

Recruiting the Next Generation of STEM Teachers from the STEM Majors in Research I Universities

MSP Learning Network
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UCI MSP: Faculty Outreach Collaborations Uniting Scientists, Students, and Schools (FOCUS)

- 3 high-need urban school districts
- 106 schools (K-12)
- 3000 teachers
- 100,000 students
- 96 STEM faculty

Comprehensive grant now in year 4 of 5

FOCUS Components

- Teacher Leader Cadre
- Future Teacher Highway
- Faculty Outreach Collaborations
- Discipline Dialogs
- Pre-K SMARTS
- Research and Evaluation

Proposition

New STEM teachers must be recruited from the ranks of the STEM majors in the research universities if we are going to meet our needs, both quantitative and qualitative, for teachers to educate the US population for the decades ahead.

UC/UCI Teacher Preparation Environment

- No undergraduate degrees awarded in Education
- “Single Subject” credentials recommended following 1-2 year post-baccalaureate programs
- Teaching is not a primary career objective of most UC undergraduates
- Strong STEM academic programs available with large enrollments of excellent students
- STEM faculty typically do not promote teaching as a career

UC Science-Math Initiative (SMI) aka California Teach

- Active and broadly based encouragement of UC STEM majors to think about teaching as a career
- Establishment of teacher recruitment and support centers housed prominently in the STEM departments
- Building of future teacher cohorts among the STEM student population
- Early structured and purposeful exposure of aspiring/potential teachers to K-12 classrooms throughout the undergraduate experience

UC Science-Math Initiative (SMI) aka California Teach

- Completion of quality STEM major and preliminary teacher licensing requirements in 4 years for early deciders → internship teaching
- A minor in Education that addresses many of the state's professional preparation standards
- A discipline-based 10-week summer workshop that combines disciplinary content with best pedagogical practices
- Goal: UC production of 1000 STEM teachers per year vs. current production of ~225 system wide

UC/CSU STEM Degrees 2002 vs. Projected Teacher Hires

Degrees	Math	Bio	Phys Sci
UC	650	4400	750
CSU	500	1900	500
Total	1150	6300	1250
Projected CA Hires	2060	1125	995

UCI MSP Future Teacher Highway (FTH) Goals

- Increase the quantity, quality, and diversity of secondary math & science teachers
- Validate UC students' interest in teaching as a potential career
- Support institutional changes that will sustain a future teacher highway

UCI Strengths on Which to Build the Future Teacher Highway

- Rigorous STEM majors with challenging curricula
 - Some majors have concentrations with electives most appropriate for secondary teachers.
- A Minor in Educational Studies
 - Includes courses that bridge subject matter knowledge and knowledge of secondary learning, cognition and curriculum.

UCI Strengths on Which to Build the Future Teacher Highway

- Strong secondary math-science fieldwork opportunities for undergraduates
- Strong single subject post-baccalaureate teacher credential program
- Strong links to the K-12 community with outreach programs and California Subject Matter Projects

UCI Challenges

- Undergraduates need early and increased opportunities, support, and incentives to consider and prepare for teaching as a career option.
- University and STEM departments need to accept greater responsibility as partners in the recruitment and preparation of teachers.
- STEM departments need to recruit and sustain:
 - Increased numbers of undergraduate STEM majors
 - Increased diversity among undergraduate STEM majors

FTH Strategies - An Overview

- Build UCI curricular pathways to attract and prepare future teachers
- Provide extra-curricular supports for future teachers
- Reach out to aspiring teachers from community colleges and high schools

Undergrad Curricular Pathways for Secondary Math or Science Teachers

- Augment a UCI math or science major to attract and prepare future teachers.
 - Create STEM major concentrations for secondary education with core and elective courses that align with state standards for the subject matter competency of teachers.
 - Provide requisite subject matter depth, breadth, and integration.
 - Future teachers complete standard STEM major curricula, in classes taught by regular STEM faculty, together with other STEM majors.

Undergrad Curricular Pathways for Secondary Math or Science Teachers

- Attract and sustain more students in the STEM majors, including undeclared freshmen and transfer students.
 - Preliminary proposal to create a Natural Sciences Major with:
 - Increased science breadth and integration
 - A selected specialization in one STEM discipline
 - More flexible sequencing of prerequisites
 - Elective choices for aspiring secondary teachers

Undergrad Curricular Pathways for Secondary Math or Science Teachers

- Augment a STEM Major with Discipline-Specific Education Coursework
 - “Math-Science Education Apprentice Field Experience”
 - “Issues & Controversies in Secondary Mathematics”
 - “Teaching and Learning in Secondary Mathematics”
- UC SMI proposes an additional pathway:
 - Undergraduates complete a UC STEM major and teacher preparation coursework (a new Education Minor) required for preliminary single subject credential in 4 years, followed by a 1-year paid teaching internship.

Undergrad Curricular Pathways for Secondary Math or Science Teachers

- Augment Major with Supervised Fieldwork
 - UCOP/FOCUS-sponsored **California Math-Science Teacher Initiative (CMST)**
 - Paid apprenticeships for teaching, tutoring, and other instructional tasks with a supervising teacher
 - Prerequisite: ED/PS 114 “Math-Science Education Apprentice Field Experience” and junior/senior status
- CMST Fieldwork provides a foundation for new UC SMI fieldwork model
 - A continuum of seminars linked to paid K-12 classroom fieldwork from freshman through senior years, building to a post-graduation intern teaching position

Pathways Leading to a Teaching Internship & Single Subject Credential

- UCI Intern Credential Program

- Math and Science candidates are employed by districts in paid teaching positions with intern credential status, while they complete credential coursework in a post-baccalaureate program.
- Current program available to UCI seniors/STEM majors who can start in spring quarter

- UC SMI proposes a new intern program model

- Most or all credential coursework is completed during undergraduate years (a minor in education with a math or science teaching emphasis).
- Candidates complete paid internships in a post-baccalaureate year, with continued support from the university.

Extracurricular Support for Future Teachers

- Additional Benefits in the UCOP/FOCUS-sponsored California Math-Science Teacher Initiative (CMST)
 - Advisement and workshops on the pathways to teaching
 - Paid registration fees for the CBEST and CSET exams, and access to study materials
 - Reimbursement for Certificate of Clearance fees

Extracurricular Support for Future Teachers

- UC SMI Provides Funding for a Science & Math Teaching Resource Center
 - Office space in the sciences section of campus - convenient and highly visible to STEM students
 - Dedicated staff for advisement and workshops on the pathways to teaching
 - Collaboration with STEM and Education counseling units and faculty for recruitment, advising, and information dissemination

Extracurricular Support for Future Teachers

- UCI Noyce STEM Teaching Scholarships
 - NSF-funded grant for 4 years
 - Up to 52 scholarships to STEM seniors and math/science credential candidates, ranging from \$7,500-\$10,000 per year
 - Some scholarships held for community college transfer students
 - Requirement to teach in a high-need school for 2-4 years

Extracurricular Support for Future Teachers

- Careers in Teaching Theme House: A Living and Learning Community
 - On-campus housing unit for aspiring teachers
 - Some spaces held for transfer students
 - Plans to expand in future years to include incoming freshmen and credential candidates

Reach out to Aspiring Teachers from Community Colleges and High Schools

- FOCUS-Sponsored TEACH Math and Science Summer Program
 - Summer institutes for UC eligible community college students from around Southern California
 - Participants learn about UCI, its programs for aspiring teachers, and about the teaching profession.
- Developing relationships with “Teacher Academies” at regional high schools
 - Century High Teach Academy in Santa Ana USD
- Annual Road to Teaching Conference
 - Jointly sponsored by UCI FOCUS with other IHE’s in the Santa Ana Partnership

UCI Future Teacher Highway (FTH) Team

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