Computer Science: It's Where the Jobs Are

Technology workforce issues are much in the news these days, stimulated by proposed changes to the nation's H-1B "guest worker" visa policy. A recent report from the Economic Policy Institute on science, technology, engineering, and mathematics (STEM) workforce supply and demand was covered last week by the *Seattle Times*, the *Washington Post*, *The Atlantic*, and others. The report argues that there is no shortage of graduates in STEM fields overall, and that this applies to all of the various subfields of STEM, including computer science. A related article appeared in the *Seattle Times* on Sunday.

Allow me to inject a few facts into the conversation. (As Daniel Patrick Moynihan famously said, "Everyone is entitled to his own opinion, but not his own facts.")

It's indeed the case, both nationwide and in our state, that there is no overall shortage of STEM graduates. But this is not news – it's been the case for many years. This does *not* mean you shouldn't major in a STEM field if that's your passion, any more than that you shouldn't major in journalism (where the job prospects are far more grim).

However, nationwide there *is* a well-documented shortage of graduates in computer science. The Bureau of Labor Statistics projects that *70% of all newly-created jobs across all STEM fields during this decade* – across engineering, the physical sciences, the life sciences, and the social sciences – will be in computer science. The field is booming.

And in Washington there is a well-documented shortage in the health professions and in engineering, as well as in computer science. A 2011 study by the Higher Education Coordinating Board carefully examined the gap between supply and demand for all fields, identifying the fields with significant gaps at the 2-year, 4-year, and graduate education levels. The accompanying chart synthesizes the 4-year and graduate data from that study. Computer science leads by far, with the health professions and engineering next. (At the bachelors level, the gap between supply and demand in computer science is nearly twice as large as the gap in engineering, and three times as large as the gap in the health professions.) Compared to these three fields, other fields barely move the needle.

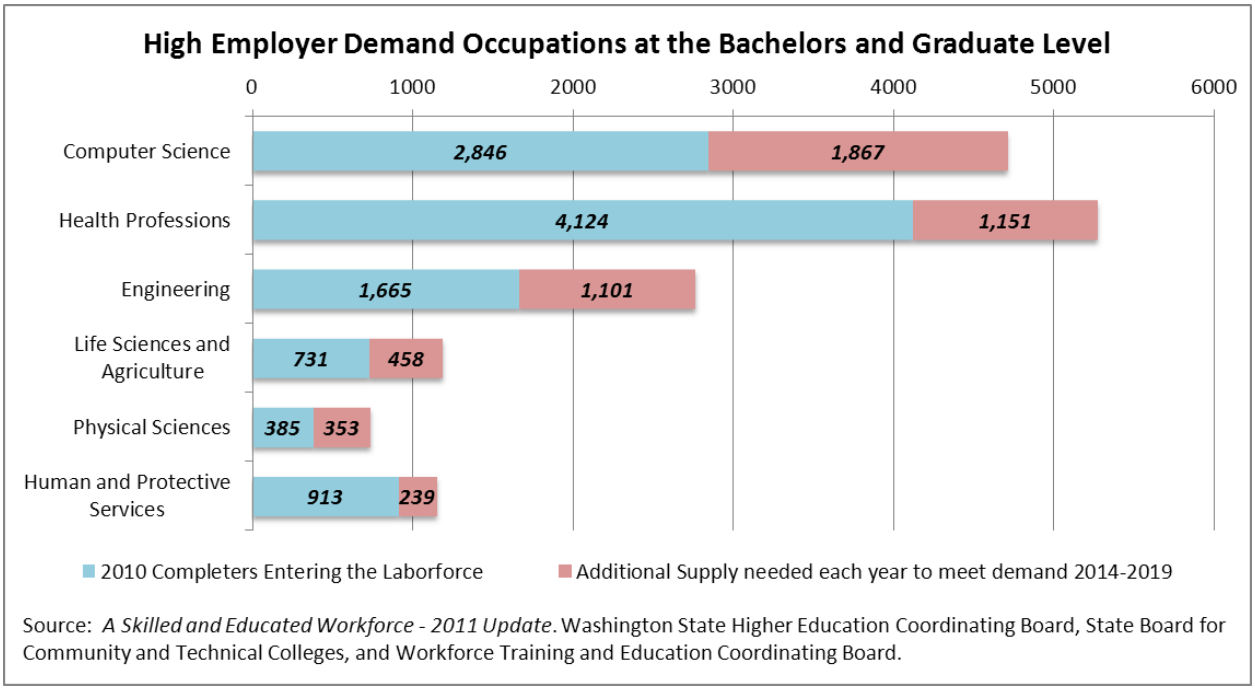
Importantly, while students educated in one field do sometimes take jobs in other fields, and while many employers require a diverse range of employee skills, preparation and skills vary significantly from field to field. STEM graduates are not interchangeable! Most civil engineers are not prepared to design biomedical implants, most biomedical engineers are not prepared to design bridges, most computer scientists are not prepared to practice surgery, and most chemists are not prepared to design complex software systems. To drive this point home: during the most recent year, *85% of all students hired from the University of Washington* by Microsoft, Google, Amazon.com and Facebook for internship and permanent positions had degrees from a single academic program: Computer Science & Engineering on the Seattle campus.

I do not take a position here on the wisdom of H-1B visa expansion. Nor do I deny that there are some individuals in the IT field who, unfortunately, are unemployed or under-employed. However, anyone in the computer science education business, or attempting to recruit for the IT field, is well aware of the extraordinary competition for both new graduates and seasoned professionals with state-of-the-art experience and skills, and of the incredible "change the world" opportunities that this field affords.

I *do* take a position on the wisdom of expanding enrollment in Computer Science & Engineering at the University of Washington! Due to staffing and facilities limitations, UW CSE – ranked among the top ten programs in the nation, along with the likes of Stanford, MIT, Carnegie Mellon, and Berkeley – can accommodate only about 25% of the students who successfully fulfill prerequisite courses and apply to the major. This is a critical issue for Washington's economy, but more importantly for Washington's students: 80% of UW CSE undergraduates are Washington residents, and the vast majority remain here after graduation.

Computer science: It's where the jobs are. It's also where the future is.

Edward D. Lazowska
Bill & Melinda Gates Chair in Computer Science & Engineering
University of Washington



Source: *A Skilled and Educated Workforce - 2011 Update*. Washington State Higher Education Coordinating Board, State Board for Community and Technical Colleges, and Workforce Training and Education Coordinating Board.