Opening Address

Welcome Message from Advisory Chair

Dear friends and colleagues,

On behalf of the President of King Mongkut's University of Technology North Bangkok (KMUTNB), I would like to welcome you to the 2021 Research, Invention, and Innovation Congress (RI2C 2021) in Virtual Platform during 1 – 2 September 2021.

From the previous successful RI2C 2019 Conferences, The RI2C 2021 in each category will provide a wonderful forum for you to refresh your knowledge basis and explore the Invention and Innovation. As the theme of the conference is Invention and Innovation and we have over 150 research works accepted to present in this event, I would like to encourage the participants to find time to meet other delegates from three main categories, including i) Materials Engineering (ME), ii) Electricals and Electronics (EE), and iii) Sustainable Sciences (SS) who come for the RI2C 2021 comprising of professors, researchers, students, and government staff to discuss about their experiences and re-vow our relationship in academic and research affairs.

I would like to thank all committee members involving with the network and organizing committee of the conference. Especially I would like to thanks the staff members of the Science and Technology Research Institute, King Mongkut's University of Technology North Bangkok that is the main organizer of the event. I wish this academic conference to be a success and achieve all the objectives.

Faithfully yours,

Professor Dr.-Ing.habil. Suchart Siengchin

President, King Mongkut's University of Technology North Bangkok

Advisory Chair, Ri2C2021

List of Conference Chairs

Conference Chair: 2021 Research, Invention, and Innovation Congress (RI2C2021)

1. Advisory Chair

Suchart Siengchin, King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand

2. Conference Chair

Somrerk Chandra-ambhorn, KMUTNB, Thailand

3. General Secretary

Wanlop Harnnarongchai, KMUTNB, Thailand

4. International Advisory Board

Babak Nahid-Mobarakeh, University of Lorraine, France

San Hoa Thang, Monash University, Australia

Athanasios Tsolakis, The University of Birmingham, UK

Pau Loke Show, University of Nottingham Malaysia, Malaysia

Yushen Cheng, National Yunlin University of Science and Technology, Taiwan

Wen-Chien Lee, National Chung Cheng University, Taiwan

Rizalman Mamat, Universiti Malaysia Pahang, Malaysia

Edmund Haberstroh, RWTH Aachen University, Germany

5. RI2C2019 Academic Chair

Somrerk Chandra-ambhorn, KMUTNB, Thailand

Kampanart Theinnoi, KMUTNB, Thailand

Malinee Sriariyanun, KMUTNB, Thailand

Titipong Lertwiriyaprapa, KMUTNB, Thailand

Rungsima Yeetsorn, KMUTNB, Thailand

Wanlop Harnnarongchai, KMUTNB, Thailand

Sunanta Sodsee, KMUTNB, Thailand

Peerapong Pornwongthong, KMUTNB, Thailand

Nonchanutt Chudpooti, KMUTNB, Thailand

Voranuch Somsongkul, KMUTNB, Thailand

Sunanta Chuayprakong, KMUTNB, Thailand

Watchareewan Jitsakul, KMUTNB, Thailand

Chaniga Chuensangjun, KMUTNB, Thailand

6. Innovative Sustainable Science (iSS) Editors

Managing Editor: Malinee Sriariyanun, KMUTNB, Thailand

Editorial board members:

Yu-Shen Cheng, National Yunlin University of Science and Technology, Taiwan

Wawat Rodiahwati, University of New England, Australia

Marttin P. Gundupalli, Indian Institute of Technology Hyderabad, India