“[U]niversities and nonprofit organizations can launch programs like UTeach at UT Austin that allows aspiring teachers to get a math or science degree and teaching certificate at the same time.” President Obama, July 2009

“To bring more educators into the classroom, the National Math and Science Initiative is working with Texas Instruments and the Dell Foundation to prepare almost 5,000 new math and science teachers in the next five years -- through a program that allows young people to earn teaching certificates and science degrees at the same time.” President Obama, January 6, 2010
Future Replication Timelines

**PHASE 1**  Planning and Proposal Development  Oct 2009–July 2011

- Phase 1 Grant Notice
- Phase 1 Applications Due
- Phase 1 Grant Awards
- Customize Competitive RFP
- Disseminate UTeach Information
- Build Awareness
- UTeach Workshops
- Release UTeach RFP
- Pre-Proposals Due
- Invitations to Submit Full Proposals
- Annual UTeach Conference
- Full Proposals Due

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<tbody>
<tr>
<td>RTT Proposal Phase</td>
<td>State Level Planning</td>
<td>UTeach Proposal Development</td>
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</table>

UTeach Open House, February 23-24, Austin
UTeach conference, May 25 – 27, Austin
Future Replication Timelines

**PHASE 2**  Site Selection and Program Implementation July 2011–May 2016

- **FALL 2011**: Proposal Review & Selection
- **JAN 2012**: UTeach Grant Awards
- **MAY 2012**: UTeach Program Planning & Start-Up
- **SEP 2012**: UTeach Kick-Off Conference
- **MAY 2016**: Planning Period Site Visits
- **MAY 2016**: Annual UTeach Conference
- **MAY 2016**: First UTeach Courses Offered
- **MAY 2016**: First UTeach Graduates

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Income and Outcome

![Graph showing the relationship between percent exceeding state criterion for SAT or ACT and economic need (Free and Reduced Lunch)].

- **X-axis**: Economic Need (Free and Reduced Lunch)
- **Y-axis**: Percent Exceeding State Criterion for SAT or ACT

Legend:
- **Minority Percent**: 0.0 (red) to 100.0 (black)
- **Number of Graduates**:
  - 6
  - 200
  - 400
  - 600
  - 800
  - 1000
  - 1185

2/2010, PTEC

UTeach Replication

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Hallmarks of UTeach

• **Collaboration** between Colleges of Sciences, Education, and Liberal Arts
• **Active recruitment** of science and mathematics majors to take the two initial one-hour UTeach courses free of charge
• Early and intensive **field experiences** throughout the program
• **Compact degree plans** that allow most students to graduate with a degree and certification in four years
• A focus on developing deep-level understanding of the **subject material** and incorporating effective approaches using technology in teaching
• Guidance and inspiration provided by faculty and highly experienced public school teachers who serve as **Master Teachers** in the program
• Courses taught by **faculty** who are actively engaged in research in mathematics and science and in the teaching and learning of mathematics and science
• Integrated **professional development courses** that all focus on teaching both mathematics and science, and are based on recent research in science and mathematics teaching and learning
• An array of **student benefits**, including paid internships that offer opportunities for community outreach in education
• All essential program elements on **permanent budget** or endowment.
Math and Science Teachers
graduating from UT Austin

![Bar graph showing the number of Math and Science teachers graduating from UT Austin from 1996-1997 to 2007-2008. The bars are color-coded with red for Science and blue for Math. The graph indicates an overall increase in the number of graduates, with peaks in certain years.]
Math and Science Teachers
graduating from UT Austin

UTeach Graduates

1999-2000: 2
2000-2001: 35
2001-2002: 81
2002-2003: 121
2003-2004: 187
2004-2005: 261
2005-2006: 335
2006-2007: 406
2007-2008: 477
2008-2009: 534
## UTeach Majors

<table>
<thead>
<tr>
<th>Major</th>
<th>Number</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (Teaching Option, 59% of math majors)</td>
<td>104</td>
<td>24.4%</td>
</tr>
<tr>
<td>Mathematics (Other, 41% of math majors)</td>
<td>71</td>
<td>16.6%</td>
</tr>
<tr>
<td>Biology (Teaching Option, 32% of bio majors)</td>
<td>37</td>
<td>8.7%</td>
</tr>
<tr>
<td>Biology (Other, 68% of bio majors)</td>
<td>79</td>
<td>18.5%</td>
</tr>
<tr>
<td>Chemistry (Teaching Option, 52% of chem majors)</td>
<td>16</td>
<td>3.7%</td>
</tr>
<tr>
<td>Chemistry (Other, 48% of chem majors)</td>
<td>15</td>
<td>3.5%</td>
</tr>
<tr>
<td>Physics (Teaching Option, 36% of physics majors)</td>
<td>8</td>
<td>1.9%</td>
</tr>
<tr>
<td>Physics (Other, 64% of physics majors)</td>
<td>13</td>
<td>3.0%</td>
</tr>
<tr>
<td>Human Ecology</td>
<td>24</td>
<td>5.6%</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>6</td>
<td>1.4%</td>
</tr>
<tr>
<td>Astronomy</td>
<td>2</td>
<td>.5%</td>
</tr>
<tr>
<td>Computer Sciences</td>
<td>7</td>
<td>1.6%</td>
</tr>
<tr>
<td>Interdisciplinary Math/CS Senior Grades</td>
<td>2</td>
<td>.5%</td>
</tr>
<tr>
<td>Interdisciplinary Math/Science Middle Grades</td>
<td>3</td>
<td>.7%</td>
</tr>
<tr>
<td>Undeclared</td>
<td>12</td>
<td>2.8%</td>
</tr>
<tr>
<td>Degree-Holders</td>
<td>28</td>
<td>6.6%</td>
</tr>
</tbody>
</table>
The average GPA for UTeach students is 3.02.

2.5 GPA required for recommendation for certification (appeals considered).
UTeach Student Demographics

- **UTeach**
  - White: 51%
  - Hispanic: 22%
  - Asian: 5%
  - African Amer: 3%
  - Other: 5%

- **College of Natural Sciences**
  - White: 44%
  - Hispanic: 18%
  - Asian: 18%
  - African Amer: 5%
  - Other: 4%

- **UT Undergrads**
  - White: 55%
  - Hispanic: 18%
  - Asian: 18%
  - African Amer: 5%
  - Other: 5%
Percentage teachers left in classroom, SASS vs UTeach

- Retention for SASS cohort of 1991
- Retention for SASS cohort of 1994
- Retention for SASS cohort of 2000
- Retention for SASS cohort of 2004
- Retention for UTeach
UTeach Team

College Administrators
Dean Mary Ann Rankin, College of Natural Sciences
Dean Manuel Justiz, College of Education

Co - Directors
Michael Marder, Physics  Larry Abraham, Kinesiology

UTeach Team

College Administrators
Dean Mary Ann Rankin, College of Natural Sciences
Dean Manuel Justiz, College of Education

Co - Directors
Michael Marder, Physics  Larry Abraham, Kinesiology

CNS Staff
Mark Tway, Equipment Manager
Brett Westbrook, UTeach Advisor
Annette Hairston, UTeach Advisor
Gary Wene, Executive Asst.
Kate Waldman, Admin Asst.
Adela Galarza, Admin Asst.
Judy Dean, Admin Asst.
Al Walser, IT Support
Amy Chavez, Accounting

Education Faculty
Jill Marshall, Science Education
Jennifer Smith, Math Education
Walter Stroup, Math Education
Tony Petrosino, Science Education
Lupita Carmona, Science Education
Cesar Delgado, Science Education
Taylor Martin, Engineering Education

Master Teachers
Pamela Powell, Math
Mark Daniels, Math
Mary Walker, Biochemistry
Denise Ekberg, Biochemistry
Bill Humphries, Engineering
Jason Ermer, CS
Lynn Kirby, Geology
Kelli Allen, Biology
Shelly Rodriguez
Prudence Cain, Everything
Brian Fortney, Chemistry

CNS Faculty: David Laude, Chemistry; Ruth Buskirk, Sahotra Sarkar, Dan Bolnick, Stan Roux, Dick Richardson, Biology; Martha Smith, Efraim Armendariz, Mathematics; Leon Long, Jay Banner, Geology; Pawan Kumar, Astronomy

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Funding from National Math and Science Initiative, ExxonMobil, Texas Education Agency, Michael and Susan Dell Foundation, Texas High School Project, Greater Texas Foundation
Replication Sites

- UKaTeach
- University of Kansas
- teach Houston
- University of Houston
- TUteach
- Temple University
- Florida State University
- FSU-teach
- UF Teach
- UTeach Dallas
- Teach North Texas
- Skyteach
- UTeach
- University of Colorado at Boulder
- Cal Teach
- California Teach Science & Mathematics Initiative at UC Berkeley
- NAUteach
- Science and Mathematics Initiative
- UCI California Teach
- UTeach
- UT D
- GeauxTeach

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UTeach Replication

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Replication Sites (Second Cohort)

• UT Tyler
• UT Arlington
• University of Colorado, Colorado Springs
• UT Knoxville
• Middle Tennessee State University
• Cleveland State University

• Race to the Top?
• Teacher Quality Grant?
• 5 new Texas sites?

New funding from Tennessee Department of Education, Texas Education Agency, Texas Instruments...
On track for around **750 new UTeach teachers per year** by 2014 from the original UTeach sites.
Replication Sites Enrollments

On track for around **750 new UTeach teachers per year** by 2014 from the original UTeach sites
Replication Sites Enrollments

On track for around **750 new UTeach teachers per year** by 2014 from the original UTeach sites
UTeach Elements of Success

Developed to identify the elements necessary for a successful UTeach program. EOS provide the framework for UTeach program replication and evaluation. Elements are further defined by activities.
UTeach Elements of Success

• Create an organization devoted to preparing teachers
  • Create an Identity
  • Work collaboratively

• Develop institutional support
  • Cultivate continuing top level support
  • Provide for sustainability
  • Secure space
  • Hire support staff
UTeach Elements of Success

• Attract and retain students
  – Engage in active recruitment
  – Provide financial support for students
  – Provide guidance and support for students
  – Build community
  – Honor students who choose to teach
  – Support teachers after graduation
**UTeach Internships**

*Students gain valuable paid experience & preparation for teaching profession*

- Students volunteer to work in non-profit educational settings and get paid for it
- Competitive pay for students who must work to stay in school – flexible hours
- Paid by UTeach with gift and foundation monies
- Tasks range from mentoring kids to working in museums to preparing educational software
- Recruits and retains students in UTeach
- Helps students to become better teachers
- Assists non-profit organizations
UTeach Elements of Success

• Create an instructional program
  – Offer 4-year degree plans (120-126 hours) for all teacher certifications in math, science, and computer science
  – Incorporate early and continuous field experiences
  – Create effective, streamlined, and flexible course sequences
UTeach Elements of Success

• Provide a first-rate instructional program
  – Assign and hire course instructors
  – Employ master teachers
  – Employ mentor teachers
  – Develop best teaching practices
  – Model best teaching practices
# UTeach Course Sequence

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
<th>Semester 3</th>
<th>Semester 4</th>
<th>Semester 5</th>
<th>Semester 6</th>
<th>Semester 7</th>
<th>Semester 8</th>
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<tbody>
<tr>
<td>Freshman Pathway</td>
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<tr>
<td>STEP 1</td>
<td>STEP 2</td>
<td>Knowing &amp; Learning</td>
<td>Classroom Interactions</td>
<td>Perspectives</td>
<td>Research Methods</td>
<td>Project-Based Instruction</td>
<td>Apprentice Teaching</td>
</tr>
</tbody>
</table>

| Sophomore Pathway | | | | | | | |
| STEP 1 | STEP 2 | Knowing & Learning | Classroom Interactions | Perspectives | Research Methods | Project-Based Instruction | Apprentice Teaching |

| Junior/Senior Pathway | | | | | | | |
| STEP 1 | STEP 2 | Knowing & Learning | Classroom Interactions | Perspectives | Research Methods | Project-Based Instruction | Apprentice Teaching |

## University Provider
- **Natural Sciences**

## College of Education
- **Knowing & Learning**
- **Classroom Interactions**
- **Project-Based Instruction**

## College of Liberal Arts
- **Perspectives in Math & Science**

**One-hour Courses:** *STEP 1, 2**

- **Research Methods**
- **Apprentice Teaching**

**Post-Baccalaureate Pathway**

**Includes field experience**
How to provide highest quality preparation within limited course hours?

UTeach Philosophy

Extensive, Individualized Coaching

Intensive Teaching Opportunities

Relevant Content
UTeach Course Sequence

**specially designed content courses**
- Functions & Modeling
- Research Methods
- Perspectives on Science & Math
- Reading in Content Areas

**recruitment courses**
- Step 1
- Step 2

**education sequence**
- Knowing & Learning
- Classroom Interactions
- Project-Based Instruction
- Apprentice Teaching

Total Course Hours: 24 – 30
Professional Development Course Hours: 18
Field Experience Hours: approx 325 (48 before AT)
• Designed to recruit math & science majors to consider teaching
• Taught by Master Teachers
• Offered at no cost
• Focus on inquiry (5E lessons)
• research-based/nationally recognized curricula & materials

Step 1: Inquiry Approaches to Teaching
• Elementary field experience
• Prepare lessons around well-tested activities

Step 2: Inquiry-based Lesson Design
• Middle School experience
• Write lessons from scratch based on district curriculum
Integration of content and pedagogy
Strong connection between theory and practice
Make explicit the connections between mathematics and science

Knowing & Learning in Mathematics and Science
- Taught by research faculty in math and science education
- Students explore the implications of learning theories on individual learning, social (classroom) learning, and within the context of larger social justice issues.
- Clinical interviews: analyze individuals’ reasoning about math and science problems
- Integration of content and pedagogy
- Strong connection between theory and practice
- Make explicit the connections between mathematics and science

**Classroom Interactions**
- Taught by research faculty in math and science education with assistance from Master Teachers
- Provides theoretical and practical frameworks for analyzing various instructional activities, focusing on content development through teacher-student, student-student, and group interactions
- Students continually explore issues of equity through readings, classroom activities, lesson design and analyses, and individual research
- High school field experiences: Students plan, implement, and analyze multiple-day lesson sequences in high school math and science classrooms
Integration of content and pedagogy
Strong connection between theory and practice
Make explicit the connections between mathematics and science

Project-Based Instruction
- Taught by research faculty in math and science education with assistance from Master Teachers
- Focus on developing an approach to designing, implementing and evaluating problem- and project-based curricula and processes
- Students develop project-based instructional units
- Secondary field experiences: Students plan, implement, and analyze 3-day problem-based teaching experiences in math and science classrooms, culminating in a day-long field-based experience
Apprentice Teaching

- Taught by Master Teachers
- 40 hours observing/on-site planning, 12 weeks of teaching 4 hours/day (240 hours total) paired with weekly seminar
- Provides a highly supportive environment that promotes collaboration, reflection and sharing and that is continually responsive to students' needs.
- Students quickly assume full teaching responsibilities for part of the day
- Regular, intensive feedback by highly trained observers, master and mentor teachers – using standardized instrument (Teacher Development Rubric)
- Development of Final Teaching Portfolio
UTeach Curriculum Overview

- Make explicit the connection between mathematics and the sciences
- Provide content knowledge of historical/philosophical development of STEM disciplines focused on teachers’ needs

Perspectives on Science and Mathematics
- Taught by research faculty in History and Philosophy
- Fulfills multiple general education degree requirements – writing and liberal arts
- Promotes student understanding that science is dynamic and has been shaped by practical needs, social conflicts, and individual personalities
- Students prepare math and science lesson plans incorporating historical content
Functions & Modeling

Research Methods

Perspectives on Science & Math

UTeach Curriculum Overview

- Make explicit the connection between mathematics and the sciences
- Provide content knowledge of particular importance for teachers through explorations in disciplines of interest

Research Methods

- Lab course taught by a team of science research faculty, Master Teachers and TA’s
- Fulfills multiple general education degree requirements – science and writing
- Focus on student understanding of how scientists develop new knowledge – students design, implement and write up 4 independent inquiries
- Topics include lab safety, experimental design, statistical analysis, mathematical modeling, peer reviewed literature and scientific controversies
Functions & Modeling

- Taught by mathematics faculty members with working knowledge of secondary mathematics curriculum and grade level expectations
- Required of math majors only - Fulfills math requirement
- Emphasizes mathematics content knowledge and content connections, as well as applications of the mathematics topics
- Student collaboration with problem solving and presentation of findings is emphasized

- Make explicit the connection between mathematics and science
- Provide content knowledge of particular importance for teachers
Fall 2005: Gathering Storm Report

Spring 2006: Mary Ann Rankin hires Tracy LaQuey Parker to start UTeach Institute

Summer 2006: Funds from Texas Education Agency enable first UTeach replication at University of Houston.

Fall 2006: Tom Luce founds NMSI, $125 million gift from ExxonMobil

Spring 2007: Request for Proposals: 52 pre-proposals received

Summer 2007: 26 full proposals received

Fall 2007: 13 replication sites chosen and announced.

Spring 2008: UTeach Institute reaches 11 employees

2009: Added two sites in Texas, two in Tennessee
Professional Support

UTeach Curriculum

Overview of the Curriculum | Take a Tour | FAQs | Discussion Board

Step 1
Step 2
Knowing & Learning
Classroom Interactions
Problem-Based Instruction
Research Methods
Perspectives
Functions & Modeling
Secondary Reading
Apprentice Teaching

A dynamic professional learning community where knowledge about best practices in the preparation of science and mathematics teachers is continually developed and shared.

News & Announcements

Webinar with Dr. Anthony Petrosino
Tuesday, March 5th
Join Dr. Petrosino for a lively discussion of instructional topics in the Knowing & Learning course
Click here to register

National Panel on Teacher Preparation
Nominate yourself or your colleagues to serve on a national panel charged with...
(more)
Professional Support

• Detailed and explicit description of program
  – UTeach Elements of Success
  – UTeach Operations Manual
  – UTeach Curriculum

Hallmarks of the UTeach Program
UTeach’s mission is to recruit, prepare, and retain qualified science, mathematics, and computer science teachers. The program serves this mission by providing full teaching certification for undergraduate majors obtaining mathematics, science, and computer science degrees without adding to the time or cost of their degree. There are many elements that have contributed to the success of UTeach. However, the hallmarks of the UTeach program include:

• Collaboration between Colleges of Sciences, Education, and Liberal Arts
• Active recruitment of science and mathematics majors to take the two initial one-hour UTeach courses free of charge
• Early and intensive field experiences throughout the program
• Compact degree plans that allow most students to graduate with a degree and certification in four years
• A focus on developing deep-level understanding of the subject material and incorporating effective approaches using technology in teaching
• Guidance and inspiration provided by faculty and highly experienced public school teachers who serve as Master Teachers in the program
• Courses taught by faculty who are actively engaged in research in mathematics and science and in the teaching and learning of mathematics and science
• Integrated professional development courses that all focus on teaching both mathematics and science, and are based on recent research in science and mathematics teaching and learning
• An array of student benefits, including paid internships that offer opportunities for community outreach in education

UTeach Components
The following components of the UTeach program incorporate and build upon the program’s hallmarks, and have all contributed to the success of the program.

CREATE AN ORGANIZATION DEVOTED TO PREPARING TEACHERS

CREATE AN IDENTITY
• UTeach is an academic program that functions as a department and is responsible for the preparation of mathematics, science, and computer science teachers.
Professional Support

- Planning and start-up time
  - Planning period and roll-out of courses over five years
  - Orderly sequence of training, implementation, and support activities focused on no more than two cohorts of replication sites at a time

**UTeach Implementation: Semester Planning Tool 2008–2012**
Professional Support

- Data and analysis tools
  - Student surveys administered across all sites
  - Standard data gathering and reporting
Expanding UTeach through the states

What can we do? We can obtain substantial permanent increases in mathematics and science teachers from universities currently producing few.

Why UTeach? We create high-quality teacher preparation programs in secondary mathematics and science with the support you need to get results as fast as possible. We don’t bypass universities. We help them work better.

How much will it cost? Marginal internal costs at UT Austin are $15,000/teacher. For 70 teachers, plan to spend $1,000,000 internally per year per university. The UTeach Institute will require annual support expenses of $75,000-$100,000/year/institution served. External agencies will not necessarily pay anything for the increased flow of teachers once the program is established.

What is a possible state funding model? Here’s what the Texas and Tennessee Education Agencies are doing. Universities compete for state funds, competition managed by UTeach Institute at cost. Winners get a grant of $1.5M/university for 5 years. Balance of funds must come from permanent internal university budgets. Once a few state institutions are familiar with UTeach, they may take over responsibility for further state expansion, ultimately removing much of the burden from the UTeach Institute in Austin.
Future Replication Timelines

**PHASE 1** Planning and Proposal Development Oct 2009–July 2011

- **OCT 2009** RTT Proposal Phase
- **DEC 2009** State Level Planning
- **MAR 2010** UTeach Proposal Development
- **APRIL 2010–DECEMBER 2011** UTeach Proposal Development
- **FEB 2011** UTeach Proposal Development
- **APR 2011** UTeach Proposal Development
- **MAY 2011** UTeach Proposal Development
- **MAY 2011** UTeach Proposal Development
- **JUL 2011** UTeach Proposal Development

**UTeach Open House, February 23-24, Austin**
**UTeach conference, May 25 – 27, Austin**
Future Replication Timelines

**PHASE 2** Site Selection and Program Implementation July 2011–May 2016

- **FALL 2011** Proposal Review & Selection
- **JAN 2012** UTeach Program Planning & Start-Up
- **MAY 2012** UTeach Conference
- **SEP 2012** Planning Period Site Visits
- **MAY 2016** First UTeach Courses Offered
- **MAY 2016** First UTeach Graduates
If 286 universities prepare an additional 35 math and science teachers per year by implementing UTeach programs, we will be preparing the **10 thousand teachers for 10 million minds** our country needs to thrive in the 21st century.