Broadening Participation in Computing:

Statement of the Problem & Relevant Research

Lisa L. Harlow

University of Rhode Island

Presented at the

Conference on Broadening Participation in CS,
University of Rhode Island – March 1, 2006

Thanks to NSF & URI Grants

Problem: Shrinking Pool in Computer Science (CS)

- Historically European Male CS work force
- Drop in available CS workforce in 1980s & 1990s
- Increased importing of CS workforce in 1990s
- Drop in imported CS workforce after 9-11-2001
- Need to interest, train and retain diverse CS talent

Compounded Problem:

Too few women & minorities in Computer Science

- Female enrollment in CS has dropped
- Less than 20% of CS majors are women
- Only 5% of CS majors are minorities
- From 3 - 30% of computer-based employees are women
- Most CS jobs for women & minorities at lower-paid level

Research Highlights Multiple Relevant Factors:

- Social Construction of Gender
- Divergent Attitudes and Perceptions
- Out-dated, Abstract, and Unattractive Curriculum
- Insufficient Resources and Opportunities

Evidence for a Social Construction of Stereotypes:

- Boys & Girls Equally Capable
- Girls have more self-deprecating views of their CS talent
- Boys often over-state their ability & understanding
- Girls less attracted to competitive & violent computer use
- Boys have more exposure & encouragement in CS

5

From Investigations of Perceptions and Attitudes:

- CS is perceived as a masculine field of study
- CS competence of Females & Minorities' is minimized
- Males in mainly white schools report more CS self-efficacy
- Females & Minorities report more anxiety about CS

6

Literature Reveals Problems with CS Education:

- Teachers give more attention to male students
- Too few female & minority CS teachers
- CS courses are often abstract & overly math-focused
- 1st CS course is often uninteresting & prohibitive

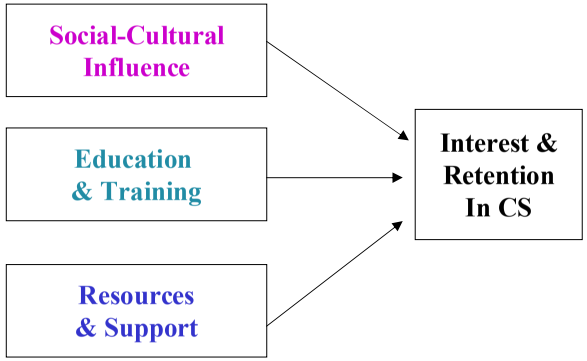
7

Research Suggests Needed Resources:

- More scholarships (esp for females & minorities)
- More summer research, internships & coursework
- More female & minority mentors/role models
- More support from top administrators
- More partnerships with business & non-profit sectors

8

Encourage More Research Regarding CS Study:



9

Learn from Other Model Programs:

- University of Maryland, Baltimore County
  - Meyerhoff Scholarship Program for Minorities
  - Center for Women & Information Technology
- UC Berkeley: Women in Science & Elec Engineering
- Carnegie Mellon: Women@SCS program
- Anita Borg Institute for Women & Technology

10

Summary:

- Use Multifaceted Approach to Address CS Need
- Recognize & Address Socio-Cultural Factors
- Work with Educators at all Levels to Improve Training
- Partner with Relevant Industry to Attract CS Talent

11

Thanks to:

Joan Peckham <joan@cs.uri.edu>

Lisa DiPippo <dipippo@cs.uri.edu>

Susan Gomes <sgomes@uri.edu>

Yan Ma <yanma@uri.edu>

Paul Mangiameli <mangia@uri.edu>

Deb Matthews <dlmath@uri.edu>

David Miller <dlmiller@etal.uri.edu>

Peter Stephenson <ps@imedia-academy.org>

David Stuart <dastuart@raytheon.com>

Diana Ukleja <Diana_Ukleja@raytheon.com>

And many others…

12