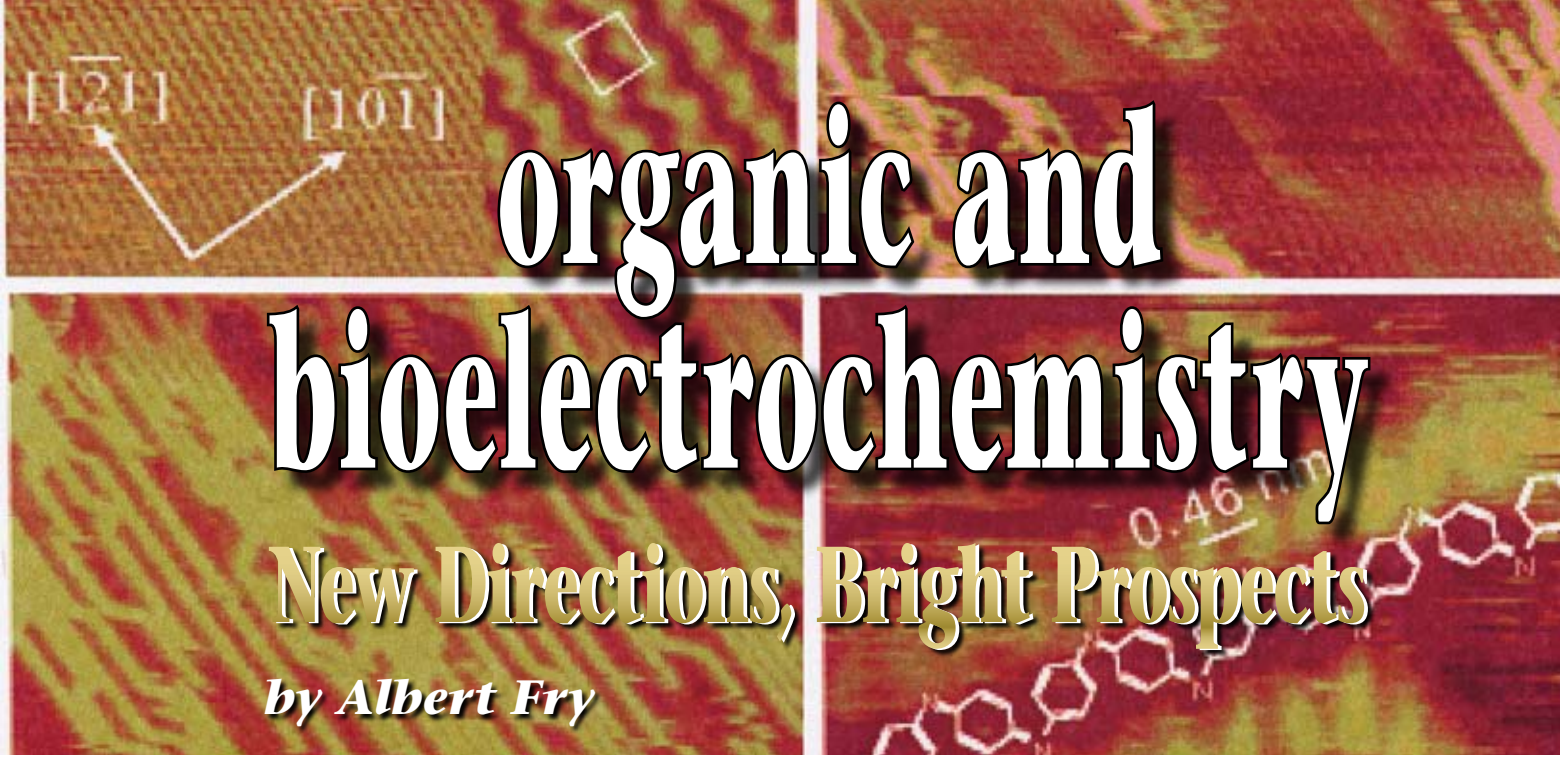

organic and bioelectrochemistry

New Directions, Bright Prospects

by Albert Fry

I am honored and delighted to have the opportunity to be guest editor of this issue of *Interface,* devoted to organic and biological electrochemistry. As I have discussed in my article in this issue, organic electrochemistry entered a period of intense growth in the mid-1960s, which I have traced to the simultaneous development around that time of new instrumental techniques, theoretical developments (such as the ability to simulate complex reaction mechanisms), and the entry of a large number of highly productive individuals into the area. Interest in biological applications began more recently with studies such as the nature of electron transfer to enzymes and i*n vivo* and *in vitro* analyses of biomolecules in living specimens, and has developed rapidly in a variety of directions in recent years.

It is my thesis that the related fields of organic and biological electrochemistry not only have expanded exponentially over the last fifty or more years, but that rather than slowing with maturity, the introduction of entirely new kinds of experiments in both areas is driving even faster growth. The two other articles in the issue demonstrate this point very nicely. Rusling's article describes recent studies of electrocatalytic chemiluminescence, initiated when an anodically oxidized ruthenium biopolymer reacts with DNA immobilized on an electrode surface, that have led to methods for screening of organic substrates for DNA-initiated toxicity. The work exemplifies the way that early studies of the electroactivity of a single enzyme or biomolecule have evolved into construction of complex systems on electrode surfaces, thus taking advantage of the selectivity of biological substances to solve important bioanalytical problems.

The rate of development of new techniques is equally impressive in organic electrochemistry. The article by Yoshida on chemistry, including electrochemistry, in microreactors is an excellent example. Electrolysis under flow conditions in these simple microcells, often at low temperatures, permits generation of reactive intermediates with exquisite control of their subsequent chemistry. Connecting several microreactors in series can permit rapid construction of complex materials in a single operation. The cover of this issue (taken from my article in this issue) describes another novel and exciting development, the use of scanning tunneling microscopy to visualize electrode products during their formation on an electrode surface. We look forward to exciting new times as these and other techniques are developed and applied in coming years. ■

About the Guest Editor

Albert Fry is the E. B. Nye Professor of Chemistry at Wesleyan University, an ECS, and Chair of the ECS Organic & Biological Electrochemistry Division. He received the 2008 ECS Manuel Baizer Award in Organic Electrochemistry. His research interests include the anodic oxidation of alkenes, including diarylethylenes and cyclooctatetraenes, and computational organic electrochemistry. He may be reached at afry@wesleyan.edu.