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2016 International Congress on Theoretical and Applied Mathematics, Physics and Chemistry

To cite this article: Ford Lumban Gaol 2016 *J. Phys.: Conf. Ser.* **725** 011001

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Preface

It's a great pleasure to present the proceedings of the 2016 International Congress on Theoretical and Applied Mathematics, Physics and Chemistry (The Science 2016), which was held at the The Panghegar Hotel - Bandung, Indonesia, during 23 - 24 April 2016.

This year, we received 37 submission and after the review and editorial revision process we accepted 11.

The theme of Science 2016 is *The Beauty in Science: From Concept to Technology*.

The conference aims to bring together scholars, leading researchers and experts from diverse backgrounds and applications in mathematics, physics and chemistry. Special emphasis is placed on promoting interaction between the experimental and applied communities, so that a high level of exchange in new and emerging areas within all areas is achieved.

We would like to express our sincere gratitude to all in the Technical Program Committee who have reviewed the selected papers and given technical and/or editorial comments for those papers

We do hope that this special issue will give positive impact to the mathematics, physics and chemistry research community.

The Guest Editor of the The Science 2016

Ford Lumban Gaol
Bina Nusantara University



Guest Editor Biographies



Ford Lumban Gaol received the B.Sc. in Mathematics, Master of Computer Science. and the Doctor in Computer Science from the University of Indonesia, Indonesia in 1997, 2001 and 2009, respectively.

He is currently Associate Professor Informatics Engineering and Information System, Bina Nusantara University www.binus.ac.id. He is the Chair of PhD Program and Research Interest Group Leader “Advance System in Computational Intelligence & Knowledge Engineering “ (IntelSys) Bina Nusantara University. He was the co-founder of JIBES School of Computer and Informatics Management www.jibes.ac.id.

Dr Ford is the officer of IEEE Indonesia section for International and Professional Activities <http://ieee.web.id/indonesia/officers/>. He is the Chair SERSC: Science & Engineering Research Support soCiety Indonesia Section. <http://www.sersc.org/organization.php> Dr Ford was the ACM Indonesia Chapter Chair http://campus.acm.org/public/chapters/geo_listing/index.cfm?rabbr=Indonesia&inus=0&ct=Professional

Dr Ford involved with some project relate with Technology Alignment in some of multinational company like Astra, United Tractors, Telkom, Sony Erickson.

For International collaboration, Dr Ford is the recipient of IEEE Visiting Professor to Hong Kong University in 2011. For 2012, Dr Ford already received confirmation form IAMSIE Hong Kong to collaborate with R&D with some Manufacturing Companies in HongKong.

Keynote Speakers

1. Prof Tokuro Matsuo, Ph.D

Professor, Advanced Institute of Industrial Technology, Japan
Guest Professor, Bina Nusantara University, Indonesia
Project Professor, Nagoya Institute of Technology, Japan



Title: Computational Method in Material Design

Artificial Intelligence(AI)-based search methods provide a lot of possibility to solve complex problem. However, except for logical reasoning, it cannot be used to analyze the detail of models because AI-based methods provide just roughly result through simulations. Traditionally, operation research(OR)-based methods may have a strong power to analyze more precise and concrete detail of local effects of systems. However, in a real world, a system sometimes has an uncertain temper like a cat. In material science and engineering, manufacturing of semiconductor is speeded up year by year because of competition with each implementing company. Thus, a lot of material scientists are annoyed with such actual situation to design new material of semiconductor. In this talk, I introduce our research contribution to the material design on adhesive design to find appropriate compositions. We employ multiple mixed-techniques including linear programming, nonlinear programming, reasoning methods, qualitative analysis and interpolation algorithm. Also, I show our developed software that is used in factories. It is used to find appropriate types of material, quantity of each material, and their combinations.

Speaker Bio

Tokuro Matsuo is a full professor at Advanced Institute of Industrial Technology since 2012. He received the doctor degree of engineering from Dept. of Computer Science at Nagoya Institute of Technology in 2006. He is a guest professor at Bina Nusantara University, Indonesia since 2015; a research project professor of Collective Intelligence Research Center at Nagoya Institute of Technology, Japan since 2015; a research fellow of SEITI in Central Michigan University, USA since 2010; and an executive director of International Institute of Applied Informatics since 2010. He was a visiting researcher at University of California at Irvine in 2010-2011; was a research fellow at Shanghai University between 2010 to 2013; and was a research project professor of Green Computing Research Center at Nagoya Institute of Technology

between 2011 to 2014. His current research interests include electronic commerce and business, service science and marketing, business management, artificial intelligence, material informatics, tourism informatics, convention research, and incentive design on e-services. Some of his researches are presented in the top international conferences on AAI, IEEE CEC, AAMAS, and WWW.

He chaired a lot of international conferences including IEEE/ACIS SNPD 2009, 2012 and 2014, IEEE/ACIS ICIS 2010 and 2013, IEEE IWEA 2007-2012, ACAN 2005-2012, and AAI 2012-2016. He gave over 70 keynotes and invited talk at international conferences, symposia, and seminars. He also received over 40 awards and research grants from research foundations, company and Government. He is also commissioned as Japan Conference Ambassador, Kumamoto City MICE Ambassador, and Adviser of Information Promotion of Japan.

2. Prof. Yiyu Cai, Ph.D

Nanyang Technological University (NTU).



Title : Virtual Reality: Research, Development and Applications.

In March 2014, Facebook announced the USD\$2 Billion acquisition of the Oculus Rift VR. In Jan 2015, Microsoft revealed its Augment Reality product HoloLens. 2016 is considered The Year of Virtual Reality (VR). VR, however, is not new. Back to the mid of 1960s, Ivan Sutherland, the inventor of the first VR Head Mounted Display (HMD), described “The screen is a window through which one sees a virtual world. The challenge is to make that world look real, act real, sound real, feel real”. In this talk, the keynote speaker will share the research and development of Virtual Reality at Nanyang Technological University, Singapore. In particular, fidelity modelling, real-time interaction, immersive visualization, and natural user interface will be detailed. This is followed by the presentation of VR applications in medicine, education, and engineering. Future direction of VR research and development will be discussed.

Speaker Bio

Professor Yiyu Cai directs the Computer-aided Engineering Labs, and heads the Strategic Program of Virtual-Reality and Softcomputing with The School of Mechanical & Aerospace Engineering, Nanyang Technological University (NTU). He

has over 20 years' experience in VR research and applications development. His research has been supported by both government and public funding agencies. He has been keynote speaker and invited speaker for numerous international and regional conferences. He was the former Co-president of The International Simulation and Gaming Association. He teaches VR, Computer Graphics and Mechatronics in NTU.

3. Zhao Shengdong, Ph.D

National University of Singapore



Title : Innovation Through Principles

Human-computer Interaction (HCI) is a very broad field without a single clear focus - there are a great number of HCI researchers from multiple disciplines working on a wide variety of problems that seem to have little connection with each other. However, a careful examination of these multiple approaches to problem solving seems to indicate that there are a number of distinctive, underlying design principles employed by researchers. In this talk, I try to describe three commonly seen design principles in HCI innovations, including "Enhance Directness, Facilitate Transition, Balance Humans and Computers", and unpack these principles using projects from the NUS-HCI lab.

Speaker Bio

Dr. Shengdong Zhao is an Assistant Professor in the Department of Computer Science of the National University of Singapore where he founded the NUS-HCI research lab in 2009. He earned his Masters and PhD degrees at the University of California at Berkeley and the University of Toronto, respectively. Shengdong has a wealth of experience in developing new interface tools and applications. ACM Interaction Magazine mentioned him as one of the most prolific authors in Asia for the ACM SIGCHI conference in the last six years. Shengdong frequently served on the program committees in top HCI conferences. He was a co-chair of the Interaction Using Specific Capabilities or Modalities subcommittee for SIGCHI in the last two years. Shengdong was also the recipient of the NUS Young Investigator Award.



