PREFACE

IN FOCUS: BIOINTERPHASE SCIENCE IN SINGAPORE

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This In Focus section, entitled "Biointerphase Science in Singapore," is a result of a discussion we had a few years ago when we decided to join forces in setting up the Center for Biomimetic Sensor Science at Nanyang Technological University (NTU) in Singapore. The editor in chief, Michael Grunze, strongly supported the idea of compiling a collection of articles related to the ongoing activities in the area of biointerphase science in Singapore.

The scientific articles and reviews presented herein are preceded by three surveys describing the funding and academic systems in Singapore, and we are very grateful for these contributions from the Chairman of the Agency of Science, Technology and Research (A*Star) (Lim Chaun Poh), the Provost of Nanyang Technological University (NTU) (Bertil Andersson), and the Deputy President of Research and Technology at the National University of Singapore (NUS) (Barry Halliwell).

The A*Star is a government agency fostering research and development (R&D) activities in biomedical sciences (BMS) and physical sciences and engineering in Singapore. The institute is composed of five entities: the Biomedical Research Council (BMRC), Science and Engineering Research Council (SERC), and A*Star Joint Council (2009), Graduate Academy, and Corporate Group. A*Star is by far the most important funding agency for basic and engineering-oriented researches in Singapore. Today, A*Star runs 14 research institutes in Singapore. Biopolis started in 2002 as an initiative to strengthen BMS in Singapore and now it hosts seven research institutes and numerous research consortia under the same roof. The focus is on basic research in a number of key areas funded by the BMRC. BMRC also funds translational and clinical research and provides infrastructure support to the research programs in terms of core facilities. In order to give an idea about the efforts put into biomedical R&D in Singapore, the BMS International Advisory Board recently announced a S$3.7 billion budget for the next 5 years. The SERC has a longer history extending back to the early 1990s, with the Data Storage Institute and the Microelectronic Institutes as pioneers. Today, SERC supports research in eight key areas. The SERC institutes are distributed over Singapore, but the majority of them will be colocated during the coming years in the Fusionopolis area, less than half a mile from Biopolis. It is amazing to see the rapid growth in the Biopolis/Fusionopolis areas. Once a strategic decision is taken, things move quickly in Singapore (see Fig. 1). Besides providing funding for basic and engineering research in Singapore, A*Star also interacts with industry through several schemes and organizations, including Spring Singapore and the Economic Development Board. They also offer students and young scientists fellowships to study abroad as well as to establish their own research careers in Singapore. For more details, see the commentary by the A*Star Chairman, Mr. Lim Chaun Poh.

Nanyang Technological University, located in the far west of the island, was founded in 1955 and over the years has become one of the largest engineering schools of the world. NTU was substantially restructured from 1980 to 1995. For example, it became the host campus for the National Institute of Education, and a number of new schools including applied science and business were established. In 2001, NTU took an important step by introducing Life Science and the School of Biological Science (College of Science). Since then, NTU has matured into a dynamic and highly ranked university, with new schools in mathematical and physical sciences and in arts and media, to mention a few. In August 2010, Prime Minister Lee Hsien Loong announced that NTU and Imperial College, London, had agreed to join forces in setting up the third medical school in Singapore.

The NUS, located in the Buona Vista area with Biopolis and Fusionopolis as nearest neighbors, has a longer history than NTU. It was founded in 1905 as a governmental medical school. Today, NUS is a top ranked university with 14 faculties and numerous research centers. For example, NUS is the host of three research centers of excellence: the Cancer

FIG. 1. Biopolis, the biomedical hub of Asia, with the two Fusionopolis towers seen in the background.

Science Institute, the Centre of Quantum Technologies, and the Mechanobiology Institute. Besides strong activities in natural science and engineering, NUS has hosted a large medical teaching hospital since 1985, the National University Hospital. The science, medical, and engineering programs at NUS are complemented by strong initiatives in the humanities, social sciences, law, and business.

The contributions to this In Focus section on Biointerphase Science in Singapore span from the basic science of lipid architectures and their phase behavior to the study of artificial organs. We appreciate the response we have received from the biointerphase community in Singapore to help us with this important mission.

We would also like to express our sincere thanks to the Institute of Materials Science and Engineering (IMRE), A*Star, the provost office (NTU), the School of Materials Science and Engineering (NTU), Analytical Pte. Ltd., and Bruker Asia Pte. Ltd. for the generous sponsorship. The local co-editors Subbu Venkatraman (NTU) and Chwee Teck Li (NUS) are also acknowledged for assisting us in identifying potential contributors to this In Focus section.