Observatoire Landau

BPC & PC

By Rubin Landau, Department Editor

Last April I attended the 2009 Richard Tapia Celebration of Diversity in Computing Conference in Portland, Oregon, a meeting aimed at broadening participation in computing (BPC). It rained and was cold at first but was bright and warm at the end. Although I had heard about this event since it started in 2001, this was the first one I attended (it was a short drive by Western standards). As might be expected, there were many students there of various colors and shades, with men and women pretty much equally represented. What I did not expect, but was delighted to experience, was how generally bright, well-spoken, socially skilled and well dressed were the students when compared to the undergraduate and graduate physics students I am familiar with at Oregon State University. (While physics students are often bright, they hardly ever well-spoken, socially skilled and well dressed.) In fact, as the days of the conference rolled along, I became more convinced that these students were real winners and would be successful in the various fields that interested them, regardless of their race or gender. As if reading my thoughts, the conference ended with Richard Tapia addressing the students in a fatherly way and by telling them that they should "think of themselves as minority professionals in their respective fields and not as professional minorities". This particularly rang a bell with me as I have been active in faculty governance at our university where I have seen "diversity" grow into an industry and have listened to faculty complains about the imposition of political correctness (the PC in the title).

The Tapia Celebration also made me wonder if BPC is just PC for computing and whether the computational science community can benefit by increasing diversity in computing. It is some of those thoughts that I wish to present here.

Let's start with some facts. National surveys and reports continue to tell us that the total number of students now in computing is not adequate to meet the future needs of the country. Furthermore, surveys also indicate that there are disproportionally small fractions of minorities, women, and persons with disabilities in computing [http://www.nsf.gov/statistics/wmpd/pdf/tabc-4.pdf]. For females:

% Bachelor's degree given to females by field for two years								
Year	*All Sci*	*Ag*	*Bio*	*CS*	*Earth*	*Physical*	*Social*	*Engr*
1997	55.7	46.4	58.5	28.0	40.0	41.1	54.2	20.5
2004	55.7	51.5	61.7	20.5	41.2	42.4	53.7	19.5

We see that the percentage of domestic bachelor's degrees in CS given to women was 28% in 1997, but has fallen to 21% in 2004. This should be compared to the 56% of all science degrees given to women in these years, to the 41-42% in the physical sciences, and to the 59-62% in the biological sciences. So not only is the percentage of CS degrees given to women lower than that in all disciplines except engineering, that percentage is also decreasing. Although we do not have this same measure for other groups, here are some data showing the interest college freshman have in majoring in various science and engineering fields according to race, ethnicity and sex [http://www.nsf.gov/statistics/wmpd/pdf/tabb-8.pdf]:

Intentions of freshman (%) to major in S&E fields, by race/ethnicity and sex; 2006

Race/ethnic/sex	*All S&E*	*Bio/Ag*	*CS*	*Engr*	*Physical*	*Soc/Behave*
White female	24.2	8.1	0.3	2.2	1.9	11.0
Black female	32.1	11.0	1.1	2.3	1.6	15.7
Hispanic	35.9	9.8	1.2	6.4	2.1	15.5
American Indian	34.4	10.0	1.6	7.5	2.7	12.2

We see that students enter college with approximately 1/2- 1/30 the interest in CS as they have in other sciences, which is clearly hard for higher education to overcome.

There is, however, a positive aspect in these tables; because the percentage of underrepresented students in other sciences is significantly higher than that in CS, we can significantly increase the number of students educated in computation, and broaden participation in computing by bringing CS-level computation into more of the sciences. This is exactly what many of us have been trying to do for some time. Furthermore, investigations have found that students not currently attracted to the hardware and software aspects of CS become more interested in computing after they learn how it is an essential ingredient in the solutions to many societal problems.

Yet broadening participation in computing by including these other groups is not just skin deep and not just for the numbers. As the NSF says, "The under participation of these groups causes a loss of opportunity for individuals, a loss of talent to the workforce, and a loss of diverse perspectives and creativity that are needed to shape the future of technology." Furthermore, because the "diverse" students will be incorporating computation into diverse fields, we should see the need for new and challenging applications of computing, which in turn should bring new challenges and advances into CS.

So we see that CSE community has much to gain here. By teaching and incorporating computation into fields other than CS, we can help meet the nation's need for well-educated IT workers, we can help correct some social wrongs of the past, we can help in the better use of computation to solve societal problems, we can help bring new ideas into CS, and we can meet some very interesting people.