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Developing a STEM Teacher Recruitment Pipeline

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Abstract

The Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM), a Phase I Robert Noyce Teacher Scholarship Program, combines internships and scholarships, an exciting summer STEM Honors Camp, a new Teaching Connections Seminar, and an impressive array of existing resources to recruit, prepare, and graduate an increasing number of STEM teachers committed to serving high need high schools.
STEM Education at CSU

- Currently, CSU educates at least 60% of the area’s teachers.
- However, Georgia produces very few teachers in certain areas of STEM, consistent with national trends.
- CSU has mirrored this trend.
- High teacher attrition rates exacerbate the problem: over half leave within 5 years.

- What can CSU do to change this equation?
CRAFT-STEM

The Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM) is an NSF Robert Noyce Teacher Scholarship program (funded with grant number 1136356). Program components include a STEM Honors Summer Camp engaging high school juniors and seniors in STEM research and activities, $4500 summer internships for CSU freshmen and sophomores, and scholarships worth $10,000-13,000. This five year grant is worth approximately $1.2 million.
Robert Noyce Teacher Scholarship Program + UTeach Columbus Program

STEM Honors Camp → Internships → Scholarships → Teaching Connections Seminar

- High school juniors & seniors
- CSU Freshmen and Sophomores
- CSU Juniors and Seniors
- Transfer Juniors and Seniors
- CSU Pre-service Teachers

High Need School District
STEM Honors Camp

• Two week experience, competitive nomination process for rising high school juniors and seniors. Vehicle to recruit talented students to STEM majors at CSU.
• Participate in authentic research with faculty and interns
• Experience life on CSU campus
• Speaker series – Careers or issues in STEM
• Field trips
• Student colloquium – students present their research projects to other camp participants, parents and faculty.
• Loosely based on successful Academy of Future Teachers camp held several years ago
• Directive from Dr. Mescon – make it a residential camp!
What is UTeach?

- Collaborative effort by College of Letters and Sciences, and College of Education and Health Professions
- Replication of nationally recognized Texas program for STEM teacher preparation
- Focus on strong content knowledge, exposing students to research in their field
  - Graduates have majors in math or science, and are eligible for teacher certification.
- Re-design/streamline of education courses to focus on STEM
- Aggressively recruit students to teaching math and science
- **Critical to success**: Master Teachers, to teach/co-teach field experience classes and mentor students
Student Recruitment

• Publicity
  – Logo, bookmarks, brochures, fliers, letters, e-mails, give-aways
  – Posters around campus
  – Articles/ads in Ledger-Enquirer, Saber, Impact
  – Word of mouth
  – Web site: http://uteach.columbusstate.edu/
  – Facebook page: http://www.facebook.com/UTeachColumbus

• Visits to introductory math and science courses and Freshman Learning Communities
• Freshman orientation activities, Visitation Day
• Meetings with high school principals
• STEM Honors Camp
• Tuition rebates for Step 1 and Step 2 classes!
Early and Intensive Classroom Experiences

Step 1: Inquiry Approaches to Teaching

Step 2: Inquiry Based Lesson Design

Classroom Interactions
<table>
<thead>
<tr>
<th>UTeach Course</th>
<th>First Semester Offered</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Inquiry Approaches to Teaching</td>
<td>Spring 2012</td>
<td>Master Teachers</td>
</tr>
<tr>
<td>Step 2: Inquiry-Based Lesson Design</td>
<td>Fall 2012</td>
<td>Master Teachers</td>
</tr>
<tr>
<td>Knowing and Learning in Math and Science</td>
<td>Fall 2012</td>
<td>Hrepic or Peker</td>
</tr>
<tr>
<td>Functions and Modeling</td>
<td>Spring 2013</td>
<td>Howard and Jones</td>
</tr>
<tr>
<td>Classroom Interactions</td>
<td>Spring 2013</td>
<td>Gober and Sinkule</td>
</tr>
<tr>
<td>Perspectives in Math and Science</td>
<td>Summer 2013</td>
<td>Van Kley</td>
</tr>
<tr>
<td>Project-Based Instruction</td>
<td>Fall 2013</td>
<td>Shaw</td>
</tr>
<tr>
<td>Research Methods</td>
<td>Fall 2013</td>
<td></td>
</tr>
<tr>
<td>Apprentice Teaching</td>
<td>Spring 2014</td>
<td></td>
</tr>
</tbody>
</table>
UTeach Columbus Enrollment Targets

Based on conservative assumptions, we developed the following enrollment targets for students entering the UTeach Columbus program, as well as targets for enrollment in Step 1 and Step 2 courses.

<table>
<thead>
<tr>
<th>At the end of</th>
<th>Enrollment target</th>
<th>Actual enrollments to date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>39</td>
<td>40</td>
</tr>
<tr>
<td>2013</td>
<td>80</td>
<td>56 students 72 seats</td>
</tr>
<tr>
<td>2014</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>209</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>251</td>
<td></td>
</tr>
</tbody>
</table>
Enrollment Updates

• In Fall 2012, we had 40 students enroll in UTeach courses, meeting our target.

• In Spring, we have approximately 56 individual students enrolled in at least one class, and 70 “seats” filled in classes.
  • Step 1 class: 35 enrolled
  • Step 2 class: 16 enrolled
  • Knowing & Learning: 10
  • Functions and Modeling (Math Ed only): 5
  • Classroom Interactions: 4

• There are also several students not enrolled in a UTeach class who intend to enroll in another next term.
Student Demographics

- **Gender:**
  - 21 males, 35 females

- **Ethnicity**
  - 33 white, 20 black, and 3 Asian

- **Majors**
  - 16 math
  - 20 biology
  - 4 chemistry
  - 8 earth and space science
  - 2 middle grades
  - 1 pre-nursing, 1 early childhood, 1 computer science, 1 marketing, 1 engineering, 1 information technology
CRAFT-STEM Scholarships

• CSU students in STEM Education majors in their junior or senior year are eligible for scholarships.
  – Minimum scholarship $10,000. Can award up to $13,000, based on financial need and merit criteria.
  – For each year of scholarship, students commit to teaching STEM in a high-needs school district for two years, within eight years of graduation.

• Awardees required to participate in the “Teaching Connections Seminars”
  – Participants have been exploring connections between high school curricula and college math and science courses.
  – This semester, we are also discussing the opportunities and challenges of teaching in high needs schools.
UTeach Scholarships

• Each semester, we have a few $1000 scholarships to award
  – Must have completed Step 1 class
  – Only eligible once per calendar year

• Funded by
  – Race To The Top grant
  – Private donations
  – Gift from AT&T
CRAFT-STEM Internships

• Any CSU freshman or sophomore can apply for summer internships.
  – Preference given to STEM and STEM education majors.
  – Competitive application process.
  – Students will work to design and organize STEM Honors Camp, carry it out with supervision from mentor faculty.
  – Afterward, will work on research, on tutoring or peer instruction, in outreach facilities and with other STEM related camps.

• Internship pays $4500 over the summer.
  – Interns expected to work ~ 400 hours.
UTeach Internships

• Work with outreach centers (such as Oxbow Meadows) in STEM education efforts
• Work on PR for UTeach and CRAFT-STEM programs

• Future efforts?
  – Tutoring programs in local after school programs
Homeschool Internships

- Middle School students in Columbus area
- Attend lab-only class every week, or every other week, at CSU
- Labs designed as 5E inquiry lessons
Any Questions?
### UTeach Columbus
#### Race To The Top funding levels

<table>
<thead>
<tr>
<th>Funding periods</th>
<th>Potential grant amounts</th>
<th>Funds for Institute Technical assistance</th>
<th>Total funds awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept – Dec 2011</td>
<td>Up to $100,000</td>
<td>$100,000</td>
<td>Up to $200,000</td>
</tr>
<tr>
<td>2012 operations</td>
<td>Up to $250,000</td>
<td>$100,000</td>
<td>Up to $350,000</td>
</tr>
<tr>
<td>2013 operations</td>
<td>Up to $350,000</td>
<td>$100,000</td>
<td>Up to $450,000</td>
</tr>
<tr>
<td>2014 operations</td>
<td>Up to $350,000</td>
<td>$100,000</td>
<td>Up to $450,000</td>
</tr>
<tr>
<td>2015 operations</td>
<td>Up to $350,000</td>
<td>$100,000</td>
<td>Up to $450,000</td>
</tr>
<tr>
<td>Total</td>
<td>Up to $1,400,000</td>
<td>$500,000</td>
<td>Up to $1,900,000</td>
</tr>
</tbody>
</table>

Long-term Goal: Build an endowment that, together with University and grant support, will make this program self-sustaining when this grant funding ends.
Universities Replicating UTeach
Spring 2012 enrollment nationwide (5,574 students)

COHORT 1: 2008–2012
- Boise State University
  IDo-Teach enrolling Fall 2012

COHORT 2: 2010–2014
- University of California, Berkeley
  Cal Teach Berkeley • 224 students
- University of California, Irvine
  UCI Cal Teach • 274 students
- University of Colorado, Boulder
  CUTeach • 265 students
- University of Colorado, Colorado Springs
  UCSCS Teach • 74 students

COHORT 3: 2011–2015
- Middle Tennessee State University
  MTeach • 215 students
- University of Memphis
  Tigers Teach • 77 students
- University of Tennessee, Chattanooga
  UTeachChattanooga • 135 students
- University of Virginia, College at Wise
  VolsTeach • 184 students
- University of Tennessee, Knoxville
  MTeach • 281 students

COHORT 4: 2012–2016
- Towson University in Maryland
  enrolling Fall 2012
- Northern Arizona University
  NAUTeach • 302 students
- University of Houston
  teachHOUSTON • 429 students
- University of North Texas
  Teach North Texas • 300 students
- University of Texas, Arlington
  UTeach Arlington • 282 students
- University of Texas, Austin
  UTeach • 588 students
- University of Texas, Brownsville
  UTeach Brownsville enrolling Fall 2012
- University of Texas, Dallas
  UTeach Dallas • 303 students
- University of Texas, Pan American
  UTeach Pan American enrolling Fall 2012
- University of Texas, Tyler
  UTeach Tyler • 149 students

- University of Arkansas at Fayetteville
  UTeach Arkansas enrolling Fall 2012
- University of Arkansas at Little Rock
  UALRTeach enrolling Fall 2012
- University of Central Arkansas
  UCA STEMTeach enrolling Fall 2012
- Louisiana State University
  GeauxTeach • 321 students

- University of Massachusetts, Lowell
  UTeach UMass Lowell
  28 students
- Western Kentucky University
  SKyTeach • 281 students
- Columbus State University
  UTeach Columbus • 31 students
- Southern Polytechnic State University
  SPSUTeach • 16 students
- University of West Georgia
  UTeach West Georgia • 61 students
- Florida State University
  FSU-Teach • 227 students
- University of Florida
  UTeach • 210 students
- Florida Institute of Technology
  FIT 4 UTeach enrolling Fall 2012