



## Brain Gain in an Outsourcing/ Off-shoring Global Economy

Much has been written and discussed about globalization, outsourcing, and off-shoring in recent months. Clearly, domestic job losses in many sectors, paradoxically in a time of economic recovery, are getting intense scrutiny and political traction in an election year. However, there is a quieter and perhaps more ominous trend in the science, technology, engineering, and mathematics (STEM) disciplines that has important ramifications for the future. This is the steadily drying pipeline of new talent available to many nations in the STEM disciplines. Gifted minds willing to engage in STEM related fields at the highest levels will give a nation the edge in economic development, security, innovation, and prosperity. Interestingly enough, high-tech jobs that are outsourced from the U.S. and Europe to countries like China and India cause a domino effect; the correspondingly red-hot economy in these countries induce the brightest minds to stay home. Students used to flock to the U.S. from China and India for higher education. Their numbers, however, have begun to decline in recent years. Further, the increased security concerns and consequent difficulties in obtaining student visas to the U.S. will not help this "brain gain."

This pipeline problem has been addressed in a recent report released by the National Science Foundation ("The Science and Engineering Workforce: Realizing America's Potential" at [www.nsf.gov](http://www.nsf.gov)). It has been pointed out that the ready availability of outstanding talent in STEM-related disciplines is no longer assured as international competition for this talent grows. In the U.S. itself, demographic data on the declining participation of domestic students in STEM-related careers coupled with the projected loss through retirement, of scientists and engineers in the workforce, underline the critical need for intervention so the pipeline can be primed. The challenge here is not only to sustain a stream of qualified scientists and engineers, but also to open opportunities for traditionally underrepresented population groups. (See, for example, S. A. Bass *et al.*, *Journal for Higher Education Strategists*, Vol. 1, No. 3-4, p. 261, 2003.) We must attract and keep the best teachers in pre-college STEM education programs. The children of today will dictate whether a nation retains the scientific/technological edge tomorrow.

Talking of education, a new column ("The Chalkboard") makes its debut in this issue of *Interface*. This column grew out of continuing discussions within the Society for the need to infuse new talent into it; clearly, the students of today will be the active Society members of tomorrow. In an effort to make the magazine more student-centric, "The Chalkboard" revisits key scientific/technological concepts in an easily digestible manner. Of course the non-student members of the Society can also benefit from it in a continuing education sense. Please let us know what you think of this new magazine feature.

The pH glass membrane electrode featured in "The Chalkboard" is a proton-selective sensor and this issue of the magazine features the Sensor Division. Sensors are playing an increasingly important role in our everyday life, ranging from automobiles and smart homes to homeland security. Three feature articles on sensors have been organized by the guest editor of this issue, Cindy Bruckner-Lea. Stay tuned.

Raj K.

Krishnan Rajeshwar  
Editor

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