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Introduction

Readers familiar with the *Journal of Industrial Microbiology & Biotechnology* will notice that this Special Issue differs from the usual presentations of scientific results and explorations—this issue focuses on education. The term Biotechnology Education is used to reflect careers and technologies currently employed in the bioscience and pharmaceutical industries and regularly reported in the *Journal*.

For the first time, articles for the *Journal of Industrial Microbiology & Biotechnology* were collected from educators to describe the science done in teaching laboratories. According to surveys of scientists, the primary goals of laboratory courses include training students to make deductions, to make observations, to learn skills, and to think critically. The authors share their strategies for including the latest technologies in laboratory work, teaching strategies that promote scientific reasoning, and encouraging students to pursue careers in microbiology-related areas.

This Special Issue is timely because the first Industrial Microbiology course was offered just over 100 years ago at the Massachusetts Institute of Technology. The work of Louis Pasteur ushered in the first 'Golden Age of Microbiology' and by the early 1900s, industrial microbiologists were working with wine, lactic acid, acetone-butanol fermentations, and production of fungi and fungal products. In the middle of the century, industrial microbiologists worked with deterioration of military material, solvent fermentations, and antibiotic discovery and production. Now, at the dawn of a new century, the development of computer-modeling, gene banks, and molecular methods have put industrial microbiology 'center stage' in the biological sciences. Many biotechnology companies grow microorganisms for their metabolites; and biotechnology companies that use genetically-altered microorganisms require microbial culture techniques.

Microbiology is a core discipline that is essential to the biological sciences. Moreover, microoganisms and microbiologic techniques are used in a wide range of classes including the Neurobiology course and the course for non-majors described in this issue. One article, co-authored by an undergraduate student, illustrates how microbiologic techniques such as media preparation, asepsis, and culturing are being used outside of a formal microbiology course. This exposure to microbiology is important to pique students' interest in microbiology as well as for its academic content—understanding of cell functions and microorganisms, for its timeliness—promoting understanding of biotechnology, and for its science.

According to the National Science Foundation, the undergraduate years should provide both literate citizens and lead toward a workforce of competent science professionals. Readers of the *Journal* have a stake in the education and training of the next generation of industrial microbiologists. Readers who work in industry will benefit from the descriptions of techniques and learning methods described in the articles. Half of the next generation of microbiologists will get their start in a 2-year or 4-year liberal arts college. The students in the classes that are described are the next generation of industrial microbiologists—they will be your colleagues and employees. These articles will show you the exciting, innovative work, emphasizing hands-on laboratory and critical analyses, currently done at the undergraduate level and may provide you with ideas for developing material for teaching laboratories. The articles that describe programs, at the undergraduate and graduate level, may help you and your company get involved in a partnership to provide new curricula to meet the needs of industry. Additionally, this Special Issue provides novel laboratory experiments for readers who are engaged in education.

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