# Panel: Educational Response to Offshore Outsourcing


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## Categories & Subject Descriptors

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## General Terms

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## Summary

The issue of IT offshore outsourcing has received significant attention recently. The impression one gets from the media is that many IT jobs are moving away from developed countries. Indeed, the growth of the IT industry in India over the last five years has been nothing less than spectacular. There is no doubt that prospective CS students are aware of the offshore-outsourcing phenomenon. Some argue that this phenomenon is partly responsible to the continuing drop in computer science enrollments in developed countries. In 2004, ACM has established the Job Migration Task Force to study offshore outsourcing and assess its implications. This study, focusing on the globalization of software, is now completed. In this panel, four members of the ACM Task Force will describe some of the finding of the study, focusing on the educational perspective.


## Statement: M.Y. Vardi - Moderator

Computer science and technology have been incredibly successful. We have created the technology that drove data and voice communication costs almost to zero, with the WWW providing information to anyone, anywhere, anytime. We have driven hardware costs down to the point that inexpensive computing technology is widely available also in developing countries. We have developed standardized curricula, and made educational material widely and freely available. We have agreed on a variety of software interoperability standards, such as MDA, UML, CWM, CORBA, OMA, and others. At the same time, globalization in the last 15 years have been charging ahead, with billions of people joining the free-market world and many dozens of countries joining the World Trade Organization. The result is a world in which not only goods are globally tradable, but labor is also globally tradable; no need to move workers, when labor can be sent over a wire. The software market is globalizing with a vengeance. Our students now find themselves competing directly with Indian programmers. Can they compete effectively? Our educational focus over the last 35 years has been on producing well-educated programmers. Have we positioned ourselves into a evolutionary dead-end niche? What is the future of computer-science education in a globalized software marketplace.

**Moshe Y. Vardi** is the George Professor in Computational Engineering and Director of the Computer and Information Technology Institute at Rice University. He chaired the Computer Science Department at Rice University from January 1994 till June 2002. Prior to joining Rice in 1993, he was at the IBM Almaden Research Center, where he managed the Mathematics and Related Computer Science Department. He is the author and co-author of over 275 technical papers, as well as a book titled "Reasoning about Knowledge". He is Guggenheim Fellow, as well as a Fellow of the Association of Computing Machinery, the American Association for the Advancement of Science, and the American Association for Artificial Intelligence. He was designated Highly Cited Researcher by the Institute for Scientific Information, and was elected as a member of the US National Academy of Engineering and the European Academy of Sciences. He chairs the ACM Task Force.

## Statement: W. Aspray

I will will report on some of the findings from the ACM study on Globalization and the Offshoring of Software. Topics will include education as an enabler of offshoring, the challenges to mounting an educational response to offshoring, descriptions of the state of IT educational systems around the world and their capability of providing an adequate workforce for the software export market, and six major recommendations



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from the study about educational response to offshoring.

**William Aspray** is Rudy Professor of Informatics and Special Advisor on Information Technology and Professional Partnerships in the Office of the Vice President for Research at Indiana University. He is the editor and a contributing author to the ACM Task Force's study of Offshoring and Globalization of Software. He is also the editor or co-author of four other IT workforce studies, including The Supply of Information Technology Workers in the United States (1999, with Peter Freeman). He has served previously as executive director of Computing Research Association, staff director of IEEE, and associate director of the Charles Babbage Institute. He has previously held faculty positions at Harvard, Pennsylvania, Rutgers, Virginia Tech, and Williams. He is on sabbatical for the 2005-06 academic year at the ATLAS Institute of the University of Colorado.

## Statement: A.F. Mayadas

India is currently the world leader in exported software and IT-enabled services. China is rapidly becoming India's principal competitor in this field. Having a sufficiently large, well-trained workforce is essential for India and China to continue to develop their export IT industries. What is the current state of education and training in these two countries? How do the missions and successes of public versus private higher education compare? What are the issues associated with primary education and its role in feeding students into the higher education system? How well are these countries doing in attracting quality faculty? How are these two countries doing in making research an important part of advanced IT education? What is the relationship between universities and industry in these two countries? How are relations with the United States changing, and what does it mean for graduate education? The material presented here is taken from the recent ACM study on Offshoring and the Globalization of Software.

Prior to coming to the Sloan Foundation, **Frank Mayadas** spent 27 years at the IBM Corporation, including serving as Research Division Vice President and Director, Almaden Research Center, San Jose, CA, from 1983 to 1987, and as Vice President, Research Division, Technical Plans and Controls from 1991 to 1992. At Sloan, Dr. Mayadas is involved in a number of areas: online education, globalization of industries, industry studies, and career choice in technical fields. He started the Sloan online learning program in 1993. Mayadas has been a keynote speaker at several distance education conferences and has testified before Congress on web-based learning. He has over 35 published papers in Systems, Devices, and Solid State Physics, and holds several patents, and awards from IBM. He is a fellow of the IEEE. He is the co-chair of the ACM Job Migration Task Force.

## Statement: S.H. Zweben

In a globalized world, our students have to compete in a global job market. We often are told that the computing graduates we are producing do not have the right skills to meet current and future needs of the workforce. Industry argues the necessity of good technical skills, good interactive skills, and good business skills. How do our educational programs fare against these needs? The pace of change of curricular recommendations, and of accreditation criteria, is appropriately deliberate but tends to result in changes at the margin - not the more radical changes that some in industry are seeking.

The most recent model curricula from the Joint Task Force on Computing Curricula, and new draft accreditation recommendations from the Computing Accreditation Commission of ABET, include interactive skills such as being able to work in teams and communicate effective with lots of different audiences. They certainly include various technical skills. But they are weak on or pay no attention to business-skill development, except possibly in the information-systems area. We must recognize that different degree programs are preparing their graduates for different kinds of jobs. We also must recognize that not everything can be expected to be learned in a four-year program.

Nevertheless, graduates in any computing area should have an understanding of how business works, how to make a business case for their (technical) ideas, how to manage technical projects, and how to link technology solutions to business problems. Even in the technical areas, there needs to be significant attention to front-end systems development activity, e.g., requirements elicitation, customer understanding, design, and systems and enterprise integration. While the lengthy list of technical topics in the curriculum recommendations includes most of these areas, the extent to which they are emphasized, or expected to be emphasized, varies considerably from one computing area to another. Important topics such as project management, integrative programming, and especially enterprise architecture and design are not part of most of the technical program areas. These represent significant opportunities for improvement in current curricula. But to implement them will require care, faculty with different expertise than we typically have now, and greater cooperation with other areas of our campuses.

**Stuart Zweben** is Professor of Computer Science and Engineering at The Ohio State University and chaired this department for eleven years. He is a fellow and former president of ACM . Since 1998, he has chaired or co-chaired the Surveys Committee of the Computing Research Association, which is responsible for conducting the annual Taulbee Survey of North American Ph.D.-granting computer science and engineering departments. This survey is widely used by the computing community and the media for its workforce-related information, and Zweben frequently has been interviewed and quoted in the media about workforce issues related to outsourcing. Zweben also serves on the executive committee of ABET's Computing Accreditation Commission and recently chaired its criteria committee.