

# SEST' 20

3rd International Conference  
on Smart Energy Systems  
and Technologies

7-9 September, 2020



Copyright © 2020 International Conference on  
Smart Energy Systems and Technologies  
(SEST 2020)

# Welcome Message

On behalf of all chairs and program committee members, I am pleased and honored to welcome you to the 3<sup>rd</sup> International Conference on Smart Energy Systems and Technologies – SEST 2020.

The SEST conference series is determined to establish itself as the venue to present top-tier scientific research in the field of Smart Energy Systems and Technologies. I would like to use this opportunity to acknowledge the exceptional contributions of all TPC members and all chairs, whose efforts were pivotal in helping make this vision a reality. The TPC carried out a comprehensive three-level review process of all submitted technical papers:

-1<sup>st</sup> Stage: Abstracts were assessed regarding scope and quality/interest, with **18%** of those abstracts have been rejected (57 abstracts). The authors of the remaining abstracts have been invited to submit the corresponding full paper.

-2<sup>nd</sup> Stage: Full papers were thoroughly evaluated by TPC members and **424** external reviewers, averaging **5.6** reviews per paper.

-3<sup>rd</sup> Stage: Revised full papers (and the response letters) were also evaluated by the conference chairs.

Overall, **326** abstracts were initially submitted (from 45 countries and all 5 continents), and **101** full papers were finally accepted to be presented. The final acceptance rate this year was **44%**.

This rigorous review process would not have been possible if not for the tremendous efforts of TPC members and all **424** external reviewers, whose contributions significantly improved the quality of the papers to be presented in technical sessions.

Finally, we also have the privilege of having six outstanding Keynote Speakers, all world-renowned experts in the field, who will be presenting keynote addresses on some of the most pressing and timely topics.

The health and safety of our participants are of the utmost importance for the SEST 2020 organizing committee. Hence, due to the COVID-19 situation, SEST 2020 will be held virtually this year. We aim at providing an opportunity to discuss various engineering challenges of smart energy system design and operation by focusing on advanced methods and practices for designing different components and their integration within modern and next-generation grids. We also hope to provide a forum for researchers from academia and professionals from industry, as well as government regulators to tackle these challenges, and discuss and exchange knowledge and best practices about design and implementation of smart energy systems.

I hope that you will enjoy this year's SEST conference with its high-quality papers and outstanding keynote presentations. Thank you very much!

**Ozan Erdinc**  
**SEST 2020 General Chair**

On Behalf of all Chairs

# Chairs and Committees

## General Chair



**Ozan Erdinc**

Yildiz Technical University, Turkey

## General Co-Chair



**João P. S. Catalão**

FEUP and INESC TEC, Portugal

## Technical Co-Chairs



**Miadreza Shafie-khah**  
University of Vaasa,  
Finland



**Akin Tascikaraoglu**  
Mugla University,  
Turkey

## Publications Chairs



**Tarek AlSkaif**  
Wageningen University &  
Research,  
The Netherlands



**Mohamed Lotfi**  
FEUP and INESC TEC,  
Portugal

## SEST Series Steering Committee

Agustin Sanchez de La Nieta, Loyola University Andalusia, Spain

Akin Tascikaraoglu, Mugla University, Turkey

Alberto Borghetti, University of Bologna, Italy

Alireza Heidari, University of New South Wales, Australia

Amjad Anvari-Moghaddam, Aalborg University, Denmark

Anastasios Bakirtzis, Aristotle University of Thessaloniki, Greece

David Pozo, SKOLTECH, Russia

Dirk Van Hertem, Katholieke Universiteit Leuven, Belgium

Edris Poursmaeil, Aalto University, Finland

Fangxing (Fran) Li, University of Tennessee at Knoxville, USA

Fei Wang, North China Electric Power University, China

Felipe Rosa, University of Sevilla, Spain

Florin Capitanescu, Luxembourg Institute of Science and Technology, Luxembourg

Gerardo Osório, University of Beira Interior, Portugal

Gianfranco Chicco, Politecnico di Torino, Italy

Hadi Amini, Florida International University, USA

Hossam A. Gabbar, UOIT, Canada

Hossein Farahmand, Norwegian University of Science and Technology, Norway

Ionel Vechiu, ESTIA, France

Jamshid Aghaei, Shiraz University of Technology, Iran

Javier Contreras, University of Castilla-La Mancha, Spain

João Martins, New University of Lisbon, Portugal

Jose L. Martinez-Ramos, University of Seville, Spain

Kai Strunz, TU-Berlin, Germany

Miadreza Shafie-khah, University of Vaasa, Finland  
Mohamed El Moursi, Khalifa University of Science and  
Technology, UAE  
Mohamed Lotfi, FEUP and INESC TEC, Portugal  
Mohammad Sadegh Javadi, INESC TEC, Portugal  
Nikolaos Paterakis, Eindhoven University of Technology,  
The Netherlands  
Pierluigi Siano, University of Salerno, Italy  
Tarek ALSkaif, Wageningen University & Research, The  
Netherlands  
Tomislav Capuder, University of Zagreb, Croatia  
Vahid Vahidinasab, Shahid Beheshti University, Iran  
Vitor Monteiro, University of Minho, Portugal  
Wei Wei, Tsinghua University, China

## SEST 2020 Local Organizing Committee

Ali Rifat Boynueđri, Yildiz Technical University, Turkey  
Ayşe Kübra Erenođlu, Yildiz Technical University, Turkey  
Erdem Akboy, Yildiz Technical University, Turkey  
İbrahim Şengör, İzmir Katip Çelebi University, Turkey  
Yavuz Ateş, Yildiz Technical University, Turkey  
Yavuz Eren, Yildiz Technical University



# Technical Program Committee

Agustin Sanchez de La Nieta, Loyola University Andalusia, Spain

Ahmad Nikoobakht, Higher Education Center of Eghlid, Iran

Alberto Borghetti, University of Bologna, Italy

Alireza Heidari, University of New South Wales, Australia

Amin Hajizadeh, Aalborg University, Denmark

Amjad Anvari-Moghaddam, Aalborg University, Denmark

Anastasios Bakirtzis, Aristotle University of Thessaloniki, Greece

Angela Russo, Politecnico di Torino, Italy

Antonio Conejo, The Ohio State University, USA

António Machado e Moura, FEUP, Portugal

Bikash Pal, Imperial College London, UK

Burak Tekgün, Abdullah Gul University, Turkey

Carlo Alberto Nucci, University of Bologna, Italy

Carlos Henggeler Antunes, University of Coimbra, Portugal

Cláudio Monteiro, FEUP, Portugal

David Pozo, SKOLTECH, Russia

Dirk Van Hertem, Katholieke Universiteit Leuven, Belgium

Edris Poursmaeil, Aalto University, Finland

Elias Kyriakides, University of Cyprus, Cyprus

Emilio Ghiani, University of Cagliari, Italy

Fangxing (Fran) Li, University of Tennessee at Knoxville, USA

Fatma Yıldız Taşcıkaraoğlu, Mugla Sitki Kocman University, Turkey

Fei Wang, North China Electric Power University, China

Fernando Silva, University of Lisbon, Portugal

Florin Capitanescu, Luxembourg Institute of Science and Technology, Luxembourg

Frede Blaabjerg, Aalborg University, Denmark

Fushuan Wen, Tallinn University of Technology, Estonia

Gabriel Pinto, University of Minho, Portugal

George Gross, University of Illinois at Urbana-Champaign, USA

Georgios Tsaousoglou, Eindhoven University of Technology, The Netherlands

Gerardo Osório, University of Beira Interior, Portugal

Gianfranco Chicco, Politecnico di Torino, Italy

Giuseppe Marco Tina, University of Catania, Italy

Gregorio Muñoz-Delgado, University of Castilla-La Mancha, Spain

Gregor Verbic, The University of Sydney, Australia

Grigoris Papagiannis, Aristotle University of Thessaloniki, Greece

Hadi Amini, Florida International University, USA

Hossein Farahmand, Norwegian University of Science and Technology, Norway

Ionel Vechiu, ESTIA, France

Jamshid Aghaei, Shiraz University of Technology, Iran

Javier Contreras, University of Castilla-La Mancha, Spain

Jianhui Wang, Southern Methodist University, USA

João Luiz Afonso, University of Minho, Portugal

João Martins, New University of Lisbon, Portugal

João Matias, University of Aveiro, Portugal

João Peças Lopes, FEUP and INESC TEC, Portugal

Jose L. Martinez-Ramos, University of Seville, Spain

José Manuel Arroyo, University of Castilla-La Mancha, Spain

José Nuno Fidalgo, FEUP and INESC TEC, Portugal  
Josep M. Guerrero, Aalborg University, Denmark  
Jovica Milanovic, University of Manchester, UK  
Juan Miguel Morales, Universidad de Málaga, Spain  
Kadir Doğanşahin, Artvin Coruh University, Turkey  
Kai Strunz, TU-Berlin, Germany  
Katia Almeida, University of Federal de Santa Catarina,  
Brazil  
Leonardo Martins, IBM Research, Brazil  
Luis Baringo, University of Castilla-La Mancha, Spain  
Manuel Matos, FEUP and INESC TEC, Portugal  
Mehdi Savaghebi, University of Southern Denmark,  
Denmark  
Miguel Asensio, European Commission  
Mohamed El Moursi, Khalifa University of Science and  
Technology, UAE  
Mohamed Lotfi, FEUP and INESC TEC, Portugal  
Mohammad Sadegh Javadi, INESC TEC, Portugal  
Mohammad Shahidehpour, Illinois Institute of Technology,  
USA  
Mudathir Akorede, University of Ilorin, Nigeria  
Murat Göl, Middle East Technical University, Turkey  
Nikolaos Paterakis, Eindhoven University of Technology,  
The Netherlands  
Nikos Hatziargyriou, National Technical University of  
Athens, Greece  
Nilufar Neyestani, INESC TEC, Portugal  
Oğuzhan Ceylan, Kadir Has University, Turkey  
Önder Güler, Istanbul Technical University, Turkey  
Pedro Faria, Polytechnic of Porto, Portugal  
Peter Palensky, TU Delft, The Netherlands

Pierluigi Siano, University of Salerno, Italy  
Radu Porumb, Universitatea Politehnica din Bucuresti,  
Romania  
Reza Hemmati, Kermanshah University of Technology,  
Iran  
Ricardo Bessa, INESC TEC, Portugal  
Rui Castro, University of Lisbon, Portugal  
Saber Talari, Fraunhofer IEE, Germany  
Salah Bahramara, Islamic Azad University, Iran  
Salvador Pineda Morente, University of Málaga, Spain  
Sérgio Cruz, University of Coimbra, Portugal  
Shahab Bahrami, University of British Columbia, Canada  
Sitki Güner, Istanbul Arel University, Turkey  
Sonja Wogrin, IIT Comillas Madrid, Spain  
Tarek ALSkaif, Wageningen University & Research, The  
Netherlands  
Thomas Strasser, AIT Austrian Institute of Technology,  
Austria  
Tomislav Capuder, University of Zagreb, Croatia  
Vahid Vahidinasab, Shahid Beheshti University, Iran  
Vitor Monteiro, University of Minho, Portugal  
Vladimir Terzija, The University of Manchester, UK  
Vladimiro Miranda, FEUP and INESC TEC, Portugal  
Wei-Jen Lee, University of Texas at Arlington, USA  
Wei Wei, Tsinghua University, China  
Yasser Hegazy, German University in Cairo, Egypt  
Zbigniew Leonowicz, Wrocław University of Science and  
Technology, Poland  
Zita Vale, GECAD - ISEP/IPP, Portugal



# SEST'20

3rd International Conference on  
Smart Energy Systems and  
Technologies (SEST)

7-9 September 2020

# Organization and Sponsorship

## Organizing Sponsors



## Technical Sponsors



# Conference Program

Turkish Time	CEST	Day 1 07/09/2020	Day 2 08/09/2020	Day 3 09/09/2020
10:30 - 11:00	9:30 - 10:00	Opening Session	-	-
11:00 - 12:30	10:00 - 11:30	Session 1	Session 5	Session 9
12:30 - 13:00	11:30 - 12:00	Break	Break	Break
13:00 - 14:30	12:00 - 13:30	Session 2	Session 6	Session 10
14:30 - 15:00	13:30 - 14:00	Break	Break	Break
15:00 - 15:45	14:00 - 14:45	<i>Keynote: Saifur Rahman</i>	<i>Keynote: Manuel Matos</i>	<i>Keynote: Josep Guerrero</i>
15:45 - 16:30	14:45 - 15:30	<i>Keynote: Fangxing Li</i>	<i>Keynote: Wei-Jen Lee</i>	<i>Keynote: Mohammad Shahidehpour</i>
16:30 - 17:00	15:30 - 16:00	Break	Break	Break
17:00 - 18:30	16:00 - 17:30	Session 3	Session 7	Session 11
18:30 - 19:00	17:30 - 18:00	Break	Break	Break
19:00 - 20:30	18:00 - 19:30	Session 4	Session 8	Session 12
20:30 - 21:00	19:30 - 20:00	-	-	Closing Session

## Conference Venue

The health and safety of our participants are of the utmost importance for the SEST 2020 organizing committee. Hence, due to the CORONAVIRUS (COVID-19) situation, which still poses a lot of concerns and uncertainty worldwide, SEST 2020 will be held virtually. Please use the following links to access the conference sessions:

### Guidelines:

The conference will use **Zoom** platform. We recommend that you install the Zoom client: <https://zoom.us/support/download>. If it is not possible to install this client, then you can use the HTML Web client. You can **test** if you can access a Zoom meeting via <https://zoom.us/test>. The **audio** for this conference is delivered through your computer. Before joining the conference, make sure to have your headset and microphone connected. Having a webcam can increase the interactivity but is not strictly necessary.

Presenting authors must be present in the session **at least 10 minutes before the start of the session**. Be ready to answer questions from the participants and the session chairs after your MP4 video or PPT slides are presented. Session chairs will announce and manage the Q&A period. **Participants** are invited to join and leave any session whenever they want. If you wish to ask a question, please type your question in the Chat window. Non-presenting authors must have the microphone **muted** during the presentations period.



## Zoom Links:

### **Day 1 - 07/09/2020**

SEST 2020 - **Opening Session plus Session 1**, 9:30 – 11:30 CEST  
<https://videoconf-colibri.zoom.us/j/91781852052?pwd=cmxrRGZkdzI2dWJlbnR1RWV1bWZkOQ>  
ID: 917 8185 2052; Pass: 000001

SEST 2020 - **Session 2**, 12:00 – 13:30 CEST  
<https://videoconf-colibri.zoom.us/j/92640967865?pwd=ROU5N2ZlbnR1RWV1bWZkOQ>  
ID: 926 4096 7865; Pass: 000002

SEST 2020 - **Keynotes Profs. Saifur and Fran**, 14:00 – 15:30 CEST  
<https://videoconf-colibri.zoom.us/j/93953733435?pwd=bTRkZkY9ITZlRkRlbnR1RWV1bWZkOQ>  
ID: 939 5373 3435; Pass: 000003

SEST 2020 - **Session 3**, 16:00 – 17:30 CEST  
<https://videoconf-colibri.zoom.us/j/93295888902?pwd=LUk5d0JlbnR1RWV1bWZkOQ>  
ID: 932 9588 8902; Pass: 000004

SEST 2020 - **Session 4**, 18:00 – 19:30 CEST  
<https://videoconf-colibri.zoom.us/j/99675795949?pwd=SDi66S0yZ2ovODJhN05lRlRlbnR1RWV1bWZkOQ>  
ID: 996 7579 5949; Pass: 000005

### **Day 2 - 08/09/2020**

SEST 2020 - **Session 5**, 10:00 – 11:30 CEST  
<https://videoconf-colibri.zoom.us/j/97065722125?pwd=Nm5aVjE5bWZkOQ>  
ID: 970 6572 2125; Pass: 000006

SEST 2020 - **Session 6**, 12:00 – 13:30 CEST  
<https://videoconf-colibri.zoom.us/j/91937557601?pwd=dktRb1JlbnR1RWV1bWZkOQ>  
ID: 919 3755 7601; Pass: 000007

SEST 2020 - **Keynotes Profs. Matos and Lee**, 14:00 – 15:30 CEST  
<https://videoconf-colibri.zoom.us/j/96981938386?pwd=dnJlbnR1RWV1bWZkOQ>  
ID: 969 8193 8386; Pass: 000008

SEST 2020 - **Session 7**, 16:00 – 17:30 CEST  
<https://videoconf-colibri.zoom.us/j/92504154335?pwd=akQybnR1RWV1bWZkOQ>  
ID: 925 0415 4335; Pass: 000009

SEST 2020 - **Session 8**, 18:00 – 19:30 CEST  
<https://videoconf-colibri.zoom.us/j/91889839046?pwd=RFI4K2RlbnR1RWV1bWZkOQ>  
ID: 918 8983 9046; Pass: 000010

### **Day 3 - 09/09/2020**

SEST 2020 - **Session 9**, 10:00 – 11:30 CEST  
<https://videoconf-colibri.zoom.us/j/98722937330?pwd=SE5uS0JlbnR1RWV1bWZkOQ>  
ID: 987 2293 7330; Pass: 000011

SEST 2020 - **Session 10**, 12:00 – 13:30 CEST  
<https://videoconf-colibri.zoom.us/j/99520453438?pwd=byVlbnR1RWV1bWZkOQ>  
ID: 995 2045 3438; Pass: 000012

SEST 2020 - **Keynotes Profs. Josep and Shahidehpour**, 14:00 – 15:30 CEST  
<https://videoconf-colibri.zoom.us/j/96346440682?pwd=SuZlbnR1RWV1bWZkOQ>  
ID: 963 4644 0682; Pass: 000013

SEST 2020 - **Session 11**, 16:00 – 17:30 CEST  
<https://videoconf-colibri.zoom.us/j/95677648030?pwd=NGowWkNlbnR1RWV1bWZkOQ>  
ID: 956 7764 8030; Pass: 000014

SEST 2020 - **Session 12 plus Closing Session**, 18:00 – 20:00 CEST  
<https://videoconf-colibri.zoom.us/j/91523830216?pwd=TFh1bnR1RWV1bWZkOQ>  
ID: 915 2383 0216; Pass: 000015

Day 1
<b>Opening Session</b>
<b>Session 1: Electric Vehicles (EV)</b>
<b>Break</b>
<b>Session 2: Power System Operation (PSO)</b>
<b>Break</b>
<i>Keynote Speaker: Saifur Rahman</i>
<i>Keynote Speaker: Fangxing Li</i>
<b>Break</b>
<b>Session 3: Demand Response (DR)</b>
<b>Break</b>
<b>Session 4: Power System Planning (PSP)</b>

Day 2

**Session 5:  
Modeling, Simulation and ICT (MS - ICT)**

**Break**

**Session 6:  
Electricity Markets (EM)**

**Break**

*Keynote Speaker: Manuel Matos*

*Keynote Speaker: Wei-Jen Lee*

**Break**

**Session 7:  
Power Electronics (PE)**

**Break**

**Session 8:  
Power Quality and System Stability (PQSS)**

Day 3
<b>Session 9: Microgrids (Micro)</b>
<b>Break</b>
<b>Session 10: Data Analytics (DA)</b>
<b>Break</b>
<i>Keynote Speaker: Josep Guerrero</i>
<i>Keynote Speaker: Mohammad Shahidehpour</i>
<b>Break</b>
<b>Session 11: Energy Storage (ES)</b>
<b>Break</b>
<b>Session 12: Forecasting (For)</b>

## Closing Session

### Important Information

Overall, there will be 101 paper presentations with authors from 30 countries. Papers have been grouped into 12 topics to ensure the best opportunities for attendees with different interests.

*No parallel sessions are envisaged this year, that is, authors are able to attend all sessions.*

*Sessions have a total duration of 90 minutes. Presenting authors should be at their designated virtual room at least 10 minutes prior to the session. The duration of each presentation should not exceed 8 minutes, followed by around 2 minutes of Q&A and discussion.*

*Every day, two consecutive keynote addresses will take place, also having a total duration of 90 minutes. Each keynote address will have a duration of about 40 minutes, followed by 5 minutes of Q&A and discussion.*

*With Technical co-sponsorship by IEEE, IEEE PES, IEEE IES, and IEEE IAS, the **top 20%** of accepted and presented **papers in SEST 2020** will be eligible for publication in **IEEE Transactions on Industry Applications**.*

## List of Keynote Addresses

### **Day 1:**

*"The Smart City Building Blocks and Their Synergy with Smart Villages"*

**- Saifur Rahman**

*"A Large-Scale Testbed as a Virtual Power Grid for Closed-Loop Controls in Research and Testing"*

**- Fangxing Li**

### **Day 2:**

*"How to deal with uncertain load and generation using Fuzzy Power Flow tools"*

**- Manuel Matos**

*"Effectiveness of Zero Pricing on Demand Shifting of Residential Customers"*

**- Wei-Jen Lee**

### **Day 3:**

*"Microgrids – Energy flowing from inside out"*

**- Josep Guerrero**

*"Blockchain for Decentralized Transactive Energy Management in Distributed Electric Power Systems with Renewable Energy Resources"*

**- Mohammad Shahidehpour**

## Day 1: Saifur Rahman

### **“The Smart City Building Blocks and Their Synergy with Smart Villages”**



**Bio:** Saifur Rahman is the founding director of the Advanced Research Institute at Virginia Tech, USA where he is the Joseph R. Loring professor of electrical and computer engineering. He also directs the Center for Energy and the Global Environment. He is a Life Fellow of the IEEE and an IEEE Millennium Medal winner. He is the president of the IEEE Power and

Energy Society (PES) for 2018 and 2019. He was the founding editor-in-chief of the IEEE Electrification Magazine and the IEEE Transactions on Sustainable Energy. He has published over 140 journal papers and has made over four hundred conference and invited presentations. In 2006 he served on the IEEE Board of Directors as the vice president for publications. He is a distinguished lecturer for the IEEE Power & Energy Society and has lectured on renewable energy, energy efficiency, smart grid, energy internet, blockchain, IoT sensor integration, etc. in over 30 countries. He is the founder of BEM Controls, LLC, a Virginia (USA)-based software company providing building energy management solutions. He served as the chair of the US National Science Foundation Advisory Committee for International Science and Engineering from 2010 to 2013. He has conducted several energy efficiency related projects for Duke Energy, Tokyo Electric Power Company, the US Department of Defense, the State of Virginia and the US Department of Energy.

## Day 1: Fangxing Li

### **“A Large-Scale Testbed as a Virtual Power Grid for Closed-Loop Controls in Research and Testing”**



**Bio:** Fangxing Li, also known as Fran Li, received the B.S.E.E. and M.S.E.E. degrees from Southeast University, Nanjing, China, in 1994 and 1997, respectively, and the Ph.D. degree from Virginia Tech, Blacksburg, VA, USA, in 2001. Currently, he is the James W. McConnell Professor in electrical engineering and the Campus Director of CURENT at the University of

Tennessee, Knoxville, TN, USA. His current research interests include renewable energy integration, demand response, energy markets, microgrid, and power system computing. Prof. Li is presently serving as the Editor-In-Chief of IEEE Open Access Journal of Power and Energy and Chair of the IEEE/PES Power System Operation, Planning and Economics (PSOPE) Committee. He is a Fellow of IEEE and a registered Professional Engineer in the state of North Carolina.



## Day 2: Manuel Matos

### **“How to Deal with Uncertain Load and Generation using Modern Fuzzy Power Flow Variants”**



**Bio:** Manuel A. Matos was born in Porto, Portugal, in 1955. He has been with the Faculty of Engineering, University of Porto, Portugal, since 1978, where he has been a Full Professor since 2000. He is also the Coordinator of the Centre for Power and Energy Systems of INESC TEC, University of Porto and the President of the Scientific Council of INESC TEC. His

research interests include classical and fuzzy modeling of power systems, reliability, optimization, and decision-aid, with application to renewables' integration, electric vehicles' deployment, and smart grids.

## Day 2: Wei-Jen Lee

### **“Effectiveness of Zero Pricing on Demand Shifting of Residential Customers”**



**Bio:** Wei-Jen Lee received the B.S. and M.S. degrees from National Taiwan University, Taipei, Taiwan, R.O.C., and the Ph.D. degree from the University of Texas, Arlington, in 1978, 1980, and 1985, respectively, all in Electrical Engineering. He is currently a professor of the Electrical Engineering Department and the director of the Energy Systems Research Center.

Professor Lee has been involved in research on arc flash and electrical safety, utility deregulation, renewable energy, smart grid, microgrid, load forecasting, power quality, distribution automation and demand side management, power systems analysis, online real time equipment diagnostic and prognostic system, and microcomputer based instrumentation for power systems monitoring, measurement, control, and protection. Since 2008 he has also served as the project manager for the IEEE/NFPA Arc Flash Research Project. Professor Lee is a registered Professional Engineer in the State of Texas

## Day 3: Josep Guerrero

### **“Microgrids – Energy Flowing from Inside Out”**



**Bio:** Josep M. Guerrero received the B.S. degree in telecommunications engineering, the M.S. degree in electronics engineering, and the Ph.D. degree in power electronics from the Technical University of Catalonia, Barcelona, in 1997, 2000 and 2003, respectively. Since 2011, he has been a Full Professor with the Department of

Energy Technology, Aalborg University, Denmark, where he is responsible for the Microgrid Research Program. From 2019 he became a Villum Investigator. His research interests is oriented to different microgrid aspects, including power electronics, distributed energy-storage systems, hierarchical and cooperative control, energy management systems, smart metering and the internet of things for AC/DC microgrid clusters and islanded minigrids; recently specially focused on maritime microgrids for electrical ships, vessels, ferries and seaports. Prof. Guerrero is an Associate Editor for a number of IEEE TRANSACTIONS. He has published more than 500 journal papers in the fields of microgrids and renewable energy systems, which are cited more than 30,000 times. During five consecutive years, from 2014 to 2018, he was awarded by Clarivate Analytics (former Thomson Reuters) as Highly Cited Researcher. In 2015 he was elevated as IEEE Fellow for his contributions on distributed power systems and microgrids.

## Day 3: Mohammad Shahidehpour

### **“Blockchain for Decentralized Transactive Energy Management in Distributed Electric Power Systems with Renewable Energy Resources”**



**Bio:** Mohammad Shahidehpour is a University Distinguished Professor, Bodine Chair Professor of Electrical and Computer Engineering, and Director of the Robert W. Galvin Center for Electricity Innovation at Illinois Institute of Technology (IIT). He has also been the Principal Investigator of \$60M research grants and contracts on power system operation and control. His project on Perfect Power Systems has converted the entire IIT Campus to an islandable microgrid. He is the recipient of the 2009 honorary doctorate from the Polytechnic University of Bucharest. Dr. Shahidehpour was the recipient several technical awards including of the IEEE Burke Hayes Award for his research on hydrokinetics, IEEE/PES Outstanding Power Engineering Educator Award, IEEE/PES Ramakumar Family Renewable Energy Excellence Award, IEEE/PES Douglas M. Staszkesy Distribution Automation Award, and the Edison Electric Institute’s Power Engineering Educator Award. He has co-authored 6 books and 750 technical papers on electric power system operation and planning, and served as the founding Editor-in-Chief of the IEEE Transactions on Smart Grid. Dr. Shahidehpour is a Fellow of IEEE, Fellow of the American Association for the Advancement of Science (AAAS), Fellow of the National Academy of Inventors (NAI), and a member of the US National Academy of Engineering (NAE).

# Conference Sessions

## Session 1 (Mon, Sep 7<sup>th</sup> 2020): Electric Vehicles (EV)

**Time:** 10:00 - 11:30 (CEST)

**Chair:** Miadreza Shafie-khah

<b>56</b>	<b>The Impact of Transitioning to Shared Electric Vehicles on Grid Congestion and Management</b> <i>Nico Brinkel, Tarek AlSkaif and Wilfried van Sark</i>
<b>99</b>	<b>Stochastic Load Modeling of High-Power Electric Vehicle Charging - A Norwegian Case Study</b> <i>Eirik Ivarøy, Bendik Nybakk Torsæter and Magnus Korpås</i>
<b>255</b>	<b>A Probability-Based Algorithm for Electric Vehicle Behaviour in a Microgrid with Renewable Energy and Storage Devices</b> <i>Pablo Diaz-Cachinero, Jose Ignacio Muñoz-Hernandez and Javier Contreras</i>
<b>285</b>	<b>Empirical Evaluation of V2G Round-trip Efficiency</b> <i>Wouter Schram, Nico Brinkel, Gilbert Smink, Thijs van Wijk and Wilfried van Sark</i>
<b>252</b>	<b>Monte-Carlo Simulation of Electric Vehicle Loads Respect to Return Home from Work and Impacts to the Low Voltage Side of Distribution Network</b> <i>Onder Polat, Onur Hakki Eyuboglu and Omer Gul</i>
<b>313</b>	<b>Online Energy Management of Electric Vehicle Parking-Lots</b> <i>Arman Alahyari, David Pozo and Mohammad Ali Sadri</i>
<b>250</b>	<b>The Harmonic and Supraharmonic Emission of Battery Electric Vehicles in The Netherlands</b> <i>Tim Slangen, Thijs van Wijk, Vladimir Cuk and Sjef Cobben</i>
<b>185</b>	<b>Optimal Sizing and Siting of EV Charging Stations in a Real Distribution System Environment</b> <i>İbrahim Şengör, Ayşe Kübra Erenoğlu, Ozan Erdinç, Akın Taşcıkaraoğlu, İbrahim Can Taştan and Ali Fuat Büyük</i>
<b>36</b>	<b>Analysis of a Coordinated Infrastructure Development for Supplying Battery and Fuel Cell Electric Vehicles</b> <i>Cristian Monsalve, Stephan Ruhe, Samir Kharboutli and Steffen Nicolai</i>

## Session 2 (Mon, Sep 7<sup>th</sup> 2020): Power System Operation (PSO)

**Time:** 12:00 - 13:30 (CEST)

**Chair:** Mohammad Sadegh Javadi

<b>6</b>	<b>A Novel Linear Optimal Power Flow Model for Three-Phase Electrical Distribution Systems</b> <i>Juan Sebastian Giraldo, Pedro Pablo Vergara, Juan Camilo Lopez, Phuong Nguyen and Nikolaos G. Paterakis</i>
<b>265</b>	<b>Optimal Service Restoration in Active Distribution Networks Considering Microgrid Formation and Voltage Control Devices</b> <i>Leonardo H. Macedo, Gregorio Muñoz-Delgado, Javier Contreras and Rubén Romero</i>
<b>205</b>	<b>Benefits of On-Load Tap Changers Coordinated Operation for Voltage Control in Low Voltage Grids with High Photovoltaic Penetration</b> <i>Alessandro Ciocia, Gianfranco Chicco and Filippo Spertino</i>
<b>55</b>	<b>Congestion Management in LV Grids Using Static and Dynamic EV Smart Charging</b> <i>Martijn Verhoog, Nico Brinkel and Tarek AlSkaif</i>
<b>66</b>	<b>Development of Distance Relay Based on Wide-Area Protection for Transmission Systems of Provincial Electricity Authority</b> <i>Chaiwat Maneekorn, Suttichai Premrudeepreechacharn and Autthaporn Supannon</i>
<b>20</b>	<b>Provision of Reactive Power by Nanogrids as part of a Topological Power Plant in a Low Voltage Network</b> <i>Jorge Helguero, Santiago Galeano, Argo Rosin and Helmuth Biechl</i>
<b>121</b>	<b>Distributed Machine Learning for Resilient Operation of Electric Systems</b> <i>M. Hadi Amini, Ahmed Imteaj and Javad Mohammadi</i>
<b>274</b>	<b>Enhancement of the Resilience Through Microgrids Formation and DG Allocation with Master-Slave DG Operation</b> <i>Juan Manuel Home Ortiz and José Roberto Sanches Mantovani</i>
<b>212</b>	<b>Information-Gap Decision Theory for Robust Operation of Integrated Electricity and Natural Gas Transmission Networks</b> <i>Ali M Rostami, Hossein Ameli, Mohammad T Ameli and Goran Strbac</i>

## Session 3 (Mon, Sep 7<sup>th</sup> 2020): Demand Response (DR)

**Time:** 16:00 - 17:30 (CEST)

**Chair:** Akin Tascikaraoglu

<b>238</b>	<p><b>Demand Response based Trading Framework in the Presence of Fuel Cells Using Information-Gap Decision Theory</b>  <i>Morteza Vahid-Ghavidel, Mohammad Javadi, Sérgio Santos, Matthew Gough, Miadreza Shafie-Khah and João P. S. Catalão</i></p>
<b>219</b>	<p><b>Impact of the Time Resolution for Data Gathering on Loss Calculation and Demand Side Flexibility</b>  <i>Gianfranco Chicco and Andrea Mazza</i></p>
<b>67</b>	<p><b>Max-min Fairness for Demand Side Management Under High RES Penetration: Dealing With Undefined Consumer Valuation Functions</b>  <i>Georgios Tsaousoglou, Pierre Pinson and Nikolaos G. Paterakis</i></p>
<b>311</b>	<p><b>Formal Controller Synthesis for Frequency Regulation Utilising Electric Vehicles</b>  <i>Ben Wooding, Vahid Vahidinasab and Sadegh Soudjani</i></p>
<b>62</b>	<p><b>Multi-energy microgrid ability to provide flexibility services to the system operator and security of supply to end-users</b>  <i>Tomislav Capuder, Matija Kostelac, Matej Krpan and Ivan Pavić</i></p>
<b>42</b>	<p><b>Semantic Interoperability for DR schemes employing the SGAM framework</b>  <i>Andrea Cimmino Arriaga, Nikoleta Andreadou, Alba Fernández-Izquierdo, Christos Patsonakis, Apostolos C. Tsolakis, Alexandre Lucas, Dimosthenis Ioannidis, Evangelos Kotsakis, Dimitrios Tzovaras and Raúl García-Castro</i></p>
<b>295</b>	<p><b>Power to Heat as Flexibility Option in Low Voltage Grids from Urban Districts</b>  <i>Alexander Hobert, Heiko Schroeder, Björn Uhlemeyer, Markus Zdrallek, Lena Seeger, Dirk Aschenbrenner and Pascal Biesenbach</i></p>
<b>31</b>	<p><b>Characterization of Aggregated Demand-side Flexibility of Small Consumers</b>  <i>Vahid Rasouli, Álvaro Gomes and Carlos Henggeler Antunes</i></p>
<b>191</b>	<p><b>Optimal Management of Household Loads Based on Consumer Elasticity and Appliance Diversity</b>  <i>Oğuzkağan Aliç and Ümmühan Başaran Filik</i></p>

## Session 4 (Mon, Sep 7<sup>th</sup> 2020): Power System Planning (PSP)

**Time:** 18:00 - 19:30 (CEST)

**Chair:** Gerardo Osório

<b>257</b>	<b>Transmission and Distribution System Expansion Planning Considering Network and Generation Investments under Uncertainty</b> <i>Gregorio Muñoz-Delgado, Javier Contreras, José M. Arroyo, Agustín Sánchez de la Nieta and Madeleine Gibescu</i>
<b>271</b>	<b>A Stochastic Model for Medium-Term Distribution System Planning Considering CO<sub>2</sub> Emissions</b> <i>Mario A. Mejía, Leonardo H. Macedo, Gregorio Muñoz-Delgado, Javier Contreras and Antonio Padilha-Feltrin</i>
<b>200</b>	<b>Wasserstein-Distance-Based Temporal Clustering for Capacity-Expansion Planning in Power Systems</b> <i>Lucas Condeixa, Fabricio Oliveira and Afzal Siddiqui</i>
<b>270</b>	<b>Optimal Switch Configuration Algorithm for Dynamically Meshed Power Distribution Grids</b> <i>Marco Kerzel, James Garzon-Real, Markus Zdrallek, Daniel Wolter and Christian Schacherer</i>
<b>246</b>	<b>Application of Routing Algorithms in Automated Distribution Network Planning</b> <i>Kevin Cibis, Julian Wruk and Markus Zdrallek</i>
<b>154</b>	<b>State Estimation with Identification of Erroneous Network Parameters</b> <i>Sulav Ghimire, Alvaro Gonzalez-Castellanos, Irina Lukicheva and David Pozo</i>
<b>268</b>	<b>Establishment of a Coordinated TSO-DSO Reactive Power Management for INTERPLAN Tool</b> <i>David Sebastian Stock, Saber Talari and Martin Braun</i>
<b>48</b>	<b>A risk averse stochastic optimization model for wind power plants portfolio selection.</b> <i>Luiz Armando Steinle Camargo, Lais Domingues Leonel, Dorel Soares Ramos and Alessandra Gracciotti Deri Stucchi</i>
<b>277</b>	<b>Adaptive Remedial Action Scheme Based on Phasor Measurement Unit</b> <i>Ahmad Yusuf Salile, Nanang Hariyanto, Masayuki Watanabe and Fathin Saifur Rahman</i>



## Session 5 (Tue, Sep 8<sup>th</sup> 2020): Modeling, Simulation and ICT (MS - ICT)

**Time:** 10:00 - 11:30 (CEST)

**Chair:** Tarek AlSkaif

<b>30</b>	<p><b>Applying Neural Networks to Large-Scale Distribution System Analysis: an Empirical Computational Perspective</b></p> <p><i>Sjoerd Doumen, Raoul Bernards, Johan Morren and Nikolaos G. Paterakis</i></p>
<b>8</b>	<p><b>OpenADR Ontology: Semantic enrichment of Demand Response strategies in Smart Grids</b></p> <p><i>Alba Fernández-Izquierdo, Andrea Cimmino, Christos Patsonakis, Apostolos Tsolakis, Raúl García-Castro, Dimosthenis Ioannidis and Dimitrios Tzovaras</i></p>
<b>151</b>	<p><b>Comparison of Pan Detection Methods for Single Switch Topology Used in Domestic Induction Cooking</b></p> <p><i>Metin Ozturk, Namik Yilmaz, Ulas Oktay, Sercan Sinirlioglu and Hakan Suleyman Yardibi</i></p>
<b>61</b>	<p><b>Graph-based Model of Smart Grid Architectures</b></p> <p><i>Benedikt Klaer, Ömer Sen, Dennis van der Velde, Immanuel Hacker, Michael Andres and Martin Henze</i></p>
<b>79</b>	<p><b>DeepSolar for Germany: A deep learning framework for PV system mapping from aerial imagery</b></p> <p><i>Kevin Mayer, Zhecheng Wang, Marie-Louise Arlt, Ram Rajagopal and Dirk Neumann</i></p>
<b>235</b>	<p><b>Open-Source Power Outlet System for IoT-based Smart Homes</b></p> <p><i>Tiago Dias, Pedro Sampaio, Diogo Cardoso, Cláudio Prates, Ricardo Jesus and Tiago Costa</i></p>
<b>264</b>	<p><b>Deep Reinforcement Learning for Long Term Hydro Power Production Scheduling</b></p> <p><i>Signe Riemer-Sørensen and Gjert Hovland Rosenlund</i></p>
<b>39</b>	<p><b>A Network Aggregation Tool for the Energy System Modelling Framework Spine</b></p> <p><i>Iasonas Kouveliotis-Lysikatos, Manuel Marin, Jon Olason, Mikael Amelin and Lennart Söder</i></p>

## Session 6 (Tue, Sep 8<sup>th</sup> 2020): Electricity Markets (EM)

**Time:** 12:00 - 13:30 (CEST)

**Chair:** Nikolaos Paterakis

<b>38</b>	<b>Exploratory Visual Analytics for the European Single Intra-Day Coupled Electricity Market</b> <i>Sumeyra Demir, Koen Kok and Nikolaos G. Paterakis</i>
<b>81</b>	<b>Local Energy Market Strategy based on the Study of Interconnected Microgrids</b> <i>Kittisak Intaprom and Paramet Wirasanti</i>
<b>53</b>	<b>Mathematical model of flexible multi-energy industrial prosumer under uncertainty</b> <i>Matija Kostelac, Ivan Pavić and Tomislav Capuder</i>
<b>279</b>	<b>Power Loss Reduction in the Energy Resource Scheduling of a Local Energy Community</b> <i>Maria Maddalena Gambini, Camilo Orozco and Alberto Borghetti</i>
<b>126</b>	<b>Designing a Distribution Level Flexibility Market using Mechanism Design and Optimal Power Flow</b> <i>Konstantinos Seklos, Georgios Tsaousoglou, Konstantinos Steriotis, Nikolaos Efthymiopoulos, Prodromos Makris and Emmanouel Varvarigos</i>
<b>156</b>	<b>A new local market structure for meeting customer-level flexibility need</b> <i>Hosna Khajeh, Hooman Firoozi, Hannu Laaksonen and Miadreza Shafie-Khah</i>
<b>28</b>	<b>A study of the inclusion of vulnerable consumers in energy communities with peer-to-peer exchanges</b> <i>Inês Reis, Ivo Gonçalves, Marta Lopes and Carlos Henggeler Antunes</i>
<b>287</b>	<b>Participation of High-Temperature Heat and Power Storage System coupled with a Wind Farm in Energy Market</b> <i>Mohammad Ali Lasemi and Ahmad Arabkoohsar</i>

## Session 7 (Tue, Sep 8<sup>th</sup> 2020): Power Electronics (PE)

**Time:** 16:00 - 17:30 (CEST)

**Chair:** Mohammad Sadegh Javadi

<b>21</b>	<p><b>Enhanced MPC for Fast Frequency Control in Inverter-Dominated Power Systems</b> <i>Ognjen Stanojev, Uros Markovic, Evangelos Vrettos, Petros Aristidou, Duncan Callaway and Gabriela Hug</i></p>
<b>122</b>	<p><b>Diagnosis of Open-Phase Faults and High Resistance Connections in Six-Phase PMSM Drives</b> <i>Pedro Gonçalves, Sérgio Cruz and André Mendes</i></p>
<b>123</b>	<p><b>Suppression of Steady-State Errors in Predictive Current Control of Six-Phase PMSM Drives</b> <i>Pedro Gonçalves, Sérgio Cruz and André Mendes</i></p>
<b>12</b>	<p><b>DC Voltage Level-Based Power Supply Prioritization in Multi-Inverter System: Marine Use Case</b> <i>Timo M. R. Alho and Hannu Laaksonen</i></p>
<b>293</b>	<p><b>Degradation analysis of 5-year field exposed photovoltaic modules using low-cost thermography, electroluminescence and I-V curve tests in Ecuador</b> <i>Miguel Davila, Luis Gonzalez, Juan Espinoza and Luis Hernández Callejo</i></p>
<b>267</b>	<p><b>A Misalignment Adaptive WPT System Ensuring Maximum Power Transfer under Asymmetric Frequency Splitting Conditions</b> <i>Serkan Sezen and Fuat Kılıç</i></p>
<b>144</b>	<p><b>Sliding Mode Control of a Switched Reluctance Motor Drive with Four-Switch Bi-Directional DC-DC Converter for Torque Ripple Minimization</b> <i>Ertugrul Ates, Burak Tekgun and Gunyaz Ablay</i></p>
<b>164</b>	<p><b>LabVIEW FPGA Based BLDC Motor Control by Using Field Oriented Control Algorithm</b> <i>Guner Tatar, Hayriye Korkmaz, Necibe Fusun Oyman Serteller and Kenan Tokar</i></p>

## Session 8 (Tue, Sep 8<sup>th</sup> 2020): Power Quality and System Stability (PQSS)

**Time:** 18:00 - 19:30 (CEST)

**Chair:** Akin Tascikaraoglu

<b>129</b>	<p><b>Selecting the Optimal Signals in Phasor Measurement Unit-based Power System Stabilizer Design</b> <i>Mahsa Rezaei, Maryam Dehghani, Bitu Shayanfard, Navid Vafamand, Mohammad Javadi and João P. S. Catalão</i></p>
<b>64</b>	<p><b>Power Quality Disturbance Classification via Deep Convolutional Auto-Encoders and Stacked LSTM Recurrent Neural Networks</b> <i>Miguel Angel Rodriguez, John Felipe Sotomonte, Jenny Alexandra Cifuentes and Maximiliano Bueno Lopez</i></p>
<b>116</b>	<p><b>Impact of the Temporal Distribution of Faults on Prediction of Voltage Anomalies in the Power Grid</b> <i>Torfinn Tyvold, Bendik Nybakk Torsæter, Christian André Andresen and Volker Hoffmann</i></p>
<b>243</b>	<p><b>Ultrafast restoration after nationwide blackout: Concept, principles &amp; example of application</b> <i>Julius Bosch, Josep M. Aniceto and Ken P. Brunner</i></p>
<b>290</b>	<p><b>Optimal Robust Control Scheme to Enhance Power System Oscillations Damping via STATCOM</b> <i>Mahsa Kashani, Alireza Alfi and Ahmad Arabkoohsar</i></p>
<b>3</b>	<p><b>Stability Implications for the Design Process of an Industrial DC Microgrid</b> <i>Darian Andreas Schaab and Alexander Sauer</i></p>
<b>75</b>	<p><b>Comparative Study of Event Prediction in Power Grids using Supervised Machine Learning Methods</b> <i>Kristian Høiem, Vemund Santi, Bendik Nybakk Torsæter, Helge Langseth, Christian Andresen and Gjert Rosenlund</i></p>
<b>245</b>	<p><b>A Novel Adaptive Relaying Scheme for Distribution Networks with DG by considering Fault Severities</b> <i>Meruyert Khamitova, Medet Auyenur, Bagdat Kamalbayev, H. S. V. S. Kumar Nunna and Suryanarayana Doolla</i></p>

## Session 9 (Wed, Sep 9<sup>th</sup> 2020): Microgrids (Micro)

**Time:** 10:00 - 11:30 (CEST)

**Chair:** Miadreza Shafie-khah

<b>100</b>	<b>DC Microgrid Energy Management System Containing Photovoltaic Sources Considering Supercapacitor and Battery Storages</b> <i>Mohammad Amin Jarrahi, Farzad Roozitalab, Mohammad Mehdi Arefi, Mohammad Sadegh Javadi and João P. S. Catalão</i>
<b>37</b>	<b>Real-world Application of Sustainable Mobility in Urban Micro Smart Grids</b> <i>Mariam Khemir, Raisa Popova, Jan Heinekamp, Mauricio Rojas, Tiba Feizi, Hai Quang Nguyen and Kai Strunz</i>
<b>248</b>	<b>Flexibility-Oriented Scheduling of Microgrids Considering the Risk of Uncertainties</b> <i>Mohammad Mansour Lakouraj, Mohammad Javadi and João P. S. Catalão</i>
<b>119</b>	<b>Developing Black-Start Strategies in Multi-Microgrids Exploiting Smart Transformers</b> <i>Mário Couto, João Peças Lopes and Carlos Moreira</i>
<b>29</b>	<b>Impact of Electric Vehicle Charging Infrastructure Expansion on Microgrid Economics: A Case Study</b> <i>Matti Sprengeler, Till Freudenmacher, Raisa Popova, Hai-Quang Nguyen, Mauricio Rojas la Rotta and Gerhard Stryi-Hipp</i>
<b>195</b>	<b>Smart LED Lighting System for Energy Efficient Industrial and Commercial LVDC Nanogrid Powered Buildings with BIPV</b> <i>Ajay Shankar, Vijayakumar Krishnasamy, Chitti Babu Baladhandautham and Ali Durusu</i>
<b>289</b>	<b>Operation Management for Next-Generation of MVDC Shipboard Microgrids</b> <i>Zahra Shajari Ghasemkheili, Josep M. Guerrero and Mohammad Hossein Javidi</i>
<b>225</b>	<b>Energy Management System for Microgrid Considering Operational Faults in Power Supply</b> <i>Vladimir A. Freire, Juan Jose Marquez, Carlos Bordons, Ascención Zafra-Cabeza and L. V. R. Arruda</i>

## Session 10 (Wed, Sep 9<sup>th</sup> 2020): Data Analytics (DA)

**Time:** 12:00 - 13:30 (CEST)

**Chair:** Tarek AlSkaif

<b>211</b>	<p><b>Understanding the Value of Net Metering Outcomes for Different Averaging Time Steps</b> <i>Gianfranco Chicco and Andrea Mazza</i></p>
<b>10</b>	<p><b>Cyber-physical data stream assessment incorporating Digital Twins in future power systems</b> <i>Andre Kummerow, Cristian Monsalve, Dennis Rösch, Kevin Schäfer and Steffen Nicolai</i></p>
<b>41</b>	<p><b>Specific and generic unsupervised algorithms for NILM applications</b> <i>Gilles Jacobs and Pierre Henneaux</i></p>
<b>105</b>	<p><b>Anomaly Detection in the Distribution Grid: A Nonparametric Approach</b> <i>Mostafa Mohammadpourfard, Karim Amiri, Behnam Mohammadi Ivatloo, Amjad Anvari-Moghaddam, Mohammad Ebrahimnejad Shalmani and Abdolsaheb Arjmand</i></p>
<b>76</b>	<p><b>Clustering and Dimensionality-reduction Techniques Applied on Power Quality Measurement data</b> <i>Kristian Høiem, Gjert Rosenlund, Bendik Nybakk Torsæter and Christian Andresen</i></p>
<b>70</b>	<p><b>The Impact of Distance, Cardinal-direction and Time on Solar Irradiance Estimation: A Case-study</b> <i>Lennard Visser, Stef Knibbeler, Tarek AlSkaif and Wilfried van Sark</i></p>
<b>171</b>	<p><b>Comprehensive Performance Comparison of Supervised Machine Learning Algorithms in Non-Intrusive Load Monitoring</b> <i>Ahmet Furkan Erşen, Ayşe Kübra Erenoğlu, İbrahim Şengör, Ozan Erdinc and João P. S. Catalão</i></p>
<b>51</b>	<p><b>A Clustering Framework for Residential Electric Demand Profiles</b> <i>Mayank Jain, Tarek AlSkaif and Soumyabrata Dev</i></p>
<b>326</b>	<p><b>Clustering Time Series over Electrical Networks</b> <i>Daniil Vankov, Ivan Zorin and David Pozo</i></p>

## Session 11 (Wed, Sep 9<sup>th</sup> 2020): Energy Storage (ES)

**Time:** 16:00 - 17:30 (CEST)

**Chair:** Nikolaos Paterakis

<b>223</b>	<p><b>Li-ion-based Battery Pack Designing and Sizing for Electric Vehicles under Different Road Conditions</b>  <i>Alper Nabi Akpolat, Yongheng Yang, Frede Blaabjerg, Erkan Dursun and Ahmet Emin Kuzucuoglu</i></p>
<b>163</b>	<p><b>Comparison and Evaluation of State of Charge Estimation Methods for a Verified Battery Model</b>  <i>Behrooz Nemounekhah, Roberto Faranda, Kishore Akkala, Hossein Hafezi, Chethan Parthasarathy and Hannu Laaksonen</i></p>
<b>94</b>	<p><b>Dimensioning the Internal Components of a Hydrogen Storage Power Plant</b>  <i>Martin Töpfer, Nayeemuddin Ahmed and Harald Weber</i></p>
<b>71</b>	<p><b>Optimal Robust Energy Management of Microgrid with Fuel Cells, Hydrogen Energy Storage Units and Responsive Loads</b>  <i>Alireza Akbari-Dibavar, Mohammadreza Daneshvar, Behnam Mohammadi-Ivatloo, Kazem Zare and Amjad Anvari-Moghaddam</i></p>
<b>201</b>	<p><b>Integration of Building Inertia Thermal Energy Storage into Smart Grid Control</b>  <i>Jan F. Heinekamp, Marcus Voß, Sabine Krutzsch, Friedrich Sick, Kai Strunz and Sahin Albayrak</i></p>
<b>272</b>	<p><b>Boosting Smart Building Energy Saving Capacity using Phase Change Materials</b>  <i>Mohammad Kheradmand, Sara Javadi and Xiaoshu Lu</i></p>
<b>149</b>	<p><b>Sizing Electric Battery Storage System for Prosumer Villas</b>  <i>Christian Andresen, Hanne Sæle and Merkebu Zenebe Degefa</i></p>

## Session 12 (Wed, Sep 9<sup>th</sup> 2020): Forecasting (For)

**Time:** 18:00 - 19:30 (CEST)

**Chair:** Gerardo Osório

<b>82</b>	<p><b>Predictive Supervision Strategy for Demand-Side Management in Distribution Grids</b>  <i>Abderrahman Bencheikroun, Arnaud Davigny, Vincent Courtecuisse, Léo Coutard, Kahina Hassam-Ouari and Benoît Robyns</i></p>
<b>69</b>	<p><b>The Importance of Predictor Variables and Feature Selection in Day-ahead Electricity Price Forecasting</b>  <i>Lennard Visser, Tarek Alskaif and Wilfried van Sark</i></p>
<b>127</b>	<p><b>Short-term Load Forecasting based on Wavelet Approach</b>  <i>Ali Karami Ghanavati, Amir Afsharinejad, Navid Vafamand, Mohammad Mehdi Arefi, Mohammad Javadi and João P. S. Catalão</i></p>
<b>188</b>	<p><b>A Robust Building Energy Pattern Mining Method and its Application to Demand Forecasting</b>  <i>Julien Leprince and Wim Zeiler</i></p>
<b>193</b>	<p><b>A novel framework for autoregressive features selection and stacked ensemble learning for aggregated electricity demand prediction of neighborhoods</b>  <i>Waqas Khan, Shalika Walker, Katarina Katic and Wim Zeiler</i></p>
<b>233</b>	<p><b>A Hybrid Approach to Load Forecast at a Micro Grid level through Machine Learning algorithms</b>  <i>Tiago Guimaraes, Luís Costa, Hélder Leite and Luís Azevedo</i></p>
<b>74</b>	<p><b>Solar Power Generation Analysis and Forecasting Real-World Data Using LSTM and Autoregressive CNN</b>  <i>Nail Tosun, Egemen Sert, Ekin Yilmaz, Enes Ayaz and Murat Göl</i></p>
<b>33</b>	<p><b>Impact of seasonal weather on forecasting of power quality disturbances in distribution grids</b>  <i>Katarzyna Michalowska, Volker Hoffmann and Christian Andresen</i></p>
<b>275</b>	<p><b>A-Day-Ahead Photovoltaic Power Prediction Based on Long Short Term Memory Algorithm</b>  <i>Seyed Mahdi Miraftebzadeh, Michela Longo and Federica Foidellì</i></p>



# SEST Series

Thank you for being part of the **SEST Series**.  
Every year, we strive to get bigger and better:

## **SEST 2018 (Seville, Spain):**

Technically sponsorship by

IEEE, IEEE IES

**110** accepted papers

**3.7** rev/paper

**64%** acceptance rate

## **SEST 2019 (Porto, Portugal):**

Technically sponsored by

IEEE, IEEE PES, and IEEE IES

**170** accepted papers

**4.2** rev/paper

**58%** acceptance rate

## **SEST 2020 (Istanbul, Turkey):**

Technically sponsored by

IEEE, IEEE PES, IEEE IES, and IEEE IAS

**101** accepted papers

**5.6** rev/paper

**44%** acceptance rate

With Technical co-sponsorship by IEEE, IEEE PES, IEEE IES, and IEEE IAS, the **top 20%** of accepted and presented **papers in SEST 2020** will be eligible for publication in **IEEE Transactions on Industry Applications**.

## **SEST 2021 (Vaasa, Finland):**

Technically sponsored by

IEEE, IEEE PES, IEEE IES, IEEE IAS and IEEE PELS

**150+** accepted papers

**5.0+** rev/paper

**<40%** acceptance rate

## **SEST 2021 Chairs:**

**Miadreza Shafie-khah**

*General Chair*

**Ozan Erdinc**

*General Co-Chair*

**João P.S. Catalão**

*Honorary Chair*

## **SEST 2021 Keynote Speakers:**

**Badrul H. Chowdhury**

**Claudio Cañizares**

**Joydeep Mitra**

**Carlo Alberto Nucci**

**Frede Blaabjerg**

**Emil Levi**

# SEST2021 Website

**<https://sites.univaasa.fi/sest2021/>**

4th International Conference on Smart Energy Systems and Technologies (SEST)  
6-8 September 2021, Vaasa, Finland



IEEE technical sponsorship



**See you next year in Vassa,**  
**Finland!**