

PREFACE

Dear Distinguished Delegates and Guests,

The Organizing Committee warmly welcomes our distinguished delegates and guests to the 2009 International Conference on Chemical, Biological and Environmental Engineering (CBEE 2009), held in Singapore from 9 to 11 October 2009.

The 2009 International Conference on Chemical, Biological and Environmental Engineering (CBEE 2009) is sponsored by IACSIT, Applied Chemical Engineering Society (ACES), Environment Science Society (ESS), and is supported by the University of Florida, East Carolina University and Bioinformatics and Biomedical Engineering Society (BBES). The main objective of CBEE 2009 is to provide a platform for researchers, chemists, biologists, engineers, academicians, as well as industrial professionals from all over the world to present their research results and development activities in chemical, biological and environmental engineering. This conference will provide opportunities for conference delegates to exchange new ideas and application experiences, establish business or research relations and find global partners for future collaboration. The conference's Program Committee is by itself quite diverse and international in membership, with members from the Americas, Europe, Asia, Africa and Oceania.

This proceedings records the fully refereed papers presented at this conference, whose main conference themes and tracks are chemical, biological and environmental engineering. CBEE 2009 aims to bring together researchers, scientists, chemists, biologists, engineers and practitioners to exchange and share their experiences, new ideas and research results on all aspects of the main conference themes and tracks. The practical challenges encountered and the solutions adopted will also be discussed. The main goal of this event is to provide international scientific forums for the exchange of new ideas in a number of interactive fields through discussions with their peers from around the world. Both inward research — core areas of chemical, biological and environmental engineering — and outward research — multi-disciplinary, inter-disciplinary and applications — will be covered during this event.

This conference has solicited and gathered scientific and technical research submissions related to all aspects of major conference themes and tracks. All the submitted papers in this proceedings have been peer reviewed by reviewers drawn from the scientific and technical committee, external reviewers and editorial board members, depending on the subject matter of the paper. The reviewing and initial selection processes were undertaken electronically, after which the submitted papers were selected on the basis of originality, significance and clarity for the purpose of the conference. These selected papers (plus additional late contributions) will be presented as lectures and will make for an exciting technical program. The conference's program is extremely rich, and features high-impact presentations.

The high quality of this program, guaranteed by the presence of an unparalleled number of internationally recognized top experts, can be assessed when reading through the contents of the program. This conference will therefore be a unique event, where attendees will be able to appreciate the latest results in their field of expertise and acquire additional knowledge in other

fields. This program has been structured to favor interactions among attendees coming from many diverse horizons — scientifically, geographically, technically, from academia and from industries.

We would like to thank the program chairs, organization staff and the members of the program committees for their work. Thanks are also due to Ms. Yang Dan, for her wonderful editorial service to this proceeding.

We are grateful to all those who have contributed to the success of CBEE 2009. We hope that all participants and other interested readers benefit scientifically from this proceedings, and also find it stimulating in the process. Finally, we would like to wish you success in your scientific and technical presentations and social networking.

We hope you have a unique, rewarding and enjoyable week at CBEE 2009 in Singapore.

With our warmest regards,

CBEE 2009 Organizing Committees
9–11 October 2009 in Singapore