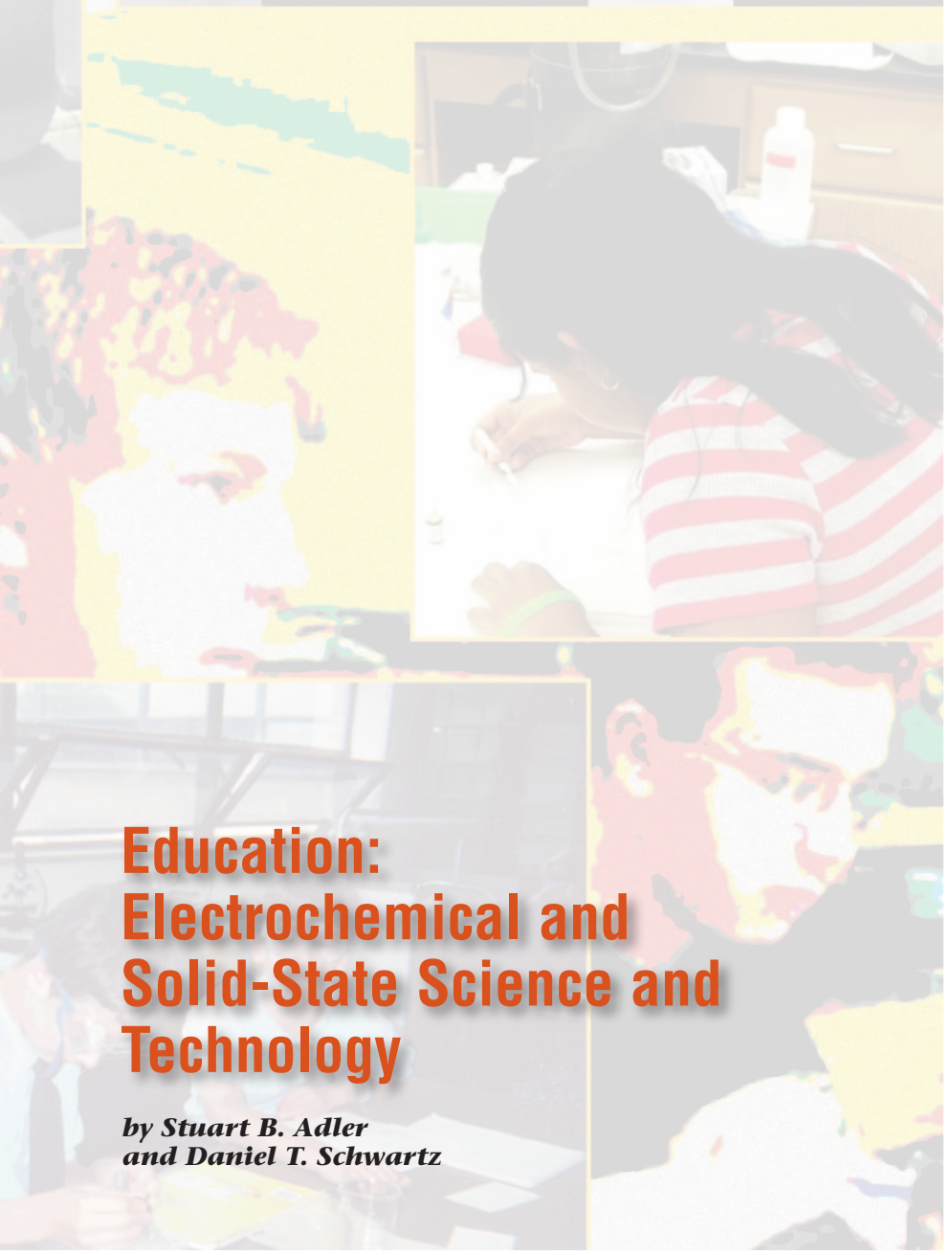

Education: Electrochemical and Solid-State Science and Technology

by Stuart B. Adler and Daniel T. Schwartz

In assembling this special issue on Education, we sought input from many constituencies. However, it quickly became clear that everyone views education from different angles, and it would be nearly impossible to fully cover all aspects of this multi-faceted subject! Instead, we took the opportunity to provoke questions that we think are important for members of ECS to think about, while also highlighting what some members of our Society are doing in the area of electrochemical education.

The primary question we decided to ask was whether current electrochemical education adequately prepares students to pursue, and be leaders in, the most exciting frontier areas of science and technology. To address this question, we asked experts in various frontier areas to contribute a paper that describes emerging challenges, and then elaborates on how well current electrochemical education prepares the next generation of scientists and engineers to tackle these challenges. For example, what major developments have occurred in these fields in the last 10-15 years? How have these developments changed our basic understanding in the chemical, physical, and biological sciences? On what areas of technology ar e these developments likely to have an impact? What new skills and knowledge are needed among scientists for this area to have widespread growth? How well recognized are the contributions of electrochemical scientists and engineers in these fields, and how does current educational content shape this recognition? If known, how might these changes impact requirements for college and K-12 education?

If ECS is to effectively facilitate education in the electrochemical sciences, where should it concentrate its limited resources? What emerged are provocative articles by Olaf Magnussen (University of Kiel) and Sangtae Kim (University of California, Davis) on the increasing importance of nanoscale science and technology in liquid and solid-state electrochemistry.

As a secondary question, we also asked educators about the practical challenges they have faced in integrating new ideas and concepts into electrochemical education. Eric Stuve (University of Washington) and Dan Scherson (Case Western Reserve University) describe some of the real hurdles facing educators at the university and K-12 level. Suzanne Fenton, Vijay Ramani, and Jim Fenton (Illinois Institute of Technology and Florida Solar Energy Center, University of Central Florida) discuss active learning of electrochemical engineering principles using a hybrid system comprising of a solar panel, water electrolyzer, and a fuel cell. Jeff Nelson and Kavita Jeerage (University of Washington) provide an inspiring recipe for fun with "Enginearring," an engineering open house activity that generates lines of kids waiting to learn about electrochemistry and thin film optics.

We hope this issue will inspire you to think broadly about electrochemical education and its linkage to the success and prestige of our profession.

About the Authors

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