

Science and Mathematics Teacher Imperative

January 6, 2010

President Barack Obama
The White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear Mr. President:

We write to salute your leadership and determination to revolutionize science, technology, engineering, and mathematics (STEM) education and to convey our commitment to contributing significantly to this noble goal.

As you have so eloquently stated, if we as a nation do not prepare one of the world's most educated, and scientifically and mathematically literate workforces, then we have no chance of continuing to be one of the world's most secure and competitive economies.

To educate our students to compete effectively in the global economy, we need to prepare the world's best science and mathematics teachers. As the institutions with, by far, the largest cohorts of the most capable undergraduate science, mathematics and engineering students, public research universities have a critical role to play in preparing the number and quality of teachers the nation requires. Over the past several decades, our large public research institutions have all too often stood aside and not participated as we can—and must—to the critical need for highly qualified science and mathematics teachers.

Discovery from research stimulates excitement and enthusiastic attention from young people. Learning by doing research at major research universities teaches science in the way that mere rote learning cannot. One of the needs now is to teach science in a different and more meaningful way—by prompting students to learn how to find the answers—and, perhaps more important, how to ask the questions. Even at the most basic level, teachers prepared at research universities have the opportunity to understand the world through their own explorations and thus become significantly more effective in their teaching craft. Decades of research on how people learn, studies of environments that support student learning, and successful models of teacher professional development, advocate for such approaches.

Many of our institutions—still too few—have demonstrated that a whole university (colleges of science and education working together) can cast science and mathematics teaching as the critical and noble profession that it is for young people to consider.

As presidents of major public universities, we are newly resolved to address this national challenge. We offer as a new major contribution to your Administration's efforts, our commitment to the **Science and Mathematics Teacher Imperative (SMTI)**.

We deliberately define this effort as an **Imperative**. We do not take this lightly, simply issuing a statement or report, expecting others to implement. For this sustained effort, our pledge is to substantially increase the number and diversity of high-quality science and mathematics teachers we prepare, and build better partnerships among universities, community colleges, school systems, state governments, business, and other stakeholders.

Preparing more than 7,500 mathematics and science teachers annually, we are presently 121 public research universities across 41 states—including 11 university systems. We launched this new and powerful effort about a year ago, making it the nation's largest such initiative.

While each of our efforts reflects the needs in our particular states for science and mathematics teachers, and acknowledges intense fiscal challenges, 39 institutions and several systems are today committing to at least doubling the number of teachers they prepare. (A chart of our individual commitments is included below.) Together, our institutions committing to SMTI will strive to increase the number of new science and mathematics teachers we prepare to more than 10,000 annually by 2015, for an accumulated 7,500 new teachers over the five years from what we would have prepared.

We and our colleagues on science, mathematics and education faculties participating in SMTI are inspired and driven by a "can-do" attitude:

- Faced with a plethora of "one-off" innovative, exemplary and dedicated programs across the country over the past decade by universities in Texas, California, North Carolina, Georgia and Colorado with no common driving force or learning community, we created SMTI to serve as a convener and coordinating vehicle.
- Finding the nation lacks a comprehensive source of information about effective programs and practices to prepare science and mathematics teachers—we are developing one. Our "Analytic Framework," funded by grants from the Carnegie Corporation of New York and the National Science Foundation (NSF) will enable institutional benchmarking and the identification of exemplar practices, supported by evidence.
- Reaching the preparation of 10,000 new teachers annually by 2015 will require more effective institutional sharing and taking to scale exemplar practices. Such scaling has not been accomplished in the past due to a lack of effective dissemination of information, collaborative leadership and coordination, the absence of a coherent model of change, and an academic desire not to repeat anyone else's ideas. SMTI will document leading practices and, working in partnership with participating public research universities; other universities; school systems; state, local and federal governments; as well as the business community, we will greatly extend the impact of locally proven practices to major regions, underserved populations and demographically similar locations.
- Recognizing that enhancing the priority of teacher preparation at individual universities is key, we have teamed with the American Physical Society in an NSF funded Math and Science Partnership to study conditions that promote change in a test group of 26 universities.

- Realizing the strength in learning across universities, SMTI encompasses many approaches. Our coalition of institutions has lead participants in major science and mathematics teacher preparation reform programs. For example:
 - APLU institutions have awarded more than half the NSF Noyce Scholarships to their students since the program began.
 - Eleven of the fifteen UTeach sites, including the originator, the University of Texas, Austin, are SMTI participants.
 - Nine of the twelve NSF funded Physics Teacher Education Coalition (PhysTEC) sites participate in SMTI.

In sum, we are committed to addressing this critical national need for more and better science and mathematics teachers. Through the Science and Mathematics Teacher Imperative we have come together to learn from leading innovative programs, define and assess the quality of our efforts, understand how to better partner with school systems, and challenge ourselves to improve relentlessly our activities.

Mr. President, we ask that you and your Administration continue to provide dedicated leadership to the nation to address these critical concerns in new ways, forming new collaborations. We seek enhanced opportunities to work with your Executive Office on an overall approach, as well as federal agencies. We note for example that your Secretary of Education would like to make his Department a science and mathematics “powerhouse” and we would like an opportunity to help make that happen. The National Science Foundation has been seeking new ways to better integrate research and education, and assisting universities in developing a robust scholarship of science education. The Department of Energy is recognizing the urgent need to support science education, if our citizenry is to understand why and how we might seek more sustainable economy.

And finally, Mr. President, we seek your sustained challenge to us to be more creative, more innovative, and more dedicated in addressing these national challenges. We hope that each time you turn back to us with further encouragement over the course of the next several years; we are working more closely with leaders of your Administration to define how we might better meet our mutual national objectives to retain our high U.S. quality of life and global leadership.

Respectfully,



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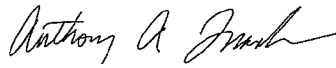
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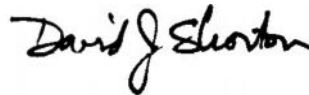
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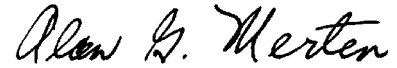
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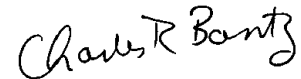
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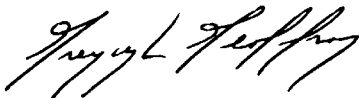
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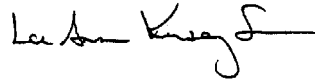
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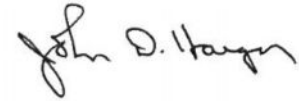
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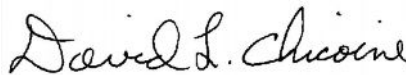
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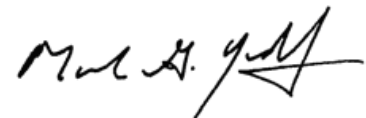
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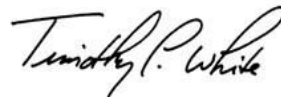
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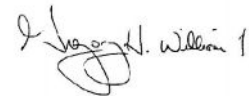
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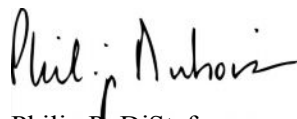
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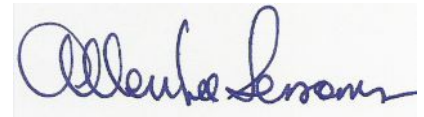
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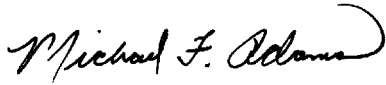
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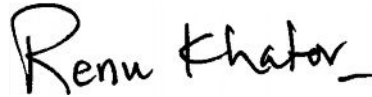
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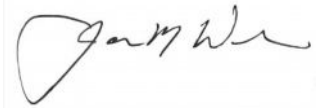
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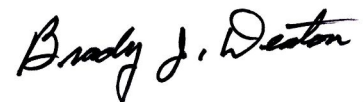
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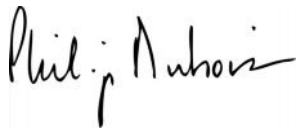
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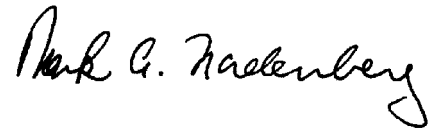
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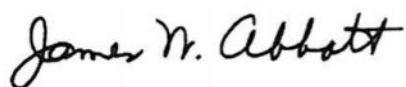
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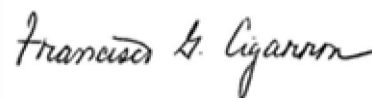
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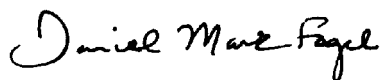
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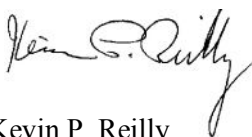
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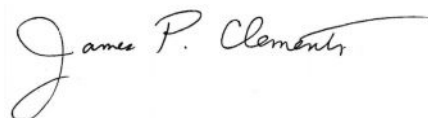
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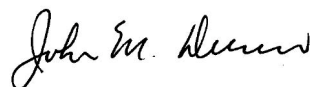
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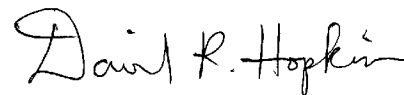
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The Association of Public and Land-grant Universities (A·P·L·U) launched the Science and Mathematics Teacher Imperative in November 2008 to increase the number and diversity of high-quality middle and high school science and mathematics teachers in the United States. To meet this goal, SMTI works to galvanize university leadership to action, strategically improve teacher preparation, develop a teacher personnel needs assessment tool, and expand the number of teachers prepared annually at public research universities.



Universities Intending to Double Science and Mathematics Teachers Prepared

Systems	Number of teachers produced in Baseline year	Number of teachers produced in Final year
California State University System*	768	1536
University of California System	563	1126
University System of Maryland	106	374
Institutions		
University of Georgia	91	206
California State University, Fullerton*	54	154
Georgia State University	46	150
University of North Carolina at Charlotte	70	148
University of Houston	43	140
San Francisco State University*	62	134
University of Maryland College Park	31	130
Colorado State University	33	117
California State University, Fresno*	38	103
University of South Carolina - Columbia	24	82
California Polytechnic State University, San Luis Obispo*	13	80
Northern Arizona University	33	80
University of Texas at Arlington	38	76
University of South Florida	31	75
University of North Texas	30	70
Virginia Tech	20	63
The University of Memphis	27	60
University of Cincinnati	29	60
University of Kansas	16	60
Florida State University	28	58
Florida International University	6	56
University of Wyoming	23	55
Ball State University	26	53
Boise State University	15	50
University of Colorado Denver	21	50
University of New Mexico	25	50
University of Colorado at Boulder	20	45
University of Illinois at Chicago	20	43
University of Tennessee, Knoxville	20	40
Wichita State University	16	40
University of Utah	14	36
University of Missouri - Kansas City	13	35
University of Idaho	13	34
University of Kentucky	13	32
The University of Montana	10	31
New Mexico State University	15	30
Cornell University	14	28
Indiana University-Purdue University Indianapolis	10	20
Alabama A&M University	5	15

The universities implemented their initiatives at different times--with most beginning in 2006-2009 and ending in 2011-2015.

*Institutions which began their initiative in 2003.