5-15 Jan 2016, Series of Workshops (Sponsored by Chinese Government, IEEE-SMC-TC: IGPS)
Hong Kong, Shenzhen, Guangzhou, Fuzhou, Xiangmen, Yangzhou, Nanjing, Shanghai

Hossam A.Gabbar (Gaber), PhD, P.Eng, Fellow RAMSP, ESCL, UOIT
IEEE, SMC, TC:IGPS, Smart Energy Grids, Green Infrastructures
China Trip Schedule

• Jan 6, HK
  • AM: HK Food and Health Bureau;
  • PM: HONG KONG CHIU CHOW ASSOCIATION

• Jan 7 Shenzhen: Company Gala

• Jan 8
  • AM: Shenzhen CHIU CHOW ASSOCIATION
  • PM: Guangzhou Lougang High-tech District

• Jan 9
  • AM: Guangzhou Zengcheng High-tech District
  • PM: Xiangmen High-tech District
China Trip Schedule

• Jan 11
• AM: Fuzhou High-tech District
• PM: Fuzhou business matching

• Jan 13
• AM: discussion with Yangzhou High-tech government
• PM: Yangzhou business matching and visited educational college

• Jan 14
• AM: travel to Nanjing and sightseeing
• PM: Nanjing Xianwu High-tech District

• Jan 15
• AM: Nanjing software High-tech District
• PM: Meeting 3D company

• Jan 16: official event, Nanjing Government-Industrial Meeting
Accomplishment Summary

• Introduce Smart Green Building Technologies and Systems
• Introduce Industrial Projects on Transportation Infrastructures Planning
• Introduce Industrial Projects on Energy Safety and Control Technologies
• Introduce Industrial Projects on High Current Plasma Generation
• Discuss Integration with Software Infrastructures
• Discuss Potential Education and Training Programs in China
• Establish Basis for Future Collaboration with China
• Recognize Opportunities for Industrial Projects in China
• Introduce and Promote IEEE SMC, IGPS in China
• Plan Exchange visits (first one was from Nanjing Software Valley to Toronto on 21-Jan-2016)
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Intelligent Green Industrial and Commercial Facilities - Smart Green Building

Dr. Hossam A. Gabbar, IEEE-SMC, IGPS TC Chair
Professor, Director of Energy Safety and Control Lab, University of Ontario Institute of Technology, Canada
Previous Visits to China, Nanjing, Tsinghua, Beijing, Qingdao, Taiyuan, and China University of Petroleum
Collaboration Projects with China

Leader: Dr. Hossam Gaber (A.Gabbar)

R&D Team:

Canada, China, Japan, India, Egypt, Iran, Kazakhstan, Brazil, Algeria, Malaysia, KSA, Qatar, UAE, Mexico, Colombia, Bangladesh

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<th>Dr. Lingzhi Xia, Postdoc</th>
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Building Energy Management System

[Diagram and text related to energy management systems]
Enterprise Energy Management
Within SG / MG (ESN)

Energy LCC Analysis
Analysis of Energy Use
Analysis of Energy Supply Scenarios

Risk-Based & Reliability Analysis of Energy System

Proposed User Interface

ISO 14000 EMS
Control and Protection of Micro Energy Grids
Integrated Modeling & Simulation for Smart Grid Systems Engineering

- Business Process Modeling
- Power / Energy Modeling
- Control / Protection Modeling
- Network & Comm. Modeling
- Grid Asset Integrity Modeling
- Geographical & Environmental Modeling
- Grid Topology Modeling

Integrated Grid Modeling & Simulation

Application Layer
- GIS Layer
- Data Management
- Communication / Control
- Grid Physical System

Utility Companies
- Ministry of Energy
- IESO / OPA / Licensing
- Energy Technology / Service Providers
- Consumers

Networks:
- Gas Network
- Thermal Network
- Electricity Network
- Transportation Network
- Water Network
CAPE-ModE is a proposed modeling and simulation environment with decision support for the synthesis and evaluation of future energy production/supply scenarios on the basis of lifecycle assessment, lifecycle costing, and risk management.
Transportation Infrastructure Planning Support Tool
Real Time Safety Verification for Process Industry

An example of flow inside the Flash Drum

Click to see expert rules in action

Click on pump to see vibration data

Click to change simulation speed

Click to see dynamic FSN

Click to change safety SIL PFD RRF etc.
Brief introduction:
1. China currently has the largest nuclear power plant market all over the world with many nuclear power plant projects on construction and on planning.
2. 3D reactor core information interpretation is very important for not only the research institute to do R&D, analysis; but also for the nuclear power plants to training, real-time online monitoring, diagnostics, and safety related analysis. 3D reactor core information is such as 3D power, 3D temperature, 3D flow, 3D pressure, 3D stress, etc.
Currently, there is no any powerful 3D visualization platform to help the power plant operators or researchers and analysts in nuclear institutes or R&D companies. For the nuclear power plant, operators read measured records from some instruments installed in some positions within the core; for researchers in R&D companies, most analysis codes still use the old language and do the simulations under DOS or UNIX command lines format. However, for both sides, they will involve 3D information illustrations. For example, power plant will do fueling, which needs analysis of 3D power distribution; for R&D companies, they will do a lot of safety analysis involving reactor internal information such as power, temperature, pressure. When 3D illustration is required, they usually extract the results (numbers) from analysis codes, and input them to the commercial software tools such as MATLAB, ORIGEN. Nevertheless, these generic software tools are not focused on 3D represents, which results in their limitation functions and feasibility on a typical 3D information analysis. Therefore, a special 3D visualization tool will be developed and dedicated to fill up these functions, such as aided analysis, interfaces, etc.
Plasma Generation and Applications

Variation of Force Density Distribution Inside the Beam

Self-Induced Lorentz Force of the 4 Plasma Beams

Simulation of Plasma Chamber using Elmer

Force Density Distribution

Analytical MHD Model for High Current Plasma Beam

Lab Experimentation for Plasma Applications

TSD Experimental Setup

Simulation of Plasma Chamber using Elmer

Analytical MHD Model for High Current Plasma Beam

Lab Experimentation for Plasma Applications

TSD Experimental Setup
Plasma Generation Technology

• Plasma Generation
  • Miniature-Size Thermal Vacuum Chamber
  • DC and RF Plasma Generation
  • 20 W to 300 W Power Input
  • Fusion and Aerospace Applications

• Advanced Hybrid Plasma Simulation
  • Elmer Modeling (Finite Element Method)
  • MATLAB (Finite Volume Method)
  • Monte Carlo Simulation, and MHD
Thanks

Energy Safety and Control Lab