March 17, 2009

The Honorable Bart Gordon
Chairman
House Committee on Science and Technology
2321 Rayburn HOB
Washington, DC 20515

The Honorable Ralph Hall
Ranking Member
House Committee on Science and Technology
394 Ford HOB
Washington, DC 20515

The Honorable Daniel Lipinski
Chairman
Subcommittee on Research and Science Education
2321 Rayburn HOB
Washington, DC 20515

The Honorable Vernon Ehlers
Ranking Member
Subcommittee on Research and Science Education
394 Ford HOB
Washington, DC 20515

Dear Chairmen Gordon and Lipinski, and Ranking Members Hall and Ehlers:

Thank you for the opportunity to comment on the draft of the Networking and Information Technology Research and Development Act of 2009. As leaders of the computing community, we are encouraged that the draft includes many key recommendations of the recent President’s Council of Advisors on Science and Technology (PCAST) report. These provisions will strengthen the Networking and Information Technology Research and Development (NITRD) program.

We believe the draft legislation can, and should, go further to bolster the networking and information technology (NIT) field. It is critical that federal efforts to expose young people to computer science improve, and that its investments recognize that all racial, gender and socioeconomic groups are crucial to the continued health of and future innovations in the computing field. To that end, the bill should expand and better leverage and coordinate existing education efforts with the NITRD program.

Specifically, we recommend that the bill:

- Promote computing education, particularly at the K-12 level, and increased exposure to computing education and research opportunities for women and minorities as core elements of the NITRD program;
- Require the NITRD program to address education and diversity programs in its strategic planning and road-mapping process;
• Expand efforts at the National Science Foundation (NSF) to focus on computer science education, particularly at the K-12 level through broadening the Math Science Partnership program; and,
• Enlist the Department of Education and its resources and reach in addressing computer science education issues.

Computing and the innovations it yields are critical to the domestic economy. However, the current NIT workforce pipeline will not satisfy the demands of an industry that includes some of the country’s most innovative and successful companies. It is crucial that K-12 students are exposed to computer science education. The PCAST report noted some of our concerns in this regard, arguing that K-12 science and mathematics preparation is weak, and students and parents are exposed to a negatively skewed view of computer science and engineering. This was reinforced by a recent National Academies study of the information technology research and development ecosystem, which says, in part:

“Concerns about the generation of talent are exacerbated by the poor state of the kindergarten through grade 12 (K-12) IT/computing education system in the United States. In its report The New Education Imperative: Improving High School Computer Science Education, the Computer Science Teachers Association correctly assesses the situation as one in which knowledge of computer science is as essential as any of the traditional science, but in which curriculums, leadership, funding, professional development for teachers, and fluency objectives for students are all deficient.”

The diversity of the pipeline also remains a major concern. Participation rates among women and minorities in computer science are among the lowest of any scientific field. In 2008, only 17% of Advanced Placement (AP) computer science test takers were women, even though women represented 55% of all AP test takers. Participation in computer science AP tests among underrepresented minorities has increased in the past decade, but it is only at 11%, compared to 19% of all AP test-takers.

NITRD has a Program Component Area (PCA) that includes education activities and specifically mentions the 21st Century workforce and K-12 education as strategic priorities. However, there is little specific attention to these issues within the PCA or prioritization within the NITRD program in general. Most education funding is from the National Science Foundation (NSF). The Department of Education does not participate in the NITRD program at all. And, of the NSF activities, there appears to be little to no involvement with some of the key programs within NSF’s Education and Human Resources Directorate focused on strengthening K-12 science, technology, engineering and mathematics education, including the Math Science Partnership program.

The public investments in K-12 education are largely based on outdated visions of education, curriculum and the skills that high school graduates should master. Simply put, we must do more to strengthen computer science and related curricula, to expose and attract a more diverse population of students to computing and to support teachers of
computer science at the K-12 level. Given the national education and workforce needs, it is short-sighted to rely on a relatively small federal agency and effort to address K-12 issues in computer science education. It is imperative that specific investments in computing education are authorized and funded. Addressing this in the NITRD reauthorization would be a welcome, and appropriate, step toward strengthening the computer science education pipeline and supporting the critical innovations it brings to industry and the economy.

Thank you again for the opportunity to comment on this important legislation. Please see the included legislative language that supports our views and proposals. We look forward to working with you as this bill moves forward.

Sincerely,

Robert B. Schnabel
Chair, ACM Education Policy Committee
Dean, School of Informatics, Indiana University

Daniel A. Reed
Chair
Computing Research Association

Lucy Sanders
Chief Executive Officer
National Center for Women and Information Technology
Proposed Legislative Language

Recommendation:

- Promote computing education, particularly at the K-12 level, and increased exposure to computing education and research opportunities for women and minorities as core elements of the NITRD program;


1. by redesignating subparagraph (I) as subparagraph (K)
2. by inserting before subparagraph (K), as redesignated by paragraph (1), the following new sub paragraphs:
   -(I) support the teaching and learning of computer science at the K-12 level, including curriculum development, computer science teacher recruitment, pre-service teacher training, and high-quality professional development for teachers;
   -(J) promote the increased participation of women and minorities in the computing field; and"

Recommendation:

- Require the NITRD program to address education and diversity programs in its strategic planning and road-mapping process;

Further, on page 4, line 7 of the draft of the Networking and Information Technology Research and Development Act of 2009, add the following new clauses:

“(iv) how the program will address computer science education challenges, including those at the K-12 level; and
   “(v) how the program will attract more women and minorities to the computing field.”

Recommendation:

- Expand efforts at the National Science Foundation (NSF) to focus on computer science education, particularly at the K-12 level through broadening the Math Science Partnership program; and,

Title II, Section 201(a), of the High Performance Computing Act is amended—

1. by redesignating paragraphs 2 through 4 as paragraphs 3 through 5; and
2. by inserting the following new paragraph before paragraph 3, as redesignated by paragraph (1):
“(2) the National Science Foundation shall use its programs, and collaborate with other federal agencies, to support efforts to develop innovative computer science curriculum, to increase exposure to and learning of computer science in the country’s K-12 education system, to recruit, retain and provide high-quality professional development for computer science teachers, and to expand the number of women and minorities in the computing field.”

Title II, Section 201, of the High Performance Computing Act is amended—

(1) by redesignating subsection (b) as subsection (c)
(2) by inserting the following new subsection before subsection (c) as redesignated by paragraph (1):

“(b) IMPROVING COMPUTER SCIENCE EDUCATION

“(1) ESTABLISHMENT- As part of the program authorized by section 9 of the National Science Foundation Authorization Act of 2002, the Director of the National Science Foundation shall provide 1 or more grants to establish partnerships as defined by subsection (a)(2) of that section, except that each such partnership shall include 1 or more businesses engaged in the computing industry. Partnerships established in accordance with this subsection shall be designated as ‘Computer Science Education Partnerships’.

“(2) PURPOSE- Computer Science Education Partnerships shall be designed to recruit and help prepare secondary school students to pursue postsecondary level courses of instruction in computer science. At a minimum, grants shall be used to support—

“(A) professional development activities to enable secondary school teachers to use curricular materials incorporating computer science and to inform teachers about career possibilities for students in computer science;

“(B) enrichment programs for students, including access to adequate computer labs, supercomputers, and other facilities and equipment at partner institutions, to increase their problem-solving skills, algorithmic thinking, understanding of computing and computer science and to inform them about career possibilities in computing and computer scientists as scientists, engineers, and technicians; and

“(C) identification of appropriate computer science educational materials and incorporation of computer science into the curriculum for secondary school students at one or more organizations participating in a Partnership.

“(3) SELECTION- Grants under this subsection shall be awarded in accordance with subsection (b) of such section 9, except that paragraph (3)(B) of that subsection shall not apply.”
Recommendation

• Enlist the Department of Education and its resources and reach in addressing computer science education issues.

Title II, Section 206(a), of the High Performance Computing Act is amended by replacing paragraph (a) as follows—

“(a) GENERAL RESPONSIBILITIES—(1) As part of the Program described in title I, the Secretary of Education is authorized to conduct basic and applied research in computational research with an emphasis on the coordination of activities with libraries, school facilities, and education research groups with respect to the advancement and dissemination of computations science and the development, evaluation and application of software capabilities; and

“(2) the Secretary of Education shall integrate computing and computer science in its activities and priorities related to science, technology, engineering and mathematics (STEM) education, including the awarding of competitive grants, discussing professional development and K-12 curriculum and ensuring that its efforts support the needs and goals of NITRD.”