
IEEE
VPPC 2022
November 1-4, 2022 // Merced, CA
VPPC 2022
CONFERENCE
PROGRAM
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Welcome from the Conference General Chairs

Ricardo de Castro
University of California, Merced USA

Scott Moura
University of California, Berkeley, USA

Keith Corzine
University of California, Santa Cruz, USA

On behalf of the Organizing Committee, we are delighted to welcome you to the 2022 edition of the IEEE Vehicle Power and Propulsion (IEEE VPPC) in Merced, California. After more than 3 years since the last in-person VPP conference, we are looking forward to reconnect with old colleagues and meet new researchers working in this exciting electric transportation field.

This is the first time that the VPP conference takes place in California. This is a timely visit. California recently announced that only zero-emission vehicles will be allowed to be sold in the state by 2035. Other states and countries will surely follow. The VPP conference, as one of the pioneer forums dedicated to electric mobility, is in a privileged position to create and disseminate knowledge that will help our communities transition toward sustainable transportation, improving air quality and reducing greenhouse emissions.

This transition will need to be performed by a diverse workforce across different continents, cultures, and communities. In this year's edition of the VPP conference, we introduced a new sub-committee dedicated to Diversity, Equity & Inclusion. This sub-committee, led by Sousso Kelouwani and Arsenio Mindu, has organized a special session focused on renewable energies for electric vehicle (EV) charging, a promising pathway to improve EV readiness level of communities in developing countries. The conference also includes a panel session on Women in Engineering, organized by Ke Li, which will focus on strategies to increase participation of women in electric transportation fields.

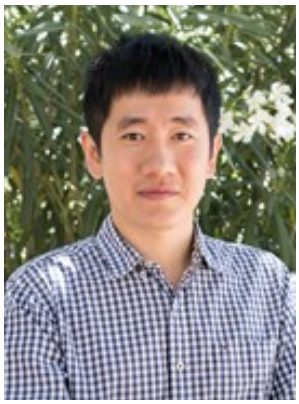
We would like to thank the Institute of Electrical and Electronics Engineers (IEEE) and Vehicular Technology Society (VTS) for their support, the Technical Program Committee Chairs (Rui Araújo, Simona Onori, XinfanLin), which coordinated the preparation of an excellent technical program for the 4 days of the conference, and the UC Merced's School of Engineering for all the local help. Our sincere thanks also go to all the authors, keynote speakers, presenters, and all the volunteers involved in the conference.

We hope you will also enjoy a relaxing time in Central California. Merced is known as the gateway to Yosemite National Park, and we encourage you to visit this natural wonder during your stay in California.

Ricardo, Scott and Keith

The General Chairs of the IEEE VPPC 2022

Rui Esteves Araújo
University of Porto



Xinfan Lin
University of California Davis

Simona Onori
Stanford University
United States

It is with great pleasure we are welcoming all participating delegates to take part in the 19th IEEE Vehicle Power and Propulsion Conference (IEEE VPPC 2022) that is organized for the first time in a hybrid format. After two virtual editions due to the COVID-19 pandemic, we are able to organize an on-site event simultaneously with a virtual event. The on-site conference is hosted by the University of California, Merced which is the 10th UC campus, located in the San Joaquin Valley of the California's Central Valley, northeast of the city of the Merced. The virtual participation is supported by a platform that will open before the conference and remain open for up to 10 days following the conference. All presentations on the virtual platform will be accessible anytime for on-demand viewing. The platform itself has chat and Q&A posting features.

The Cambridge Dictionary define hospitality as "*the act of being friendly and welcoming to guests and visitors*". In academia, generosity and affability are the fundamental expressions of welcoming and embracing diversity and integration, as well as the sharing new ideas and knowledge. Conferences are instrumental to these purposes, where the "*scientific hospitality"* is essentially exercised through the debate of ideas, dissemination of knowledge, and exchange of experiences between younger and senior researchers. With this spirit in mind, we invite "*guests*" to participate and enjoy the venues for discussion in the on-site and virtual technical sessions. We hope your participation will result in important technical discussions, renewed contacts with colleagues through in-person and/or virtual networking and strengthened technical expertise.

The IEEE VPPC 2022 edition has been able to establish a diverse program ranging across the latest areas of research in modeling, design, analysis and control of electrified vehicle power as well as electric railway systems. The Technical Program Committee (TPC) has prepared a hybrid program of technical presentations, that is organized in 8 Regular Tracks and 9 Special Sessions covering the topics related to latest developments in connected and automated vehicles, automotive electronics, transportation systems and vehicle power and propulsion systems. In additional, the conference includes three prestigious keynote talks, a technical exhibition, a social networking program, three tutorials on Monday and technical visits on Friday afternoon. We assure you that the local organizing committee of IEEE VPPC 2022 is striving to offer an exciting and attractive stay in Merced.

We are grateful to the large number of volunteers who have worked hard at all levels, including those who participated in the review process, the Track Chairs involved in the paper selection (including Special Session and Tutorial Tracks), and the Invited Speakers. This conference would not be possible without their dedication and efforts.

Finally, and most importantly, we would like to thank you, the "*participants",* for having decided to contribute and share your ideas and works to this conference and for making it a success.

We look forward to meeting you in person or virtually in Merced, California, United Sates, from November 1st to November 4th.

TPC Chairs of IEEE VPPC 2022

Rui Esteves Araújo
University of Porto
Portugal

Xinfan Lin
University of California Davis
United States

Simona Onori
Stanford University
United States

Welcome from the VT Society President
Jae Hong Lee, Seoul National University, South Korea

On behalf of the IEEE Vehicular Technology Society, it is my pleasure to welcome you to the 2022 IEEE Power and Propulsion Conference – VPPC 2022. VPPC has been successfully held every year for 19 years since the 1st VPPC was held in 2004. VPPC 2022 is the first hybrid VPPC to be held both virtually and face-to-face in Merced, California, after being held virtually for two years due to the spread of the COVID-19 pandemic. Here we hope to see the end of the tunnel where normal lives and human relationships are restored and even improved with the development of new technologies.

VT Society has the unifying theme of 'Mobility'. Under the slogan "Connecting the Mobile World," the VT Society is committed to all aspects of mobility related to motor vehicles, wireless communications, and land transportation. Over the past decade the role and stature of VT Society has grown very rapidly in these areas with the advent of electric and connected vehicles, autonomous driving, 5G, 6G, smart land transportation and urban air mobility. VT Society's conferences, including VPPC and VTC, provide participants with a solid platform to exchange new ideas and knowledge. The VT Society has also been very successful in its publications. The IEEE Transactions on Vehicular Technology and the IEEE Vehicular Technology Magazine attract more quality papers and interesting articles each year, such that their impact factors have increased for more than several years in a row. The new IEEE Open Journal of Vehicular Technology is expected to follow suit.

We invite you to join the VT Society as a member to help to shape the future of your profession. VT Society supports services and activities specifically designed for members' career development. Having one of the largest Distinguished Lecturer programs in the IEEE, VTS provides its local chapters with presentations by renowned experts on interesting and important topics.

I hope that this conference can inspire you to consider hosting a VPPC in the future. Our Vehicular Power and Propulsion Committee, and Conference Committee are ready to listen to your proposals and provide any assistance you may need.

I wish to convey a special thank you to General Co-Chairs Ricardo De Castro, Scott Moura, and Keith Corzine, Technical Program Co-Chairs Rui E. Araújo, Xinfan Lin, and Simona Onori, and other committee members of the IEEE VPPC 2022 for their thoughtful implementation of this excellent conference program.

Finally, I would like to express my sincere gratitude to all participants who attended this conference and I hope that you have a pleasant conference.

Jae Hong Lee

President, IEEE Vehicular Technology Society

Prof. Alain Bouscayrol,
University of Lille, France

Welcome from the Chair of the VPPC Steering Committee

On behalf of the Vehicle Power Propulsion Conference (VPPC) steering committee, it is my great pleasure to welcome you to the 19th IEEE VPPC.

IEEE-VPPC'20 and IEEE-VPPC'21 were fully organized in a virtual mode due to the COVID-19 pandemic. But it was important to continue the dissemination of research activities. Unfortunately, the situation is not quite stable to have a normal conference this year, and the organizing committee, the VPP steering committee and VTS decided that **IEEE-VPPC'22** will be in hybrid mode to enable each attendee to opt for their best solution with the possibility of in-presence scientific exchange and networking.

Special thanks to Prof. Jae Hong Lee, VTS President, and Prof. J.R. Cruz, the VTS VP Conference chair, for their strong supports. Warms thanks to Cerry Leffler and Rodney Clint Keele (VTS Program Administrators) for their huge work in this difficult context. Kind thanks to Prof. Ricardo de Castro (Merced University), VPPC'22 general chair, for his great effort to organize this high-level event despite the context. Many thanks to Rui E. Araujo (University of Porto, Portugal), Xinfan Lin (University of California Davis, USA) and Simona Onori (Stanford University, USA), the Technical Program Committee co-chairs for their hard work to keep a high-level scientific program. **A key international conference needs a strong and dynamical international team** that can propose relevant adaptations in any context. We are lucky to have such a strong and dynamical team!

I hope you will enjoy the hybrid IEEE-VPPC'22, and I am looking forward to meeting you in-presence in Merced… or virtually!

Prof. Alain Bouscayrol
Chair of the VPPC steering committee

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Cerry Leffler, University of Oklahoma, USA

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Satadru Dey, Penn State University, USA (Lead)
Jorge Barreras, Imperial College of London, UK
Seongbeom Lee, Romeo Power, USA

Track 2 – Power Electronics Motor Drives and Electric Power Systems
Sergio Cruz, University of Coimbra, Portugal (Lead)
Akanksha Singh, National Renewable Energy Laboratory, USA
Li Ke, University of Coventry, UK

Track 3 – Vehicular Electronics and Intelligent Transportation Systems
Francis F. Assadian, University of California, Davis, USA (Lead)
Anthony Patire, University of California, Berkeley, USA
Bin Xu, University of Oklahoma, USA

Track 4 – Control and Energy Management of Transportation Systems
Theo Hofman, Eindhoven University of Technology, Netherlands (Lead)
Ziyou Song, National University of Singapore, Singapore
Donald Docimo, Texas Tech University, USA

Track 5 – Modeling, Analysis and Simulation of Transportation Systems
Shima Nazari, University of California, USA (Lead)
Sylvain Pagerit, Argonne National Laboratory, USA
Jonathan Brembeck, German Aerospace Center, Germany

Track 6 – Charging Systems and Infrastructures
Yu Zhang, University of California, Santa Cruz, USA (Lead)
Mohamed Badawy, San José State University, USA
Ricardo Prata, E-Redes, Portugal

Track 7 – Hydrogen Refueling Infrastructures and Fuel Cell Vehicles
Abel Chuang, University of California, Merced, USA (Lead)
Daniel Hissel, University of Franche Comté, France
Loïc Boulon, University of quebec at Trios-Rivières, Canada

Track 8 – Electric Railway
Pablo Arboleya, University of Oviedo, Spain (Lead)
Zhongbei Tain, University of Liverpool, UK
Yunqing Hu, CRRC Railways, China

Recent Results Track
Vincent Leite, Polytechnic Institute of Bragança, Portugal (Lead)
Báo-Huy Nguyen, University of Sherbrooke, Canada
Erik Schaltz, Aalborg University, Denmark
Sari Ali, University of Lyon, France
Rochdi Trigui, University of Gustave Eiffel, France
Yuan Cheng, Hargin Instititute of Technology, China

Track and Special Session Chairs—Continued

SS1 – Advanced Control Technologies for Multi-Motor Multi-Source Vehicles
Co-chair: Bao-Huy Nguyen, Université de Sherbrooke, Canada
Co-chair: Thanh Vo-Duy, Hanoi University of Science and Technology, Vietnam
Co-chair: Binh Minh Nguyen, Toyota Technological Institute, Nagoya, Japan
Co-chair: Kan Akatsu, Shibaura Institute of Technology, Japan
Co-chair: Minh C. Ta, University of Sherbrooke, Canada

SS2 – Multi-Agent System in Vehicle and Energy Related Problems
Co-chair: Nguyen Dinh Hoa, Kyushu University, Japan
Co-chair: Hung Dinh Nguyen, Nanyang Technological University, Singapore
Co-chair: Thinh Thanh Doan, Virginia Tech, USA

SS3 – Cyber-Physical Systems with Applications in Vehicle Electrification and Intelligence
Co-chair: Xiaosong Hu, Chongqing University, China
Co-chair: Chen Lv, Nanyang Technological University, Singapore
Co-chair: Ziyou Song, National University of Singapore, Singapore
Co-chair: Hong Wang, Tsinghua University, China

SS4 – Linear Flux-Modulation Permanent-Magnet Machines and Systems for Transportation
Co-chair: Ronghai Qu, Huazhong University of Science and Technology, China
Co-chair: Yuting Gao, Nagoya Institute of Technology, Japan
Co-chair: You Zhou, Nayang Technology University, Singapore

SS5 – Modeling and Control of Intelligent Vehicles and Infrastructure
Co-chair: Hicham Chaoui, Carleton University, Canada
Co-chair: Sousso Kelouwani, University du Québec à Trois-Rivières, Canada
Co-chair: Hamid Gualous, University of Caen Normandy, France

SS6 – Vehicle Dynamics Control and State Estimation Techniques for Over-actuated Vehicles
Co-chair: Basilio Lenzo, University of Padova, Italy
Co-chair: Davide Tavernini, University of Surrey, UK
Co-chair: Edoardo Sabbioni, Politecnico di Milano, Italy

SS7 – Design and Testing Technologies for Next Generation Electric Vehicle Components
Co-chair: Valentin Ivanov, Technische Universität Ilmenau, Germany
Co-chair: Aldo Sorniotti, University of Surrey, UK
Co-chair: Viktor Skrickij, Vilnius Tech, Lithuania

Track and Special Session Chairs—Continued

SS8 – Battery Diagnosis, Modeling, and Energy Management for Electric Vehicles
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Co-chair: Irune Vilaluenga, POLYMAT, The Basque Center for Macromolecular Design and Engineering, Spain
Co-chair: Kenneth Higa, Lawrence Berkeley National Laboratory, USA

SS9 – Smart Condition Monitoring of Electrical Machines and Power Electronic Converters
Co-chair: Adil Usman, University of California, Santa Cruz, USA
Co-chair: Dinesh Kumar, Global Research & Development Centre, Japan

SS10 – IEEE VTS Motor Vehicles Challenge – Sizing and Energy Management of Hybrid Dual-Energy Storage System for Electric Vehicles
Co-chair: Thanh Vo-Duy, Hanoi University of Science and Technology, Vietnam
Co-chair: Jonathan Brembeck, German Aerospace Center (DLR), Germany
Co-chair: Jakub Tobolar, German Aerospace Center (DLR), Germany

SS11 – Fuel Cell Based Hybrid systems
Co-chair: Nadia Steiner, University of Bourgogne Frache-Comté, France
Co-chair: Yash Raka, SINTEF, Norway

SS12 – Renewable Energy for EV Charging Infrastructure
Co-chair: Sousso Kelouwani, University of Québec à Trios-Rivières, Canada
Co-chair: Afef Bennani Ben Abdelghani, University of Carthage, Tunisia
Co-chair: Arsénio José Mindú, Universidade Pedagogica, Mozambique

SS13 – EMR and Other Graphical Descriptions
Co-chair: David Ramsey, University of Lille, France
Co-chair: Nassim Noura, University of Québec at Triois Rivières, Canada

SS14 – Higher Education for Electro-Mobility
Co-chair: Paulo G. Pereirinha, IPC-ISEC, Polytechnic Institute of Coimbra, Portugal
Co-chair: Mohamed Badawy, San Jose State University, USA

SS15 – Power Electronics for EV Battery Charging Systems Dashboard
Co-chair: Vitor Monteiro, University of Minho, Portugal
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Yash Raka (SINTEF)
Yashar Farajpour (Carleton University)
Yasser GHOULAM (INSA Strasbourg - University of Strasbourg - ICube (UMR CNRS 7357))
Yasser Khalil (University of Ottawa)
Yiming Ye (Clemson University)
Yixiu Wang (The University of British Columbia)

Plenary Sessions

Plenary Session 1	**Wed**	8:45	9:05	**Welcome Speeches**
		9:05	9:40	**Keynote 1 - Battery Management using Estimated State of Health, State of Power, and State of Safety**
		9:40	10:15	**Keynote 2 - Challenges & Opportunities for SiC in Automotive Applications**
Plenary Session 2	**Thr**	8:15	8:45	**VTS Network Breakfast**
		8:45	9:40	**Panel Discussion - Career Development and Women in Engineering**
		9:40	10:15	**Keynote 3 - Advanced Power Electronics and Electric Machines for Electric-Drive Mobility Applications**
Plenary Session 3	**Friday**	8:45	9:40	**Panel Discussion - Electrification of Offroad Vehicles**
		9:40	10:15	**Keynote 4 - Improving Energy Efficiency of Medium-Duty and Heavy-Duty Vehicles through Connectivity and Automation**

Title: **Panel Discussion – Career Development and Women in Engineering**
Summary: *With the aim to encourage more people especially women engineers and researchers to join the IEEE Vehicle Technology Society (VTS) for future transportation electrification, and to promote equality, diversity and inclusivity, a Panel Discussion session on Career Development and Women in Engineering is organized. Panel members include women engineers and researchers from different career stages and paths (postgraduate, early career, established career and industry). They will share their experience on career development, discuss any challenges they face and bring the solutions they have during their careers. The session will benefit not only women engineers and researchers, but also all the VPPC attendees and VTS members. Before the session, there will be an organized breakfast for VTS members to gather and to network. The session is sponsored by IEEE VTS.*

Title: **Panel Discussion – Electrification of Offroad Vehicles**
Summary: *In 2019, off-road equipment contributed 20.1 million metric tons of carbon dioxide emissions. This panel will identify and showcase the growing potential of electric offroad equipment in offroad applications throughout the San Joaquin Valley. We will explore the potential challenges to replacing internal combustion engines, how industry is looking to maximize efficiency of offroad applications, and what the outlook is for future applications.*
Participants:

- Valerie Thorsen, CalStart, San Joaquin Valley Deputy Director
- Hari Viswanathan, SVP for Global Product Development, Solectrac
- Jose Daugherty, Director of Sales Engineering, ZeroNOx

Program At Glance - Part I

Day 1

	TUESDAY, 1 November
8:00 AM	Registration
	All Tutorials will take place in the Ballroom 150
9:00-10:30 am	Tutorial: Powertrain Control Software Validation & Continuous Testing (In-Person)
10:15 am- 10:45 am	Coffee Break | Lobby
11:00-12:30pm	Tutorial: Impact of EV Charging on Elec. Infrastructure: From Forecast to Analysis (In-Person)
12:30-1:30 pm	Lunch
1:30-3:00pm	Tutorial: Fuel Cell VIRTUAL & Physical Platform for Fuel Cell Sys. Dev I (In-Person)
3:00-3:30pm	Coffee Break | Lobby
3:30-5:00pm	Tutorial: Fuel Cell VIRTUAL & Physical Platform for Fuel Cell Sys. Dev. II (In-Person)
6:30pm	Reception | El Capitan

Day 2 & 3

	WEDNESDAY, 2 November				THURSDAY, 3 November			
8:00 AM	Registration | Lobby				Registration | Lobby			
8:15 am- 8:45 am					VTS Network Breakfast | Ballroom 150			
8:45 am- 10:15 am	Plenary Session 1 | Ballroom 150				Plenary Session 2 | Ballroom 150			
10:15 am- 10:45 am	Coffee Break | Lobby				Coffee Break | Lobby			
10:45 am- 12:25 pm	Room 105	Room 110	Room 205	Room 225	Room 105	Room 110	Room 205	Room 225
	1. Energy Storage & Generation I (RT1) In-Person	2. Charging Systems I (RT6) In-Person	3. Vehicular Electronics & ITS I (RT3) Virtual	4. Electric Railway I (RT8) Virtual	13. Energy Managmnt. of EVs II (RT4) In-Person	14. Power Electronics, Motor Drive II (RT2) In-Person	15.Modeling, Analysis & Simulation of EVs II(RT5) Virtual	16. Vehicle Dynamics Control (SS6) Virtual
12:30 pm- 1:45 pm	Lunch | Ballroom 150				Lunch | Ballroom 150			
1:45 pm- 3:25 pm	Room 105	Room 110	Room 205	Room 225	Room 105	Room 110	Room 205	Room 225
	5. Fuel Cell Vehicles I (RT7) In-Person	6. Modeling, Analysis & Simulation of EVs I (RT5) In-Person	7. Energy Managmnt. of EVs I (RT4) Virtual	8. Power Electronics, Motor Drives I (RT2) Virtual	17. Charging Systems II (RT6) In-Person	18. Vehicular Electronics & ITS II (RT3) In-Person	19. EMR & Graphical Descriptions (SS13) In-Person	20. Electric Railway II (RT8) Virtual
3:30 pm - 4:00 pm	Coffee Break |Lobby				Coffee Break | Lobby			
4:00 pm- 6:00 pm	Room 105	Room 110	Room 205	Room 225	Room 105	Room 110	Room 205	Room 225
	9. Design & Testing for Next Gen EVs (SS7) In-Person	10. IEEE VTS Motor Vehicles Challenge (SS10) In-Person	11. Battery Diagnosis, Modeling for EVs (SS8) In-Person	12. Energy Storage & Generation II (RT1) Virtual	21. Renewable Energy for EV Charging (SS) In-Person	22. Modeling & Control of Intelligent Vehicles (SS5) In-Person	23. Advanced Control for Multi-Motor Vehicles (SS1) Virtual	24. Fuel Cell Based Hybrid Systems (SS11) Virtual
6:30 PM					Gala Dinner | El Capitan			

Program At Glance - Part II

Day 4

<table>
<tr><td></td><td colspan="4">FRIDAY, 4 November</td></tr>
<tr><td>8:00 AM</td><td colspan="4">Registration | Lobby</td></tr>
<tr><td>8:15 am-
8:45 am</td><td colspan="4"></td></tr>
<tr><td>8:45 am-
10:15 am</td><td colspan="4">Plenary Session 3 | Ballroom 150</td></tr>
<tr><td>10:15 am-
10:45 am</td><td colspan="4">Coffee Break | Lobby</td></tr>
<tr><td rowspan="2">10:45 am-
12:25 pm</td><td>Room 105</td><td>Room 110</td><td>Room 205</td><td>Room 225</td></tr>
<tr><td>25. Energy Storage & Generation III (RT1)
In-Person</td><td>26. Power Electronics, Motor Drive III (RT2)
In-Person</td><td>27. Charging Systems III (RT6)
In-Person</td><td>28. Energy Managmnt. of EVs III (RT4)
Virtual</td></tr>
<tr><td>12:30 pm-
1:45 pm</td><td colspan="2">Lunch | Ballroom 150</td><td colspan="2" rowspan="2">Technical Visit 2
UC Berkeley

(Lunch Box will be provided)

In-Person</td></tr>
<tr><td>1:45 pm
-
6:00 pm</td><td colspan="2">Technical Visit 1 |
TRC Inc.

In-Person</td></tr>
</table>

PLENARY SESSION 1 (In-Person)			
Wed. Nov 2	8:45	9:05	**Welcome Speeches**
	9:05	9:40	**Keynote 1 - Battery Management using Estimated State of Health, State of Power, and State of Safety** *Anna Stefanopoulou (Univ. Michigan, USA)*
	9:40	10:15	**Keynote 2 - Challenges & Opportunities for SiC in Automotive Applications** *Carl Bonfiglio (Infineon, USA)*
	Chairs: Ricardo de Castro (UC Merced, USA), Rui Araujo (FEUP, PT)		

PLENARY SESSION 2 (In-Person)			
Thr. Nov 3	8:15	8:45	**VTS Network Breakfast**
	8:45	9:40	**Panel Discussion - Career Development and Women in Engineering** *Moderator: Azar Alizadeh (UC Merced, USA)*
	9:40	10:15	**Keynote 3 - Advanced Power Electronics and Electric Machines for Electric-Drive Mobility Applications** *Sreekant Narumanchi (NREL, USA)*
	Chairs: Loic Boulon (UQTR CA), James Palco (UC Merced, USA)		

PLENARY SESSION 3 (In-Person)			
Friday Nov 4	8:45	9:40	**Panel Discussion - Electrification of Offroad Vehicles** *Moderator: Valerie Thorsen (CalStart, USA)*
	9:40	10:15	**Keynote 4 - Improving Energy Efficiency of Medium-Duty and Heavy-Duty Vehicles through Connectivity and Automation** *Kanok Boriboonsomsin (UC Riverside, USA)*
	Chairs: Joao Trovao (U. Sherbrooke, CA), Valerie Thorsen (CalStart, USA)		

Keynotes

Anna Stefanopoulou (Professor and Fellow of ASME, IEEE and SAE, University of Michigan)

Title: "Battery Management using Estimated State of Health, State of Power, and State of Safety"

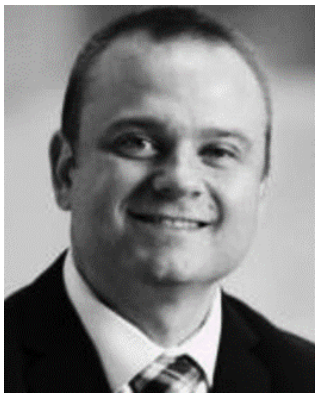
Anna G. Stefanopoulou, the William Clay Ford Professor of Technology has been recognized as a Fellow of three different societies: the ASME (08), IEEE (09), and SAE (18). She is an elected member of the Executive Committee of the ASME Dynamics Systems and Control Division and the Board of Governors of the IEEE Control Systems Society. She is the Founding Chair of the ASME DSCD Energy Systems Technical Committee and a member of a U.S. National Research Council committee on the 2025 US. Light Duty Vehicle Fuel Economy Standards. She is a recipient of multiple awards and has co-authored a book, 22 US patents, and more than 350 publications (8 of which have received awards) on estimation and control of engines, fuel cells, and batteries. … and she likes small cars, scooters, e-bikes.

Abstract: The battery management system (BMS) has been critical for merging multi-physics models and data analytics necessary for the efficiency, longevity, and safety of battery electric vehicles. The BMS is the brain of the battery system and is responsible for State of Charge (SOC), State of Health (SOH), State of Power (SOP) and State of Safety (SOS) estimation, protecting the pack, minimizing aging, accounting for cell-to-cell variability, and monitoring battery degradation in real time from field data. Accurate predictions of degradation and lifetime of lithium-ion batteries are essential for reliability, safety, and key to cost-effectiveness and life-cycle emissions. The ultimate BMS task is the detection of the onset of venting, the prediction of imminent thermal runaway, that helps manage the risk of explosions and fires from failing batteries.

Keynotes

Carl Bonfiglio (Director of Application Engineering Automotive Team – Vehicle Motion)

Title: "Challenges & Opportunities for SiC in Automotive Applications"



Carl Bonfiglio is a veteran of the automotive industry having spent the past 20 years focusing on automotive semiconductors and electronics. He currently holds the position of Director of Application Engineering with Infineon Technologies in North America and is responsible for growing Infineon's Vehicle Motion segment, which focuses on electrified powertrains.

Prior to his current role, Carl held various positions in the field of application engineering and business development within Infineon. He developed an expertise in the area of microcontrollers and automotive electronic systems such as powertrain controls, hybrid and electric vehicle components, and safety systems.

Carl earned a Bachelor of Science in Computer Engineering from the University of Michigan and a M.B.A. from the University of Michigan Ross School of Business.

Outside of his professional career, Carl enjoys spending time with his wife and two children, golfing, and honing his skills as an amateur chef.

Abstract: The automotive industry is set for rapid growth of Electric Vehicles in the coming years, and this brings with it a great demand for efficient power conversion within the vehicle. This call for efficiency is driven by automakers wanting to both increase the range of their vehicles, while also maintaining cost effective battery capacities. So, while the automotive industry is going through it's own rapid conversion to electrification, the power semiconductor industry is seeing a disruption of it's own; the rapid changeover of traditional silicon devices, like IGBTs and Super Junction MOSFETs, to SiC based devices. The introduction of SiC MOSFETs into traction inverters, On-Board Charger, and DC-DC converters brings with it large gains in efficiency, but it is not without challenges. Semiconductor manufacturers must address key headwinds such as reliability concerns, building the necessary capacity and obtaining the needed quantities of raw materials to meet automotive demand, all while meeting the cost targets of the carmakers which are needed to product EVs profitably. This presentation will discuss both the benefits of SiC for automotive applications as well as how the challenges are being addressed.

Keynotes

Sreekant Narumanchi (ASME Fellow and Group Manager, Advanced Power Electronics and Electric Machines Group Center for Mobility Sciences)

Title: "Advanced Power Electronics and Electric Machines for Electric-Drive Mobility Applications"

Sreekant Narumanchi is the Group Manager of the Advanced Power Electronics and Electric Machines (APEEM) Group within the Center of Integrated Mobility Sciences at the National Renewable Energy Laboratory, where he is currently in his 18th year. He leads a Group of 14 researchers focused on electro-thermal, thermal-fluids, thermo-mechanical and reliability aspects of power electronics and electric machines. This includes investigation of various cooling technologies, thermal interface materials/ interfaces, interconnects, as well as reliability of these components. His broad research interests include heat transfer, power electronics and electric machines thermal management, packaging and reliability. Over the years, his Group has collaborated with numerous institutions cutting across industry, universities, national labs, and other research institutions.

Sreekant is an ASME Fellow, an IEEE Senior Member, and has published over 90 peer-reviewed journal and conference papers and book chapters. Professionally, he is active as an Associate Editor for the ASME Journal of Electronic Packaging, as an organizer for InterPACK (Topic, Track Chair, Technical Program Co-Chair, Conference General Chair) and ITherm conferences, on the ASME K-16 Committee on Heat Transfer in Electronic Equipment, as Guest Editor of the IEEE Components, Packaging, and Manufacturing Technologies Journal, on the Thermal Working Group of the IEEE Heterogeneous Integration Roadmap Committee, serving on the Scientific Advisory Board of the POETS NSF Engineering Research Center, serving on the External Advisory Board of the Washington State University School of Mechanical and Materials Engineering, as well as a reviewer for numerous journals and federal agencies. He is also part of the Executive Committee of the ASME Electronic and Photonic Packaging Division.

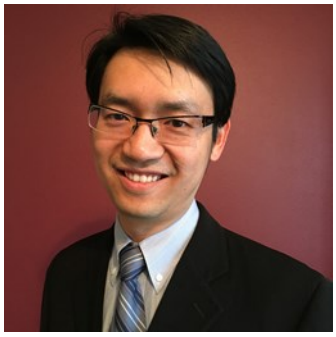
Some of the external awards Sreekant has received include the 2022 THERMI Award, the 2020-21 Associate Editor of the Year Award from the ASME Journal of Electronic Packaging, 2018 ASME EPPD-K16 Clock Award, a 2016 R&D 100 Award, the Best Paper Award from the ASME Journal of Electronic Packaging (2003), and the ASME 2013 InterPACK Conference Outstanding Paper Award. Within NREL, he received the 2013 NREL Outstanding Business Collaboration Award, and the 2009 NREL Staff Award for Outstanding Performance. Sreekant received a Ph.D. from Carnegie Mellon University (2003), M.S. from Washington State University (1999), and B. Tech. from Indian Institute of Technology Kanpur (1997), all in Mechanical Engineering.

Abstract: Electronics, power electronics, and electric machines are becoming important for an array of mobility/transportation, renewable energy and energy efficiency applications. In this presentation, I will provide an introduction to NREL and my Group. Then, I will describe some challenges and opportunities for power electronics, electric machines and electric drives for mobility applications in particular. After that, I will give a brief overview of my Group's research activities in these areas.

Keynotes

Kanok Boriboonsomsin (Research Engineer and Associate Director of the College of Engineering, University of California, Riverside)

Title: "Improving Energy Efficiency of Medium-Duty and Heavy-Duty Vehicles through Connectivity and Automation"



Dr. Kanok Boriboonsomsin is a Research Engineer and Associate Director of the College of Engineering – Center for Environmental Research and Technology at the University of California, Riverside. He has over 20 years of research and development experience in the areas of connected and automated vehicles, intelligent transportation systems, traffic operations, traffic simulation, vehicle energy and emissions modeling, and sustainable transportation. Dr. Boriboonsomsin currently serves as the Vice Chair of the Measurement and Modeling Subcommittee under the Air Quality and Greenhouse Gas Mitigation Committee of the Transportation Research Board. He also serves as an Associate Editor of IEEE Intelligent Transportation Systems Magazine. He is a member of IEEE, ITE, ITSCA, and SAE International.

Abstract: Medium-duty and heavy-duty (MDHD) vehicles account for the second largest share (~21%) of energy consumed by the transportation sector in the U.S., and their share is projected to grow larger as a result of increasing e-commerce activity. At the same time, the transportation sector is going through transformational changes driven by automated, connected, electric, and shared (ACES) vehicle technologies, which have opened up new opportunities for significantly improving vehicle energy efficiency. In this seminar, recently completed research projects that utilize connectivity and automation to drive energy efficiency improvements in plug-in hybrid electric bus and conventional diesel truck will be discussed. In these research projects, a connected vehicle application called Eco-Approach and Departure (EAD) was developed and evaluated. The application takes advantage of communication between vehicle and traffic signal to optimize a vehicle's speed profile as it approaches and departs a signalized intersection. In the application development, machine learning techniques were explored and used to enable real-time computation of optimal vehicle speed for energy efficiency, taking into account powertrain characteristics of the vehicle. The evaluation of the application—conducted through traffic simulation, hardware-in-the-loop testing, as well as real-world experiment—showed 5% to 25% vehicle energy efficiency improvements. The evaluation results demonstrated the EAD application's potential to significantly improve energy efficiency of MDHD vehicles, especially those frequently traveling on signalized corridors such as transit buses and drayage trucks.

Tutorials

T1 – VIRTUAL & Physical Platform for Fuel Cell System Development

Instructors:
Yash Raka, SINTEF Research Institute, Norway
Mari Juel, SINTEF Research Institute, Norway
Kyrre Sundseth, SINTEF Research Institute, Norway
Nadia Yousif Steiner, University Bourgogne Franche-Comté, Norway

Yash Raka Dr. Yash Raka is a Research Scientist at SINTEF. His work focuses on modelling for electrochemical energy systems, techno-economic and environmental impact assessments for hybrid sustainable energy systems.

Dr. Yash Raka received his doctoral degree from NTNU, Norway and graduated from TU Delft with a master's degree. Before his masters, he worked as an energy engineer for two years at Orange County foundation, India.

Mari Juel is a senior research scientist at SINTEF in Norway working on developing hybrid energy systems for both the mobility and stationary applications. She received a master's degree in physics in 2002 and a PhD in Surface Science at Norwegian University of Science and Technology in 2007. Since 2007 she worked as a researcher in the field of renewable energy and solutions technologies including PV and electrochemical conversion technologies.

Dr. Kyrre Sundseth is a Research Manager at the Sustainable Energy department in SINTEF. He is a Co-leader of SINTEFs strategic portfolio on hydrogen as well as being a Coordinator of the Norwegian Centre for Environment-friendly Energy Research (FME), HYDROGENi. He is also the Coordinator of the Virtual-FCS EU project funded by the Clean Hydrogen Partnership. Dr. Sundseth' s research is focused on new energy solutions based on electrochemical energy technologies and systems.

T1—Continued

Nadia Yousif Steiner is full professor at the Université Bourgogne Franche-Comté. She received a master's degree in mathematics, a master's degrees in Fluidics and Energetics in 2006 and a PhD in Engineering Science in collaboration between the University of Franche-Comté and the European Institute for Energy Research EIFER in Karlsruhe, Germany in 2009. From 2009 to 2014, she worked as R&D Project Manager at EIFER, Germany, in charge of collaborative projects on Hydrogen and Fuel Cells. Her main research activity is linked to Fuel Cell systems characterization diagnostics, prognostics, and control.

Abstract: VIRTUAL-FCS is an EU FCH JU project that aims to make the design process of hybrid fuel cell and battery systems easier, cheaper, and quicker. For that, a toolkit combining a system model with X-in-the-loop capabilities has been developed for designing and optimizing PEM fuel cells and battery hybrid systems. The platform utilizes the OpenModelica modelling environment and is entirely open source, allowing everyone in both industry and research to benefit from and contribute to the future development of the framework. In this tutorial, the core developers will offer participants an introduction to the Virtual-FCS platform. They will discuss the capabilities of some of the foundational models developed in the project and demonstrate a use-case simulating the performance of a fuel cell electric vehicle (FCEV) powertrain. Participants should come away from the tutorial with the skills needed to start applying the Virtual-FCS platform in their research and development activities.

Objectives:

- Introduce the VFCS library
- Review the foundational models
- Demonstrate the capabilities of the platform

T2 – Powertrain Control Software Validation and Continuous Testing

Instructor: Peter Gartner, Director, HIL Solution

Petar Gartner is the Director of HIL Solutions at Typhoon HIL. Petar leads the development of advanced computationally efficient ultra-high fidelity real-time machine and converter models. He also works closely with the most advanced HIL users to accelerate technology development and customer HIL adoption. He holds M.Sc. in Power Electronics and Electrical Machines from University of Novi Sad.

Abstract: The two most challenging Hardware in the Loop (HIL) testing applications in the Electric Vehicle (EV) domain are motor drives and battery chargers. Developing and testing control software for these power converters are challenging due to: high switching frequency, new wide-bandgap semiconductors, highly nonlinear motors, new topologies, and their safety critical role.

To enable comprehensive HIL testing of EV power electronics controllers under all the operating conditions, including faults, it is necessary to use high-fidelity plant models able to capture all the relevant real-world phenomena. These include semiconductor power losses (including switching and conduction losses), on-state voltage drops and switching delays, heat-sink thermal models, motor nonlinearities including spatial harmonics, inter-winding short circuits etc.

T3 – Impact of EV Charging on Electrical Infrastructure: From Forecast to Analysis

Instructor: Giambattista Gruosso, Associate Professor, Politecnico di Milano

Giambattista Gruosso: Giambattista Gruosso is associate professor at Politecnico di Milano. Since 2019 he holds the national "abilitazione" as a full professor. His main research interests include modeling, simulation, and electrical systems design, focusing on industrial automation, energy system, electric mobility and intelligent manufacturing systems He has 20 years of experience in research issues in electrical engineering and its links with ICT. For years he has been working on systems and components for Smart City, Smart Mobility and Smart Factory. In the last years, the research activity focuses on the digital transformation of the electrical systems and components and the modeling of traditional electrical systems integrated with their digital part. The core of its activities is the realization of Digital Twins of electrical systems using mixed techniques of Hardware in The Loop simulation to validate electrical architectures' behavior integrated with digital systems of supervision, automation, and data collection. In particular, the activities of the laboratory concern the implementation of 4.0 technologies for electrical systems. He is director of Simlab4.0 on advance in the simulation of electrical systems. He is director of the master Digital Skills for industry 4.0.

He is co-chair of the IEEE IES Committee on Transportation Electrification. He is an active member of the IEEE Vehicular Technology Society as co-chair of VPP committee. He was secretary of the Italian section of IEEE (2016- 2019), member of the local board of engineers (Milan). He is currently also scientific head of the technical area of MADE (competence center for Industry 4.0) He is IEEE senior member and actually he is Chair of the IEEE Italy Section HAC committee and Secretary of IEEE IES Italy section chapter. He is member of IEEE EPP working group in ICT.

Abstract: In this tutorial, the main challenges of electric charging systems interfaced with electricity distribution networks will be analyzed.
The main areas of work and the main analysis and simulation techniques will be presented.
Particular attention will be paid to the formalization of data-based techniques.

The points are:
-Problems and challenges of charging systems interfaced with electricity grids
-Data modeling and forecasting of charging requirements
-System simulations: impact on power flow and network congestion
-Component simulations: analysis of charging systems
-Excellent management of charging systems and integration with renewables.

Dear VPPC2022 Participant,

As a consequence of the COVID-19 pandemic, the VPPC2022 will be a hybrid conference composed of two types of presentations: i) in-person and ii) virtual.

The ***in-person presentations*** are highlighted with the label ***In-Person (IP)*** in the conference program. The authors of these contributions have indicated their intention to travel to the conference venue and deliver an in-person presentation.

The ***virtual presentations*** are emphasized with the label ***Virtual (V)***. The session chairs (or the student volunteer monitoring the room) will play the pre-recorded presentation during the time slot allocated to paper and collect questions/comments from the audience at the end of the presentation.

Irrespective of the presentation mode, all papers will be available in the VPPC2022 on-demand virtual platform for a 3-week period (Oct 31 – Nov 18). You will receive an email prior to the start of the conference with the login information. We encourage you to engage with both in-person and virtual presenters in order to create a dynamic forum for the exchange of ideas and knowledge within our community. Additionally, we would like to share the following instructions for authors and session chairs:

In-Person Presentations (IP)

Authors with in-Person Presentations

- The meeting rooms have a projector with an HDMI interface and cable. Authors should bring their own laptop with HDMI output in order to present their work.
- Go to the meeting room at least 10 minutes before the start of the session and introduce yourself to the session chairs.
- *(Optional)* You may login into the VPPC2022 on-demand virtual platform. Find your session in the platform and join the zoom link. You can share your slides and audio with the virtual participants during your in-person presentations (make sure to unmute yourself during you presentation)
- Spend 14-16 minutes for presentation and reserve at least 4 minutes for questions from the in-person and virtual audience.

Session Chairs with in-Person Presentations

- Go the meeting room at least 10 minutes before the start of the session to welcome the speakers.
- At the beginning of the presentation, you should introduce the author to the audience, including their name, affiliation, paper's topic and any other biographical information that the author might share with you before the session.
- You should moderate the questions from the in-person and virtual audience at the end of each presentation. It is your responsibility to enforce the session schedule and guarantee that the presentations do not exceed the allocated time (20 minutes/paper).
- If the authors of a paper are absent (but their in-person presentation was expected) the session chair should play the pre-recorded presentation during the paper's time slot. This pre-recorded video is available in the VPPC2022 on-demand virtual platform (see details below).

Virtual Presentations (V)

Authors with Virtual Presentations

- You are welcome to log into the VPPC2022 on-demand virtual platform during the time slot of your paper. Your video will be played to the in-person attendees. At the end, the session chair will introduce questions in the online chat for you to answer and/or interact with you via audio. Due to the large time difference between California/Europe/Asia, we do not expect all virtual presenters to be available to answer the questions in real-time. You may respond to questions asynchronously at a later stage.
- You should regularly monitor the virtual platform in order to address questions/comments about your paper that are posed by the conference participants.
- The organizing committee is planning to record the in-person plenary sessions, and panel discussions and share them on the virtual platform for later visualization.

Session Chairs with Virtual Presentations

- Go the meeting room at least 10 minutes before the start of the session to establish connection with the VPPC2022 on-demand virtual platform. Check if any author is online and available to answer question in real-time.
- You should play the pre-recorded presentations during the paper's time slot; if possible, bring your laptop and connect to the VPPC2022 on-demand virtual platform to reproduce the videos to the audience physically present in the room. You may ask the student volunteer for help playing the videos if you don't have a laptop.
- You should collect questions/comments from the audience at the end of the presentation and add them to the VPPC2022 on-demand virtual platform.

VPPC2022 On-demand Virtual Platform

- All VPPC participants will receive an email prior to the start of the conference with the login information, which allow you to access the pre-recorded presentations and virtually interact with other participants.
- If you have any technical issues accessing the virtual platform please contact Rodney C. Keele (rckeele@ieee.org), Rachel Knight (rknight@conferencecatalysts.com) or the onsite Helpdesk.

We hope you enjoy this hybrid format with a mix of in-person and virtual interaction!

The VPPC2022 Organizing Team

Technical Sessions

Wednesday, 2 November 2022

Wednesday, 2 November 2022, 10:45-12:25, Room 105

Session 1 - RT1, Energy Storage and Generation, Components and Systems I

Chairs: Yuanyuan Xie (CSU Fresno, USA) and Daniel da Silva (IFPEN, France)

1 A Robust and Simple Long Horizon Health Estimation of Lithium-ion Batteries Using NARX Recurrent Neural Network *(IP)*
Safieh Bamati, Department of Electronics , Carleton University, Canada|Hicham Chaoui, Department of Electronics , Carleton University, Canada| Hamid Gualous, LUSAC Laboratory, Université de Caen Normandie, France

2 Reducing Charging Burden of Light Electric Vehicles by Integrated Photovoltaic Modules *(IP)*
Kil Young Lee, Smart Mobility Systems, Technical University of Berlin, Germany|Sangyoung Park, Smart Mobility Systems, Technical University of Berlin, Germany

3 Environmental impacts of batteries for transportation application according to different life cycle steps *(IP)*
Clotilde Robert, ENERGIE, GAUSSIN GROUP, FEMTO-ST, CNRS, Univ. Bourgogne Franche-Comté, France|Alexandre Ravey, ENERGIE, FEMTO-ST, FCLAB, UTBM, CNRS, Univ. Bourgogne Franche-Comté , France|Raphaël Perey, Electrical, GAUSSIN GROUP, France|Daniel Hissel, ENERGIE, FEMTO-ST, FCLAB, CNRS, Univ. Bourgogne Franche-Comté, France

4 DOE medium-and heavy-duty EV data collection project *(IP)*
Kevin Leong, CalStart, California, USA|Chase LeCroy, CalStart, California, USA|Yin Qiu, CalStart, California, USA|Cristina Dobbelaere, CalStart, California, USA

5 Observability analysis of a Li-ion cell equivalent circuit model based on interval arithmetic *(IP)*
Simone Fasolato, Department of Electrical, Computer and Biomedical Engineering, University of Pavia, Italy|Davide M. Raimondo, Department of Electrical, Computer and Biomedical Engineering, University of Pavia, Italy

Wednesday, 2 November 2022, 10:45-12:25, Room 110

Session 2 - RT6, Charging Systems and Infrastructures I

Chairs: *Sarah Kurtz (UC Merced, USA) and Samir Jemei (U. Franche-Comte, France)*

1 Multi-Day Stochastic Scheduling of Electric Vehicle Charging for Reliability and Convenience *(IP)*
Karl Schwenk, Institute for Automation and Applied Informatics, Karlsruhe Institute of Technology, Germany|Veit Hagenmeyer, Institute for Automation and Applied Info, Karlsruhe Institute of Technology, Germany|Ralf Mikut, Institute for Automation and Applied Informatics, Karlsruhe Institute of Technology, Germany

2 Application benchmark for quantum optimization on electromobility use case *(IP)*
Marika Federer, Cognitive Energy Systems, Fraunhofer IOSB-AST, Germany|Daniel Müssig, Cognitive Energy Systems, Fraunhofer IOSB-AST, Germany|Stefan Klaiber, Cognitive Energy Systems, Fraunhofer IOSB-AST, Germany|Jörg Lässig, Cognitive Energy Systems, Fraunhofer IOSB-AST, Germany|Peter Bretschneider, Cognitive Energy Systems, Fraunhofer IOSB-AST, Germany|Steve Lenk, Cognitive Energy Systems, Fraunhofer IOSB-AST, Germany

3 Coordination Strategies for Electric Vehicle Chargers Integration in Electrical Grids *(IP)*
Cesar Diaz-Londono, DEIB, Politecnico di Milano, Italy|Giambattista Gruosso, Deib, Politecnico di Milano, Italy|Paolo Maffezzoni, Deib, Politecnico di Milano, Italy|Luca Daniel, MIT, MIT, United States

4 Flexible artificial intelligence optimization for smart home energy systems with V2X *(IP)*
Florian Rippstein, AST, Fraunhofer IOSB, Germany|Steve Lenk, AST, Fraunhofer IOSB, Germany|Martin Rudolph, AST, Fraunhofer IOSB, Germany|Stefan Klaiber, AST, Fraunhofer IOSB, Germany|Peter Bretschneider, AST, Fraunhofer IOSB, Germany

5 Development of a short circuit simulation tool for railway DC electric traction infrastructure *(IP)*
Alejandro Palma, Electrical Engineering, Universidad de Oviedo, Spain|Francisco Torresano, CAF TE, CAF , Spain|Pablo Arboleya, Lemur Research Group, University of Oviedo, Spain

Wednesday, 2 November 2022, 10:45-12:25, Room 205

Session 3 - RT3, Vehicular Electronics and Intelligent Transportation Systems I

Chairs: Razieh Ghaderi (UQTR, Canada) *and Abraham Kebede (VUB, Belgium)*

1 Speed planning for connected and automated vehicles in urban scenarios using deep reinforcement learning *(V)*
Jie Li, School of Mechanical Engineering, Shanghai Jiaotong University, China|Xiaodong Wu, School of Mechanical Engineering, Shanghai Jiaotong University, China|Jiawei Fan, SJTU-ParisTech Elite Institute of Technology, Shanghai Jiaotong University, China

2 Vehicle Teleoperation: Successive Reference-Pose Tracking to Improve Path Tracking and to Reduce Time-Delay Induced Instability *(V)*
Jai Prakash, Department of Mechanical Engineering, Politecnico Di Milano, Italy|Michele Vignati, Department of Mechanical Engineering, Politecnico Di Milano, Italy|Edoardo Sabbioni, Department of Mechanical Engineering, Politecnico Di Milano, Italy|Federico Cheli, Department of Mechanical Engineering, Politecnico Di Milano, Italy

3 Optimal control of a long haul automated articulated vehicle for tyre wear minimisation *(V)*
Georgios Papaioannou, The Centre for ECO2 Vehicle Design, KTH Royal Institute of Technology, Sweden|Vallan Marroof, Department Engineering Mechanics, KTH Royal Institute of Technology, Stockholm, Sweden, Sweden|Jenny Jerrelind, Department Engineering Mechanics, KTH Royal Institute of

Technology, Stockholm, Sweden, Sweden|Lars Druggu, Department Engineering Mechanics, KTH Royal Institute of Technology, Stockholm, Sweden, Sweden

4 A Lyapunov Optimization Approach to the Quality of Service for Electric Vehicle Fast Charging Stations *(V)*
Mohammad Hossein Abbasi, Automotive Engineering, Clemson University, United States|Jiangfeng Zhang, Automotive Engineering, Clemson University, United States|Venkat Krovi, Automotive Engineering, Clemson University, United States

5 A sorting method of retired lithium-ion batteries using the improved k-means algorithm based on the incremental capacity curve *(V)*
Zuhang Chen, School of Rail Transportation, Soochow University, China|Yelin Deng, School of Rail Transportation, Soochow University, China|Honglei Li, School of Mechanical Engineering, Dalian University of Technology, China|Weiwei Liu, School of Mechanical Engineering, Dalian University of Technology, China

Wednesday, 2 November 2022, 10:45-12:25, Room 225

Session 4 - RT8, Electric Railway I

Chairs: *Josu Amondarain (Ikerlan, Spain)*

1 Distributed PI Control Design for Ground--Aerial Cooperative Vehicle Tracking *(V)*
Dinh Hoa Nguyen, Institute of Mathematics for Industry (IMI), International Institute for Carbon-Neutral Energy Research, Japan|Hung Dinh Nguyen, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, Singapore

2 Pole Pitch Optimization of Permanent Magnet Electrodynamic Suspensions in High-Speed Transportation Systems *(V)*
Louis Beauloye, Institute of Mechanics, Materials and Civil Engineering (IMMC), Université catholique de Louvain (UCLouvain), Belgium|Bruno Dehez, Institute of Mechanics, Materials and Civil Engineering (IMMC), Université catholique de Louvain (UCLouvain), Belgium

3 Parameter optimization for three-level inverter model Predictive control based on artificial neural network *(V)*
Cheng Li , Center for Basic Research and Platform Dept., CRRC ZhuZhou Institude CO., LTD., China

4 An Improved Model Predictive Control for Three-level inverter *(V)*
Zhaohui Wang, Electric Drive Control Technology Department, CRRC ZhuZhou Institude CO., LTD., China

5 The research of levitation control method based on acceleration feedback linearization *(V)*
Chen Qihui, Drive control department, CRRC zhuzhou institute, China|Hou Zhaowen, Drive control department, CRRC zhuzhou institute, China|Gan Weiwei, Drive control department, CRRC zhuzhou institute, China|Guo Wei, Drive control department, CRRC zhuzhou institute, China|Xu Yijing, Drive control department, CRRC zhuzhou institute, China|Chen Ke, Drive control department, CRRC zhuzhou institute, China

Wednesday, 2 November 2022, 1:45-3:25, Room 105

Session 5 - RT7, Hydrogen Fuelling Infrastructures and Fuel Cell Vehicles I

Chairs: Abel Chuang (UC Merced, USA) and Nadia Steiner (U. Franche-Comte, France)

1 Evaluation of High-Efficiency Hydrogen Production from Solar Energy using Artificial Neural Network at the Université du Québec à Trois-Rivières *(IP)*
Ashkan Makhsoos, Institute for Hydrogen Research(IRH), Université du Québec à Trois-Rivières, Canada|Mohsen Kandidayeni, Electrical and Computer Engineering, University of Sherbrooke, Canada|Loïc Boulon, Institute for Hydrogen Research(IRH), Université du Québec à Trois-Rivières, Canada|Bruno G. Pollet, Institute for Hydrogen Research(IRH), Université du Québec à Trois-Rivières , Canada|Sousso Kelouwani, Institute for Hydrogen Research(IRH), Université du Québec à Trois-Rivières, Canada

2 Fuel Cell Ageing Prediction and Remaining Useful Life Forecasting *(IP)*
Karem BenChikha, Department of Electrical Engineering, Université du Québec à Trois-Rivières, Canada|Mohsen Kandidayeni, Department of Electrical and Computer Engineering, Université de Sherbrooke, Canada|Ali Amamou, Hydrogen Research Institute, Université du Québec à Trois-Rivières, Canada|Sousso Kelouwani, Department of Mechanical Engineering, Université du Québec à Trois-Rivières, Canada|Kodjo Agbossou, Hydrogen Research Institute, Université du Québec à Trois-Rivières, Canada|Afef Bennani Ben Abdelghani, Department of Electrical Engineering, University of Carthage, Tunisia

3 An Online Energy Management Strategy For Multi-Fuel Cell Stacks Systems Using Remaining Useful Life Prognostic *(IP)*
Wabi Réné BANKATI, Department of Electrical and Computer Engineering, Hydrogen Research Institute, Université du Québec à Trois-Rivières, Canada; FEMTO-ST Institute, FCLAB, Univ. Bourgogne Franche-Comté, CNRS, France, France|Alvaro Macias, Department of Electrical and Computer Engineering, Hydrogen Research Institute Université du Québec à Trois-Rivières, Canada|Mehdi Soleymani, Department of Electrical and Computer Engineering, Hydrogen Research Institute Université du Québec à Trois-Rivières, Canada|Loïc Boulon, Department of Electrical and Computer Engineering, Hydrogen Research Institute Université du Québec à Trois-Rivières, Canada|Samir Jemei, Energy Department, FEMTO-ST Institute, FCLAB Univ. Bourgogne Franche-Comté CNRS, France, France

4 Power Allocation of an Electrified Vehicle Based on Blended Reinforcement Learning With Fuzzy Logic *(IP)*
Razieh Ghaderi, Electrical and Computer Engineering, Université du Québec à Trois-Rivières, Canada|Mohsen Kandidayeni, Electrical and Computer Engineering, University of Sherbrooke, Canada|Loïc Boulon, Electrical and Computer Engineering, Université du Québec à Trois-Rivières, Canada|João Pedro F. Trovão, Electrical and Computer Engineering, University of Sherbrooke, Canada

5 Proton Exchange Membrane Fuel Cell Signal-Based Diagnostics Using Empirical Fourier Transform *(IP)*
Abderazek CHEIKH, Department of Energy, FEMTO-ST Institute, FCLAB Univ. Bourgogne Franche-Comte CNRS,, France|Nadia Yousfi Steiner, Department of Energy, FEMTO-ST Institute, FCLAB Univ. Bourgogne Franche-Comte CNRS,, France|Elodie Pahon, Department of Energy, FEMTO-ST Institute, FCLAB Univ. Bourgogne Franche-Comte CNRS,, France|Michel Benne, HSE, IUT

de La Réunion, Energy-Lab, Univ Reunion, France|Daniel Hissel, Department of Energy, FEMTO-ST Institute, FCLAB Univ. Bourgogne Franche-Comte CNRS,, France|Cedric Damour, Department of HSE, IUT de La Réunion, Energy-Lab,Univ Reunion, France

Wednesday, 2 November 2022, 1:45-3:25, Room 110

Session 6 - RT5, Modelling, Analysis and Simulation of Electrified Vehicles I

Chairs: Antti Lajunen (U. Helsinki, Finland) and Giambatista Gruosso (POLIMI, Italy)

1 Optimal control of aftertreatment electric heaters for mild hybrid vehicles during cold start *(IP)*
Alexis Benaitier, Christian Doppler Laboratory, TU Wien, Austria|Christoph Hametner, Christian Doppler Laboratory, TU Wien, Austria|Ferdinand Krainer, Powertrain Engineering, AVL list GmbH, Austria|Stefan Jakubek, Institute of Mechanics and Mechatronics, TU Wien, Austria

2 A Novel Hydrogen-Based Thermal Management System for an Electric Helicopter *(IP)*
David Filusch, TUM School of Engineering and Design , Technical University of Munich (TUM), Germany|Jonas Zucker, -, Siemens Energy AG, Germany|Hans-Georg Herzog, TUM Schoolt of Engineering and Design (ED), Technical University of Munich (TUM), Germany

3 An analytical model to optimize the powertrain sizing of Fuel Cell Hybrid Electric Vehicles *(IP)*
Daniel Carlos da Silva, Mobility and Systems, IFP Energies nouvelles, France|Laid Kefsi, Mobility and Systems, IFP Energies nouvelles, France|Antonio Sciarretta, Digital Science and Technology, IFP Energies nouvelles, France

4 Developing a Mesoscopic Energy Consumption Model for Battery Electric Trucks Using Real-World Diesel Truck Driving Data *(IP)*
Chao Wang, CECERT, University of California Riverside, United States|Peng Hao, CECERT, University of California Riverside, United States|Kanok Boriboonsomsin, CECERT, University of California Riverside, United States|Matthew Barth, CECERT, University of California Riverside, United States

5 Simulation of energy efficiency and performance of electrified powertrains in agricultural tractors *(IP)*
Antti Lajunen, Department of Agricultural Sciences, University of Helsinki, Finland

Wednesday, 2 November 2022, 1:45-3:25, Room 205

Session 7 - RT4, Control and Energy Management of Electrified Vehicles I

Chairs: Diego Iannuzzi (U. Naples, Italy) and Pablo Arboleya (U. Oviedo, Spain)

1 Control of Over-Actuated Systems - From Practical to Theoretical Concepts with Application in Hybrid Powertrain Speed Control Development *(V)*
Louis Filipozzi, Mechanical and Aerospace Engineering, UC Davis, United States|Francis Assadian, Mechanical and Aerospace Engineering, UC Davis, United States

2 Component Sizing Optimization of 48V Electric Drivetrain for Urban-Sized Zero-Emissions Last-Mile Delivery and Services Vehicles *(V)*
Amin GHADIRZADEH, ETEC, Vrije Universiteit Brussel, Belgium|Dai-Duong Tran, ETEC, Vrije Universiteit Brussel, Belgium|Mohamed El-Baghdadi, ETEC, Vrije Universiteit Brussel, Belgium|Omar Hegazy, ETEC, Vrije Universiteit Brussel, Belgium

3 Experimental Validation of Online Motion Planning for Semi-Autonomous Vehicles *(V)*
Christoph Winter, Institute of System Dynamics and Control, German Aerospace Center (DLR), Germany|Ricardo de Castro, Department of Mechanical Engineering, University of California, Merced, United States|Tilman Bünte, Institute of System Dynamics and Control, German Aerospace Center (DLR), Germany

4 Motion control and power coordination of electric propulsion and braking distributed on multiple axles on heavy vehicles *(V)*
Sachin Janardhanan, Mechanics and Maritime Sciences, Chalmers University of Technology, Sweden|Leo Laine, Group Trucks Technology, Volvo Group AB, Sweden|Mats Jonasson, Mechanics and Maritime Sciences, Chalmers University of Technology, Sweden|Bengt Jacobson, Mechanics and Maritime Sciences, Chalmers University of Technology, Sweden|Esteban Gelso, Group Trucks Technology, Volvo Group AB, Sweden

5 Energy-efficient power-split control of heterogeneous connected HEVs on urban conditions *(V)*
Jie Luo, College of Information Engineering, Zhejiang University of Technology, China

Wednesday, 2 November 2022, 1:45-3:25, Room 225

Session 8 - RT2, Power Electronics, Motor Drives and Electric Power Systems I

Chairs: Andreas Gerlach (OVGU, Germany) and Ronan German (U. Lille, France)

1 DB-DTFC for PMSM in the Stationary Reference Frame Using Reference Flux Vector Calculator *(V)*
Yuefei Zuo, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore|Chenhao Zhao, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore|Huanzhi Wang, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore|Shuangchun Xie, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore|Boon Siew Han, Schaeffler Hub for Advanced Research at NTU, Schaeffler (Singapore) Pte Ltd, Singapore|Chi Cuong Hoang, Schaeffler Hub for Advanced Research at NTU, Schaeffler (Singapore) Pte Ltd, Singapore|Chok-You Chan, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore|Christopher H. T. Lee, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore

2 N-level GaN Transistor Model for Fast Simulation of Electric Vehicle based Power Electronics Systems *(V)*
Mattea Eckstein, C-ALPS, Coventry University, United Kingdom|Ke Li, PEMC group, University of Nottingham, United Kingdom

3 A New Flux-Concentrating Rotor of Double Stator and Single Rotor Axial Flux Permanent Magnet Motor for Electric Vehicle Traction Application *(V)*
Shirong Ge, School of Automation, Nanjing University of science and technology, China|Weiwei Geng, School of Automation, Nanjing University of science and technology, China|Qiang Li, School of Automation, Nanjing University of science and technology, China

4 A Stator Yokeless Radial Flux Dual Rotor Permanent Magnet Synchronous Motor *(V)*
Minglei Yang, School of Automotive Studies, Tongji university, China|Zaimin Zhong, School of Automotive Studies, Tongji university, China|Qinglong Wang, School of Automotive Studies, Tongji university, China|Zhongshu Shao, School of Automotive Studies, Tongji university, China

5 Current Harmonic Suppression for High-speed Air Compressor based on Improved Discrete-time Current Controller and LC Filter *(V)*
Yuan Zhu, School of Automotive Studies, Tongji University, China|Mingkang Xiao, School of Automotive Studies, Tongji University, China|Ling Meng, School of Automotive Studies, Tongji University, China|Ke Lu, School of Automotive Studies, Tongji University, China|Zhihong Wu, School of Automotive Studies, Tongji University, China

Wednesday, 2 November 2022, 4:00-6:00, Room 105

Session 9 - SS7, Design and Testing Technologies for Next Generation Electric Vehicle Components

Chairs: Valentin Ivanov (TU Ilmenau, Germany) and Jian-Qiao Sun (UC Merced, USA)

1 Brake Blending Design Using Distributed and Shared X-in-the-loop Test Environment *(IP)*
Valentin Ivanov, Automotive Engineering Group, TU Ilmenau, Germany|Viktar Beliautsou, Automotive Engineering Group, TU Ilmenau, Germany|Viktor Schreiber, Automotive Engineering Group, TU Ilmenau, Germany|Marius Heydrich, Automotive Engineering Group, TU Ilmenau, Germany|Elizaveta Gramstat, Virtual Driving Testing, EFS, Germany|Sebastian Gramstat, Development Foundation Brake, AUDI AG, Germany

2 Energy Regeneration of Active Suspension System in Fuel Cell Vehicles *(IP)*
Mehdi Soleymani, Mechanical Engineering, UQTR, Canada|Arash Khalatbarisoltani, Electrical Engineering, UQTR, Canada|Mohsen Kandidayeni, Electrical Engineering, UQTR, Canada|Loic Boulon, Electrical Engineering, UQTR, Canada|Sousso Kelouwani, Mechanical Engineering, UQTR, Canada

3 Defensive driving of autonomous vehicles in mixed traffic *(IP)*
X. Li, University of California, Merced, USA|J. Sun, University of California, Merced, USA

4 Validation of Integrated EV Chassis Controller Using a Geographically Distributed X-in-the-loop Network *(IP)*
Viktar Beliautsou, Automotive Engineering Group, TU Ilmenau, Germany|Jesus Alfonso, Mechatronics Dept., Instituto Tecnologico de Aragon, Spain|Joris Giltay, Dept. of Cognitive Robotics, Delft University of Technology, Netherlands|Florian Büchner, Automotive Engineering Group, TU Ilmenau, Germany|Barys Shyrokau, Dept. of Cognitive Robotics, Delft University of Technology, Netherlands|Jose A. Castellanos, Instituto de Investigación en Ingeniería de Aragón, Universidad de Zaragoza, Spain|Valentin Ivanov, Automotive Engineering Group, TU Ilmenau, Germany

5 Hardware in the Loop testing of an LQR based lateral stability control
Federico Alfatti, DIEF, Dipartimento di Ingegneria Industriale, Università degli Studi di Firenze, Italy|Margherita Montani, DIEF, Dipartimento di Ingegneria Industriale, Università degli studi di Firenze, Italy|Tommaso Favilli, DIEF, Dipartimento di Ingegneria Industriale, Università degli Studi di Firenze, Italy|Luca Pugi, DIEF, Dipartimento di Ingegneria Industriale, Università degli Studi di Firenze, Italy|Claudio Annicchiarico, -, Meccanica 42 S.r.l., Italy|Renzo Capitani, DIEF, Dipartimento di Ingegneria Industriale, Università degli Studi di Firenze, Italy

6 Energy Efficiency Assessment for an Ultra-Fast Charging Station *(IP)*
Ciro Attaianese, Department of Electrical Engineering and Information Technology, University of Naples Federico II, Italy|Antonio Di Pasquale, Department of Electrical Engineering and Information Technology, University of Naples Federico II, Italy|Emanuele Fedele, Department of Electrical Engineering and Information Technology, University of Naples Federico II, Italy|Diego Iannuzzi, Department of Electrical Engineering and Information Technology, university of Naples Federico II , Italy|Mario Pagano, Department of Electrical Engineering and Information Technology, university of Naples Federico II , Italy|Mattia Ribera, Department of Electrical Engineering and Information Technology, university of Naples Federico II, Italy

Wednesday, 2 November 2022, 4:00-6:00, Room 110

Session 10 - SS10, IEEE VTS Motor Vehicles Challenge

Chairs: Loic Boulon (UQTR Canada) and Minh C. Ta (U. Sherbrooke, Canada)

1 IEEE VTS Motor Vehicles Challenge 2023: A Multi-physical Benchmark Problem for Next Generation Energy Management Algorithms *(V)*
Jonathan Brembeck, Institute of System Dynamics and Control (SR), German Aerospace Center (DLR), Germany|Ricardo de Castro, Department of Mechanical Engineering, University of California Merced, United States|Jakub Tobolár, Institute of System Dynamics and Control (SR), German Aerospace Center (DLR), Germany|Iman Ebrahimi, Department of Mechanical Engineering, University of California Merced, United States

2 Optimal Sizing and Management of a Hybrid Energy Storage System for Full-Electric Vehicles *(IP)*
Alessandro Serpi, Department of Electrical and Electronic Engineering, University of Cagliari, Italy|Mario Porru, Department of Electrical and Electronic Engineering, University of Cagliari, Italy

3 Recurrent Neural Network-based Predictive Energy Management for Hybrid Energy Storage System of Electric Vehicles *(V)*
Jingda Wu, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore|Zhiyu Huang, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore|Chen Lv, School of Mechanical and

Aerospace Engineering, Nanyang Technological University, Singapore

4 Sizing and Energy Management Strategy of a Hybrid Energy Storage System for EVs *(IP)*
Edoardo Ferri, DEIB, Politecnico di Milano, Italy|Marzio Barresi, DEIB, Politecnico di Milano, Italy|Silvia Colnago, DEIB, Politecnico di Milano, Italy

5 Use of supercapacitors to enhance the lifetime and efficiency of road vehicle batteries *(V)*
Davide del Giudice, DEIB, Politecnico di Milano, Italy|Davide De Simone, DEIB, Politecnico di Milano, Italy|Luigi Piegari, DEIB, Politecnico di Milano, Italy

6 Sizing of Battery/Supercapacitor Hybrid Energy Storage System for Electric Vehicles *(IP)*
Tien Nguyen-Minh, Department of Automation Engineering, Hanoi University of Science and Technology, Vietnam|Thanh Vo-Duy, Department of Automation Engineering, Hanoi University of Science and Technology, Vietnam|B?o-Huy Nguy?n, Department of Automation Engineering, Hanoi University of Science and Technology, Vietnam|Minh C. Ta, e-TESC Laboratory, University of Sherbrooke, Canada|Joao Pedro F. Trovao, e-TESC Laboratory, University of Sherbrooke, Canada

Wednesday, 2 November 2022, 4:00-6:00, Room 205

Session 11 - SS8, Battery Diagnosis, Modelling, and Energy Management for Electric Vehicles

Chairs: Yuanyuan Xie (CSU Fresno, USA) and Daniel Hissel (U. Franche-Comte, France)

1 An Adaptive and Fast Health Estimation of Lithium-ion Batteries Under Random Missing Data *(IP)*
Safieh Bamati, Department of Electronics , Carleton University, Canada|Hicham Chaoui, Department of Electronics , Carleton University, Canada|Hamid Gualous, LUSAC Laboratory, Université de Caen Normandie, France

2 Impact of battery cell imbalance on the voltage behavior of commercial Ni-MH EV/HEV battery modules *(V)*
Piyushkumar Ahir, Mechanical Engineering, California State University Fresno, United States|Yuanyuan Xie, Mechanical Engineering, California State University Fresno, United States|Gemunu Happawana, Mechanical Engineering, California State University Fresno, United States

3 A study of the interactive effect of cathode material loss, SEI formation and lithium plating in NMC-graphite battery modeling *(IP)*
Boman Su, Department of Mechanical and Aerospace Engineering, Case Western Reserve University, United States|Chris Yuan, Department of Mechanical and Aerospace Engineering, Case Western Reserve University, United States|Olivia Cai, College of Computing, Georgia Institute of Technology, United States

4 Enabling Rapid State of Health Offline Estimation of a 48V Lithium-Ion Battery Pack *(V)*
Sara Luciani, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Italy|Pier Giuseppe Anselma, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Italy|Mario Silvagni, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Italy|Angelo Bonfitto, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Italy|Andrea Tonoli, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Italy

5 Input Excitation Optimization for Estimating Battery Electrochemical Parameters using Reinforcement Learning *(IP)*
Rui Huang, Department of Mechanical and Aerospace Engineering, University of California, Davis, United States|Jackson Fogelquist, Department of Mechanical and Aerospace Engineering, University of California, Davis, United States|Xinfan Lin, Department of Mechanical and Aerospace Engineering, University of California, Davis, United States

6 Investigating changes in transport, kinetics and heat generation over NCA/Gr-SiOx battery lifetime *(V)*
Malgorzata Wojtala, Department of Engineering Science, The University of Oxford, United Kingdom|Ferran Brosa-Planella, -, WMG University of Warwick, The Faraday Institution, United Kingdom|Alana Zülke, Department of Engineering, Lancaster University, The Faraday Institution, United Kingdom|Harry Hoster, Engineering Department, Lancaster University, The Faraday Institution, The Hydrogen and Fuel Cell Center ZBT GmbH, United Kingdom|David Howey, Department of Engineering Science, The University of Oxford, The Faraday Institution, United Kingdom

Wednesday, 2 November 2022, 4:00-6:00, Room 225

Session 12 - RT1, Energy Storage and Generation, Components and Systems II

Chairs: Tedjani Mesbahi (INSA Strasbourg, France)

1 Machine Learning Applied to Battery Prognostics based on Advanced State of Health Estimation *(V)*
Kaoutar Benlamine, ICUBE, INSA, France

2 An interlaced strategy for open circuit voltage and capacity estimation for lithium-ion batteries *(V)*
Domenico Natella, Department of Engineering , University of Sannio, Italy|Simona Onori, Energy Resources Engineering, Stanford University, United States|Francesco Vasca, Engineering, University of Sannio, Italy

3 Fast and High Resolution Expansion Measurement at an Audi e-tron Battery Cell *(V)*
Gunther Bohn, Electrical Engineering, University of Applied Sciences Würzburg-Schweinfurt, Germany|Johannes Taub, Electrical Engineering, University of Applied Sciences Würzburg-Schweinfurt, Germany|David Oeser, Technology Transfer Center for Electromobility, University of Applied Sciences Würzburg-Schweinfurt, Germany|Andreas Ziegler, Technology Transfer Center for Electromobilit, University of Applied Sciences Würzburg-Schweinfurt, Germany

4 Online Capacity Estimation of Lithium-ion Batteries by Partial Incremental Capacity Curve *(V)*
Yixiu Wang, Chemical and Biological Engineering, The University of British Columbia, Canada|Jiangong Zhu, Clean Energy Automotive Engineering Center, Tongji University, China|Liang Cao, Chemical and Biological Engineering, The University of British Columbia, Canada|Bhushan Gopaluni, Chemical and Biological Engineering, The University of British Columbia, Canada|Yankai Cao, Chemical and Biological Engineering, The University of British Columbia, Canada

5 Thermal modeling of batteries for EV energy management *(V)*

Ali ABBAS, S2ET, LICIT-ECO7, ESTACA, Gustave EIFFEL University, France|Nassim RIZOUG, S2ET, ESTACA, France|Rochdi TRIGUI, LICIT-ECO7, Gustave EIFFEL University, France|Anthony BABIN, S2ET, ESTACA, France|Eduardo REDONDO-IGLESIAS, LICIT-ECO7, Gustave EIFFEL University, France|Serge PELISSIER, LICIT-ECO7, Gustave EIFFEL University, France

6 Set-based joint state and parameter estimation of a Li-ion cell using constrained zonotopes *(V)*

Diego Locatelli, Department of Industrial and Information Engineering, University degli studi di Pavia , Italy|Giacomo Saccani, Department of Industrial and Information Engineering, Università degli studi di Pavia , Italy|Brenner Santana Rego, Department of Electronics Engineering, Federal University of Minas Gerais (UFMG), Brazil|Guilherme Raffo, Department of Electronics Engineering, , Federal University of Minas Gerais (UFMG), Brazil|Davide Martino Raimondo, Department of Industrial and Information Engineering, Università degli studi di Pavia, Italy

Thursday, 3 November 2022

Thursday, 3 November 2022, 10:45-12:25, Room 105

Session 13 - RT4, Control and Energy Management of Electrified Vehicles II

Chairs: James Palko (UC Merced, USA) and Diego Iannuzzi (U. Naples, Italy)

1 Battery temperature aware equivalent consumption minimization strategy for mild hybrid electric vehicle powertrains *(IP)*
Matteo Acquarone, Department of Energy "Galileo Ferraris" (DENERG), Politecnico di Torino, Italy|Pier Giuseppe Anselma, Department of Mechanical and Aerospace Engineering (DIMEAS), Politecnico di Torino, Italy|Federico Miretti, Department of Energy "Galileo Ferraris" (DENERG), Politecnico di Torino, Italy|Daniela Anna Misul, Department of Energy "Galileo Ferraris" (DENERG), Politecnico di Torino, Italy

2 Energy Management Strategy with Adaptive Cut-off Frequency for Hybrid Energy Storage System in Electric Vehicles *(IP)*
Yasser Ghoulam, Electrical Engineering, INSA Strasbourg, France|Thomas Pavot, Electrical Engineering, INSA Strasbourg, France|Lakhdar Mamouri, Electrical Engineering, Unistra, France|Tedjani Mesbahi, Electrical Engineering, INSA Strasbourg, France|Sylvain Durand, Electrical Engineering, INSA Strasbourg, France|Christophe Lallement, Electrical Engineering, INSA Strasbourg, France|Renaud Kiefer, Electrical Engineering, INSA Strasbourg, France|Edouard Laroche, Electrical Engineering, INSA Strasbourg, France

3 Design and Testing of Wireless EV Charging System with Improved Lateral Misalignment Tolerance *(IP)*
Mustafa Abdulhameed, Department of Electrical Engineering, American University of Sharjah, United Arab Emirates|Eiman ElGhanam, Department of Electrical Engineering, American University of Sharjah, United Arab Emirates|Ahmed H. Osman, Department of Electrical Engineering, American University of Sharjah, United Arab Emirates|Mohamed S. Hassan, Department of Electrical Engineering, American University of Sharjah, United Arab Emirates *(IP)*

4 Reinforcement Learning-based Controller for Thermal Management System of Electric Vehicles
Wansik Choi, School of Mechanical Engineering, Pusan National University, South Korea|Jae Woong Kim, Total Thermal Management Research Lab, Hyundai Motor Company, South Korea|Changsun Ahn, School of Mechanical Engineering, Pusan National University, South Korea|Juhui Gim, School of Electrical Electronics and Control Engineering, Changwon National University, South Korea

5 Range Extension of Battery Electric Trucks in Drayage Operations with Wireless Opportunity Charging at Port Terminals *(IP)*
Fuad Un-Noor, Center for Environmental Research and Technology, University of California, Riverside, United States|Alexander Vu, Center for Environmental Research and Technology, University of California, Riverside, United States|Shams Tanvir, Civil and Environmental Engineering, California Polytechnic State University, United States|Zhiming Gao, National Transportation Research Center, Oak Ridge National Laboratory, United States|Matt Barth, Center for Environmental Research and Technology, University of California, Riverside, United States|Kanok Boriboonsomsin, Center for Environmental Research and Technology, University of California, Riverside, United States

Thursday, 3 November 2022, 10:45-12:25, Room 110

Session 14 - RT2, Power Electronics, Motor Drives and Electric Power Systems II

Chairs: Ranya Badawi (Oakland Uni., USA) and Ronan German (U. Lille, France)

1 PMSM with Hall Sensors- Which Control Method: Field-Oriented Control or Block Commutation? *(IP)*
Andreas Gerlach, Electric Drives, Electric Power Systems, Germany|Roberto Leidhold, Electric Drives, Electric Power Systems , Germany

2 Core Loss Distribution in a Switched Reluctance Motor – Linear and Nonlinear Analysis *(IP)*
Pedro Melo, Electrical Engineering, School of Engineering, Polytechnic of Porto , Portugal|Rui Araújo, Electrical Engineering, INESC TEC and Faculty of Engineering, University of Porto , Portugal

3 Analysis of Total DC-Bus Current in Single-Pulse-Operated Switched Reluctance Machine Drive *(IP)*
Anupam Verma, Electrical Engineering, Indian Institute of Science, India|Gopalaratnam Narayanan, Electrical Engineering, Indian Institute of Science, India

4 Transient Thermal Lumped Parameter Model of an Electrical Excited Synchronous Machine with Forced Air Cooling for Shape Optimization *(IP)*
Hagen Spielmann, Institute of Vehicle Concepts, German Aerospace Center (DLR), Germany

5 Modeling and Speed Control for a Doubly-Salient Special Machine Employing a High-Fidelity Plant Model *(IP)*
Chandra Sekhar Goli, Electrical and Computer Engineering, University of North Carolina at Charlotte, United States|Somasundaram Essakiappan, Research and Development, QM Power Inc, United States|James Gafford, Energy Production & Infrastructure Center, University of North Carolina at Charlotte, United States|Dan M Ionel, Electrical and Computer Engineering, University of Kentucky, United States|Madhav Manjrekar, Electrical and Computer Engineering, University of North Carolina at Charlotte, United States|Nakul Shah, Research and Development , QM Power Inc, United States

Thursday, 3 November 2022, 10:45-12:25, Room 205

Session 15 - RT5, Modelling, Analysis and Simulation of Electrified Vehicles II

Chairs: Giambatista Gruosso (POLIMI, Italy) and Valentin Ivanov (TU Ilmenau, Germany)

1 Adaptive LQR Control for a Rear-Wheel Steering Battery Electric Vehicle *(V)*
Eugenio Tramacere, Center for Automotive Research and Sustainable mobility (CARS), Politecnico di Torino, Italy|Luis Miguel Molina Castellanos, Center for Automotive Research and Sustainable mobility (CARS), Politecnico di Torino, Italy|Nicola

Amati, Center for Automotive Research and Sustainable mobility (CARS), Politecnico di Torino, Italy|Andrea Tonoli, Center for Automotive Research and Sustainable mobility (CARS), Politecnico di Torino, Italy|Angelo Bonfitto, Center for Automotive Research and Sustainable mobility (CARS), Politecnico di Torino, Italy

2 Modeling of the Thermal Energy Management System for Battery Electric Vehicles *(V)*
Prashant Lokur, Electrical Engineering , Chalmers University of Technology , Sweden|Kristian Nicklasson, Energy and Thermal Management, China Euro Vehicle Technology, Sweden|Leo Verde, Energy and Thermal Management, China Euro Vehicle Technology, Sweden|Mikael Larsson , Energy and Thermal Management , China Euro Vehicle Technology, Sweden|Nikolce Murgovski, Electrical Engineering, Chalmers University of Technology , Sweden

3 Drag force parameters identification for a cargo-bike based on free deceleration measurement *(V)*
Bastien Collette, AME, Gustave Eiffel University, France|Emmanuel Vinot, AME, Gustave Eiffel UNiversity, France|Pierre-Olivier Vandanjon, AME, Gustave Eiffel University, France

4 Reinforcement Learning-Based Energy Management System Enhancement Using Digital Twin for Electric Vehicles *(V)*
Yiming Ye, Department of Automotive Engineering, Clemson University, United States|Bin Xu, School of Aerospace and Mechanical Engineering, University of Oklahoma , United States|Jiangfeng Zhang, Department of Automotive Engineering, Clemson University, United States|Benjamin Lawler, Department of Automotive Engineering, Clemson University, United States|Beshah Ayalew, Department of Automotive Engineering, Clemson University, United States

5 Battery Pack Cell Balancing using Topology Switching and Machine Learning *(V)*
Yuqin Weng, Electrical and Computer Engineering, Marquette University, United States|Cris Ababei, Electrical and Computer Engineering, Marquette University, United States

Thursday, 3 November 2022, 10:45-12:25, Room 225

Session 16 - SS6, Vehicle Dynamics Control and State Estimation Techniques for Over-actuated Vehicles

Chairs: Lenzo, Basilio (U. Padova, Italy) and José Rosado (ISEC, Portugal)

1 Driver-in-the-Loop Simulation to Assess Steering Torque Feeling due to Torque Vectoring Control *(V)*
Michele Asperti, Mechanical Engineering, Politecnico di Milano, Italy|Michele Vignati, Mechanical Engineering, Politecnico di Milano, Italy|Edoardo Sabbioni, Mechanical Engineering, Politecnico di Milano, Italy

2 Reviewing control allocation using quadratic programming for motion control and power coordination of battery electric vehicles *(V)*
Sachin Janardhanan, Mechanics and Maritime Sciences, Chalmers University of Technology, Sweden|Esteban Gelso, Group Trucks Technology, Volvo Group AB, Sweden|Leo Laine, Group Trucks Technology, Volvo Group AB, Sweden|Mats Jonasson, Mechanics and Maritime Sciences, Chalmers University of Technology, Sweden|Bengt Jacobson, Mechanics and Maritime Sciences, Chalmers University of Technology, Sweden

3 Tire Force Allocation with Different Vertical Load Estimation Methods for 4WID-4WIS Vehicles *(V)*
Runfeng Li, School of Vehicle and Mobility, Tsinghua University, China|Yiwen Sun, School of Vehicle and Mobility, Tsinghua University, China|Ziwang Lu, School of Vehicle and Mobility, Tsinghua University, China|Guangyu Tian, School of Vehicle and Mobility, Tsinghua University, China

4 Azimuthal localization of a ground stationary target using Doppler and comparison with antenna-based phase method *(V)*
Ashish Mishra, Radar Development, Veoneer US, LLC, United States|Michael Paradie, Radar Development, Veoneer US, LLC, United States|Stephen Osgood, Radar Development, Veoneer US, LLC, United States

5 Improved Vehicle Dynamics performance using In-Wheel Motor Torque Vectoring and Electromechanical Active Suspension Roll Damping
Nick De Bie, MotionS, Flanders Make VZW, Belgium|Jeroen Geysen, MotionS, Flanders Make VZW, Belgium|Bernhard E. Westerhof, MotionS, Flanders Make VZW, Belgium|Jasper De Smet, MotionS, Flanders Make VZW, Belgium

Thursday, 3 November 2022, 1:45-3:25, Room 105

Session 17 - RT6, Charging Systems and Infrastructures II

Chairs: Joao Trovao (U. Sherbrooke, Canada) and Karl Schwenk (KIT, Germany)

1 En-Route Opportunity Charging for Heavy-Duty Battery Electric Trucks in Drayage Operations: Case Study at the Southern California Ports *(IP)*
Jacqueline Garrido, Department of Electrical and Computer Engineering, University of California, Riverside, United States|Emmanuel Hidalgo, Department of Electrical and Computer Engineering, University of California, Riverside, United States|Matthew Barth, Department of Electrical and Computer Engineering, University of California, Riverside, United States|Kanok Boriboonsomsin, CE-CERT, Center for Environmental Research and Technology, United States

2 EVCCS: Realistic Simulation Framework for Electric Vehicle Commute and Charge *(IP)*
Sushil Poudel, Department of Computer Science, Tennessee Technological University, United States|Mahmoud Abouyoussef , Department of Computer Science, Tennessee Technological University, United States|Muhammad Ismail, Department of Computer Science, Tennessee Technological University Cookeville, United States

3 Effect of Battery/Supercapacitor Hybrid Storage System on Battery Voltage in Electric Vehicles *(IP)*
Chi Nguyen, e-TESC Lab, Université de Sherbrooke, Canada|Bao-Huy Nguyen, School of Electrical and Electronic Engineering, Hanoi University of Science and Technology, Vietnam|Joao Trovao, e-TESC Lab, Université de Sherbrooke, Canada|Minh Ta, e-TESC Lab, Université de Sherbrooke, Canada

4 IEVCC - A Mesh Managed Network for Electric Vehicle Charging *(IP)*

Filipe Cardoso, ESTGV, Polytechnic Viseu , Portugal|Pedro Baptista, ESTGV, Polytechnic Viseu, Portugal|Marco Silva, DEE, IPC - Instituto Superior de Engenharia de Coimbra, Portugal|Filipe Caldeira, ESTGV, Polytechnic Viseu, Portugal|José Rosado, DEIS, IPC - Instituto Superior de Engenharia de Coimbra, Portugal

5 Modelling of power flow and losses in a conductive Electric Road System *(IP)*

David Wenander, Faculty of Engineering, Lund University, Sweden|Francisco J. Márquez-Fernández, Faculty of Engineering, Lund University, Sweden|Mats Alaküla, Faculty of Engineering, Lund University, Sweden

Thursday, 3 November 2022, 1:45-3:25, Room 110

Session 18 - RT3, Vehicular Electronics and Intelligent Transportation Systems II

Chairs: Kulhandjian, Hovannes (CSU Fresno, USA) and Lenzo, Basilio (U. Padova, Italy)

1 Real-time implementation of yaw rate and sideslip control through individual wheel torques *(IP)*

Mariagrazia Tristano, Engineering and Mathematics, Sheffield Hallam University, United Kingdom|Basilio Lenzo, Industrial Engineering, Università di Padova, Italy|Xu Xu, Engineering and Mathematics, Sheffield Hallam University, United Kingdom|Bart Forrier, TSVT Division, Siemens Digital Industries Software, Belgium|Thomas D'hondt, TSVT Division, Siemens Digital Industries Software, Belgium|Enrico Risaliti, TSVT Division, Siemens Digital Industries Software, Belgium|Erik Wilhelm, Research division, Kyburz, Switzerland

2 Smart Traffic Light Controller using Visible Light Communications *(IP)*

Hovannes Kulhandjian, Electrical and Computer Engineering, California State University, Fresno, United States|Wyatt Greives, Electrical and Computer Engineering, California State University, Fresno, United States|Michel Kulhandjian, Electrical and Computer Engineering, Rice University, United States

3 Design and Control of a Partially 3D Printed Valve Actuator for a Free Piston Engine *(IP)*

Andreas Gerlach, Electric Drives, Electric Power Systems , Germany|Thomas Schallschmidt, Electric Drives, Electric Power Systems , Germany|Mario Stamann, Electric Drives, Electric Power Systems , Germany

4 Drowsy Driver Detection Using Deep Learning and Multi-Sensor Data Fusion *(IP)*

Hovannes Kulhandjian, Electrical and Computer Engineering, California State University, Fresno, United States|Nicolas Martinez, Electrical and Computer Engineering, California State University, Fresno, United States|Michel Kulhandjian, Electrical and Computer Engineering, Rice University, United States

5 Versatile Safe Autonomous Intersection Management Protocol for Heterogeneous Connected Vehicles *(V)*

Ashkan Gholamhosseinian, Electrical Engineering and Information Technology, Technische Universität Ilmenau, Germany|Jochen Seitz, Electrical Engineering and Information Technology, Technische Universität Ilmenau, Germany

Thursday, 3 November 2022, 1:45-3:25, Room 205

Session 19 - SS13, EMR and Other Graphical Descriptions

Chairs: Bouscayrol, Alain (U. Lille, France) and Anatole Desreveaux (U. Paris Saclay, France)

1 Analysis of Power Flows in a DC Railway System with Hardware-in-the-Loop Simulation *(IP)*

Ryan O. Berriel, LEP, L2EP - Univ. Lille, France|David Ramsey, LEP, L2EP - Univ. Lille, France|Lauro Ferreira, LEP, L2EP - Univ. Lille, France|Alain Bouscayrol, LEP, L2EP - Univ. Lille, France|Philippe Delarue, LEP, L2EP - Univ. Lille, France|Charles Brocart, Transport, Métropole Européenne de Lille, France

2 Fast Computational Dynamic Model of Traction Drive for Electric Vehicles *(IP)*

Anatole Desreveaux, Group of electrical engineering of Paris, University Paris Saclay - Centrale Supelec, France|Eric Laboure, Group of electrical engineering of Paris, University Paris Saclay - Centrale Supelec, France|Olivier Bethoux, Group of electrical engineering of Paris, Sorbonne Universite, France|Clement Mayet, SATIE, Conservatoire National des Arts et Metiers (CNAM), France|Alessio Iovine, Laboratory of Signals and Systems, University Paris Saclay - Centrale Supelec, France|William Pasillas-Lepine, Laboratory of Signals and Systems, University Paris Saclay - Centrale Supelec, France|Francis Roy, Automotive Research and advanced engineering, Stellantis, France

3 HiL Testing of a High C-Rate Battery For the Nissan Leaf *(IP)*

Salma FADILI, L2EP, University of Lille, France|Ronan GERMAN, L2EP, University of Lille, France|Alain Bouscayrol, L2EP, University of Lille, France

4 Passive Coupling of Batteries and Supercapacitors Based on Module-Scaled Models *(V)*

Théo Lenoir, GEGI, University of Sherbrooke, Canada|Pascal Messier, GEGI, University of Sherbrooke, Canada|João Pedro Trovão, GEGI, University of Sherbrooke, Canada|Félix-A. Lebel, GEGI, University of Sherbrooke, Canada

5 Steering Vector Control for Lateral Force Distribution of Electric Vehicles *(IP)*

An-Toan Nguyen, Electrical and Computer Engineering, Université de Sherbrooke, Canada|Binh-Minh Nguyen, Advanced Energy, The University of Tokyo, Japan|Thanh Vo-Duy, CTI Lab. for EVs, Hanoi University of Science and Technology, Vietnam|Minh C. Ta, Electrical and Computer Engineering, Université de Sherbrooke, Canada

Thursday, 3 November 2022, 1:45-3:25, Room 225

Session 20 - RT8, Electric Railway II

Chairs: Pablo Arboleya (U. Oviedo, Spain)

1 A Review of Simulation Models for CO2 Pollution Reduction in Transportation Sector *(V)*

Nahid Nasrin, Department of Electrical Electronic, Communications and Systems Engineering, Universidad de Oviedo, Spain|Islam El-Sayed, Department of Electrical Electronic, Communications and Systems Engineering, Universidad de Oviedo, Spain|Jorge Garcia, Department of Electrical Electronic, Communications and Systems Engineering, Universidad de Oviedo, Spain

2 A Systems Integration Case Study involving SCADA, Interfaces and Challenges *(V)*
Kshitij Saxena, Transit and Rail, KS Consulting, Canada

3 Sustainable MVDC Railway System Integrated with Renewable Energy Sources and EV Charging Station *(V)*
Hamed Jafari Kaleybar, Energy, Politecnico di Milano, Italy|Morris Brenna, Energy, Politecnico di Milano, Italy|Francesco Castelli-Dezza, Mechanical, Politecnico di Milano, Italy|Dario Zaninelli, Energy, Politecnico di Milano, Italy

4 Targeted Traction Power Modulation of High-Speed Trains for Stabilization of Electric Supply Network with the Electric Flexibility *(V)*
Abdoulaye PAM, Innovation and Research, SNCF, France|Tony Letrouvé, CEDD, SNCF Reseau, France|Olivier Grellier, Innovation and Research, SNCF, France

5 Design and Analysis of Parallel Hybrid-Excited Superconducting Linear Motor for High-Speed Electromagnetic Suspension Maglev *(V)*
Yiming Shen, Key Laboratory of Railway Industry of Maglev Technology (TJU), National Railway Administration of P. R. C, China|Yanxin Li, College of Electrical Engineering, Zhejiang University, China|Qinfen Lu, College of Electrical Engineering, Zhejiang University, China

Thursday, 3 November 2022, 4:00-6:00, Room 105

Session 21 – SS, Renewable Energy for EV Charging Infrastructure

Chairs: Joao Trovao (U. Sherbrooke, Canada) and Federico Zenith (SINTEF, Norway)

1 Carbon care action of a European research project on electrified vehicles *(IP)*
Amandine LEPOUTRE, L2EP, University of Lille, France|Alain BOUSCAYROL, L2EP, University of Lille, France|Cristi IRIMIA, Brasov, Siemens Industry Software, Romania|Calin HUSAR, Brasov, Siemens Industry Software, Romania|Theodoros KALOGIANNIS, Mobi Group, Vrije University of Brussels, Belgium|Mariam AHMED, VEEM, Valeo, France|Claudia MARTIS, Cluj-Napoca, University of Technology of Cluj Napoca, Romania|Dragan ZUBER, Novi Sad, Typhoon HIL, Serbia|Sven MAISEL, Battery Testing, TUV-SUD, Germany|Fei GAO, FEMTO-ST, Université de Bourgogne Franche-Comté, France|Wieteke VAN VALEN, Delft, Unireserach BV, Netherlands|Adrian BIRTAS, Bucharest, Renault Technologie Roumanie, Romania|Johan LECOUTERE, Leuven, Bluways, Belgium

2 Power Hardware-in-the-loop Simulation of Hybrid Energy Storage System Considering Supercapacitor Voltage Limitation *(IP)*
Lam Vu-Ngoc, School of Electrical and Electronic Engineering, Hanoi University of Science and Technology, Vietnam|Bao-Huy Nguyen, School of Electrical and Electronic Engineering, Hanoi University of Science and Technology, Vietnam|Thanh Vo-Duy, School of Electrical and Electronic Engineering, Hanoi University of Science and Technology, Vietnam|Minh Ta, e-TESC Lab, Université de Sherbrooke, Canada|Joao Trovao, e-TESC, Université de Sherbrooke, Canada

3 The StasHH Fuel-Cell Module Standard *(IP)*
Federico Zenith, Robotics and Control, SINTEF Digital, Norway|Ruud Bouwman, Enabling Transport Solutions, VDL, Netherlands|Henrik Lundkvist, Reliable Automation, SINTEF Digital, Norway

4 Suitability of On Site Solar Generation, Including Vertical Bifacial Panels, for a Charging Station Analogous to a Present Day Convenience Store *(IP)*
Jeremiah Reagan, Materials Biomaterials Science and Engineering, UC Merced, United States|Sarah Kurtz, Materials Biomaterials Science and Engineering, UC Merced, United States

5 A Theoretical Study Of Stator Flux Linkage DC Offset Based Stator Fault Detection For PMSM Drive Systems *(V)*
Akanksha Upadhyay, Div. of Industrial Electrical Engineering and Automation, Lund University, Sweden|Mats Alaküla, Div. of Industrial Electrical Engineering and Automation, Lund University, Sweden

Thursday, 3 November 2022, 4:00-6:00, Room 110

Session 22 - SS5, Modelling and Control of Intelligent Vehicles and Infrastructure

Chairs: YangQuan Chen (UC Merced, USA) and Hamid Gualous (U. Normandie, France)

1 A Hybrid Energy Management Strategy Based on ANN and GA Optimization for Electric Vehicles *(IP)*
Yashar Farajpour, Department of Electronics, Carleton University, Canada|Hicham Chaoui, Department of Electronics, Carleton University, Canada|Mehdy Khayamy, Department of Electronics, Motiv Power Systems, United States|Sousso Kelouwani, Hydrogen Research Institute and the Department of Mechanical Engineering, Université du Québec à Trois-Rivières, Canada|Mohamad Alzayed, Department of Electronics, Carleton University, Canada

2 Comprehensive Comparison of Multi-Physics and Deep Learning Modelling Approaches for Data-Driven Prediction of Traction Energy Demand *(IP)*
Sebastian Reimann, Institute of Vehicle System Technology, Karlsruhe Institute of Technology (KIT), Germany|Markus Tesar, Institute of Vehicle System Technology, Karlsruhe Institute of Technology (KIT), Germany|Peter Gratzfeld, Institute of Vehicle System Technology, Karlsruhe Institute of Technology (KIT), Germany

3 Parametrization, Simulation and Energy Management Evaluation of a Fuel Cell Hybrid Electric Bus *(IP)*
Josu Olmos, Energy Storage and Management, Ikerlan Technology Research Centre (Basque Research and Technology Alliance), Spain|Petr Hajduk, Smart Vehicle Fleets, VTT Technical Research Centre of Finland, Finland|Joel Anttila, Smart Vehicle Fleets, VTT Technical Research Centre of Finland, Finland|Valtteri Pulkkinen, Fuel Cells and Hydrogen, VTT Technical Research Centre of Finland, Finland|Rafael Åman, Smart Vehicle Fleets, VTT Technical Research Centre of Finland, Finland|Andoni Saez-de-Ibarra, Energy Storage and Management, Ikerlan Technology Research Centre (Basque Research and Technology Alliance), Spain

4 Machine Learning Approach for Charging Queue Waiting Time Prediction of Electrical Autonomous Forklifts Fleet *(IP)*
Bilel allani, electrical and computer engineering, hydrogen research institute, Canada|ali amamou, electrical and computer engineering, hydrogen research institute, Canada|sousso kelouwani, mechanical engineering, hydrogen research institute,

Canada|messaoud ahmed ouameur, electrical and computer engineering, laboratoire des signaux et systèmes intégrés LSSI, Canada|ghofrane benarfa, electrical and computer engineering, hydrogen research institute, Canada|lotfi zeghmi, electrical and computer engineering, hydrogen research institute, Canada

5 Online Energy Management Strategy for a Fuel Cell Hybrid Self Guided Vehicle *(IP)*

Karem BenChikha, Department of Electrical Engineering, Université du Québec à Trois-Rivières, Canada|Ali Amamou, Hydrogen Research Institute, Université du Québec à Trois-Rivières, Canada|Sousso Kelouwani, Department of Mechanical Engineering, Université du Québec à Trois-Rivières, Canada|Afef Bennani Ben Abdelghani, Department of Electrical Engineering, University of Carthage, Tunisia|Mohsen Kandidayeni, Department of Electrical and Computer Engineering, Université de Sherbrooke, Canada|Kodjo Agbossou, Hydrogen Research Institute, Université du Québec à Trois-Rivières, Canada

Thursday, 3 November 2022, 4:00-6:00, Room 205

Session 23 - SS1, Advanced Control Technologies for Multi-Motor Multi-Source Vehicles

Chairs: Minh C. Ta (U. Sherbrooke, Canada)

1 A Multi-Agent Approach to Landing Speed Control with Angular Rate Stabilization for Multirotors *(V)*

Binh Minh Nguyen, Advanced Energy, The University of Tokyo, Japan|Shinji Hara, Computational Intelligence and Systems Science, Tokyo Institute of Technology, Japan|Vu Phi Tran, Engineering and Information Technology, University of New South Wales, Australia

2 Grid-Favorable, Consumer-Centric, On/Off Smart Charging of Electric Vehicles in a Neighborhood *(V)*

Kartik Sastry, School of Electrical and Computer Engineering, Georgia Institute of Technology, United States|Thomas Fuller, School of Chemical and Biomolecular Engineering, Georgia Institute of Technology, United States|Santiago Grijalva, School of Electrical and Computer Engineering, Georgia Institute of Technology, United States|David Taylor, School of Electrical and Computer Engineering, Georgia Institute of Technology, United States|Michael Leamy, School of Mechanical Engineering, Georgia Institute of Technology, United States

3 Robust Adaptive Learning Control for Different Classes of Dissipative Vehicle Systems *(V)*

Mohamed Mabrok, Department of Mathematics, Statistics and Physics,, Qatar University, Qatar|Vu Phi Tran, School of Engineering and Information Technology, University of New South Wales at Canberra, Australia|Matthew Garratt, School of Engineering and Information Technology, University of New South Wales at Canberra, Australia|Ian Petersen, Research School of Engineering, Australian National University, Australia

4 Identification of Planar Double-wishbone Suspension Mechanism Using Jacobian Approach *(V)*

Guofeng Zhou, College of Engineering Science and Technology, Shanghai Ocean University, China|Shengye Jin, College of Engineering Science and Technology, Shanghai Ocean University, China|Yafei Wang, School of Mechanical Engineering, Shanghai Jiao Tong University, China|Shouqi Cao, College of Engineering Science and Technology, Shanghai Ocean University, China

5 Tire Vertical Force Estimation Method using Suspension Deformation and Stochastic Road Model in Vehicle Suspension System *(V)*

Dasol Cheon, Department of Robotics Engineering, DGIST, South Korea|Wonhyeok Choi, Department of Robotics Engineering, DGIST, South Korea|Kanghyun Nam, School of Mechanical Engineering, Yeungnam University, South Korea|Sehoon Oh, Department of Robotics Engineering, DGIST, South Korea

Thursday, 3 November 2022, 4:00-6:00, Room 225

Session 24 - SS11, Fuel Cell Based Hybrid Systems

Chairs: Nadia Steiner (U. Franche-Comte, France) and Sam Markolf (UC Merced, USA)

1 Optimal Sizing for MH Tank and PEM Fuel Cell Coupled Hydrogen System Affected by An Active Thermal Management system *(V)*

Dan ZHU, School of Automobile, Chang'an University, China

2 Decentralized convex optimization-based energy management strategy for modular heavy-duty fuel cell vehicles *(V)*

Hao Long, College of Mechanical and Vehicle Engineering, Chongqing University, China|Arash Khalatbarisoltani, College of Mechanical and Vehicle Engineering, Chongqing University, China|Xiaosong Hu, College of Mechanical and Vehicle Engineering, xiaosonghu@ieee.org, China

3 Integral sliding mode control combined with Passivity-based control applied to Fuel Cell/ Supercapacitors hybrid power system of Electric Vehicles *(V)*

Hussein OBEID, University of Caen Normandy, LUSAC Laboratory, France|Salah Laghrouche, University of Bourgogne Franche-Comte, FEMTO-ST UMR CNRS, France|Mickael Hilairet, University of Bourgogne Franche-Comte, FEMTO-ST UMR CNRS, France|Yue Zhou, University of Bourgogne Franche-Comte, Femto-ST UMR CNRS, France

4 Harnessing nature: Using solar and wind power with stationary battery storage for electric minibus taxis *(V)*

MJ Booysen, Engineering, Stellenbosch University, South Africa|Larissa Fuessl, Electrical and Electronic Engineering, Stellenbosch University, South Africa|Bernd Thomas, Engineering, Reutlingen University, Germany

5 Linear Scaling Evaluation of Losses for Automotive Traction Voltage Source Inverters *(V)*

Luis Ramirez, L2EP, Universite de Lille, France|Ayoub Aroua, L2EP, Universite de Lille, France|Philippe Delarue, L2EP, Universite de Lille, France|Walter Lhomme, L2EP, Universite de Lille, France

Friday, 4 November 2022

Friday, 4 November 2022, 10:45-12:25, Room 105

Session 25 - RT1, Energy Storage and Generation, Components and Systems III

Chairs: Antti Lajunen (U. Helsinki, Finland) and Sam Markolf (UC Merced, USA)

1 Analytical analysis of stationary Li-Ion-battery storage-system efficiency on a large scale *(IP)*
Farzan ZareAfifi, Mechanical Engineering, University of California, Merced, United States|Sarah Kurtz, Materials Science and Engineering, University of California, Merced, United States

2 Battery Tab Cooling in Traction Battery Modules using Thermally Conductive Plastics *(IP)*
Johannes Liebertseder, New Drive Systems, Fraunhofer Institute for Chemical Technology, Germany|Andreas Dollinger, formerly: New Drive Systems, formerly: Fraunhofer Institute for Chemical Technology, Germany|Thomas Sorg, New Drive Systems, Fraunhofer Institute for Chemical Technology, Germany|Lars-Fredrik Berg, New Drive Systems, Fraunhofer Institute for Chemical Technology, Germany|Jens Tübke, Applied Electrochemistry, Fraunhofer Institute for Chemical Technology, Germany

3 Battery Diagnosis and Prognosis: A Lifelong Learning Framework for Electric Vehicles *(IP)*
Jingyuan Zhao, Institute of Transportation Studies, University of California, Davis, CA 95616, USA., United States|Jinrui Nan, Shenzhen Automotive Research Institute, Beijing Institute of Technology, China|Junbin Wang, BYD Automotive Engineering Research Institute, BYD Co. Ltd., China|Heping Ling, BYD Automotive Engineering Research, BYD Co. Ltd., China|Yubo Lian, BYD Automotive Engineering Research Institute, BYD Co. Ltd., China|Andrew Burke, Institute of Transportation Studies, University of California, Davis, CA 95616, USA., United States

4 Impact of EV Charging Schedule on Storage Requirements for a Renewable-driven Grid in California *(IP)*
Zabir Mahmud, Environmental Systems, UC Merced (PhD Student), United States|Sarah Kurtz, Material Science and Engineering, UC Merced (Professor), United States

5 Optimal Sizing and Aging Investigation of Second Life Lithium-ion Battery Using Renewable Power Smoothing Stationary Application *(IP)*
Abraham Alem Kebede, Electrical Engineering and Energy Technology, Vrije Universiteit Brussel, Belgium|Md Sazzad Hosen, Electrical Engineering and Energy Technology, Vrije Universiteit Brussel, Belgium|Theodoros Kalogiannis, Electrical Engineering and Energy Technology, Vrije Universiteit Brussel, Belgium|Henok Ayele Behabtu, Electrical Engineering and Energy Technology, Vrije Universiteit Brussel, Belgium|Towfik Jemal, Electrical and Computer Engineering, Jimma University, Ethiopia|Joeri Van Mierlo, Electrical Engineering and Energy Technology, Vrije Universiteit Brussel , Belgium|Thierry Coosemans, Electrical Engineering and Energy Technology, Vrije Universiteit Brussel , Belgium|Maitane Berecibar, Electrical Engineering and Energy Technology, Vrije Universiteit Brussel, Belgium

Friday, 4 November 2022, 10:45-12:25, Room 110

Session 26 - RT2, Power Electronics, Motor Drives and Electric Power Systems III

Chairs: Josu Amondarain (Ikerlan, Spain) and Anupam Verma (Indian Institute of Science, India)

1 Performance Evaluation of Event-Triggered Model Predictive Control for Boost Converter *(IP)*
Ranya Badawi, Electrical and Computer Engineering, Oakland University, United States|Jun Chen, Electrical and Computer Engineering, Oakland University, United States

2 Modular Battery Energy Storage Systems for Available Energy Increase *(IP)*
Xabier Dorronsoro, Electronics and Computer Science, Mondragon Unibertsitatea, Spain|Iker Lopetegi, Electronics and Computer Science, Mondragon Unibertsitatea, Spain|Erik Garayalde, Electronics and Computer Science, Mondragon Unibertsitatea, Spain|Unai Iraola, Electronics and Computer Science, Mondragon Unibertsitatea, Spain|Josu Yeregui, Electronics and Computer Science, Mondragon Unibertsitatea, Spain

3 The Effect of Transformer Interwinding Capacitance on Hard-Switched Converter Operation *(V)*
Claus Kjeldsen, Department of Mechanical and Electrical Engineering, University of Southern Denmark, Denmark|Christian Østergaard, Department of Mechanical and Electrical Engineering, University of Southern Denmark, Denmark

4 Three-Wheel Fuel Cell Hybrid Vehicle with a High-Performance Active Switched Quasi-Z-Source Inverter *(IP)*
Thang V. Do, GEGI, University of Sherbrooke, Canada|Pascal Messier, GEGI, University of Sherbrooke, Canada|Joao P. Trovao, GEGI, University of Sherbrooke, Canada|Loïc Boulon, GEGI, UNIVERSITÉ DU QUÉBEC À TROIS-RIVIÈRES, Canada

5 Optimal Switching Angles for Switched Reluctance Generator Operating Under Modified Single-Pulse-Mode *(IP)*
Anupam Verma, Electrical Engineering, Indian Institute of Science, India|Gopalaratnam Narayanan, Electrical Engineering, Indian Institute of Science, India

Friday, 4 November 2022, 10:45-12:25, Room 205

Session 27 - RT6, Charging Systems and Infrastructures III

Chairs: Karl Schwenk (KIT, Germany) and Kanok Boriboonsomsin (UC Riverside, USA)

1 Application of Artificial Intelligence in Optimization of Solid State Transformer Core for Modern Electric Vehicles Using Multi-Objective Genetic Algorithm *(IP)*
Abiodun Olatunji, Electrical and Computer Engineering, Tennessee Technological University, United States|Indranil Bhattacharya, Electrical and Computer Engineering, Tennessee Technological University, United States|Webster Adepoju, Electrical and Computer Engineering, Tennessee Technological University, United States|Ebrahim Nasr Esfahani, Electrical and Computer Engineering, Tennessee Technological University, United States|Trapa Banik, Electrical and Computer Engineering, Tennessee Technological University, United States

2 Analysis of Active Front End Rectifier with LLC Resonant Converter for EV Charging Application *(V)*
Pawan Kumar Dhakal, Electrical Eng., Coimbra Polytechnic – ISEC, University of Oviedo – Gijon Campus, Spain Instituto de Telecomunicacoes (IT), Portugal|Andre M. S. Mendes, Electrical Eng., University of Coimbra, Instituto de Telecomunicacoes (IT), Portugal|Paulo G. Pereirinha, Electrical Eng., Coimbra Polytechnic – ISEC and INESC Coimbra, Portugal

3 Model Based Analysis of Low Frequency Metamaterial For Efficient Wireless Power Transfer *(IP)*
WEBSTER ADEPOJU, Electrical and Computer Engineering , Tennessee Technological University, United States| Indranil Bhattacharya, Electrical and Computer Engineering , Tennessee Technological University, United States|Charles Van Neste, Electrical and Computer Engineering , Tennessee Technological University, United States|Olufunke Mary Sanyaolu, Material Science, University of Johannesburg, South Africa|Abiodun Olatunji, Electrical and Computer Engineering , Tennessee Technological University, United States|Trapa Banik, Electrical and Computer Engineering , Tennessee Technological University, United States

4 A Solar Powered Wireless Power Transfer for Electric Vehicle Charging *(V)*
Ravi Kumar Yakala, Electrical Engineering, Indian Institute of Technology Delhi, India|Debiprasad Nayak, Electrical Engineering, Indian Institute of Technology Delhi, India|Manish Kumar, Electrical Engineering, Indian Institute of Technology Delhi, India|Sumit Pramanick, Electrical Engineering, Indian Institute of Technology Delhi, India

5 Modeling and Tuning of Parameters of a Bidirectional Wireless Power Transfer For interfacing EVs with the DC Smart Grids *(IP)*
Ebrahim Nasr Esfahani, Electrical and computer engineer, Tennessee Tech University, United States|Indranil Bhattacharya, Electrical and computer engineer, Tennessee Tech University, United States|Webster Adepoju, Electrical and computer engineer, Tennessee Tech University, United States|Abiodun Olatunji, Electrical and computer engineer, Tennessee Tech University, United States

Friday, 4 November 2022, 10:45-12:25, Room 225

Session 28 - RT4, Control and Energy Management of Electrified Vehicles III

Chairs: Steve Lenk (Fraunhofer IOSB-AST, Germany)

1 A Consensus-Based Charging Control Strategy for Electric Vehicles Participating in Performance-Based Regulation Markets *(V)*
Chenhao Li, School of Electrical and Information Engineering, Tianjin University, China|Shuang Gao, School of Electrical and Information Engineering, Tianjin University, China|Ruxin Dai, School of Electrical and Information Engineering, Tianjin University, China

2 Pre-emptive Power Management Controller of HEV for Zero Emission Zone Drive *(V)*
Seohee Han, School of Mechanical Engineering, Pusan National University, South Korea|Jemin Woo, School of Mechanical Engineering, Pusan National University, South Korea|Jeamun Lee, Electrification Control Development Team 2, Hyundai Motor Company, South Korea|Dasom Ahn, Electrification Control Development Team 2, Hyundai Motor Company, South Korea|Changsun Ahn, School of Mechanical Engineering, Pusan National University, South Korea

3 A Multi-Agent Approach for P2P Energy Trading with EV Battery Thermal Profile Management *(V)*
Anshuman Singh, School of Electrical and Electronic Engineering , Nanyang Technological University, Singapore|Mohasha Lahanda Purage, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore|Hoa Nguyen, WPI-I2CNER, and IMI, Kyushu University, Japan|Hoay Gooi, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore|Hung Nguyen, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore

4 Failure-prone propulsion system modelization for UAV predictive maintenance *(V)*
Nassim RIZOUG, S2ET, ESTACA'Lab, France|Fouad KHENFRI, S2ET, ESTACA'Lab, France|Pierre-Yves BRULIN, S2ET, Hexadrone, ESTACA'Lab, France

5 Cloud-edge Collaborative Distributed Optimal Bidding Strategy for Large-scale EVs in Electricity Markets *(V)*
Shuang Gao, School of Electrical and Information Engineering, Tianjin University, China|Ruxin Dai, Information Engineering Tianjin University, Tianjin University, China|Chenhao Li, School of Electrical and Information Engineering , Tianjin University, China|Wenjing Cao, School of Engineering and applied Science, Sophia University, Japan

Last Update: 10/25/2022

Technical Visits (Nov. 4th)

Visit 1. TRC California

Date: Nov 4th
Start: 1:45pm
Duration: ~3hours

TRC California is located in Atwater, California, on a 225-acre portion of the former Castle Air Force Base. Just a 2-hour drive from Silicon Valley, the San Francisco Bay Region and other west coast technology centers, TRC California provides mobility innovators with convenient access to the first-rate testing facilities and expertise they need to validate advanced systems and technologies.

Additional Info:
https://www.trcpg.com/about-us/trc-california/

Visit 2. UC Berkeley

Date: Nov 4th
Start: 12:45pm
Duration: ~2hour drive to Berkeley + 2h tour + 2h drive back to Merced

Established in 1868 as the University of California, UC Berkeley is the state's first land-grant university and the first campus of the University of California system. During the visit we will tour the engineering campus (Jacobs, the Davis test bay, Hearst Mining), as well as the Sproul Plaza, Faculty Glade, Doe or Bancroft Library, and the Campanile.

Additional Info
https://www.berkeley.edu/

Participants interested in taking part in the technical visits need to sign up for the tours by Wednesday Nov 2nd 2022

http://tinyurl.com/VPPC22visits

Addresses

Conference Venue

Nov 1st – 4th

University of California Merced
5200 North Lake Rd.
Merced, California 95343

Welcome Reception

Nov 1st, 6:30pm

El Capitan Hotel
609 W Main Street
Merced, California 95340
+1 209 383 1234

Gala Dinner

Nov 3th, 6:30pm

Mainzer
655 W Main St,
Merced, California 95340

Contact Information

Ricardo de Castro, +1 209 305 2094, rpintodecastro@ucmerced.edu

D.B. Quan +1 818 217 5455, dquan2@ucmerced.edu

Transportation - Buses

Buses will be made available for transportation between the hotels, the *UC Merced Conference Center*, the *Welcome Reception* at El Capitan Hotel and the *Gala Dinner* at The Mainzer (which is a 2-minutes walking distance from El Capitan)

Tentative bus schedule:

Direction: Downtown → Conference Venue (Morning)						Direction: Conference Venue → Downtown (Evening)					
Day	Bus	Hotel - Holiday Inn	Hotel - Courtyard Merced	Hotel - El Capitan	UC Merced	Day	Bus	UC Merced	El Capitan Hotel	Hotel - Courtyard Merced	Hotel - Holiday Inn
Tue. Nov 1	A	-	-	6:45	7:15	Tue. Nov 1	A	17:15	17:45	-	-
	A	7:45	8:00	8:15	8:45		A	18:15	18:45	-	-
	A	9:15	9:30	9:45	10:15		A	-	20:30	20:45	21:00
							A	-	21:30	21:45	22:00
Wed Nov 2	A	-	-	6:30	7:00	Wed Nov 2	A	18:00	18:30	-	-
	B	-	-	7:30	8:00		B	18:20	18:50	19:05	19:20
	A	7:00	7:15	8:00	8:30		A	19:00	19:30	-	-
Thr Nov 3	A	-	-	6:30	7:00	Thr Nov 2	A	18:00	18:30	-	-
	B	-	-	7:30	8:00		B	18:30	19:00	-	-
	A	7:00	7:15	8:00	8:30		A	-	21:00	21:15	21:30
							B	-	22:00	22:15	22:30
Friday Nov 4	A	-	-	6:30	7:00	Friday Nov 4	A	Technical Visit to UCB (starts@12:45)			
	B	-	-	7:30	8:00		B	Technical Visit to TRC (starts@13:45)			
	A	7:00	7:15	8:00	8:30		Note: buses will return to El Capitan and UC Merced after the visits				

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Please, check the website and/or the onsite helpdesk for an updated version of the bus schedule. The schedule might be subject to modifications during the conference. Let us know the name the hotel that you are staying in Merced by filling out this form:

http://tinyurl.com/VPPC22bus

This information will help the VPPC organizing team schedule the buses during the conference.

Bus Stop	Google Maps
Hotel - Holiday Inn Express and Suite	https://goo.gl/maps/iFe8MLypUjpFTUhh9
Hotel - Courtyard Merced	https://goo.gl/maps/Jqc5AJSfCzgY4xaT8
Hotel - El Capitan	https://goo.gl/maps/4sohZJUaXx1Y4W548
UC Merced - Conference Center	https://goo.gl/maps/f8mMxLRzy5FQun2V8

Transportation – Carpooling

We encourage the conference participants to share car journeys, e.g. from the airport to Merced and from your hotel to the conference venue.

We prepared a conference carpool platform which you can use to find fellow conference who may be interested in starting a carpool group[1]:

https://www.groupcarpool.com/t/aocjgd

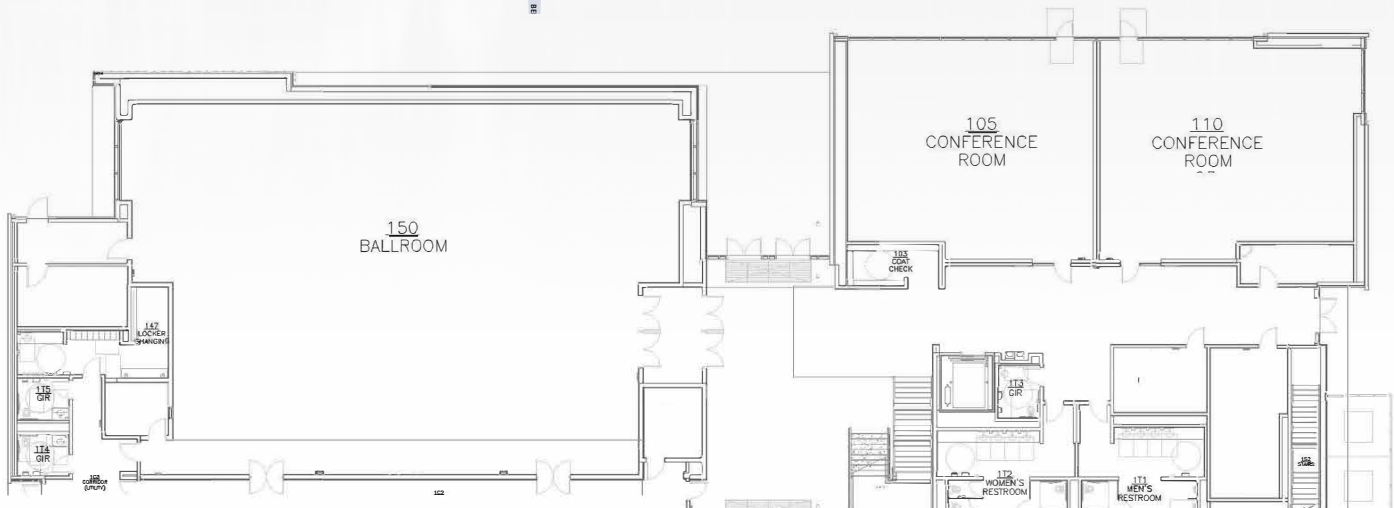
If you have technical problems using the carpooling platform, please contact: Sam Markolf smarkolf@ucmerced.edu, or Colby Priest cpriest@ucmerced.edu

Disclaimer: This carpooling service is not arranged, sponsored or endorsed by IEEE or the VPPC organizing committee. IEEE and the VPPC organizing committee take no responsibility for the quality or safety of the service.

Parking at the Conference Venue

Complimentary parking will be offered to the VPPC participants at UC Merced's Bellevue Lot. There will be directional signs that will guide you to the Bellevue Parking Lot (if you are driving) and/or direct you to the UC Merced Conference Center, which is a brief walk from the bus drop off area (University Transit Center) directly across from Bellevue Lot.

[1] Additional information on how to use the platform can be found here: https://www.youtube.com/watch?v=fh2ahWi2Slg



2nd Floor Rooms

VTC2023-Spring

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Workshop Proposal Deadline: 12 December 2022

Paper Deadline Extended: 5 January 2023

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Conference website:

events.vtsociety.org/vtc2023-spring

TrackChair:

vtc2023spring.trackchair.com

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