, CSME is facilitating an Elementary STEM endorsement program and developing plans for a new Secondary Physics endorsement.

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**Current Programs**

**Enhancing K-12 Math & Science Instruction**

CSME specializes in science and math teacher preparation programs that include in-depth subject matter and hands-on research experiences designed to make teachers more effective in the classroom:

- **Master of Science for Secondary School Teachers (MSSST)**
  MSSST is a content-based master’s program for licensed science and math teachers. As a disciplinary cohort, teachers receive content-area training and conduct scientific research.

- **Math for America (MfA) Utah**
  MfA creates and supports mathematics teacher leaders within a collaborative community focused on improving the quality of Utah mathematics education.

- **Teacher Research Fellows**
  Teachers participate in a workshop and a four-week lab or field experience working alongside a university faculty member.

- **Earth Science from Navajo and Western Perspectives**
  This annual workshop gathers teachers from MSSST and the four-corners area for an intensive, field-based experience.

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**Engaging K-12 Students in STEM**

K-12 student involvement is encouraged by promoting student-driven research and engaging diverse groups in STEM learning:

- **Salt Lake Valley Science & Engineering Fair (SLVSEF)**
  This annual science competition involves over 600 students/year in grades 5-12 from over 130 different schools. SLVSEF works with students, teachers, parents, and scientists to mentor students and foster a love for STEM.

- **REFUGES Afterschool Program**
  REFUGES (Refugees Exploring the Foundations of Undergraduate Education in Science) provides academic support, tutoring, mentoring, college readiness workshops, and STEM content to refugee students in grades 7-12. Over 90% of participating students are minorities.

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**Empowering Undergraduates to Succeed**

By offering programs for under-represented students and promoting best practices in undergraduate instruction, CSME encourages undergraduate retention and success:

- **Summer Science Bridge Course**
  This 7-week transition course and orientation for incoming undergraduates is designed for minority, women, and refugee students. Students live on-campus, attend classes, and participate in authentic research.

- **Undergraduate Sustainability & STEM Scholars (U-S²TEM)**
  In partnership with the Global Change and Sustainability Center, U-S²TEM provides academically talented, financially challenged, and diverse undergraduate students with scholarships, cohort experiences, mentoring, and research opportunities.

- **Research Opportunities for Undergraduate Students**
  With the cooperation of campus and community partners, CSME is increasing the number of undergraduate research opportunities available to University of Utah students.

- **Hugo Rossi Lecture Series**
  CSME bridges the College of Science and College of Education by inviting local and national education leaders to campus to discuss contemporary issues in K-16 math and science education.

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**Science & Math Performance Assessments**

CSME staff and faculty fellows are engaging with College of Science departments to assess student learning outcomes in gateway courses and develop recommendations for improvements.

**Professional Development for Teaching Assistants and Faculty Members**

For science and math majors, many courses are taught by graduate TA’s and new faculty members who have limited teaching experience. In 2015-2016, CSME will work with College of Science departments to develop enhanced training opportunities for new instructors.

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