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PROFESSOR

DEPARTMENT OF COMPUTER SCIENCE
AND ENGINEERING

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Faculty Senate

The Department of Computer Science and Engineering proposes that the University of South Carolina change its mathematics and science requirements for admission to permit the use of Advanced Placement Computer Science A (AP CS A) in satisfaction of either a mathematics course requirement or a science course requirement, provided that direction from the Commission on Higher Education recommends and permits such a change.

This change would reflect a growing agreement that computer science is a core academic discipline and that a rigorous course in computer science provides for a high-school student an equivalent educational preparation in critical thinking, analytical and mathematical reasoning, and the scientific method as do the traditional courses in mathematics and the other sciences. As of January 2014, thirteen states (AL, IN, MD, MI, MO, NC, OK, TN, TX, UT, VT, VA, WI) and the District of Columbia now permit AP CS A to count for high school graduation as a math course; one state (GA) permits it to count as a science course, and three states (OR, RI, WA) permit it to count for either math or science. Use of AP CS A to fulfill a math or science requirement for university admission has happened in some of these states and is under consideration in the rest.

We in computing at USC emphasize two points in this proposal. We are proposing that a course requirement in mathematics or in science could be satisfied by a course in “real computer science”, and that the course that is used must be rigorous. To ensure rigor, we confine ourselves at present to AP CS A; although this might change, we do not anticipate a change in the near future. And in speaking of “real computer science”, we (in the computing discipline) distinguish courses in computer science, as computer science is defined in a university setting, from courses in the *use* of computer applications such as Microsoft Office, Photoshop, or tools for web design. *Using* computer software is not *doing* computer science; doing computer science would come if one were designing or creating a new software package.

We add some background comments in support of the conclusion that computer science is, in the 21st century, a core subject. The US Department of Energy has put

computational science on an equal footing with theory and with bench lab experiments. The most recent Nobel prizes in chemistry went to researchers whose contribution was entirely in computational chemistry. Increasingly, computation is replacing bench lab science as a means for reducing the number of (expensive) bench lab experiments that must be performed.

We remark finally that an emphasis on computer science is more than consistent with the notion that the university, even as it tries to emphasize scholarship and learning, must also be mindful of the marketplace and of economic development. In all the areas of “STEM” (computer and information science; life, physical, and agricultural science; engineering and engineering technology; and mathematics), the United States is producing more graduates than projected jobs in all sub-disciplines EXCEPT in computer science. The US is producing more engineers than engineering jobs, more life and physical scientists than jobs in those areas, and more mathematicians than mathematics jobs. But we as a nation are producing only about 1/3 as many computer scientists as there are jobs available. Accepting AP CS A as a math or a science will not make a *significant* change in this issue of national security, but making a statement that computer science is in fact a core discipline for the 21st century is a first step that must be taken.

Sincerely,

A handwritten signature in blue ink, appearing to read "D. Buell".

Duncan A. Buell