

Task Force: Application of Big Data Analytic on Transmission System Dynamic Security Assessment

Core Members Kick-off Meeting

Rafael Segundo (Chair), segu@zhaw.ch

Yanli Liu (Vice-Chair), yanliliu@tju.edu.cn

Emilio Barocio (Secretary), emilio.barocio@cucei.udg.mx

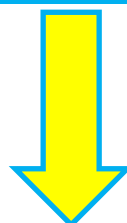
Petr Korba (Secretary), korb@zhaw.ch

Agenda

- ❑ Official introduction of TF board and core members.
- ❑ Brief Background
- ❑ Description of the objectives and activities planned for the duration of the TF
- ❑ Description of activities planned during the first year.
- ❑ Organization of the first virtual meeting during the IEEE PES GM 2020
 - Define date and time (August 2-6)
 - Open to the general public
- ❑ Organization of the first deliverable (technical report)
 - Deadlines
 - Procedures
- ❑ Feedback and comments from core members
- ❑ Closing remarks & distribution of Minutes of Meeting (MoMs)

Background

IEEE PES Subcommittee on Big Data & Analytics for Power Systems
 Le Xie (Chair), Yannan Sun (Vice-Chair) and Hung-Ming Chou (Secretary)



WK: Data Access

Facilitate public access to power systems data to promote big data research and development.

TF: Big Data Webinar Series

TF: Big Data Applications in Power Distribution Systems

NEW!

TF: Application of BD Analytic on Transmission Systems DSA

Panel Sessions

Proposed: PESGM 2019
 Application: Sept 2019
 Accepted: May 2020

Mission and Scope

- Achieve **transfer of knowledge between different scientific communities** to solve challenging power system problems and bridge the gap between these communities.
- **Evaluate how innovative algorithms could be used in the control room** of power system operators to facilitate the decision making and to find stability margins in order to guarantee a secure operation.
- **Enhance the value of available data in control rooms**, quickly, easily and precise.
- **Development of offline/online tools** for parameter validation in control rooms.
- **Provide a high quality report** with a compilation of data mining, artificial intelligence and machine learning applications for the secure operation of transmission systems.

Board & Core Members

- Rafael Segundo, Zurich University of Applied Sciences, Switzerland
- Liu Yanli, Tianjin University, China
- Emilio Barocio, University of Guadalajara, Mexico
- Petr Korba, Zurich University of Applied Sciences, Switzerland
- Mario Paolone, EPFL, Switzerland
- Hjörtur Jóhannsson, DTU, Denmark
- Marcos Netto, National Renewable Energy Laboratory, USA
- Venkat Krishnan, National Renewable Energy Laboratory, USA
- Yingchen Zhang (YC), National Renewable Energy Laboratory, USA
- Yoshihiko Susuki, Osaka Prefecture University, Japan
- Simon Tindemans, TU Delft, Netherlands
- Jose Luis Rueda Torres, TU Delft, Netherlands
- Jochen Cremer, Imperial College London, UK
- Federica Bellizio, Imperial College London, UK
- Mingyang Sun, Zhejiang University, China
- Yajun Wang, Dominion Energy, USA
- Robert Eriksson, Svenska Kraftnät, Sweden
- Rusejla Sadikovic, Swissgrid, Switzerland
- Mats Larsson, ABB Corporate Research, Switzerland
- Hector Chavez, University of Santiago de Chile, Chile

Activities and deliverables planned (2020-2022)

- **A1** TF physical meetings during the PES GM 2020, 2021 and 2022.
- **A2 Virtual Meetings, at least two per year (Autumn & Spring).**
- **A3** International Workshop in ZHAW, Switzerland, 2020.
- **A4** Organization of one panel session in one IEEE PES Conference in 2021. such as IEEE ISGT Europe or IEEE SGSMA.
- **A5** International Workshop in Tianjin University, China, 2021.

- **D1 Report 1**: “Data handling on transmission systems: A survey of needs for transmission utilities to understand they current issues related with continuous grow of data in control rooms”. [end 2020]
- **D2 TF Special Issue**: on international Journal, announced before the end of 2021.
- **D3 Report 2**: “Compilation of data mining, artificial intelligence and machine learning applications to enhance the value of data in control rooms”. [by PESGM2021]
- **D4 Final Report**: “Demonstration of application of data mining, artificial intelligence and machine learning algorithms to maintain the security operation of transmission systems”, IEEE Transactions, [by PESGM2022]

Activities planned during 2020

- A1.1 Official Kick-off Meeting during IEEE PESGM2020 [TF Board]
- A1.2 Panel Session during IEEE PESGM2020 [YL]
- A1.3 Virtual Workshop DynPOWER, September 2020 [RS]
- A1.4 Virtual Workshop organized by Tianjin University, October 2020 [YL]
- A1.5 Open official website for TF [RS]

- D1.1 Report 1: “Data handling on transmission systems: A survey of needs for transmission utilities to understand they current issues related with continuous grow of data in control rooms” [All]

Official Kick-off Meeting (Virtual) during IEEE PESGM2020

“Group meetings for TF/WG, you need to schedule the TF/WG meeting yourself at a time that is convenient for your members”

- Proposed date and time:
Tuesday 4th of August 2020 at 3:00pm Zurich Time (GMT+2)
- Open meeting to all registered conference participants
- Repetition of similar information (introduction of TF)
- Recruitment of interested people and creation of a database pool of members
- Open invitation of TF planned activities to new members

Panel Session during IEEE PESGM2020

Integration of various source data for enhanced situational awareness of power system

Session Type:	Panel Session
Time:	Tuesday, August 4, 2020 8:00 AM-10:00 AM
Room:	On Demand
Committee:	(AMPS) Big Data Analytics
Co-Sponsoring Committee 1:	Unspecified
Co-Sponsoring Committee 2:	Unspecified
Chair 1:	Yanli Liu; Tianjin University
Chair 2:	
Summary:	Integration of various source data for enhanced situational awareness of power system

[20PESGM2321-Potential and Limitations of Using Smart Meter and Secondary Substation Data for Phase Connection Identification](#)

Antonio Gomez-Exposito; University of Seville

Antonio de la Villa-Jaen; University of Seville

Esther Romero-Ramos; University of Seville

Daniel Morales Wagner; Ingelectus

Adolfo Gastalver Rubio; Ingelectus

Isidro Diaz Caballero; Ingelectus

Javier Leiva Rojo; Enel

Co-Author: Antonio Gomez-Exposito , Daniel Morales , Adolfo Gastalver , Isidro Díaz , J. Leiva

[20PESGM2322-From smart time synchronized sensors to effective monitoring, protection and control applications](#)

Vladimir Terzija; The University of Manchester

[20PESGM2323-Super resolution social data analytics for understanding power system load characteristics](#)

Junhua Zhao; The Chinese University of Hong Kong, Shenzhen

[20PESGM2324-Research on differential lightning protection of distribution lines in Zhejiang based on big data analysis](#)

Shaohe Wang; State Grid Zhejiang Electric Power Research Institute

[20PESGM2325-Machine learning based nonparametric probabilistic forecasting of wind power generation](#)

Can Wan; Zhejiang University

[20PESGM2326-RMT-based analysis of the temporal-spatial data in a grid with high uncertainties](#)

Xing He; Shanghai Jiaotong University, China

[20PESGM2327-Distribution system monitoring via widespread sensing](#)

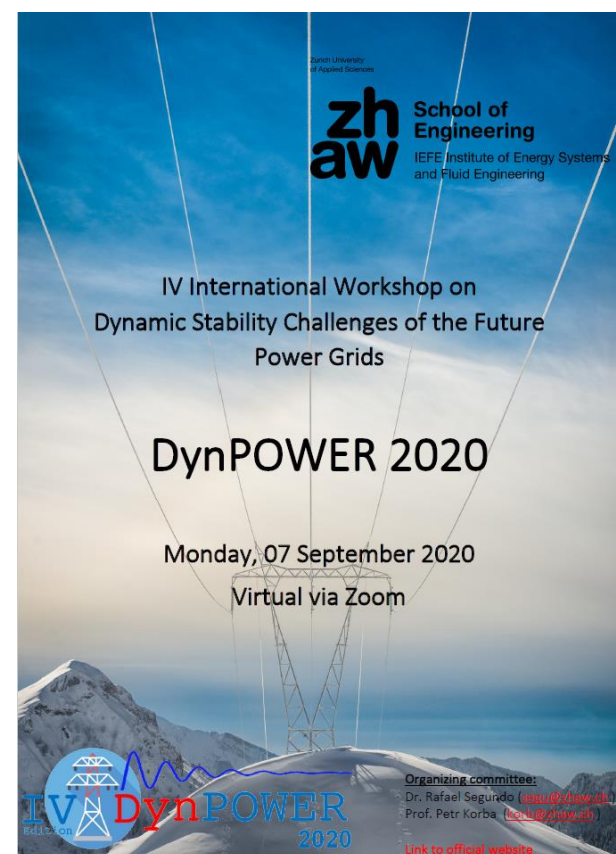
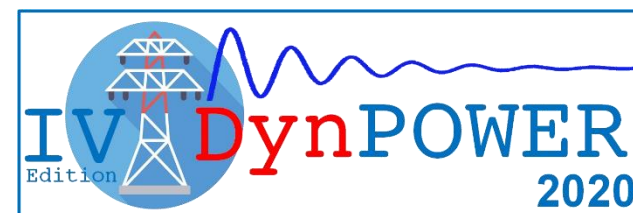
Wenpeng Luan; Tianjin University, China

[20PESGM2328-Application of data-driven and knowledge fusion artificial intelligence in power system](#)

Xinying Wang; China Electric Power Research Institute

Virtual Workshop DynPOWER 2020

- Date: **Monday 7th, September 2020**
- Free of charge to all participants
- Zoom (max 300 participants)
- Confirmed speakers:
 - ✓ Prof. Joe Chow, RPI, USA
 - ✓ Prof. Daniel Dotta, University of Campinas, Brazil
 - ✓ Prof. Petros Aristidou, Cyprus University, Cyprus
 - ✓ Dr. Guglielmo Frigo, METAS, Switzerland
 - ✓ Prof. Jose Luis Rueda, TU Delft, Netherlands
 - ✓ Prof. Yanli Liu, Tianjin University, China
 - ✓ Prof. Emilio Barocio, UdG, Mexico
 - ✓ Dr. Miguel Ramirez, ZHAW, Switzerland
- Final agenda and program to follow in August



Open official website of the new TF

With the following information:

- Mission and Scope
- Board and Core Members (if allowed)
- Report of Activities and events
 - Infor about web and physical meetings
 - Organization of panel sessions
 - Special issue calls
 - Workshops and other events
- Dissemination of Reports

Proposal of Uni-LAB

- Theme: **Big Data Analytics for Smart Energy Systems**
- Activities:
 - ✓ Hold international competitions
 - ✓ Establish a sharing platform(data set, report, education resource)
 - ✓ Panel or even a new symposium(publish competition results and next topic)
 - ✓ 1-2 academic seminars per year
 - ✓ Academic exchange visits among partners
- Confirmed Partners:
 - ✓ Tianjin University, China
 - ✓ UNSW, Australia
 - ✓ NTU, Singapore
 - ✓ The Chinese University of Hong Kong, Shen Zhen, China
 - ✓ KTH, Sweden
 - ✓ Zurich University of Applied Sciences, Switzerland
 - ✓ Some Companies from China

Report 1: Data handling on transmission systems

Objective: To make a compilation of current needs of TSOs for power systems around the world caused by to growing amount of data in control rooms.

Procedure:

- **To distribute the template** with the main information to be collected (today and to additional interested members after kick-off meeting PESGM 2020)
- Only **one survey per transmission system**
 - Members belonging to a same TS need to team up in the elaboration of the report, e.g. One report for Switzerland
 - No page limit per report
- **Core members have priority** to take the lead for this activity
- **Report to TF board, who take the lead and which power system 31.08.2020**
- It is possible and **recommended to team-up with regional collaborators** in order to make the survey as precise as possible, e.g. system operators or other academic partners with more experience on the transmission system.
- **No restriction with number of authors** per survey.
- **Deadline of first draft 01.12.2020**
- TF board merge surveys into a single document and distribute for review (Dec2020-Jan2021)
- **Deliver of first report to Subcommittee: end January 2021**

Feedback and comments from core members

Closing remarks

- Next virtual meeting during PESGM 2020
- Additional Virtual Meeting?, before the end of 2020
- MoMs, slides and templates to be distributed at the end of the meeting

Thank you for your participation