IEEE CSS TC on Smart Grid

Minutes of 2017 December In-Person Meeting
(IEEE Conference on Decision and Control, Melbourne, Australia)
Wednesday, December 13, 2017

IEEE
Advancing Technology for Humanity

Attendees

- Alessandra Parisio, alessandra.parisio@manchester.ac.uk
- Mads Almassalkhi, malmass@uvm.edu
- Ian Hiskens, hiskens@umich.edu
- Wei Kang, wkang@ups.edu
- Fayar Jabbari, fjabbari@uci.edu
- Michael Chertkov, chertkov@lanl.gov
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- Dennice Gayme, dennice@jhu.edu
- Enrique Mallada, mallada@jhu.edu
- Tao Yang, tao.yang@unt.edu
- Maria Vrakopaulou, vrakopoulou@control.ethz.ch
- Anuradha Annaswamy, anu@mit.edu
- Zhihua Qu, Univ. of Central Florida, qu@ucf.edu

Agenda

1. Welcome and introductions
2. TC membership, website and operation
3. TC activities
4. CSS SG Vision Document
5. Next steps and general discussions

New members (2017)

- Maria Vrakopaulou, vrakopoulou@control.ethz.ch
- Paul Trodden p.trodden@sheffield.ac.uk
- Enrique Mallada mallada@jhu.edu
- Mads Almassalkhi malmassa@uvm.edu
- Jin Dong, dongj@ornl.gov
- Pardis Khayyer, Cummins Inc., pardis.khayyer@gmail.com
- Laiz Souto de Carvalho, University of Groningen, laiz.souto@gmail.com
- Changhong Zhao, NREL, changhong.zhao@nrel.gov
- Draguna Vrabie, PNNL, draguna.vrabie@pnnl.gov
- Jianming (Jamie) Lian, jianming.lian@pnnl.gov
- Karan Kalsi, PNNL, karanjit.kalsi@pnnl.gov

TC Operation

1) Website and its updates
2) Invited Sessions
3) Operational and Technical Subcommittees
4) IEEE Smart Grid
5) Annual in-person meetings

TC Website

webpage: http://smart-grids.ieeecss.org/

1. Member directory
2. Group email (tcsg@ieeecss.org; please do not send advertisements)
3. TC documents
4. Current and future events (main conferences; invited sessions)
5. Meeting schedules
6. Reports
   - BOG report
   - CSM column
7. Additions
   - Conference announcements (please send to the TC chair for posting)
   - Job opportunities

TC Activities: Invited Sessions

- *ACC 2017*
  - Advanced Control of Wind Farms, led by Andrew Scholbrock, et al.
  - Advances in Control of Thermal Inertia Loads and DC Micrgrid Stability, led by Abhishek Halder, et al.
  - Control of Wind Energy Systems, led by Christopher Vermillion and Warren White
  - Scalable Networked Control for Smart Grid Ancillary Services, led by Sahika Genc and Reza Ghaemi

- *IEEE CTTA 2017*
  - Control Applications for Renewable Integration, led by Joshua Taylor and Zhihua Qu
  - Distributed Energy Management Towards Clean and Energy Efficient Society, led by Takeshi Hatanaka and Jun-ichi Imura

- *IEEE CDC 2017*
  - Estimation and Control of Electric Load Ensembles, led by Ian Hiskens and Julio Braslavsky
  - Control of Low-Inertia Power Systems, I and II, led by Dorfler Florian, et al.
  - Control and Optimization of Emerging Power Networks, led by Tao Yang, et al.

- ACC 2018
  - Optimizing Interdependent Infrastructures, insufficient submissions for an invited session

- , CCTA 2018
  - Control of DERs, session proposal organized by Joshua/Zhihua

- CDC 2018
  - Tentatively with the title of Secure control designs for power systems

TC Activities: CSS Key Words

Current, Updated (in June 2017) and New (in December 2017)

Control application	Building and facility automation
	Smart cities/houses
	Renewable energy
	Energy storage
	Electricity market
	Transportation electrification
	Wide-area control
Electrical and Power Systems	Electrical machine control
	Energy systems
	Power electronics
	Power generation
	Power systems
	Smart grid

The list will be periodically reviewed.

Technical Activities: Subcommittees

TC also organizes its activities through operational and technical subcommittees:

Operational subcommittees:

- Membership (lead: Changhong Zhao)
- Conference Activities (lead: Joshua Taylor)
- International Collaborations (lead: Jakob Stoustrup)

Technical suncommittees:

- Integration of Renewable Energy (lead: Amro Farid)
- Energy Storage and Electrified Transportation Subcommittee (lead: Scott Moura, co-lead: Javad Mohammadpour)
- Microgrids (lead: Nicanor Quijano)
- Smart Buildings (lead: John James)

A subcommittee on utility/industry was recommended.

TC Activities: IEEE Smart Grid

Representatives of our TC:

- IEEE Smart Grid Steering Committee and Technical Activities Committee: Zhihua Qu and Anu Annaswamy
- IEEE Smart Grid Education Committee: Josh Taylor
- IEEE Smart Grid R&D Committee: Anu Annaswamy

Webinars and Tutorials

IEEE Smart Grid Webinar (April 2018)

- transactive control
- distributed control
- secure control

IEEE Smart Grid Webinar (April 2017)

Financial Transmission and Storage Rights, presented by Josh Taylor

Technical Activities: Vision Document

Smart Grid Control: An Overview and Research Opportunities

Editors: Jakob Stoustrup, Anuradha Annaswamy, Aranya Chakrabortty, and Zhihua Qu

Springer Verlag, 2018.

Main topics:

- Electricity Markets
- Wide Area Control
- Distributed Control
- Cyberphysical Security.

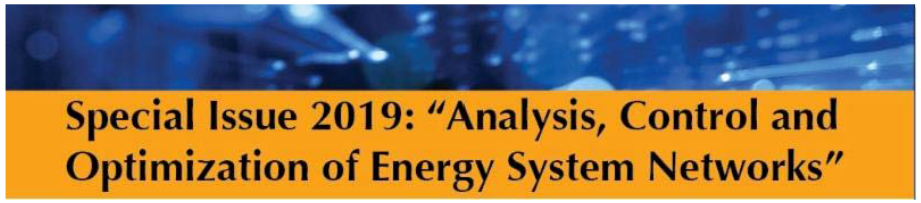
TC Activities: In-Person Meetings

- Semi-annual lunch meeting (at hotel)

  day 2 for *IEEE Conference on Decision and Control (CDC)* --- December 18, 2018

- Semi-annual dinner meeting (meeting at hotel and then dinner at a local restaurant)

  day 2 for American Control *Conference (ACC)* --- June 28, 2018



Submissions now accepted for TCNS Special Issue

Submissions are being accepted for TCNS special issue:
Analysis, Control and Optimization of Energy System Networks

The increased deployment of new technologies, e.g., renewable generation and electric vehicles, is rapidly transforming power networks by blurring the previously distinct spatio-temporal scales that many traditional approaches rely on for designing, analyzing and operating power grids. Other energy systems, such as natural gas systems and district heating systems, are undergoing similar revolutionary transformations. This trend can be characterized as a disruptive surge in complexity that challenges design and operation, but also offers opportunities to deliver unprecedented efficiency and reliability.
Learn more about this topic.

The theme of the special issue will be emerging theoretical and computational methods for the analysis, control, and optimization of energy networks such as power networks, natural gas systems, and district heating systems. The main focus will be on methods which are informed by underlying physical flows, are aided by data, and mitigate increasing uncertainty.

Specific potential topics include but are not limited to:

- Tractable outer and inner approximations for feasible domains of network operations
- Chance constrained and robust optimization and control of networks
- Emergency control, or control of dangerous transients
- Operation and uncertainty aware network expansion and asset management methods
- Inference and learning of network topology
- Joint statistical modeling and reconstruction of loads, renewable generation, components failures, and costs of service interruptions
- Control and optimization for demand response technology, e.g. ensemble and mean-field control of loads
- Coordinated control of coupled energy systems, such as power and natural gas networks

Submissions are being accepted.
Please submit your manuscript through CONES, the TCNS submissions site.

Submissions deadline: January 7, 2018.

Guest Editors:
Michael Chertkov, Los Alamos National Laboratory
Mihailo Jovanovic, Electrical Engineering - Systems, University of Southern California
Bernie Lesieutre, Electrical & Computing Engineering, University of Wisconsin
Steven Low, Computing & Mathematical Sciences, Electrical Engineering, Caltech
Pascal Van Hentenryck, Industrial & Operations Engineering, Computer Science & Engineering, University of Michigan
Louis Wehenkel, Electrical Engineering & Computer Science, University of Liege

Upcoming Conference

IFAC
INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL

2nd IFAC Conference on Cyber-Physical & Human Systems

December 14-15,2018, Miami, USA www.cphs2018.org

CALL FOR PAPERS

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Anuradha Annaswamy, *MIT, USA*
Dawn Tilbury, *UMichigan, USA*

Program Chair
Sandra Hirche, *TU München, Germany*

Steering Committee
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Tariq Samad, *UMinnesota, USA, Vice Chair, Industry*
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Zhaodan Kong, *UC Davis, USA*
Peter Kopacek, *Vienna University of Technology, Austria*
Tamara Lorenz, *University of Cincinnati, USA*
Franck Mars, *IRCCyN, CNRS & Ecole Centrale de Nantes, France*
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Sarah Spurgeon, *University College London, UK*
Gabor Sziebig, *The Arctic Univ. of Norway, Norway*
Frédéric Vanderhagen, *Université de Valenciennes, France*
Philipe Vezin, *IFSTTAR, France*
Ljubo Vlacic, *Griffith University, Australia*
Birgit Vogel-Heuser, *TU München, Germany*
Jessie Yang, *University of Michigan, USA*
Yildiray Yildiz, *Bilkent University, Turkey*
Jianhua Zhang, *East China University of Science and Technology, China*

Steady advances in controls, communications, and computing are enabling new forms of cyber-physical systems (CPS), and are simultaneously redefining the role and position of humans in broad areas of applications and blurring the traditional boundaries between humans and technology. Therefore, for the most part, human interactions in these technical systems are becoming more complex and raising a range of new technical challenges and broader questions, touching social and even cultural domains. This newfound relationship between humans and technology must be studied from an engineering perspective, a human-factors perspective, and from the perspective of social sciences. This conference series on Cyber-Physical & Human Systems (CPHS) is intended to examine these multidisciplinary dimensions.

The second IFAC conference on CPHS builds on the success of CPHS 2016 and the H-CPS-I meeting in 2014. CPHS 2018 aims to bring together researchers and practitioners from academia and industry to share scientific and technological advances as well as gain a deeper understanding of the interactions between cyber-physical systems and humans. Of particular interest are human-centered technologies in a wide-range of applications including transportation, energy, robotics, manufacturing, and health-care. Examples of topics include human-machine symbiosis, humans as supervisors/operators of complex engineering systems, humans as agents in multi-agent systems, and humans as elements in controlled systems. In addition to the technical and theoretical contributions, CPHS 2018 also invites papers studying the ethical questions, public policies, regulatory issues, and new risks associated with interactions between humans and cyber-physical systems. Towards this end, we invite submissions in the following categories:

- Full conference papers (6-8 pages) addressing relevant CPHS topics, which will be peer-reviewed, and presented at the conference (if accepted). Review, Tutorial and Vision papers are also welcome.
- Extended abstracts (a minimum of 500 words) addressing topics of interest, subject to the same review process as full papers, and invited to present at the conference (if accepted).
- Invited sessions, consisting of six full papers and/or short abstracts, to fill a two-hour block.
- Tutorials and/or workshops, a half-day or full-day event either before or after the conference (please contact the organizers for guidance and details)

The conference program will only include papers of the highest standard as selected by the IPC, in accordance with the IFAC guidelines www.ifac-control.org/publications/Publications-requirements-1.4.pdf. All papers and abstracts will be accepted with the understanding that the authors will present them at the CPHS Conference. At least one author of every accepted paper will be required to register for the conference before uploading the final version. Accepted papers and abstracts will be presented either in oral or poster format. Accepted papers will be included in the conference "preprints" (USB drive) and published online, whereas accepted abstracts will only be included as preprints and not published on-line. All papers, abstracts, and invited session proposals must be submitted through the conference submission website, www.cphs2018.org, and conform to the policy found therein.

Important Dates:
Submission Deadline: April 15, 2018
Acceptance/Rejection Notice: September 1, 2018
Final Submission Deadline: October 1, 2018

2nd IFAC Conference

on Cyber-Physical&Human-Systems

December 14-15, 2018, Miami, USA www.cphs2018.org

General Chairs: Anu Annaswamy and Dawn Tilbury
Program Chair: Sandra Hirche

Action items

- Invited sessions for conferences, special issues for journals, etc.

  CCTA invited session: Please send paper title/abstract to Joshua/Zhihua by January 10, 2018

  CDC invited session: session plan will be developed.

- Nomination of associate editor(s) for CSS CEB

  Nominations could be submitted before the end of the year (2 already submitted in November 2017)

- TC activities on new topics

  New topics: Big data, blockchain, EV integration

  Possible actions:

  - Tutorial session at CDC 2018
  - Invited speaker for the TC meeting during 2018 ACC

Thank you for participating!