

IEEE CSS Technical Committee on Automotive Controls Meeting 2018 CDC

- Dec 19th, 2018 Miami Beach FL
- Jason Siegel -- siegeljb@umich.edu



IEEE CSS TECHNICAL COMMITTEE ON AUTOMOTIVE CONTROLS

- The scope of interests of the IEEE CSS Technical Committee (TC) on Automotive Controls (AC) covers modeling, simulation, identification, estimation, control, optimization, and diagnostics of present and future automotive systems.
- Joint Organization of Invited Sessions at ACC with ASME Automotive Transportation Systems TC
- Invited session organization at CCTA, CDC, CCTA and IFAC.

OUTLINE

- **Round Table Introductions (Please Sign-in)**
- **Summary of current activities**
 - **Invited sessions – get involved.**
 - **IFAC CPS Workshop.**
- **Upcoming activities**
 - **CSS Conferences**
 - **CCTA CFP for invited session, due Early Jan.**
 - **Nomination for CEB (1) due in January**
 - **Webpage Updates (thankyou Reza!)**
 - **Plan for next invited Workshop at ACC/CDC/CCTA**
 - **Column for CSM (Due Jan 25th 2019)**
- **Outreach: Emerging Trends in Automotive Controls**
 - **Wiki-**

2018 ACC – INVITED SESSIONS (PAST)

- Invited sessions organized by Dr. Yan Chen (Arizona State - Lead), Dr. Qadeer Ahmed (Ohio State), Dr. Reza Amini (Univ. of Michigan), Dr. Ali Borhan (Cummins), Dr. Mehran Bidarvatan (Karma Auto.), Dr. Carrie Hall (Illinois Inst. of Tech.), Dr. Ping Chen (Tennessee Tech), Dr. Sara Dadras (Ford Motor), Dr. Satadru Dey (Univ. of Colorado Denver), Dr. Hamid-Reza Ossareh (Univ. of Vermont), Dr. Simona Onori (Clemson Univ.), Dr. Nima Lotfi (Southern Illinois Univ. Edwardsville), Dr. Selina Pan (Ford Motor), Dr. Yasha Parvini (Univ. of Detroit Mercy), Dr. Jason Siegel (U of Michigan), Dr. Annalisa Scacchioli (Steven Inst. of Tech), and Y-Y Wang (General Motors).
- The invited sessions were jointly organized with ASME ATS and the IEEE CSS Technical Committee on Automotive Controls
- Received a total of 56 papers and selected 54 for the proposal submission (finally submitted 9 invited session proposals);
- After the ACC review process, 7 out of 9 invited sessions were accepted, with 47 papers accepted, 5 papers rejected, 2 paper withdrawn;
- The summary of the accepted invited sessions is as follows:
 1. Efficient and Resilient Control of Connected Vehicles (6 papers); FrB02
 2. Control of Engine Breathing; Advances in Control of the Air-Path for Internal Combustion Engines (6 papers); ThA01
 3. Energy/Fuel Efficient Powertrains (6 papers);
 4. Vehicle Dynamics Estimation and Control (4 papers); ThB02
 5. Advanced Control of Internal Combustion Engines (6 papers)
 6. Control of Engine Exhaust and Aftertreatment Systems (6 papers)
 7. Avoidance and Accident Mitigation Systems for Ground Vehicles (5 papers) FrA02

Acceptance: 90.7% acceptance rate

2018 CCTA INVITED SESSION AUG 21-24 COPENHAGEN

Conference: 2018 IEEE Conference on Control Technology and Applications, Invited session Titled "Control and Diagnostics of Powertrains and Vehicle Dynamics" Organizers: Satadru Dey*, Qadeer Ahmed, Jason B. Siegel, Qilun Zhu, Simona Onori. ThC3

- (1) Role of Regenerative Braking in Velocity Trajectory Optimization of Electrified Powertrains Over Varying Road Grades
- (2) Least Costly Energy Management for Extended Range Electric Vehicles with Start-Up Characterization
- (3) Increasing Computational Speed of Nonlinear Model Predictive Control Using Analytic Gradients of the Explicit Integration Scheme with Application to Collision Imminent Steering
- (4) Predictive Fuzzy Markov Decision Strategy for Autonomous Driving in Highways
- (5) Retrospective Performance-Based Fuel Economy Improvement in an Electrified Powertrain
- (6) Cyclic Torque Imbalance Detection in Gasoline Engines Using Second Order Sliding Mode

2018 CDC INVITED SESSION (TODAY)

- Control of Autonomous and Connected Vehicles at the 2018 CDC. The session **WeC13** is scheduled for Wednesday, Dec 19th, 2018 in **Glimmer 7 (note room change)**.
 - Positive Invariant Sets for Safe Integrated Vehicle Motion Planning and Control, from Mitsubishi Electric Res. Labs.
 - Parameter Space and Model Regulation Based Robust, Scalable and Replicable Lateral Control Design for Autonomous Vehicles, from The Ohio State University.
 - Outcome Oriented Evaluation of Autonomous Driving Functions, from Johannes Kepler University.
 - Two-Layer Model Predictive Battery Thermal and Energy Management Optimization for Connected and Automated Electric Vehicles, from University of Michigan, Ann Arbor.
 - Vehicle Localization and Control on Roads with Prior Grade Map, from University of California at Berkeley.
 - Optimal Control of Autonomous Vehicles for Non-Stop Signalized Intersection Crossing, from Boston University.

2019 ACC – PHILADELPHIA, PA, JULY 10 - 12

INVITED SESSIONS CO-SPONSORED WITH ASME ATS-TC

- Jointly organized invited sessions with the ASME Automotive and Transportation Systems TC at the 2019 American Control Conference. The organizing committee is led by Dr. Yan Chen (Arizona State), and includes the following 19 organizers:
- Dr. Yan Chen, Arizona State Univ., Dr. Qadeer Ahmed, Ohio State Univ., Dr. Reza Amini, Univ. of Michigan – Ann Arbor, Dr. Ali Borhan, Cummins Inc., Dr. Pinggen Chen, Tennessee Tech. Univ., Dr. Sara Dadras, Ford Motor Company, Dr. Satadru Dey, Univ. of Colorado Denver,, Dr. Carrie M. Hall, Illinois Inst. of Tech., Dr. Youngki Kim, Univ. of Michigan – Dearborn, Dr. Zhaojian Li, Michigan State University, Dr. Hamid-Reza Ossareh, Univ. of Vermont, Dr. Gabor Orosz, Univ. of Michigan – Ann Arbor, Dr. Selina Pan, Toyota Research Institute, Dr. Yasha Parvini, Univ. of Detroit Mercy, Dr. Annalisa Scacchioli, Rutgers Univ., Dr. Jason Siegel, Univ. of Michigan – Ann Arbor, Dr. Yildiray Yildiz, Bilkent Univ., Dr. Chen Zhang, Univ. of Michigan – Twin Cities, Dr. Junfeng Zhao, General Motors Company
- The organizers received a total of 57 submissions and formed **9 invited sessions**:
 - 1. Advances in Internal Combustion Engine Control
 - 2. Power and Thermal Management of Smart Vehicles
 - 3. Control Challenges in Smart Multi-Vehicle Systems
 - 4. Driving Behavior and Route Planning for Autonomous Vehicles
 - 5. Detection, Prediction and Planning for Safe Autonomous Vehicles
 - 6. Planning and Prediction for Vehicle Safety and Collision Avoidance
 - 7. Control and Optimization of Engine Aftertreatment Systems
 - 8. Eco-Driving for Connected and Automated Vehicles
 - 9. Vehicle Dynamics Estimation and Control

CROSS-TC WORKSHOP PARTICIPATION



2nd IFAC Conference on
Cyber-Physical & Human Systems
December 14-15, 2018, Miami, USA www.cphs2018.org



Several TC chairs participated in the workshop/panel

Speakers:

Ruzena Bajcsy – UC Berkeley

Robert Gregg – UT Dallas

Panelists:

Yue (Sophie) Wang – Clemson University

Richard Hull – UTC Aerospace Systems

Jason Siegel – University of Michigan

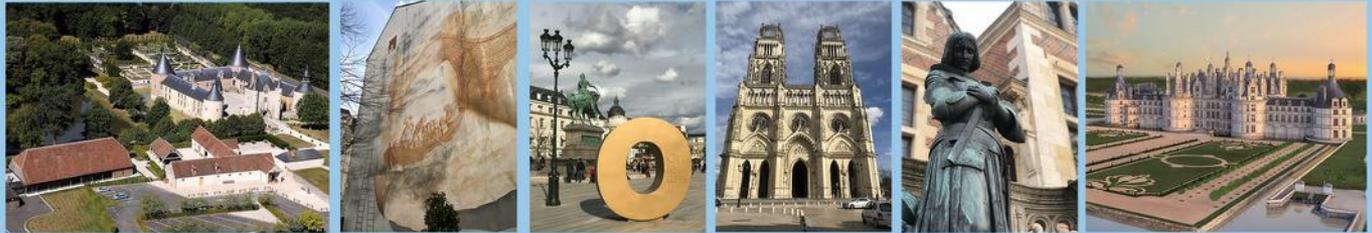
Cedric Langbort – University of Illinois at Urbana-Champaign

UPCOMING CONFERENCES



9th IFAC International Symposium on Advances in Automotive Control
Orléans, France
24 - 27 June 2019

AAC
Orléans
2019



**2019 AMERICAN CONTROL
CONFERENCE, PHILADELPHIA, USA
JULY 10-12, 2019**



cdc2019.ieeecss.org



58th Conference on Decision and Control - Nice, France - December 11th-13th 2019



3rd IAVSD Workshop on Dynamics of Road Vehicles

Connected and Automated Vehicles

April 28-30, 2019, Ann Arbor, Michigan, USA

speakers

Chris Atkinson (ARPA-E)

David Bevly (Auburn University)

Francesco Borrelli (UC Berkeley)

Stefano Di Cairano (MERL)

Avinash Balachandran (Toyota Research Institute)

Paolo Falcone (Chalmers University)

Dimitar Filev (Ford)

Karl Johanson (KTH)

John Kenney (Toyota)

Shengbo Li (Tsinghua University)

Andreas Malikopoulos (University of Delaware)

Lars Nielsen (Linköping University)

Huei Peng (University of Michigan)

Vasumathi Raman (Nuro)

Giorgio Rizzoni (Ohio State University)

Jim Sayer (UMTRI)

Sanjit Seshia (UC Berkeley)

Steve Shladover (Berkeley PATH)

Anna Stefanopoulou (University of Michigan)

Kirk Steudle (MDOT)

Jing Sun (University of Michigan)

Eric Tseng (Ford)

Ardalan Vahidi (Clemson University)

Nok Wongpiromsarn (nuTonomy)

Nathan van de Wouw (Eindhoven University)

Diana Yanakiev (Uber)

Yafeng Yin (University of Michigan)

<http://cav2019.engin.umich.edu/>

Purpose

The workshop aims to bring together scientists and engineers from academia and industry in the field of connected and automated vehicles to present and exchange their latest ideas and breakthroughs.

CCTA 2019 INVITED SESSION ORGANIZATION

**City University of Hong Kong, Hong Kong, China,
on August 19-21, 2019.**

- **Call for Invited Sessions:** Invited sessions consist of 5-6 papers presenting a unifying. Proposals must describe the motivation and relevance of the session. Proposals must be accompanied by full versions of each paper, which will be individually reviewed together with the proposal itself.
- Invited Session Proposals Due **January 19, 2019**, we will request papers 1 day early (Jan 18th) to organize the session.
- Look for an email later this week with the Call.

CEB NOMINATION

- The main charge of the Conference Editorial Board (CEB) is to ensure the technical quality of major conferences sponsored or co-sponsored by the Society.
- The CEB coordinates the receiving, logging, acknowledging, distributing, collecting and collating reviews, and evaluating Regular papers submitted to the Society (co-)sponsored conferences: the IEEE conference on Decision and Control (CDC), the American Control Conference (ACC), and the IEEE Conference on Control Technology and Applications (CCTA).
- Our TC can recommend 1 member for the CEB, if you have time and are interested to volunteer, or would like to suggest a nomination please contact me.

CEB Nominations-Process

- 229 CEB members. About 30 new appointees every year.
- 10 people were added to the CEB in October based on your recommendations of TC chairs
- Please recommend ONE person from your TC for the CEB.
- Of the total of 19 names from TC chairs, about 10 will be recommended by the CEB Chair, discussed at the Excomm, then approved by the BOG at the ACC.
- Deadline for you to send this to Joao: **January 20, 2019**
- Results of CDC BOG approvals from last round will be shared shortly.

CSS WEBSITE

<http://automotive-controls.ieeecss.org/>

- Website Updates. Thankyou Reza!
- Need to update: Roster- (photos and emails)

ANNOUNCEMENTS

- Simona Onori will give the Plenary at AAC June 24th Orleans France
- Scott Moura and I are Organizing a Tutorial Session at ACC2019 “on The State-of-the-Art and The Future of Battery Systems & Control”

OPEN DISCUSSION

- Website Updates. Roster-
- Where to post Job Updates? Linked-in vs CSS website?
- CSM Magazine article to Highlight TC activities, please share any updates, initiatives or activities you would like me to include in the article (Due Jan 25th).
- Plan for an Invited Workshop on Challenges and Open Problems in Control of Automotive Systems: Overlap with CAV workshop at Michigan, possible to address different specific topic (e.g. EV charging and reach out smart grids)
- Outreach: What can we do to educate the broader community about Emerging Trends in Automotive Controls? Social hour at SAE in April?
- Interested to help with organizing invited sessions for 2019 CDC and CCTA, please email me. (**CCTA Jan 18th, CDC Mar 7th**)