CSU Northridge

CSU Northridge proposal for MSTI funding: 2019-20

CSUN MSTI Project Best Practices

1. ***Which components and activities of the campus MSTI project have been especially effective to date and why?***

The CSUN MSTI project is working to increase the number of STEM teachers through: (1) **recruitment** of new students into STEM teaching fields through outreach, advertisement, and early field experiences in STEM teaching, (2) **test preparation** to enable new recruits to qualify for entrance to credential program, (3) **financial incentives** to facilitate application, admission, and completion of the credential program, and (4) **alternative pathways** to make it feasible for prospective teachers to earn credentials in a timely fashion.

A significant bottleneck in the STEM credentialing pipeline is the California Subject Exam Test (CSET). Would-be teachers must demonstrate subject matter competence on CSET exams before being admitted to credential programs. Unfortunately, the pipeline of science and math majors is very small, and the pipeline of those that choose to go into science teaching is even smaller. The pipeline can be widened either by encouraging more undergraduates to pursue careers in science and mathematics, or by re-training college graduates so that they obtain the requisite knowledge and skills and can pass the subject exams. At CSUN, we have focused on "widening the pipeline" of potential math and science teachers by preparing potential STEM teachers to pass the CSET subject exams in math and science, primarily by providing a workshop series to those who have expressed an interest in becoming STEM educators.

The CSUN MSTI project has dedicated a large proportion of our MSTI resources to providing numerous, intensive workshops to help aspiring teachers pass the Foundation Level General Science (FLGS) Subtest-I, the Foundation Level Math (FLM) Subtests I & II, the Mathematics Subtest III, and the specialized Physics Subtest-II. We have recruited extensively for these workshops and have provided substantial financial support to those willing to participate in the workshops and study the requisite subject matter in order to pass the CSET exams.

Our CSET preparation courses are a particularly effective tool in increasing the number of applicants to our credential programs. In the past 6 years, 68 of the 152 applicants to our science credential program (45%) were participants in our CSET-Preparation courses before gaining admission to our science credential programs (link to database). Although our data is not complete, it appears as though the ratio of math CSET-Prep participants to total math credential program attendees is similar. It should be noted that many of these credential applicants enrolled in our workshops multiple times before developing sufficient expertise to pass the CSET exams and gain admission to the credential program. It is believed that our credential numbers would be significantly lower without the CSET preparation courses preparing potential credential program applicants.

In addition, recordings of our CSET FLGS and Physics-II workshops, as well as all related resources, are available online so that aspiring teachers throughout the state can prepare to pass these exams. Once individuals pass CSET exams, we encourage them to apply to teaching credential programs, or to acquire additional authorizations to existing multiple subject or single subject credentials. The following is a listing of those activities that we have found to be particularly successful in the preparation of STEM teachers.

In person Physics-II CSET Preparation Courses (40-hour workshops)

(40-hour, in-person workshops).

The Next Generation Science Standards (NGSS) are designed "to provide ***all students*** an internationally benchmarked science education."[1] NGSS specifies disciplinary core ideas (DCIs) and performance expectations (PE) in biology, earth & space science, chemistry, and physics. Prior to the adoption of NGSS, "only 28% of [California] high school juniors and seniors enrolled in chemistry, and only 10% in physics, and less than 12% of students were enrolled in an Earth and Space Science course",[2] but with the adoption of NGSS, 100% of California's graduating seniors are expected to meet performance expectations in ALL science subjects. The adoption of NGSS has created a tremendous need for chemistry and physics teachers throughout the state of California[3] since all students will now be assessed in all 4 sciences. The *2018 California State University Mathematics and Science Teacher Initiative Report* reports that the shortage of physics and chemistry teachers is "especially severe"[4] To address the profound shortage of physics teachers, we offered another 40-hour long intensive free in-person NGSS-based Physics-II CSET preparation course that was attended by approximately 25 aspiring physics teachers, of which more than a quarter are from under-represented populations. Nearly all of the participants in these workshops are credentialed in other areas, particularly biology, and have been sent by their schools to the workshops to obtain added authorizations in physics. Many are electing to take the intensive workshop a second time to build the requisite skills necessary to pass the exams and to be able to teach physics effectively. The first 7 to take the Physics-II exam have passed, and we anticipate many more in coming months.

Online Physics Subtest-II CSET Preparation Courses

(40-hour online workshops)

To facilitate an increase in the number of physics teachers throughout the state, we have produced and published 40-hours of training videos online and have linked numerous simulations, animations and other learning resources to the video segments. Forty-eight (48) teachers have taken the online course (link to see names). We intend to advertise these workshops more and conduct surveys regarding their effectiveness. These teachers may be completing credential programs at other universities

Foundational-Level Mathematics (FLM) Subtests I & II CSET Preparation Courses

(64-hour in-person workshop series)

Teachers who pass the FLM CSET exam are credentialed to teach general mathematics, algebra, geometry, probability and statistics, and consumer mathematics. This year we offered 3 workshops with a total attendance of approximately 60. \

Mathematics [Subtest – III] CSET – Preparation Workshops

(40-hour in-person workshop)

This year we offered one workshop to prepare aspiring math teachers to pass the Math III CSET exam. The teachers who pass subtest-III are qualified to teach all secondary mathematics classes through calculus.

Foundation-Level General Science (FLGS) [Subtest-I; formerly Subtests I & II]

(48-hour in-person and online workshop series)

In the past year, we offered three 56-hour workshops to prepare 49 prospective science teachers (link to see registrants) to pass the Foundation-Level General Science Exam. Many of our workshop participants have entered other credential programs in the greater Los Angeles area. We believe that many more individuals will soon be applying to the CSUN program **and** other credential programs in the greater Los Angeles area.

Recruitment

We maintain a large database of math and science teachers, CSET-prep program graduates, district STEM coordinators, administrators, self-identified potential STEM teachers. We send personalized emails to these individuals and encourage them to share information about our STEM credential programs and recruitment incentives with those whom they know who might be interested. We find that this "word-of-mouth" approach yields many potential recruits. We actively recruit potential math and science teachers by inviting them to participate in ourfree CSET preparation courses, and to attend information sessions on how to apply to our credential programs. In addition, we encourage potential STEM teachers to apply for our Noyce Scholarships, federal TEACH grants, STEM Teacher and Researcher (STAR) Program, and CSUN's multiple partnerships with the National Aeronautics and Space Administration (NASA-MUREP, NASA-EDPC, CSUN-JPL STEM Initiative). In addition, we offer financial incentives to those who complete our CSET preparation programs and enter our credential program. Additional incentives are provided for those who finishe the program and earn math and science credentials.

Advertisement: Websites / Listserves / Emails

All of our initiatives are advertised on websites. In addition, we invite prospective students by sending emails to (a) upper class science majors (biology, chemistry, geology, physics, etc.), (b) upper class math majors, (c) local teachers through our affiliations with surrounding schools and districts, (d) individuals who have registered online through our promotional website, (e) local cooperating teachers (master teachers), (f) previous participants in CSET workshops, (g) local secondary school principals, (h) participants in our CSP, (California Science Project) and CSCS (Computer Supported Collaborative Science) summer institutes, (i) listserves of local science teachers, (j) liberal studies majors, (k) students in our multiple-subjects credential programs, and (l) local county and district STEM coordinators. We encourage the recipients of these emails to share information about the free CSET workshops with those interested in earning foundation-level science or math credentials as well those who are seeking added authorizations to their multiple-subjects credentials or other secondary credentials. Participants in these workshops receive free books and parking passes, and are eligible to earn $500 upon

admission to the credential program, and $500 upon earning their first science or math credential. In the past four years, more than 450 prospective teachers have participated in these workshops. Many of these have already earned FLM, FLGS, Mathematics, or Physics credentials, and many more are in the pipeline. We are currently conducting surveys to follow-up with previous participants and encourage those who have not yet earned credentials to complete the process.

We believe that our CSET preparation workshops have been our most effective MSTI activity. The workshops not only help prospective credential candidates gain the skills necessary to pass the CSET exams required for entrance into the credential program, but they also provide ample opportunity to advise candidates. During these workshops we advise candidates of other free preparation workshops (credential advising workshops, free CBEST writing workshops), financial aid (university financial aid, Noyce Scholarships, TEACH grants, CSUN College of Education grants, Federal Perkins Loan Teacher Cancellation, Federal Teacher Loan Forgiveness Program, etc.), and opportunities for admission (exceptional admission, and ITA ["intent to apply"], which enables students to take classes prior to admission). In addition, prospective credential applicants get the opportunity to know university faculty and staff that can help advise them on the process needed to get a credential.

Developing STEM Education Ambassadors through our Master's Degree Programs –

California State University Northridge offers Master's Degree programs in Science Education, Mathematics Education, and Instructional Technology. In the past 15 years, we have conferred approximately 475 Master Degrees in STEM Education (Science, Mathematics or Instructional Technology). Our graduates are teacher-leaders and STEM-education ambassadors that help recruit future STEM teachers through their academic and personal networks. Approximately 20% of the individuals that enter our math and science credential programs were referred by our Master's graduates.

2. ***What best practices in math and science teacher recruitment and preparation has your campus implemented? Which of these have potential for replication and scale-up?***

We believe that it is important to provide a ***coordinated***, ***progressive assistance plan*** for science and math teacher recruitment and preparation. We believe that each of the following has potential for replication and scale-up, but we are convinced that the most effective recruitment mechanism is the CSET preparation workshops.

(1) **Paid Early Field Experience** – Before an individual may enter the CSUN credential program, they must have had early field experience working with adolescents. We employ pre-teachers in a local high school STEM education program during the summer as teaching assistants, as well as in the CSUN Upward Bound program. This provides them not only with an early field experience necessary for admission, but helps them see if teaching is the right career for them. Due to limited MSTI funding, this program has been on hiatus. Since we see the value in this work we are going to prioritize our other work and bring this program back. .

(2) **Free CBEST Writing Preparation Workshops**– All credential candidates are required to pass the CBEST Writing Exam. We provide free monthly CBEST writing preparation courses to help prospective students prepare for the exam.

(3) **Free CSET Preparation workshops in Foundation Level Math (FLM)** – We provide a free *64-hour* CSET Preparation course in mathematics [Subtests-I,II]

(4) **Free CSET Preparation workshops in Foundation Level General Science**– We provide a free *40-hour* CSET Preparation course in Foundation Level General Science [Subtest-I]

(5) **Free CSET Preparation workshops in Mathematics**– We provide a free *40-hour* CSET Preparation course in mathematics [Subtest-III]

(6) **Free CSET Preparation workshops in Physics**– We provide a free *40-ho*ur CSET Preparation course in physics [Subtest-II]

(8) **Websites /Online Recruitment -** Surveys have determined that the majority of our teacher candidates have found our CSET preparation workshops and credential program through Internet searches. We place interest surveys on our websites that allow us to passively collect the names of those interested in learning more about becoming a math or science teacher. (https://sites.google.com/site/csunmsti/)

(9) **Listserves** – We created a listserve of those who have expressed interest in becoming a math or science teacher, and advertise our offerings to them via email.

(10) **Recruitment of Undergraduates** – We advertise our credential program, scholarships, CSET and CBEST prep, and other MSTI resources to every upperclassman at CSUN who is in the College of Science and Mathematics.

(11) **Undergraduate Advising** – We offer advisement to those in the four-year integrated (FYI) math/credential program and a 2-year Junior Year Integrated (JYI). Faculty and staff provide counseling, encouragement, and information about enrichment activities and scholarships. The mathematics department recently hired a full-time advisor who will provide information about credential pathways as well as other career options.

(12) **Special Admissions** – Those who have attended our CSET preparation workshops, but are not fully qualified for admission to the credential program, are encouraged to apply for exceptional admission and/or ITA status. This shortens the time required to complete the program and encourages those who may have been otherwise denied admission.

(13) **Financial Incentive for Entrance to the Credential Program** – We offer a $500 scholarship to those who complete our math and science preparation workshop and enter our CSUN credential programs.

(14) **Credential and Employment Advisement** – The College of Education provides advisement to math and science credential candidates, providing information about course selection, financial aid, job fairs, and job openings.

(15) **Financial Incentive for first Math or Science Credential** – We offer a $500 scholarship to those who attended the CSET preparation workshops and earned their first math or science credential.

(16) **Pre-Professional Development Opportunities** – CSUN advertises professional development opportunities for which pre-service teachers in the credential program can apply. During the past year we have engaged pre-service teachers in the following.

a. NASA- CSUN-JPL Initiative – This initiative has just started and will involve pre-service STEM teachers in NGSS-based Earth and Space Science Education projects. We anticipate serving about 50 participants/year, approximatley 25% of which are pre-service teachers.

b. California Science Project – San Fernando Valley Science Project. STEM credential students may participate in 2+ week workshops in

Environmental Science.

c. STAR Project - CSU STEM Teacher and Researcher (STAR) Summer Internships with federal research laboratories in California (starteacherresearcher.org) or in internships with Informal Science Institutions. The participation in this project varies from 0-2 per year.

3. ***How have the MSTI project and activities contributed to addressing state teacher shortage in math and science and to campus teacher shortage efforts overall?***

The MSTI project and activities have been vital for recruitment and persistence in the CSUN math and science credential programs. It should be noted that the CSUN MSTI Project has been working on a significantly reduced budget for the past few years. In 2016, at the request of the CSU Chancellor's office, CSUN used MSTI funds as leverage to support associated efforts in two projects: the Bechtel NGEI Project and the NSF i3 Project. As a result, the MSTI project was forced to operate for one year without any MSTI funds and solely on the $75,000 TRP funds. Two years ago, our MSTI budget was reduced significantly from $165,000 to $100,000. Nonetheless, we have continued to be successful in recruiting and retaining many potential science and math teachers, and if our funding is restored, we expect to have significantly greater impact.

We believe that we will exceed our targets in coming years for the following reasons:

(1) Through our CSET-preparation workshops in Foundation Level General Science and Foundation Level Math, we have helped numerous teachers qualify for entrance to credential programs at CSUN and our sister campuses, CSUCI, CSUB, CSULA, CSUDH, CSUF, and CSULB. We are in the process of collecting data on the numbers who are attending each of these institutions.

(2) Through our CSET-Math-III Exam preparation workshops, numerous teachers have qualified to earn Mathematics credentials.

(3) Through our CSET-Physics Exam preparation workshops, approximately 100 teachers have received training to pass the CSET exam. To our knowledge, 7 have taken the exam and passed, but we believe many more have done so, and we plan to collect data. None of the participants in these workshops were prepared to pass the physics CSET exam prior to the workshop, and many will have to take the preparation courses a second or third time before gaining the skills necessary to pass the CSET and effectively teach physics. Many others are planning to take the exam in the within the next year.

(4) In the *past yea*r we have revised an ***extensive online curriculum for those seeking physics credentials***. This site includes numerous simulations, animations, and movies, as well as complete movies of 40-hour CSET preparation course for aspiring physics teachers. This site is ***free to anyone who is interested in preparing for the CSET Physics Subtest-II***. Nearly fifty teachers throughout the state have used the videos and study material to prepare for the CSET Physics exam (subtest II), and we anticipate many more will use the resources once we start to advertise.

(5) In the *past four year*s we have adopted a much more ***aggressive advertisement*** strategy. We advertise widely for our CSET FLM, FLGS,

Physics-III and Math-III preparation courses, as well as for NGSS courses, Noyce scholarships, and other scholarship possibilities.

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[1] Lead States, N. G. S. S. (2013). Next generation science standards: For states, by states.
[2] Gao, Niu. (2016). College Readiness in California: A Look at Rigorous High School Course-Taking. Public Policy Institute of California.
[3] American Association for Employment in Education, Inc., 2010 Executive Summary: Educator Supply and Demand in the United States (AAEE, Columbus,OH, 2010)
[4] California State University (2018). Mathematics and Science Teacher Initiative Annual Report

2019-20 MATHEMATICS AND SCIENCE TEACHER INITIATIVE (MSTI) PLAN Campus: Northridge

MATHEMATICS: ***PLEASE DUPLICATE TO COMPLETE THE CAMPUS MSTI MATHEMATICS PLAN.***
It is expected that a portion of the plan will be new and address state teacher shortages. Components that are continued should reflect evidence of success.

I. Mathematics Teacher Preparation Objectives: Indicate the number of teachers prepared in years listed below and the numbers planned for 2019-20 by type (Regular and Foundational Level).

Regular*	**2018-19 12**	**2019-20 17**	**2020-21 19**	**Subject Matter Authorization Regular †**	**2018-19 3(15)**
FLM*	**2018-19 4**	**2019-20 10**	**2019-20 11**	**Subject Matter Authorization FLM †**	**2018-19 5(21)**

* These are the number of basic credentials recommended by the credential office.

† The CSUN Credential Office does not report added authorizations, however our MSTI program leads to many added authorizations. The first number represents the number of added authorizations that we are aware of. The number in parentheses represents the total number of credentials earned. CSUN students earned a total of 15 regular math credentials, and 21 FLM credentials (anyone qualifying for math credential also earns a FLM credential), for a **total of 36 math credentials**. CSUN does not track *supplemental* authorizations, although we plant to do so.

II. Describe all planned project components and identify from below the strategies each component represents:
(1) Support for teacher shortage initiatives, (2) New and/or expedited pathways (3) Increasing candidates in existing credential programs (4) Comprehensive recruitment and outreach
(5) Community college partnerships (6) Online Learning (7) Financial Assistance (8) Industry or federal lab partnerships (9) Preparing teachers for FLM or (10) Other (please specify).

III. Indicate the target population the component is directed toward.
(a) Undergraduates (b) Recent college graduates (c) Credential candidates (d) Career changers (e) Second credential teachers (f) Community college students, or (g) Other (please specify).

New Components	*Strategies to Be Used*	*Target Populations*
Residency Student Teaching Program (ACT-R)- The Accelerated Collaborative Teacher Residency (ACT-R) Program, offered collaboratively by the Michael D. Eisner College of Education, California State University, Northridge (CSUN) and the Los Angeles Unified School District (LAUSD), is recruiting a diverse cohort of teacher candidates in special education, secondary mathematics education and secondary science education. Selected candidates will obtain a credential in 2 semesters through full-time study, completing coursework in the late afternoon and evening and residency assignments with experienced mentor teachers in high-need LAUSD schools. Candidates in ACT-R are eligible for a stipend of up to $15,000 through a grant funded by the Commission on Teacher Credentialing. Program completers must commit to teaching in LAUSD for a minimum of four years.	1,2,7	b,c,d
Computer Science Supplemental Authorization - We are working with our partners to develop a pathway for teachers to attain the Computer Science Supplemental Authorization as defined by the CTC. Prof. Foley (Secondary Education) and Professor Liu (Computer Science) are collaborating to develop the program, including a new computer science methods	2	a,b,c,d,e,f

course that will be a key feature of this program (as well as for the Computer Science Credential which is expected to be authorized by CTC in 2019). We will provide guidance for in-service and preservice teachers on which courses to take and how to apply for the Authorization.		
Encouraging math teachers to consider teaching Computer Science –Teachers who earn math credentials are authorized to teach computer science."[1] We plan to work with the CSUN Credential Preparation Office to ensure that those seeking to earn mathematics credentials know that they will also be authorized to teach computer science. Although all mathematics teachers may be authorized to teach computer science, most have not taken much, if any coursework in computer science. We plan to encourage math credential candidates to take consider taking the program of study mentioned in the previous row (courses in computational thinking, computing practice and programming, computer and communication devices, and impacts of computing) so that they are truly prepared to teach computer science.	10 (broadening perspectives)	b,c,d,e
Expanded Math CSET subtest III Exam Preparation Workshop- We have found that our CSET preparation workshops are key factors in the preparation of prospective applicants for acceptance in to our credential programs. There was substantial interest in the 2017 MATH CSET subtest III Workshop. We plan to offer this workshop more frequently to address the dramatic shortage of Math teachers. Participants will earn a $500 scholarship once they earn their math credential.	4,9	c,d,e, g (preparing for subtest III_
Improved Website advertising Financial Support through TEACH, Noyce, and other programs for prospective math teachers – We plan to develop a website that aggressively advertises TEACH grants, Federal Perkins Loan Teacher Cancellation, Federal Teacher Loan Forgiveness Program, and CSUN Robert Noyce scholarships.	7	a,b,c
National Council of Teachers of Mathematics (NCTM) student memberships– We plan to offer student memberships and additional funding for prospective teachers to attend NCTM conferences. We believe that early involvement in professional organizations will encourage professional networking and ease the transition from the university to the workplace.	8	a,c
Stipends and Scholarships for Prospective Math Credential Candidates - Continue to expand the number of stipends and scholarships awarded to prospective credential candidates, current credential candidates, and undergraduate and graduate students interested in math teaching careers. Supported activities include summer field experiences, paid tutoring opportunities in collaboration with programs such as *Project GRAD, Summer Academic Enrichment Program*, and *Upward Bound.* Additionally, scholarships will be awarded to outstanding STEM majors, and undeclared majors participating in field experiences	2, 3, 4, 7	a, b, c, d, e
Continuing Components	***Strategies To Be Used***	***Target Populations***
40-hour Math CSET subtest III Exam Preparation Workshop (3 times per year)- We have found that our CSET preparation workshops are key factors in the preparation of prospective applicants for acceptance in to our credential programs. To date, we have only offered CSET preparation workshops for Foundation Level Math (FLM) and Foundation Level General Science (FLGS). We now intend to offer preparation for *subtest III (Calculus / Trigonometry / History of Mathematics).* We anticipate that this will be a 40-hour workshop. Participants will earn a $500 scholarship once they earn their math credential.	4,9	c,d,e, g (preparing for subtest III_

[1] California Department of Education (2018). "California Adopts First-Ever Computer Science Standards". Release 18-56, September 7, 2018. Tom Torlakson, State Superintendent of Public Instruction.

64-hour CSET Foundational Level Preparation Workshops for Math Subtests I & II (3 times per year) - Continue to offer CSET Mathematics Preparation Workshops for prospective Single Subject Mathematics credential candidates, Multiple Subject credential candidates, and credentialed teachers to prepare for passage of the CSET Mathematics exams. These sessions support admission to the Mathematics and Foundation-Level Mathematics credential programs, and assist credentialed teachers in obtaining Single Subject Mathematics credentials through Added Authorization.	2, 3, 4, 9	a, b, c, d, e, f
CBEST Writing Workshops (monthly) - CBEST writing workshops will continue for prospective Single Subject Mathematics credential candidates to prepare for passage of the writing portion of the CBEST exam. This workshop supports admission to Mathematics credential programs. Participants will be tracked to provide follow up support and determine workshop effectiveness.	2, 4	a, b, d
Support for TEACH grants for prospective math teachers - The TEACH Grant Program provides grants of up to $4,000 a year to students who are completing or plan to complete the single subject foundational level and/or math credential. The CSUN MSTI project will encourage prospective math teachers to apply for TEACH grants.	4,7	c
Project Lead The Way – We plan to offer incentives to prepare current teachers and potential candidates in innovative activities that introduce the engineering design process such as Makerspaces and Project Lead the Way	10 enrichment	b,c
Experiences for prospective math teachers– We plan to align MSTI closely with other campus programs (credential program, masters program, Noyce scholars), encouraging MSTI participants to attend enrichment activities, such as viewing through the historic 60" Mt. Wilson telescope, attendance at math education conferences, attending math education lectures, etc.	3	a,b,c
Advertisement to Undergraduate math students – We plan to work with the math department to coordinate teacher recruitment sessions during class-time in undergraduate math courses. Experienced math teachers and university faculty will team up for brief recruitment and Q&A sessions in undergraduate math courses. In addition, flyers about the math credential program and special opportunities will be posted in the math building.	1,3,4	a
Advisement for FYI- and JYI Math-Teacher Program- We have developed a successful Four-Year Integrated Mathematics (FYI-Math) and two-year Junior Year Integrated (JYI) teacher credential program, designed for students who wish to complete a BA in mathematics simultaneously with a preliminary secondary teaching credential. We plan to support faculty and staff in the math department to recruit students for this program and to advise those who are in the program.	4, 9	a
Follow-up CSET FLM and Math-III Workshop Participants - As a result of word-of-mouth and aggressive advertising, our CSET workshops have become much more popular in recent years. Although many workshop participants enter our credential program, preliminary data shows that many have not earned their credentials within two years of the workshops. We plan to conduct follow-up surveys to determine what is happening to those that do not enter our credential program, followed up with counseling and support to encourage and prepare them to enter a credential program at CSUN or another university.	4, 9	a, b, c, d, e, f
Database Tracking of Applicants and Graduates- Continue the application and development of the comprehensive database and tracking applications. A database coordinator has designed and implemented a program to record and track MSTI and related collaborative projects, as well as individual project participants. Tracking and evaluation applications will continue to be refined and developed to evaluate program effectiveness, how programs can be improved, track progress made by candidates, and determine how to best assist candidates to earn Math credentials.	4	a, b, c, d, e, f

Supporting CSU Graduation Initiative 2025 (Executive Order 1110) - The CSUN MSTI program is aligned with the Graduation Initiative 2025, employing undergraduates to tutor young people in mathematics through our University's Upward Bound Program and through the Polytechnic HS STEM Summer program. Gainful employment will help CSUN pre-STEM teachers complete their undergraduate education in a timely fashion while learning how to teach math and science effectively. In addition, the secondary school students they tutor will be better academically prepared to complete their baccalaureate education in a timely fashion.	7,10 (early field experience)	a, c
Recruitment via website - Continue with revisions, upgrades and enhancements to the College of Education website that include pages devoted to the recruitment of Mathematics teachers. These pages link to credential program information, financial assistance opportunities, clinical and early teaching experience opportunities, information on adding mathematics authorizations to existing credentials, and CSET and CBEST preparation workshops.	2, 3, 4	a, b, c, d, e

SCIENCE ***PLEASE DUPLICATE TO COMPLETE THE CAMPUS MSTI SCIENCE PLAN.***
It is expected that a portion of the plan will be new and address state teacher shortages. Components that are continued should reflect evidence of success.

I. Science Teacher Preparation Objectives: Indicate the number of teachers prepared in 2018-19, the numbers projected for 2019-20, and the numbers planned for 2020-21 by discipline (Biology, Chemistry, Earth Sciences, Physics, Foundational Level General Science).

Preliminary credentials

Biology*	**2018-19 12**	**2019-20 16**	**2020-21 18**	**Chemistry***	**2018-19 4**	**2019-20 5**	**2020-21 6**
Geosciences*	**2018-19 2**	**2019-20 3**	**2019-21 4**	**Physics ***	**2018-19 1**	**2019-20 8**	**2020-21 9**
FLGS*	**2018-19 5**	**2019-20 7**	**2020-21 8**				

2018-19 Subject Matter Authorizations

Biology † 2(14) Chemistry † 0(4) Geosciences † 0(2) Physics †† 6(8+) FLGS † 1(33)

* These are the number of basic credentials recommended by the credential office.

† The CSUN Credential Office does not report added authorizations, however our MSTI program leads to many added authorizations. The first number represents the number of added authorizations that we are aware of. The number in parentheses represents the total number of credentials earned. CSUN students earned a total of 14 biology credentials, and 4 chemistry credentials, 2 geoscience credentials, 7 physics credentials, and 33 FLGS credentials (anyone qualifying for biology, chemistry, geoscience or physics credentials also earns a FLGS credential) for a **total of 61 science credentials**.

† † Our Physics CSET training is provided free online (https://sites.google.com/site/physicsiicsetprepcourse/physics-cset to anyone who wishes to prepare for the Physics CSET-II. Aspiring physics teachers throughout the state watch 40+ hours of physics CSET-II preparation and earn credentials, but we do not have an accurate count of who does this.

Note: CSUN does not track *supplemental* authorizations, although we plant to do so.

II. Describe all planned project components and identify from below the strategies each component represents.

(1) Support for teacher shortage initiatives, (2) New and/or expedited pathways (3) Increasing candidates in existing credential programs, (4) Comprehensive recruitment and outreach (5) Community college partnerships (6) Online Learning (7) Financial Assistance (8) Industry or federal lab partnerships (9) Preparing candidates for FLGS, or (10) Other (please specify).

III. Indicate the target population the component is directed toward.

(a) Undergraduates (b) Recent college graduates (c) Credential candidates (d) Career changers (e) Second credential teachers (f) Community college students or (g) Other (please specify).

New Components	*Strategies To Be Used*	*Target Populations*
Computer Science Supplemental Authorization - We are working with our partners to develop a pathway for teachers to attain the Computer Science Supplemental Authorization as defined by the CTC. Prof. Foley (Secondary Education) and Professor Liu (Computer Science) are collaborating to develop the program, including a new	10 (broadening perspectives)	b,c,d,e

computer science methods course that will be a key feature of this program (as well as for the Computer Science Credential which is expected to be authorized by CTC by 2020). We will provide guidance for in-service and preservice teachers on which courses to take and how to apply for the Authorization. There are many connections between sciences and computer science, and we will encourage science teacher candidates to consider earning computer science supplemental authorizations through our newly developed pathway. We will advertise this program to all 30 teachers currently enrolled in our Masters program in instructional technology.		
Residency Student Teaching Program (ACT-R)- The Accelerated Collaborative Teacher Residency (ACT-R) Program, offered collaboratively by the Michael D. Eisner College of Education, California State University, Northridge (CSUN) and the Los Angeles Unified School District (LAUSD), is recruiting a diverse cohort of teacher candidates in special education, secondary mathematics education and secondary science education. Selected candidates will obtain a credential in 2 semesters through full-time study, completing coursework in the late afternoon and evening and residency assignments with experienced mentor teachers in high-need LAUSD schools. Candidates in ACT-R are eligible for a stipend of up to $15,000 through a grant funded by the Commission on Teacher Credentialing. Program completers must commit to teaching in LAUSD for a minimum of four years.	1,2,7	b,c,d
Improved Website advertising Financial Support through TEACH, Noyce, and other programs for prospective math teachers – We plan to improve our website that aggressively advertises TEACH grants, Federal Perkins Loan Teacher Cancellation, Federal Teacher Loan Forgiveness Program, and CSUN Robert Noyce scholarships.	7	a,b,c
CSET Chemistry subtest II Exam Preparation Workshop – NGSS requires that all graduating high school seniors have competencies in all four basic sciences (biology, chemistry, physics, earth and space science). With the advent of NGSS, we anticipate a dramatic increase in the demand for chemistry teachers as high schools adopt the 4-course or 3-course (with integrated earth and space science) models. To address this impending chemistry teacher shortage, we plan to offer a specialized workshop for those seeking additional authorization to teach high school chemistry. We anticipate that this will be a 40-hour workshop. Participants will earn a $500 scholarship once they earn their chemistry credential. We planned to offer this in the summer of 2019, but did not have sufficient funding so will plan to do this in 2020.	9, 10 Preparing for CSET chemistry exam	a, b, c, d, e, f , g (preparing for subtest III)
Continuing Components	***Strategies to Be Used***	***Target Populations***
44-hour Foundation Level General Science - CSET subtest I Exam Preparation Workshop (2 times per year)- We have found that our CSET preparation workshops are key to the preparation of prospective applicants for acceptance in to our credential programs. We plan to offer CSET. We plan to offer free workshops in the Spring, Summer and Fall semesters.	3	a,b,c,d,e
40-hour CSET Subtest-II Physics Exam Preparation Workshop (once per year) – We plan to offer a free 40-hour CSET prep course for teacher who want to earn the physics credential.	3	a,b,c,d,e
CBEST Writing Workshops - CBEST writing workshops will continue for prospective Single Subject Mathematics credential candidates to prepare for passage of the writing portion of the CBEST exam. This workshop supports	3	a,b,c,d,e

admission to Mathematics credential programs. Participants will be tracked to provide follow up support and determine workshop effectiveness.		
Support for TEACH grants for prospective science teachers - The TEACH Grant Program provides grants of up to $4,000 a year to students who are completing or plan to complete a single subject science credential. The CSUN MSTI project will encourage prospective science teachers to apply for TEACH grants.	4,7	c
New Online Physics CSET subtest II Preparation Course – Open to anyone throughout California – We have developed an online course for anyone wanting to pass the new NGSS-based CSET-II exam for physics. The online course includes 40 hours of video instruction by professors at CSUN, as well as numerous simulations. We plan to advertise this site to prospective physics teachers throughout California and beyond. The website is: https://sites.google.com/site/csunmsti/physics-cset.	1,2,3,4,6	a,c,d,e
Continuing Support for CSU Graduation Initiative 2025 (Executive Order 1110) - The CSUN MSTI program is aligned with the Graduation Initiative 2025, employing undergraduates to tutor young people in the sciences through our University's Upward Bound Program as well as placing undergraduates interested in teaching into local high school summer bridging programs in math and science.. Gainful employment will help CSUN pre-STEM teachers complete their undergraduate education in a timely fashion while learning how to teach math and science effectively. In addition, the secondary school students they tutor will be better prepared in the sciences for entrance to college and will be better prepared to complete their baccalaureate education in a timely fashion.	7,10 (early field experience)	a, c
Recruitment, NGSS and CSLC Workshops and Activities for Science Tutors – Aligned with above we will offer follow up activities for STEM majors who participate in MSTI sponsored tutoring, after-school programs, out-reach STEM programs and clinical experiences. These activities provide information about science teaching careers through presentations by current science teachers, CSUN faculty and current science credential candidates; Next Generation Science Standards (NGSS), including practical application; credential program application requirements and procedures; CBEST and CSET, including preparation workshops; and comprehensive financial aid including MSTI sponsored stipends and federal loan forgiveness programs. This component is specifically designed to cultivate an interest in teaching science developed through clinical experiences and funnel the participants into credential program preparation and admission by providing them the opportunity to get their field experience hours necessary for admission.	2, 3, 4,	a, g (graduate STEM majors)
Workshops for NGSS Framework – Delivered by Framework writers - The NGSS-based California State Framework for Teaching Science in high school was written by three professors at CSU Northridge (both the 3-course and 4-course models). We will continue to present workshops for prospective and practicing teachers on implementation of NGSS as outlined in the Framework. Throughout the state most high schools have adopted the 3-course model. The 3-course model is an integrative high school model, in which earth and space science is threaded through the content in biology (*The Living Eart*h), chemistry (*Chemistry in the Earth System*, and physics (*Physics in the Universe*). Our team has presented the scope and sequence of the 3-course model throughout the state in one and two day workshops. At these workshops it becomes clear that we have a shortage of chemistry and physics teachers and therefore we encourage practicing science teachers to earn second and third science credentials (a goal of the MSTI project), and we have found that many who attend these workshops can be influenced to pursue additional science credentials to better prepare to teach NGSS.	1, 9, 10	a,b,c,d,e,f

Follow-up for CSET FLGS and Physics-II Workshop Participants - As a result of word-of-mouth and aggressive advertising, our CSET workshops have become much more popular in the past two years. Although many workshop participants enter our credential program, preliminary data shows that many have not earned their credentials within two years of the workshops. We plan to conduct follow-up surveys to determine what happens to those that do not enter our credential program, followed up with counseling and support to encourage and prepare them to enter a credential program at CSUN or other another university.	4, 9	a, b, c, d, e, f
Experiences for prospective science teachers– We plan to align MSTI closely with other campus programs (credential program, masters program, Noyce scholars), encouraging MSTI participants to attend enrichment activities, such as viewing through the historic 60" Mt. Wilson telescope and our annual NGSS open house.	3	a,b,c
California Science Teachers Association (CSTA) student memberships– We plan to offer student memberships and additional funding for prospective teachers to attend CSTA conferences. We believe that early involvement in professional organizations will encourage professional networking and ease the transition from the university to the workplace.	8	a,c
Stipends and Scholarships for Prospective Science Credential Candidates - Continue to expand the number of stipends and scholarships awarded to prospective credential candidates, current credential candidates, and undergraduate and graduate students interested in science teaching careers. Supported activities include summer field experiences, paid tutoring opportunities in collaboration with programs such as *Upward Bound.* Additionally, scholarships will be awarded to outstanding STEM majors, and undeclared majors participating in field experiences.	2, 3, 4, 7	a, b, c, d, e
Database Tracking of Science Credential Applicants and Graduates- Continue the application and development of the comprehensive database and tracking applications. A database coordinator has designed and implemented a program to record and track MSTI and related collaborative projects, as well as individual project participants. Tracking and evaluation applications will continue to be refined and developed to evaluate program effectiveness, how programs can be improved, track progress made by candidates, and determine how to best assist candidates to earn biology, chemistry, physics, earth and space science and foundation level science credentials.	4	a, b, c, d, e, f
Recruitment of Potential Science Teachers - Continue to expand focused and coordinated recruitment efforts to recruit current STEM professionals, CSUN students, teaching assistants, tutors, participants in clinical experience, community college students, and high school students. Activities will continue that encourage and support credential program applicants, follow up on applicants who do not complete the application process, and applicants who have been denied. Activities will be coordinated with various entities such as CSUN's Career Center, the College of Science and Mathematics, the College of Engineering and Computer Science, and University Outreach.	2, 3, 4	a, b, c, d, e, f
Liberal Studies Recruitment Activities of Science Teacher Candidates- Continue to expand Liberal Studies recruitment activities focusing on bringing Multiple Subject candidates into the Enhanced Option for Added Authorization in FLGS. We will also include the Liberal Study students who have a concentration in science and encourage them to consider getting an added authorization in science as they will already have additional science content courses. The focus will include Liberal Studies majors not in a teaching option and encourage them to	2, 3, 4	a, c

pursue credential programs that can offer both Multiple and Single Subject credentials by choosing the Enhanced Option leading to an Added Authorization in FLGS.		
Recruitment via Website - Continue with revisions, upgrades and enhancements to the College of Education website that include pages devoted to the recruitment of science teachers. These pages link to credential program information, financial assistance opportunities, clinical and early teaching experience opportunities, information on adding mathematics authorizations to existing credentials, and CSET and CBEST preparation workshops. Links will also appear on the College of Science and Mathematics website.	2, 3, 4	a, b, c, d, e
Special admission for prospective science teachers via ITA – CSUN has developed a program entitled "Intent to Apply" which allows students to take a total of 10 semester units before formal admission to the program. We started encouraging prospective science teachers to take advantage of ITA so that they obtain their credentials in a more expeditious manner. We plan to advertise the ITA option more widely to prospective applicants.	1, 2,3	b,c
Special admission for prospective science teachers via Exceptional Admission - California State University Chancellor's Executive Order #758 allows the College of Education to admit a limited number of Teacher Education candidates under Exceptional Admission. Starting in the Fall 2016, we strongly encouraged a number of prospective science teachers to apply for exceptional admission, and we plan to do the same in the coming year.	1, 2,3	a, b

MSTI Budget Narrative for 2019-2020

1.0 Personnel Salaries

1.1 MSTI funds in the amount of **$18,200** will be used as replacement salary for faculty to coordinate the Campus Plan Components, for Fall, Spring and Summer semesters.

2.0 Supplies and Expenses

3.1 MSTI funds in the amount of **$2,000** for Printing and Duplication used in the Campus Plan Components.

3.2 MSTI funds in the amount of **$3,500** will be used for the purchase of Instructional Materials used in the Campus Plan Components.

3.3 MSTI funds in the amount of **$1,500** will be used for office supplies used in the Campus Plan Components.

4.0 Consultants and Honoria

4.2 MSTI funds in the amount of **$1,800** will be used for Faculty Advisors to attend and answer questions during EdTPA Community Gatherings.

5.0 Travel (In-state)

5.2 MSTI funds in the amount of **$5,000** will be used for travel to the Annual MSTI Project Director's Meeting.

7.0 Stipends and Scholarships

7.1 MSTI funds in the amount of **$12,000** will be used for the stipends and housing costs for 2 STAR Fellows.

7.3 MSTI funds in the amount of **$4,000** will be used for books and materials for participants in Campus Plan Components.

7.4 MSTI funds in the amount of **$23,000** will be used for scholarships for students to facilitate

the completion of Math and Science credentials.

8.0 Other Expenses

8.1 MSTI funds in the amount of **$29,000** will be used for CSET Test Preparation and to reimburse the costs incurred by students for CSET exams.

California State University — 2019-20 Budget Form

Mathematics and Science Teacher Initiative Funding

Campus: Northridge Fund/Account for Transfer: 48501 / 660B01 Fiscal Contact: fred.moreno@csun.edu

2018-19 Budget Report and 2019-20 Proposed MSTI & TRP Budgets

Year	Item		MSTI Actual 2018-19	TRP Actual 2018-19	MSTI Proposed 2019-20	TRP Proposed 2019-20
	1.0	**Personnel - Salaries**				
	1.1	Faculty	$ 23,300.00	$ -	$ 18,200.00	$ -
	1.2	Staff	$ -	$ -	$ -	$ -
	1.3	Students	$ -	$ 25,800.00	$ -	$ 13,000.00
		Sub-Total	$ 23,300.00	$ 25,800.00	$ 18,200.00	$ 13,000.00
	2.0	**Personnel - Benefits**				
	2.1	Faculty	$ -	$ -	$ -	$ -
	2.2	Staff	$ -	$ -	$ -	$ -
	2.3	Students	$ -	$ -	$ -	$ -
		Sub-Total	$ -	$ -	$ -	$ -
	3.0	**Supplies and Expenses**				
	3.1	Printing and Duplication	$ 5,000.00	$ -	$ 2,000.00	$ -
	3.2	Instructional materials	$ 4,500.00	$ -	$ 3,500.00	$ -
	3.3	Office supplies	$ 2,500.00	$ -	$ 1,500.00	$ -
		Sub-Total	$ 12,000.00	$ -	$ 7,000.00	$ -
	4.0	**Consultants and Honaria**				
	4.1	K-12 Teachers	$ -	$ -	$ -	$ -
	4.2	Other	$ -	$ -	$ 1,800.00	$ -
		Sub-Total	$ -	$ -	$ 1,800.00	$ -
	5.0	**Travel (In-state)**				
	5.1	Recruitment/Outreach	$ -	$ -	$ -	$ -
	5.2	Professional Development	$ -	$ 200.00	$ 5,000.00	$ -
	5.3	Other	$ -	$ -	$ -	$ -
		Sub-Total	$ -	$ 200.00	$ 5,000.00	$ -
	6.0	**Meeting Expenses**				
	6.1	Facilities	$ -	$ -	$ -	$ -
	6.2	Refreshments	$ -	$ -	$ -	$ -
	6.3	Other	$ 200.00	$ -	$ -	$ -
		Sub-Total	$ 200.00	$ -	$ -	$ -
	7.0	**Stipends and Scholarships**				
	7.1	Stipends	$ 9,620.00	$ 9,000.00	$ 12,000.00	$ -
	7.2	Student Fees	$ 300.00	$ -	$ -	$ -
	7.3	Books and Materials	$ -	$ -	$ 4,000.00	$ -
	7.4	Scholarships	$ 16,500.00	$ 1,000.00	$ 23,000.00	$ -
		Sub-Total	$ 26,420.00	$ 10,000.00	$ 39,000.00	$ -
	8.0	**Other Expenses**				

Mathematics and Science Teacher Initiative Campus Contacts 2018-19 All Liaisons Should be Identified		
Campus Name: California State University, Northridge	College Submitting Plan: Michael D. Eisner College of Education	
MSTI Project Director (1):		
Name: Shari Tarver-Behring	Title: Dean, Michael D. Eisner College of Education	
Department: - Dean of the Michael D. Eisner College of Education		
Street Address and Campus Mail Code: 18111 Nordhoff St., 8265		
City and Zip Code: Northridge, CA 91330-8265		
Campus Phone: (818) 677-2590	Fax: (818) 677-4000	E-mail Address: starver-behring@csun.edu
MSTI Project Director (2):		
Name: Jerry Stinner	Title: Dean, College of Science and Mathematics	
Department: Dean, College of Science and Mathematics		
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City and Zip Code: Northridge, CA 91330-8238		

Campus Phone: (818) 677-2005	Fax: N/A	E-mail Address: jerry.stinner@csun.edu
College of Education Liaison:		
Name: Norman Herr	Title: Professor of Secondary Science Education	
Department: Secondary Education		
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Campus Phone: 818 677-2505	Fax: 818 677-2582	E-mail Address: norm.herr@csun.edu

Science Department Liaison:		
Name: Virginia Vandergon	Title: Professor of Biology	
Department: Biology		
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Math Department Liaison:		
Name: Kellie Evans	Title: Professor of Mathematics	
Department: Mathematics		
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Phone: (818) 677-2705	Fax: 818 677-2582	E-mail Address: *kellie.m.evans@csun.edu*
Fiscal/Administrative Liaison:		
Name: Fred Moreno	Title: Manager of Academic Resources	
Department: Dean's Office		
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City and Zip Code: Northridge, CA 91330-8265		
Campus Phone: (818) 677-2590	Fax: Fax: (818) 677-4000	E-mail Address: alfred.moreno@csun.edu

PLEASE SEND ELECTRONICALLY to:
Dr. Fred Uy, fuy@calstate.edu on or before September 6, 2019