Electronics and Photonics Lead the Way

This particular issue of the magazine features the Electronics and Photonics Division. This Division was formed on April 24, 1931 at the ECS meeting in Salt Lake City; but another two decades elapsed before it really started to grow. The invention of the transistor undoubtedly had a salutary role in this growth. Even the early days of electronics (*i.e.*, the 1950s) featured close collaborations between physicists and electronics engineers. The subsequent boom in *micro*electronics in the 1960s and 1970s was underpinned by a remarkable situation where teams of physicists and electronics engineers were joined by materials scientists, chemists, and metallurgists working toward common goals that had relevance to both military and consumer applications. I want to return to this theme of collaboration later but many of these scientists and engineers wound up considering the Electronics Division and the Society as their primary "technical home." Two of the three areas of interest of the original Division (fluorescence and rare metals) were "spun off" to form the Luminescence and Display Materials Division in 1982 leaving behind the general electronics core. In the meantime, modern communications devices have increasingly integrated both electronic and photonic functions catalyzing a change of the Division's name from "Electronics" to "Electronics and Photonics" in 2005. Over the past fifteen years, the critical dimensions in electronic and photonic devices have dramatically shrunk to the nanometer size scale to usher in the era of *nano*electronics and *nano*photonics. In my crystal ball, biology and medicine are two fields that will benefit from the revolutionary advances in electronics/photonics.

Consensus-building has always been a hallmark of the electronics/photonics community and no better example of this can be found than in the International Technology Roadmap for Semiconductors (ITRS). Five regions spanning the globe (U.S., Europe, Japan, Korea, and Taiwan) have come together to predict the major trends in the semiconductor industry 15 years into the future. Impressively, the leading semiconductor manufacturers and suppliers of equipment, materials, and software have crafted the ITRS documents with *significant input* from researchers in university and government laboratories. Consortia such as SEMATECH in Austin, Texas have also spurred this collaborative mindset and culture. It is debatable whether the spectacular advances in electronics/photonics over the past few decades would have occurred without this global initiative.

Surely, we can learn from this successful model and develop roadmaps that are critically needed in other sectors as well. For example, government organizations, industry, and academia have yet to reach consensus to create a roadmap for energy on a global scale. Identifying challenges in energy supply and use perhaps is easier than finding potential (and globally compatible) solutions as the Montréal and Kyoto protocols remind us. Regio-centric energy roadmaps do exist (*e.g.*, National Hydrogen Energy Roadmap of the U.S. Department of Energy in 2002). However what energy R&D needs is ITRS-style documents, created by the co-operative efforts *worldwide* of companies, universities, and research institutions. Consortia and university/industry/government laboratory partnerships serve to ease the financial burden and, more importantly, trigger innovation. Electronics and photonics have shown us the strategic way and it is up to the other communities to take a leaf out of their playbook. Stay tuned.

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Editor

The Electrochemical Society ***Interface*** (USPS 010-327) (ISSN 1064-8208) is published quarterly by The Electrochemical Society, Inc., at 65 South Main Street, Pennington, NJ 08534-2839 USA. Subscription to members as part of membership service; subscription to nonmembers $50.00 plus $5.00 for postage outside U.S. Single copies $6.00 to members; $13.00 to nonmembers. Periodicals postage at Pennington, New Jersey, and at additional mailing offices. POSTMASTER: Send address changes to The Electrochemical Society, Inc., 65 South Main Street, Pennington, NJ 08534-2839.

The Electrochemical Society is an educational, nonprofit 501(c)(3) organization with more than 7000 scientists and engineers in over 70 countries worldwide who hold individual membership. Founded in 1902, the Society has a long tradition in advancing the theory and practice of electrochemical and solid-state science by dissemination of information through its publications and international meetings.

The Electrochemical Society
INTERFACE

Published by:
The Electrochemical Society
65 South Main Street
Pennington, NJ 08534-2839 USA
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Production Notes
Design Consultant:
O&Y Design,
Trenton, NJ

Printed by:
Cummings Printing Co.
Hooksett, NH