



ChESA 8th
Chemical Engineering on Science and Applications

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(AIC - UNSYIAH)
IN CONJUNCTION WITH
THE 8th CHEMICAL ENGINEERING ON SCIENCE AND APPLICATION
(ChESA)

LIFE SCIENCES CHAPTER



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Message from the Rector



Assalamu'alaikum Wr. Wb.

Ladies and gentlemen, it is an honor indeed to open this conference, the 5th Annual International Conference (the 5th AIC) in conjunction with the 8th Chemical Engineering on Science and Application (the 8th ChESA) conference. On behalf of Syiah Kuala University or Unsyiah, I would like to extend a warm welcome to all participants and our speakers who are with us to make this a notable and exciting event.

This year, Unsyiah commemorates its 53rd anniversary. As part of the celebration, the university has held a number of events, including this interdisciplinary conference from September 9-11, 2015. At Unsyiah, we emphasize the excellence in education and research, and are also committed to innovation and technology. Today, we are facing more challenges in these spheres, therefore, as members of the academic community; we have a duty to find innovative research solutions for them. Hence, this conference is an excellent forum for experts, professionals, researchers, and students, to present, share, and discuss their knowledge and experiences with all of us. As a result, it is a privilege to host you, not just this year, but for years to come, to give and provide opportunities to contribute lasting and practical solutions to the challenges that confront us from time to time.

This conference includes keynote speeches, oral and poster parallel sessions on topics in the field of sciences, life sciences, engineering, social sciences, and ChESA. We thank our keynote and invited speakers for their contribution, time and support for this conference. Heartfelt appreciation goes to all the authors of the selected papers for their effort and hard work. I also thank the organizing committee of the conference for their exertion in making this event successful. I wish to encourage them to continue more events and other initiatives as well. To support and sustain important research linkage for dialogue and facilitate ideas exchange such as this will certainly generate many new discoveries in years to come.

Finally, I wish you a wonderful stay in Banda Aceh. Please enjoy our university's pleasant learning environment and our city's appealing offer in food and tourism. I am sure the committee of this conference extends their warm hospitality to make your brief stay positively memorable.

Thank you.

Prof. Dr. Ir. Samsul Rizal, M.Eng.

Message from the Chairman



Assalamu'alaikum Wr. Wb.

I take this occasion to cordially welcome all participants of the 5th Annual International Conference (or AIC) in conjunction with the 8th Chemical Engineering on Science and Application (or ChESA) conference. This conference is held in the heart of our campus, Syiah Kuala University or Unsyiah, Banda Aceh, from September 9 to September 11, 2015. Unsyiah, the home of 12 notable faculties and one school of postgraduate studies, is one of the major state universities in Indonesia. Its pleasant surroundings in a city with remarkable history are a spotlight for this congregation. We are assured that the 200 scientific participants contribute to productive discussions and exchanges that impact the success of this conference. Participants from 10 countries; Indonesia, Malaysia, Thailand, South Africa, Japan, Singapore, Taiwan, Germany, England, Australia countries have marked the conference to be in an international scope.

I would like to express my gratitude to the Research Institute of Syiah Kuala University or *Lembaga Penelitian (Lemlit)* and the committee members for helping us with full force in organizing the conference. The conference and proceedings are a credit to a large group of people and everyone should be proud of the outcome. There are four plenary speakers covering the different areas of the conference. From science and engineering, there is Prof. Dr. Evamarie Hey-Hawkins from University Leipzig, Germany. From ChESA, there is Dr. Kazuaki Syutsubo from the National Institute for Environmental Studies (NIES), Japan. From life sciences, there is Associate Professor Dr. Ororat Mongkolporn from Kasetsart University, Thailand. And finally from social sciences, there is Professor Dr. Patrick Daly from National University of Singapore. Their talks cover the full range of the conference topics.

We are delighted with the vast responses of 166 submissions from researchers and practitioners. The knowledge bases that we are aiming to generate on the conferences topics are overwhelming due to the involvement of these experts from various fields of studies. Their papers are published in the proceedings to provide permanent records of what has been presented. The proceedings are divided into Life Sciences, Engineering, Social Sciences, and ChESA sections, and the 158 papers published here exhibit the current state of development in all aspects of important topics that are instrumental to all researchers in the field. They have succeeded in bringing together various aspects of developments and innovations in knowledge and technology that will benefit not only the academic community, but society itself.

It is hoped that this conference does not only provide a member meet, but also offer a common platform for academia and practitioners to discuss issues related to their field of studies. We also wish everyone a pleasant stay in Banda Aceh and have a taste of our best traditional culinary.

Thank you,
Prof. Dr. drh. Darmawi, M.Si

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Keynote and Invited Speakers:

Associate Prof. Dr. Ororat Mongkolporn, Ph.D
(Kasetsart University, Thailand)

Prof. Dr. Dr. h.c. Evamarie Hey-Hawkins
(Universität Leipzig, Germany)

Dr. Kazuaki Syutsubo
(National Institute for Environmental Studies, Japan)