



2021 CAPA Virtual Technical Forum

Energy and Digital Transition: The Road to Zero Emission Through New Energy and Digital Transformation

能源轉型的挑戰：從新能源及數字技術到零排放之路

Morning Program: Keynote Presentation

9:30 – 9:45 am, Login and Greetings

9:45 – 10:00 Opening Remarks and CAPA Introduction

Dr. Xinli Jia, Technical Forum Chair, 2021 CAPA President

10:00 – 10:30, Smart Energy Transitions Towards a Net-zero Future

Dr. Xiaonan Wang

Associate Professor, Department of Chemical Engineering, Tsinghua University, Beijing

10:30 – 11:00, Wind Energy Development in Taiwan

Dr. Jia-Hao Ko

Floating Foundation Package Manager at Swancor Renewable Energy, Taiwan

11:00 – 11:30, Hydrogen Developments for Energy Transition to Net Zero

Mr. Frank Frey

Principal at GHD, Houston

11:30 – 12:00, How to Start an Engineering/Consulting Firm

Dr. Yuan-Hong Kuo, *President, MCT Engineering, Houston*

12:00 – 12:30, Q&A

12:30 – 1:00pm Coffee/Lunch Break

Afternoon Program: Technical and Career Panel Discussion

Theme: Data and Cloud Technology, and Entrepreneurship

The afternoon session will focus on the skills and opportunities in the transition to zero emission goals committed by United Nation members and all major energy companies. The transition not only imposes many challenges but also provides many opportunities for career transition. Skill sets that are in great need due to the transition will be discussed.

Moderator:

Dr. Sean Yang, Quantitative Analytics Director, EDF NA

Panelists:

Ms. Jing Xiang, Principal Data Modeling Analyst, Energy Harbor

Mrs. Mei Yang, Global Salesforce Program Manager, BP

Dr. Yuan-Hong Warren Kuo, President and Chief Engineer, MCT Engineering

Agenda:**1:00 – 1:10 pm, Login and Greetings****1:10 – 1:20 pm, Opening Remarks and Intro of CAPA**

Dr. Xinli Jia, Technical Forum Chair, 2021 CAPA President

1:20 – 1:30 pm, Theme Talk - Data&Cloud Technology

Moderator: Dr. Sean Yang

Quantitative Analytics Director, EDF NA

1:30 – 1:50 pm, Road to Data Scientist

Ms. Jing Xiang

Data scientist, Energy Harbor

1:50 – 2:10 pm, Road to Data/DevOps Engineer

Mrs. Mei Yang

DevOps Project Manager, BP

2:10 – 2:30 pm, Road to Entrepreneur

Dr. Yuan-Hong Warren Kuo

President and Chief Engineer, MCT Engineering

2:30 – 3:00 pm, Discussion, Q&A, and Closing**CAPA 2021 Technical Forum Committee:**

Xinli Jia (Technical Forum Chair), Kuochen Tsai (Technical Forum Co-chair), Mei Yang, Sean Yang, Qi Zhang, Ching-Wen Chen, Yaping Zhu, Jianxiong Chen, Kim Shih, Jiasheng Qin, Li Chang, Sizhang Deng, Yan Dong

Keynote Presentation Abstracts and Speaker Biographies:

Smart energy transitions towards a net-zero future



Dr. Xiaonan Wang

Associate Professor

Department of Chemical Engineering, Tsinghua University,
Beijing

E-mail: wangxiaonan@tsinghua.edu.cn

Abstract

Facing the pressing environmental and climate change challenges, novel approaches are needed for sustainable energy transitions towards a carbon-neutral future. The emergence of big data analytics, IoT, machine learning, and AI provide enormous smart tools for processing complex data and information, which could revolutionize next-generation research, industry and society. The potential contribution of ML combined with big data and cyber-physical systems to energy and the environment is worth investigating. In this talk, an overview of multi-scale smart systems engineering approaches and their applications in crucial domains of energy and environment management will be first given. The recent developments of ML models and data-driven optimization that can expedite smart systems engineering will be demonstrated via a series of use cases. The design, operation and management of multi-scale systems with enhanced economic and environmental performance are then presented. Finally, opportunities, challenges, and future directions of smart energy and environment management faced by the pressing carbon-neutrality or net-zero targets are discussed.

Dr. Xiaonan Wang is currently an associate professor in the Department of Chemical Engineering at Tsinghua University in Beijing. Upon receiving her PhD from University of California, Davis, she previously worked at the National University of Singapore (NUS) and Imperial College London. Her research focuses on the development of intelligent computational methods including multi-scale modelling, optimization, data analytics and machine learning for applications in advanced materials, energy, environmental and manufacturing systems to support smart and sustainable development. She has won numerous outstanding awards from prestigious professional societies including AIChE, IEEE, ACS, and IChemE.

Offshore Wind Industry Development Overview and Opportunity of Floating Wind Technology



Chia-Hao Ko, Ph.D.

Floating Foundation Package Manager

Swancor Renewable Energy, Taiwan

E-mail: ChiaHao.Ko@swancor-renewable.com

Abstract

In the past few years, offshore wind power projects within the Asia-Pacific region have developed rapidly. Bottom fixed wind turbines have been widely used in these projects for shallow water areas. To enable more project opportunities, developers have begun to explore new technology for deep water project developments. The solution, floating wind technology which has advanced rapidly in the past decade and now is considered as a viable solution for offshore wind development for water depths greater than 60m.

To achieve the emission reduction targets, demand for offshore floating wind power will be increased significantly throughout the Asia Pacific countries. This presentation will briefly provide an overview on the offshore wind industry development, and discuss designs of floating wind foundation structures and mooring systems. Potential opportunities of Oil and Gas industry for the offshore wind project development will also be outlined.

Dr. Chia-Hao Ko has 15 years of professional experience in offshore engineering and large-scale oil and gas project development and operations. He worked for ExxonMobil and SBM Offshore in Houston TX, and had assignments in the Netherlands and South Korea for multi-country EPCI project executions. Chia-Hao returned to his motherland Taiwan in 2021, and joined Swancor-Renewable Energy to develop floating wind projects in Taiwan and Asia Pacific region.

He has expertise in floating structure design and construction, naval architecture, and offshore structural engineering. He holds a PhD and Master's degree from National Taiwan University, a MS from Texas A&M University, and a Bachelor degree from National Cheng Kung University.

Chia-Hao was an active CAPA EC Member in 2009-2019 and will be continuing to support CAPA from renewable energy industry perspective.

Infrastructure in a Mature Hydrogen Economy



Mr. Frank Frey

Principal at GHD

E-mail: frank.frey@ghd.com

Abstract

In this presentation, we examine the hydrogen demand of a mature hydrogen economy, assuming hydrogen as a primary energy carrier. Challenges to hydrogen at scale are discussed. We review the basics of hydrogen characteristics. Requirements for production of blue and green hydrogen, transmission, and storage are presented for various levels of hydrogen demand.

Mr. Frank Frey, based in Houston, Texas, has been designing a broad range of oil & gas facilities for over 30 years. His experience includes design at refining and petrochemical facilities, as well as midstream and upstream projects. Frank has a strong background in underground storage facilities, brine infrastructure, terminals, and pump / compressor stations.

Mr. Frey is currently supporting GHD's Future Energy Program by assisting the oil & gas and midstream industries with the energy transition. He has developed projects in Hydrogen blending, pipeline change of service, carbon sequestration, and renewable natural gas.

How to Start an Engineering/Consulting Firm



Dr. Warren Yuan-Hung Kuo
President, MCT Engineering, Inc
Katy, Texas
E-mail: wkuo@mct-eng.com

Abstract

It is a daunting idea for many engineers to consider starting their own engineering companies. In their mind, they think the stake is high and the uncertainty is very certain. Two common questions will be continuously addressed throughout this presentation - what is it like to start your own engineering firm? And what are the challenges for an ordinary engineer when she/he starts an engineering company?

Warren Kuo will share his experience on running an engineering firm in the last 5 years. He is going to share his first-hand experience on his start-up journey, what strategy works and what might not work, the challenges of getting the first projects, the challenges of running a company, how to utilize his engineering skills to find the niche in this ever-changing market, and more.

Dr. Warren Kuo is the Founder and President of MCT Engineering, Inc. With more than 15 years of experience in offshore and onshore structural engineering, Dr. Kuo started his own engineering company in 2015, one year after the completion of his McCombs MBA degree. He found the niche in the global offshore wind sector and actively participated in Taiwan's offshore wind development. His company has been helping the local fabricators in Taiwan to build the fabrication capability in the offshore wind foundation structures. Warren's company provides offshore wind structural design, analysis, fabrication support, rigging design, and engineering consulting. His company co-hosted technical workshops and seminars with universities, NGO research institutes, and certification agencies in Taiwan. He was also actively involved in the early Asian government policy making of the offshore wind farm development strategies.

Career Development Panelist Biographies:

Moderator: Dr. Sean Yang

director of Quantitative Analytics at EDF NA, has worked for various energy companies and investment banks in quantitative trading, derivative pricing, risk modeling and system expert; including at Shell, BP as senior trading strategist, Suez energy as director, Enron as trading technology manager, and at United Bank of Switzerland as associate director of risk management – where the team established, from scratch, the UBS energy risk management department. Dr. Yang holds PhD in applied mathematics and M.S. in computer science, both from Michigan State University, and an MBA in finance from the University of Houston.

Ms. Jing Xiang

Currently working in Energy Harbor as principal data modeling analyst in the marketing team, focusing on business process automation and building machine learning models to predict customer behavior and analyze marketing strategy efficiency and effectiveness. She has been working in the digital world since 2019 when taking a data science program offered by Springboard online, and worked with Innower as a data scientist and IHS Markit as a senior research data analyst, on building machine learning models and automating data processes. Experienced in Python and SQL, and cloud platforms such as AWS, Microsoft SQL server, Oracle database, etc. She worked 6 years in a research and consulting company Geomechanics Technologies, did research for DOE on CO2 storage and consulting projects in oil and gas upstream varying topics. She holds a bachelor degree in petroleum engineering from China University of Petroleum in Beijing, and a master degree in the same major from TAMU; currently enrolled in online master of data science in UT Austin.

Mrs. Mei Yang

Mrs. Yang is a senior project Manager. She has successfully delivered many cross-org & integration projects. She is currently working at bp international as a global Salesforce Program Manager. Other than that, she also has hands-on experience as Delivery Lead, Platform Developer, DevOps Engineer, Scrum Master, and Business Analyst. Her industry expertise includes hospitality, energy, consumer, oil & gas, and manufacturing. Prior to joining Accenture, she had 6+ years of program manager experience in the oil and gas industry.

Dr. Warren Yuan-Hung Kuo

Founder and President of MCT Engineering, Inc. With more than 15 years of experience in offshore and onshore structural engineering, Warren started his own engineering company in 2015, one year after the completion of his McCombs MBA degree. He found the niche in the global offshore wind sector and actively participated in Taiwan's offshore wind development. His company has been helping the local fabricators in Taiwan to build the fabrication capability in the offshore wind foundation structures. Warren's company provides offshore wind structural design, analysis, fabrication support, rigging design, and engineering consulting. His company co-hosted technical workshops and seminars with universities, NGO research institutes, and certification agencies in Taiwan. He was also actively involved in the early Asian government policy making of the offshore wind farm development strategies.

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