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Workforce Diversity in the IT Profession: Recognizing and Resolving the Shortage of Women and Minority Employees

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There are two related problems – Hispanic-American employees hold only 5% of IT workforce, but under 30% of the IT workforce. African- and Department of Commerce, women represent 46% of the total untapped (ITAA, 2000). According to statistics from the U.S. fields, and as employers struggle to recruit an adequate number in the general population, this shortage could be ameliorated or resolved entirely. Moreover, achieving a greater representation of women and minority employees in the IT workforce may enhance creativity, performance and product markets (Panteli et al., 2001). Women and minorities are underrepresented in the IT fields, and as employers struggle to recruit an adequate number of IT skilled workers, large pools of potential talent remain untapped (ITAA, 2000). According to statistics from the U.S. Department of Commerce, women represent 46% of the total workforce, but under 30% of the IT workforce. African- and Hispanic-American employees hold only 5% of IT workforce jobs, yet comprise over 12% of the US population (NSF, 2000). There are two related problems – attracting women and minorities to IT-related careers and retaining them, once educated and hired.

In terms of problems attracting women to the IT workforce, this problem should have improved in recent years, but has actually worsened. In the past decade, more women have received college degrees than men, however, these have largely been in fields other than science, engineering, and IT-related subjects (NCES, 1999, 2002). The proportion of women holding IT-related jobs has declined precipitously in the past decade. The problem of insufficient minority candidates remains unchanged.

Categories and subject descriptors
Computing Profession, Occupations (K7.1)

General Terms: Measurement.

Keywords: careers, gender, minorities, race

Introduction and Motivation
There is growing evidence of another impending skills shortage of IT professionals, with a significant contributor being the underrepresentation of women and minorities in the IT workforce (Office of Technology Policy, 1999; Freeman & Aspray, 1999). There are claims that if minorities and women were included in the IT workforce at rates close to their representation in the general population, this shortage could be ameliorated or resolved entirely. Moreover, achieving a greater representation of women and minority employees in the IT workforce may enhance creativity, performance and product markets (Panteli et al., 2001). Women and minorities are underrepresented in the IT fields, and as employers struggle to recruit an adequate number of IT skilled workers, large pools of potential talent remain untapped (ITAA, 2000). According to statistics from the U.S. Department of Commerce, women represent 46% of the total workforce, but under 30% of the IT workforce. African- and Hispanic-American employees hold only 5% of IT workforce jobs, yet comprise over 12% of the US population (NSF, 2000). There are two related problems – attracting women and minorities to IT-related careers and retaining them, once educated and hired.

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Overview of Panelist Presentations
Mike Gallivan will introduce the panel and its members, and summarize the key themes of several recent studies that have examined issues of gender and the underrepresentation of minority groups in IT tertiary education and in the IT workforce.

Monica Adya will report on her research examining what diverse cultures can teach us about the environments conducive to equitable representation of women in the IT workforce. Her presentation will examine cultural and social dimensions of gender issues in IT, including the similarities and differences between women IT professionals from western and South Asian cultures regarding parental and societal influences, role models, IT career motivations, perceptions of IT work, and work-life balance. Her presentation will examine how organizations and schools must respond to declining numbers of women, contrasted with the increasing cultural diversity of the workforce.

Manju Ahuja will report on an NSF-funded IT workforce (ITWF) project involving a large-scale investigation of the role of academic culture in relation to women’s IT educational experiences over time. Data were collected through a web-based survey of over 1,700 students across 18 participating academic units, 152 face-to-face interviews, classroom observations, and observations of the physical spaces of various academic units. Preliminary findings indicate concerns shared by faculty they surveyed with regard to students’ perceptions of IT courses and curricula. She will also report various academic units’ efforts to recruit women and minority students – including outreach, scholarships, and special admissions. One intriguing finding is that women who exhibit high gender awareness (a construct that she will introduce) are more ambitious than the women employees as a whole. If we assume that ambition correlates...
with success, this suggests that the women most likely to seek change may be well-positioned to be successful in their fields.

**Peter Hoonakker** will present research that he has jointly conducted with Pascale Carayon at the University of Wisconsin-Madison. In their NSF-sponsored study on turnover in the IT workforce, they have examined the job and workplace factors that contribute to turnover among women and members of underrepresented minority groups. Their study found that, in comparing women and underrepresented minorities with white males, the reasons for job turnover were largely the same: a combination career advancement and desire to learn new skills. For employees from underrepresented minority groups, the importance of seeking a higher salary was much more important than for the other groups. This makes sense, given findings showing that minorities in the IT workforce have lower status jobs and lower salaries, relative to “majority group” men and women. Not surprisingly, minority IT employees report fewer job demands and less job challenge, leading to high turnover.

**Amy Wosczynski** will present her research on the choices made by university students with regard to IS, computer science, and other IT-related tertiary education. As high schools begin to offer more distance learning courses, universities have an opportunity to establish partnerships to deliver a variety of courses. As we face declining enrollment in technology-related fields, these partnerships offer the ability to reach a set of students who may not otherwise consider careers in IT (women, African- and Hispanic-Americans, as well as first-generation college students). She will describe CyberTech I, an NSF-funded program to deliver online courses to secondary school students. Initial results indicate that students were satisfied with their online course experience and plan to continue in the program. Amy will also explain the impact of CyberTech I on the IT job “pipeline,” as well as in terms of recruiting members of these underrepresented groups to IT careers.

**Question & Answer session**. We will ask attendees to submit their questions on note cards during the presentations. Following the panel presentations, the Moderator will organize these questions and encourage participants to elaborate on them.

**Biographical Information:**

Mike Gallivan is Associate Professor of Computer Information Systems at Georgia State University in Atlanta. He received a BA in Psychology & Social Relations from Harvard, MBA and MPH degrees from University of California, Berkeley, and a PhD from the MIT Sloan School of Management. He studies human resource practices for managing IT employees, as well as user training, technology adoption, and outsourcing. He won the 2003 Best Paper Award at SIG MIS-CPR for research on gender and job stress in the IT workforce. Two chapters describing this research are forthcoming in the *Encyclopedia of Gender & IT*.

Monica Adya is an Assistant Professor at Marquette University, Milwaukee. Her interests lie in IT workforce issues pertaining to gender and the impact of global sourcing on workforce needs. As a co-Principal Investigator on a 3M Foundation grant, she is involved in the development of educational responses to global sourcing. In 2005, she published a conceptual paper in *Information Technology & People* regarding the factors shaping young girls’ career choices in the US and India. Her research on judgment in forecasting systems was published in *Information Systems Research* and *Journal of Forecasting*.

Manju Ahuja is an Assistant Professor of MIS at the Kelley School of Business, Indiana University. She holds a PhD in MIS from the University of Pittsburgh. Her work has appeared in *MIS Quarterly*, *Management Science*, *Organization Science*, *European Journal of Information Systems* and *Journal of Management*. She conducts research on issues related to virtual teams, virtual communities, and HR issues for IT employees, including gender. Along with colleagues at Indiana University, she recently received a $700,000 NSF grant.

Peter Hoonakker is a Research Scientist at the Center for Quality and Productivity Improvement at the University of Wisconsin-Madison. His research, jointly conducted with Pascale Carayon, Director of the CQPI, focuses on relationships among job and organizational characteristics, quality of working life and various outcomes such as productivity, turnover, employee health and safety. His research has appeared in *Behaviour & Information Technology*, *Applied Ergonomics*, and *Total Quality Management*. Four chapters describing his research on gender issues in IT will appear in the *Encyclopedia of Gender & IT*.

Amy Wosczynski is Associate Professor of IS and Director of the MSIS Program at Kennesaw State University. She received a BS degree in Industrial Engineering from Georgia Tech, MBA from Kennesaw State University, and a PhD in Industrial Management from Clemson University. She studies gender and diversity issues related to the IT workforce and has published her related work in *Journal of CIS*, *Journal of IS Education*, *Encyclopedia of Information Science and Technology*, and *Encyclopedia of Gender & IT*. She is a co-Principal Investigator on an NSF ITEST grant (Initiative on IT Experiences for Students and Teachers) to increase diversity in IT education.

**References:**


