Chapter 15
Super Leaders:
Supercomputing Leadership for the Future

Kim Grover-Haskin
University of North Texas, USA

ABSTRACT

Present day and projected labor demands forecast a need for minds to comprehend in algorithm in order to leverage computing developments for real world problem resolutions. This chapter focuses not so much on solutions to the preparation of the learners and the scientists, but on the future leadership that will advocate and open doors for the high performance computing community to be funded, supported, and practiced. Supercomputing's sustainable future lies in its future of leadership. Studies over the last ten years identify a shift in leadership as the Baby Boomers enter retirement. The talent pool following the Baby Boomers will shrink in numbers between 2010-2020. Women continue to be under represented in IT leadership. This chapter provides information on the talent pool for supercomputing, discusses leadership and organizational culture as influenced by gender, and explores how a mentoring community fosters leaders for the future.

INTRODUCTION

High Performance Computing (HPC) is a nationally recognized resource providing scientists and educators a research tool for real world problems. The High Performance Computing Act of 1991 established federal support for HPC environments, applications, research, and development. Supercomputing has gained momentum with enhanced analysis capabilities. In *Getting up to Speed: The Future of Supercomputing* (Graham, Snir, & Patterson, 2005) Raymond Orbach, Director of the Department of Energy (DOE) Office of Science, stated in his testimony before the U.S. House of Representatives Committee on Science, "Now we can simulate systems to discover physical laws for which there are no known predictive equations" (pp. 73-74). Using computational modeling and simulation, the scientific community has the ability to predict the behavior of complex systems.

Over the last 25 years there has been significant progress in supercomputing through an active supercomputing culture of technicians, programmers, and scientists supporting and perpetuating discovery. Leaders must be readied to sustain the momentum and progress of supercomputing. The

DOI: 10.4018/978-1-4666-7461-5.ch015

Bureau of Labor statistics estimates that by 2020 the Baby Boomer population, 55-and-older, will represent the greatest share of the workforce.

The current stream of talent for supercomputing in the fields of mathematics, science, computer science, and engineering will primarily reside within the 45-54 age group by 2020. This group's presence in the job market will shrink 7.6 percent. What is the status of the supercomputing community current talent pool in leadership positions today? Falkenheim and Burrelli (2012) state for science and engineering:

Just over 1 in 10 scientists and engineers working in industry are managers. Men and women and the various racial/ethnic groups differ in their propensity to be managers, partly reflecting differences in age distributions. Among scientists and engineers in the United States, women are younger on average than men, and minorities are younger on average than whites. Among scientists and engineers within industry, men are more likely than women to be managers, both midlevel and top-level managers, executives, and administrators within most racial/ethnic groups and regardless of disability status (table 4). Asians, blacks, and persons who reported multiple races are less likely than whites to be managers. Similar proportions of persons with and without disabilities are managers. (p. 5)

The current diversity within the talent pool in science and engineering is not entering leadership roles. Women are underrepresented in science and engineering leadership. This chapter will provide information on the talent pool for supercomputing revealing a strong technical community for supercomputing's future. A discussion of leadership and organizational culture follows with research on gender. While the future talent pool for supercomputing will be technically capable across multiple roles, there must be effort directed to mentoring individuals to leadership positions. My experience with supercomputing support the power of a mentoring community.

The Talent Pool: A Community of Leaders

The Bureau of Labor Statistics (BLS) in its 2008-2018 employment outlook study projected growth in information technology, computer, and mathematical science occupations. The 2010 to 2020 study continues to support those findings.

Employment in professional, scientific, and technical services is projected to grow by 29 percent, adding about 2.1 million new jobs by 2020. Employment in computer systems design and related services is expected to increase by 47 percent, driven by growing demand for sophisticated computer network and mobile technologies. Employment in management, scientific, and technical consulting services is anticipated to expand, at 58 percent. Demand for these services will be spurred by businesses' continued need for advice on planning and logistics, the implementation of new technologies, and compliance with workplace safety, environmental, and employment regulations. Combined, the two industries—computer systems design and related services and management, scientific, and technical consulting services—will account for more than half of all new jobs in professional, scientific, and technical services (Bureau of Labor Statistics, U.S. Department of Labor, 2012, para. 28).

It has become more apparent for individuals, in order to prepare for these occupations, to pursue postsecondary education, at a minimum. The IES National Center for Education Statistics in its publication *Projections of Education Statistics to 2021* shows total enrollment in postsecondary education is projected to increase 15 percent between Fall 2010 and 2021. The vast majority of those enrolling will be between 18-24 years of age. Graduate enrollment is expected to rise

Related Content