ASME® 2020 DSCC
Dynamic Systems and Control Conference

CONFERENCE
Oct 5–7, 2020

Virtual, Online

Program

https://event.asme.org/DSCC

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Dear Friends:

Welcome to the 2020 Annual ASME Dynamic Systems and Control Conference (DSCC) held through virtual conferencing platform, on October 5 – 7, 2020.

DSCC is the showcase technical forum of the ASME Dynamic Systems and Control Division. It provides a focused and intimate setting for disseminating and discussing the state of the art research in dynamic systems and control, with a mechanical engineering focus. This year, the DSCC Technical Program consists of sessions in all areas of interest to the Division, including automotive and transportation systems, bio-systems and health care, energy systems, mechatronics, modeling, identification, intelligent systems, robotics, vibrations, and smart structures. The conference features contributed sessions, invited sessions, workshops and special sessions, plenary talks, student programs of best student paper competition and networking, as well as committee meetings and social functions.

We want to thank all the authors who have contributed their quality work, without which the conference would not be possible. We are grateful for the participation of many volunteers who ensured the high technical standards of the conference and engaging program. All DSCD technical Committees have organized invited sessions. The Conference Editorial Board chaired by Qian Wang, with assistance from a very large number of anonymous reviewers, conducted meticulous paper reviews. Also we would like to recognize members of DSCC Organizing Committee who provided tireless effort to facilitate the conference matters: Junmin Wang, Publications Chair; Manish Kumar, Workshops & Tutorials Chair; Chinedum Okwudire, Publicity Chair; Xu Chen and Beibei Ren, Students & Young Members Chairs; Kenn Oldham and Yunjun Xu, Invited/Special Sessions Chair; Xiayun Zhao, Local Arrangement Chair. We acknowledge the assistance from the ASME staff: Andrew Koleba, Conference Manager, who coordinated logistic details; Stacey Cooper, Webtool Manager, who led the IT support for the conference.

Finally, we want to especially thank the past and current members of the ASME DSCD Executive Committee, who have provided great leadership and guidance to the Division and to DSCC.

This has been an eventful year and many of us have experienced difficult times. We sincerely wish you a joyful experience in DSCC-2020!

Jiong Tang, General Chair
Qingze Zou, Program Chair

DSCC 2020

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ASME

All Times in US EDT		**Pre Conference (October 4) - Hosted by Conference Volunteers**		
1:00PM	3:00PM	**Workshop 1:** Mitigating Gasoline Particulate Emissions: Challenges and Best Practices, a Modeling and Control Perspective		
3:00PM	5:00PM	**Workshop 2:** Controllable Tensegrity Structures and Membranes		
All Times in US EDT		**Day 1 (October 5)**		
10:00AM	10:50AM	**Plenary 1:** The price of battery degradation and the value of battery health estimation in the transition to electrified transportation **Speaker: Dr. Anna Stefanopoulou**		
10:50AM	11:00AM	Break		
11:00AM	12:00PM	**NSF Program Directors Presentations**	**Technical Session:** Adaptive and Intelligent Systems Control	**Technical Session:** Advanced Driver Assistance and Autonomous Technologies
12:00PM	12:30PM	**Breakout Room (Open forum continued discussion)**		
12:00PM	12:10PM	Break		
12:10PM	1:10PM	**Technical Session:** Advances in Control Design Methods	**Technical Session:** Advances in Nonlinear Control	**Technical Session:** Assistive and Rehabilitation Devices Design, Modeling, Analysis and Control
1:10PM	1:40PM	**Breakout Room (Open forum continued discussion)**		
1:10PM	1:20PM	Break		
1:20PM	2:20PM	**Technical Session:** Vehicle Dynamics, Estimation and Control	**Technical Session:** Energy and Power Systems	**Technical Session:** Estimation and Identification I
2:20PM	2:50PM	**Breakout Room (Open forum continued discussion)**		
2:20PM	2:30PM	Break		
2:30PM	3:30PM	**Technical Session:** Advances in Motion and Vibration Control	**Technical Session:** Advances in Robotics I	**Technical Session:** Dynamics and Control of Human-Robot Systems
3:30PM	4:00PM	**Breakout Room (Open forum continued discussion)**		
3:30PM	3:40PM	Break		

3:40PM	4:40PM	**Industrial Workshop**	**Technical Session:** Advances in Sensors and Actuators	**Technical Session:** Vibration and Control Systems I
4:40PM	5:10PM		**Breakout Room (Open forum continued discussion)**	
4:40PM	4:50PM		Break	
4:50PM	5:30PM		**Technical Session:** Modeling and Control of Engine and After-treatment Systems	**Technical Session:** Biomedical and Rehabilitation Systems
All Times in US EDT		**Post Day 1 Sessions - Hosted by Conference Volunteers**		
5:40PM	6:50PM	**Best Student Paper Presentations**		
7:30PM	10:00PM	**DSCD General Meeting**		
All Times in US EDT		**Day 2 (October 6)**		
10:00AM	10:50AM	**Plenary 2:** Robotic Fish: Make "Sense" of the Underwater World **Speaker: Dr. Xiaobo Tan**		
10:50AM	11:00AM	Break		
11:00AM	12:20PM	**Awards & Oldenburger Lecture Speaker: Dr. Mark Spong**		
12:20PM	12:25PM	Break		
12:25PM	1:15PM	**Technical Session:** Building Energy Systems (invited)	**Technical Session:** Advandc Power Systems	**Technical Session:** Vibrations: Modeling , Analysis, and Control
1:15PM	1:45PM	**Breakout Room (Open forum continued discussion)**		
1:15PM	1:20PM	Break		
1:20PM	2:20PM	**Student Career Advising/Networking Session**	**Technical Session:** Estimation and Identification II	**Technical Session:** Advances in Mechatronics Systems
2:20PM	2:50PM	**Breakout Room (Open forum continued discussion)**		
2:20PM	2:30PM	Break		
2:30PM	3:30PM	**NSF Program Director Workshop**	**Technical Session:** Advanced Manufacturing Systems	**Technical Session:** Advances in Robotics II
3:30PM	4:00PM		**Breakout Room (Open forum continued discussion)**	
3:30PM	3:40PM		Break	
3:40PM	4:40PM		**Technical Session:** Control and Estimation of Energy Systems	**Technical Session:** Vibration and Control Systems II
4:40PM	5:10PM	**Breakout Room (Open forum continued discussion)**		
4:40PM	4:50PM	Break		

4:50PM	5:30PM		**Technical Session:** Estimation and Identification III	**Technical Session:** Driver Assistance and Autonomous Technologies
All Times in US EDT		**Day 3 (October 7)**		
10:00AM	10:50AM	**Plenary 3:** Nyquist Lecture: A Hot Topic with Controls at its Core **Speaker: Professor Marcia O'Malley**		
10:50AM	11:00AM	Break		
11:00AM	12:00PM	**Technical Session:** Design, modeling and control of rehabitation devices	**Technical Session:** Multi-agent and Networked Systems	**Technical Session:** Path Planning and Motion Control
12:00PM	12:30PM	**Breakout Room (Open forum continued discussion)**		
12:00PM	12:10PM	Break		
12:10PM	1:10PM	**Technical Session:** Unmanned Ground and Aerial Vehicles I	**Technical Session:** Modeling and Control of Soft Actuators and Manipulators	
1:10PM	1:40PM	**Breakout Room (Open forum continued discussion)**		
1:10PM	1:20PM	Break		
1:20PM	2:20PM	**Technical Session:** Unmanned Ground and Aerial Vehicles II	**Technical Session:** Energy Storage Systems	**Technical Session:** Improving Vehicle Efficiency and Reducing Emissions
2:20PM	2:50PM	**Breakout Room (Open forum continued discussion)**		
2:20PM	2:30PM	Break		
2:30PM	3:30PM	**Technical Session:** Advances in Robotics III	**Technical Session:** Tracking Control Systems	**Technical Session:** Connected Vehicle Systems
3:30PM	4:00PM	**Breakout Room (Open forum continued discussion)**		
3:30PM	3:40PM	Break		
3:40PM	4:40PM	**Technical Session:** Intelligent Transportation and Vehicles	**Technical Session:** Motion and Vibration Control Applications	
4:45PM	5:00PM	**Closing Remarks**		

Live Presentations

Plenary 1: October 5th – 10:00AM

Speaker: Dr. Anna Stefanopoulou
William Clay Ford Professor of Technology
Department of Mechanical Engineering
University of Michigan

Title: The price of battery degradation and the value of battery health estimation in the transition to electrified transportation

Abstract: Replacing a gasoline or diesel internal combustion engine vehicle (ICEV) with an electric vehicle (EV) will zero out the tailpipe emissions and depending on where it charges can have 50% lower green-house gas emissions. Key barrier to EV adoption is the higher up-front cost of EVs compared to ICEVs. Using transit buses, we will show how the total cost of ownership depends on the lower operating cost due to fuel and maintenance savings that depend on the route, utilization, and charging of the vehicle. If the battery stays healthy, vehicle to building, vehicle to grid, and other 2nd life applications can provide additional value streams and be considered as a long-horizon optimization problem.

The battery state of health (SOH) is thus at the crux of the payback calculations and consequently can tip the EV adoption. Unfortunately, estimating the battery health with high confidence can only be done under certain discharge patterns. Identifying the physical origin of the degradation is even more difficult but very important, because it can inform the battery management system and hence prevent further degradation. We will present various on-board signals for tracking the intrinsic "aging wrinkles" in batteries. We will conclude by highlighting the estimation of gas venting and assess the intensity of thermal runaway for first-responders and post-accident management of damaged batteries. This presentation will be similar to the one presented in IEEE ECCE and ICCAS.

Bio: Prof. Anna Stefanopoulou, is the William Clay Ford Professor of Technology and the Director of the Energy Institute at the University of Michigan. Stefanopoulou joined the Department of Mechanical Engineering in 2000 after working at the University of California, Santa Barbara and in the automotive industry, where she developed algorithms and calibrations for highly efficient and advanced powertrains. Stefanopoulou is currently working with a multidisciplinary group to knit automotive and manufacturing expertise with battery and grid experts with the goal to realize a clean electrified transportation.

She is in the fellow rank of three of the largest engineering societies (IEEE, SAE, ASME). Her innovation in powertrain control technology has been recognized by multiple awards and has been documented in a book, 21 US patents, 340 publications (8 of which have received awards) on estimation and control of internal combustion engines and electrochemical processes such as fuel cells and batteries. Stefanopoulou also has co-authored influential reports on the cost effectiveness of fuel-efficient technologies for light-duty vehicles, sponsored by the National Academies, to help inform policymakers.

NSF Program Directors Presentations: October 5th – 11:00AM

This presentation will describe opportunities that are relevant to the robotics, dynamics and controls communities. The presentation will also describe programs targeted toward junior investigators, as well as guidelines for proposal preparation and NSF's Intellectual Merit and Broader Impacts criteria.

Radhakisan (Kishan) S. Baheti - Kishan handles the areas of Control and Sensor Networks in the Power, Controls and Adaptive Networks (PCAN) Program in ECS.

Jordan M. Berg – Jordan is Program Director in the Division of Civil, Mechanical, and Manufacturing Innovation (CMMI), in the Engineering Directorate (ENG) of the US National Science Foundation (NSF). He is Emeritus Professor of Mechanical Engineering at Texas Tech University, where he served as Co- Director of the Nano Tech Center, and Associate Director of the DISCO (Dynamic Intelligent Systems, Control and Optimization) group

Irina Dolinskaya – Irina is a Program Director at the National Science Foundation (NSF) in the Division of Civil, Mechanical & Manufacturing Innovation (CMMI). Dr. Dolinskaya services Dynamics, Control and Systems Diagnostics (DCSD) and Foundational Research in Robotics (Robotics) programs, as well as National Robotics Initiative (NRI 2.0) and Navigating the New Arctic (NNA) NSF's 10 Big Ideas.

Robert Landers – Robert is a Curators' Distinguished Professor of Mechanical Engineering in the Department of Mechanical and Aerospace Engineering at the Missouri University of Science and Technology (formerly University of Missouri Rolla) and served as the department's Associate Chair for Graduate Affairs for eight years. He is currently a program manager at the National Science Foundation

Eduardo Misawa – Eduardo is currently a Program Director in the Directorate for Engineering at the National Science Foundation, where he manages the Engineering Research Centers (ERC) and Network for Computational Nanotechnology (NCN) programs.

Industrial Workshop Panel: October 5th – 3:40PM - This session will not be recorded

Claus Danielson: Speaking about his experience going between academia and industry from when he was a controls researcher at MERL and now a professor at UMN, highlighting (and dismantling) the idea that you are "locked in" to the career you choose upon graduation.

Evan Chang-Siu: Speaking about his experience as a teaching faculty member. He spent time at a robotics startup and then moved into a teaching-focused undergraduate institution, which are two opposite ends of the career spectrum.

Erin McColl: Speaking about taking her technical background in mechatronics and applying it to a technical program management role, a position that many engineers are qualified for but may not know about.

Sarah Thornton: Speaking about applying her degree in controls and ethics research to the field of systems engineering.

Plenary 2: October 6th -10:00AM

Speaker: Dr. Xiaobo Tan
MSU Foundation Professor & Richard M. Hong Endowed Chair
Department of Electrical & Computer Engineering
Department of Mechanical Engineering
Michigan State University

Title: Robotic Fish: Make "Sense" of the Underwater World

Abstract: Bioinspired robotic fish have gained widespread interest due to their natural appeal and promising prospect for underwater sensing. In this talk I will share our robotic fish work, from lab research to field experimentation. I will focus on gliding robotic fish "GRACE", which combines maneuverability of robotic fish with energy-efficiency of underwater gliders. I will highlight the roles of dynamics and control in advancing the goal of autonomous sensing, through a series of examples motivated by applications of practical relevance: exploiting spiral dynamics of GRACE to monitor harmful algal blooms, developing distributed filtering algorithms to track movement of invasive fish species, and facilitating human-robot collaboration in underwater search and rescue.

Bio: Dr. Xiaobo Tan is an MSU Foundation Professor and the Richard M. Hong Endowed Chair in Electrical and Computer Engineering at Michigan State University. He received his bachelor's and master's degrees in automatic control from Tsinghua University, Beijing, China, in 1995, 1998, respectively, and his Ph.D. in electrical and computer engineering from the University of Maryland in 2002. His research interests include underwater robotics, soft robotics, smart materials, and control systems. He has published about 300 papers and been awarded four US patents in these areas.

Dr. Tan is a Fellow of IEEE and ASME. He was a recipient of the NSF CAREER Award (2006), MSU Teacher-Scholar Award (2010), MSU College of Engineering Withrow Distinguished Scholar Award (2018), Distinguished Alumni Award from the ECE Department at University of Maryland (2018), and multiple best paper awards. Dr. Tan is currently a Senior Editor for IEEE/ASME Transactions on Mechatronics (TMECH), and has served as an Associate Editor for Automatica, Technical Editor for TMECH, and guest editor for six journals. He has been on the organizing committees for a number of international conferences, including serving as the General Chair for the 2018 ASME Dynamic Systems and Control Conference. Dr. Tan is keen to integrate his research with educational and outreach activities, and has served as Director of an NSF-funded Research Experiences for Teachers (RET) Site program at MSU from 2009 - 2016 and Curator of a robotic fish exhibit at MSU Museum in 2016-2017.

Rufus Oldenburger Lecture: October 6th – 11:00AM

Speaker: Dr. Mark Spong
Professor of Systems Engineering
Professor of Electrical and Computer Engineering
Excellence in Education Chair
Erik Jonsson School of Engineering & Computer Science
University of Texas at Dallas

Title: Life in the Underactuated Lane

Abstract: Underactuated mechanical systems are those with fewer actuators than degrees of freedom and arise in several applications including flexible-joint and flexible-link robots, gymnastic robots, as well as walking, flying, and swimming robots. In addition, the relatively new area of soft robots presents new challenges and opportunities for control of underactuated systems. Various tools have been applied to control underactuated systems, such as static and dynamic feedback linearization, partial feedback linearization, and passivity-based control. In this talk I will present several results that my students and I have obtained for flexible-joint robots, gymnastic robots, and other systems, and discuss how these ideas may prove useful for controlling soft robots.

Bio: Mark W. Spong received his doctorate degree in systems science and mathematics in 1981 from Washington University in St. Louis. He has held faculty positions at Lehigh University (1981-82), Cornell University (1982-84), and at the University of Illinois at Urbana-Champaign (1984-2008).

He is currently Professor of Systems Engineering, Professor of Electrical and Computer Engineering and holds the Excellence in Education Chair at the University of Texas at Dallas. From 2008-2017 he was the Dean of the Erik Jonsson School of Engineering and Computer Science at UT-Dallas. He is also Donald Biggar Willett Professor Emeritus from the University of Illinois at Urbana-Champaign.

Professor Spong is Past President of the IEEE Control Systems Society and past Editor-in-Chief of the IEEE Transactions on Control System Technology. He is a Life Fellow of the IEEE and a Fellow of IFAC. His main research interests are in robotics, mechatronics, and nonlinear control theory. He has authored or coauthored more than 300 technical articles in control and robotics, five books and holds one patent. He has made fundamental contributions in robust and nonlinear control of robot manipulators, teleoperators, bipedal walking robots, and multi-robot systems.

Professor Spong's notable awards include the 2020 Rufus Oldenberger Medal from the ASME, the 2018 Bode Lecture Prize from the IEEE CSS, the 2016 Nyquist Lecture Prize from the ASME, the 2011 Pioneer in Robotics Award from the IEEE Robotics and Automation Society, the first IROS Fumio Harashima Award for Innovative Technologies in 2007, the IEEE Transactions on Control Systems Technology Outstanding Paper Award, the Senior Scientist Research Award from the Alexander von Humboldt Foundation, the Distinguished Member Award from the IEEE Control Systems Society, the John R. Ragazzini and O. Hugo Schuck Awards from the American Automatic Control Council, and the IEEE Third Millennium Medal.

Student Career Advising/Networking Session -Navigating a Post-Graduate Career Path in a Challenging Time: October 6th – 1:20PM

This session will not be recorded

Dr. Selina Pan is a Senior Research Scientist for Planning and Control at Toyota Research Institute. She received the Ph.D. degree in mechanical engineering from UC Berkeley in 2014, the M.S. degree in mechanical engineering from UC Berkeley in 2009, and the B.S.E. degree in aerospace engineering from the University of Michigan in 2008. Her doctoral research was in unmanned aircraft and automotive engine control. Her current research interests are in ethics, driver-vehicle interaction, and integrated path planning and tracking in autonomous vehicles.

Sam Pedigo is the Boeing-side Director of the University of Washington/Boeing collaborative research lab called BARC (Boeing Advanced Research Center). In this role, he leads university students and Boeing embedded engineers in collaborative research into many different areas relevant to aerospace manufacturing. Sam's responsibilities include finding appropriate research projects, contract development, mentoring students and Boeing engineers, and conducting tours of the research facilities.

Igor Alvarado is a Business Development and Account Manager at National Instruments (NI). He received the A.S. and B.S. degrees in mechanical engineering from Kansas State University in 1982 and 1984, respectively. At NI, he helps to develop collaborations and strategic partnerships with national labs and leading universities in the U.S. in such areas as Cyber-Physical Systems, Energy, Medical Imaging/Devices and RF/Wireless Communications. He has led the design, development and deployment of real-time, measurement and intelligent control systems that involve advanced numerical methods and algorithms using high-performance embedded computing platforms. He is also an NSF Innovation-Corps mentor.

Karsin Lam is an Industrial Engineer at Quanser. He graduated from Ontario Tech University in 2016 with a B.Eng degree in mechanical engineering. At Quanser, he works on streamlining new products from R&D to production, creating processes and introducing new technology to raise the efficiency of operations within the company. He has spearheaded many initiatives including introducing new ERP, data management and project management systems to Quanser in the short time he has been with the company. He was also involved in programs such as FIRST robotics where he mentored students through competitive robotics providing a path towards an education and career in STEM.

Dr. Bernhard Knigge is Director of the RSS HDI Firmware teams at Western Digital Corporation, focusing on head disk interface spacing control and defect management. Bernhard studied Physics at the TU Munich. He then pursued his Ph.D. in Engineering Sciences from UCSD, with his thesis focusing on head disk interface physics. Bernhard is an expert in the tribology field with over 20+ years of experience; he held positions at IBM Almaden Research Center and Hitachi GST where he made significant contributions to the head disk interface design and to improve drive reliability; in particular Bernhard invented the slider-disk contact potential compensation scheme. He joined Western Digital in 2009 where he led the PMR and HAMR tribology teams. He has also mentored many students and initiated new research projects inside and outside of Western Digital. In the last 4 years Bernhard is managing the world-wide HDI Firmware teams. In 2016, Bernhard was honored with the "Outstanding Alumni Award" from UCSD. He holds 55 patents and has authored and co-authored over 50 publications. He enjoys reading, skiing, hiking and playing the piano

Plenary 3: Nyquist Lecture: October 7th – 10:00AM

Title: Haptics: A Hot Topic with Controls at its Core

Abstract: We depend on touch-based, or haptic, information throughout our daily activities, even in ways that we do not consciously realize. Given the importance of this sensory channel, haptic feedback is becoming commonplace in consumer electronic devices and advanced robotic systems. From simple smart watch vibration notifications to state of the art full body haptic displays in virtual reality games, the potential for our sense of touch to enhance information transfer and realism is clear. What is "under the hood," making realistic haptic interactions possible? Feedback and stability are critical concepts, central to realizing high-fidelity haptics. These concepts also play out in the applications of haptic guidance, virtual environment-based training , and rehabilitation robotics that have shaped my own research. In this talk, I will discuss the fundamental concepts in dynamic systems and controls that are at the heart of these haptic

interactions. I will also share how the dynamic systems and controls community launched the field of haptics, and the need for our continued engagement in the field going forward.

Bio: Marcia O'Malley is the Thomas Michael Panos Family Professor in Mechanical Engineering, Computer Science, and Electrical and Computer Engineering at Rice University where she directs the MAHI (Mechatronics and Haptic Interfaces) Lab. Her research addresses issues that arise when humans physically interact with robotic systems, with a focus on training and rehabilitation in virtual environments. She is a Fellow of both the American Society of Mechanical Engineers and the Institute of Electrical and Electronics Engineers. She serves as a senior associate editor for the ACM Transactions on Human Robot Interaction and the IEEE/ASME Transactions on Mechatronics, and as co-Editor in Chief of the IEEE Transactions on Haptics.

Workshops

October 4th - 1:00PM

Mitigating Gasoline Particulate Emissions: Challenges and Best Practices, a Modeling and Control Perspective Workshop:

Impending particulate emissions regulations have placed emphasis on the number of particles emitted from gasoline engines, creating an imposing challenge for manufacturers who utilize direct injection combustion strategies. While substantial work remains in the in-cylinder prevention of gasoline particulates, the immediate need remains their removal from current exhaust streams. Filtration of gasoline particulates creates unique challenges due to the inherent nature of spark ignited engine operation. This workshop outlines and addresses the fundamental modeling and control challenges of filtering gasoline particulates, provides best practices for experimental particulate investigations, introduces the audience to the unique challenges of physically modeling gasoline particulate filters, and speaks toward the impact of particulate filtration on engine control.

October 4th - 3:00PM

Controllable Tensegrity Structures and Membranes Workshop:

The growing need for lightweight, flexible, adaptive mechanical systems led to increased interest in structural networks which include a large number of cables. This approach to structural design leads to significant reduction in weight as well as increased flexibility compared to classical bar assemblies because cables are lightweight and flexible. Important members of the cable structures family are tensegrity structures, which are prestressed cable-bar networks that elicit significant interest from the dynamic and control community. These structural designs have a bio-inspired flavor since they mimic the articulated skeletons of living organisms. In these organisms, tendons and muscles control the movement of the skeletal structure, playing the equivalent role of cables, while bones can be assimilated with bars. If membranes are added to these structures, they mimic the skin of living organisms. Importantly, recent advances in power electronics, signal processing, control, as well as materials, computational capabilities and system design, enable implementation of modern controllers that can effectively control the behavior of such structures networks. Following these major breakthroughs, this workshop discussed key challenges, fundamental principles, and recent advances in the analysis, design, and control of tensegrity and membrane structures.

October 6th - 2:30PM

NSF Program Director Workshop

So, you think you have a great research idea, now how do you get funding from the National Science Foundation (NSF) to do the work? A well-scoped and written proposal is instrumental to successful submission. This session targets junior faculty and researchers who might be new to NSF and describes detailed guidelines and practical advice for proposal preparation. The presenter will go over NSF review process and Intellectual Merit and Broader Impacts criteria, as well as share most common mistakes made by the Primary Investigators when submitting a proposal. Question-and-answer session will follow the presentation.

Technical Committee Meetings

Automotive and Transportation Systems (ATS) Technical Committee
Time: Oct 6, 6pm-7pm (EDT)
Link: to be hosted by Marcello Canova (canova.1@osu.edu)

Bio-Systems and Health Care (BSHC) Technical Committee Meeting
Time: Oct 6, 8pm-9pm (EDT)
To be hosted by Dumitru Caruntu (dumitru.caruntu@utrgv.edu)

Mechatronics Technical Committee Meeting
Time: Oct 6, 7pm EDT
To be hosted by Dr. Garrett Clayton (garret.clayton@villanova.edu

Robotics Technical Committee Meeting
Time: Oct 6, 8pm-9pm (EDT)
To be hosted by Dr. Jongeun Choi (jongeunchoi@yonsei.ac.kr)

Vibrations Technical Committee Meeting
Time: Oct 6, 7pm-8pm (EDT)
To be hosted by Dr. Minhgui Zheng (mhzheng@buffalo.edu)

Energy Systems (ES) Technical Committee Meeting
Time: Oct 6, 7pm-8pm (EDT)
To be hosted by Dr. Scott Moura (smoura@berkeley.edu)

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Technical Session Program

Session Name	Time	Paper Number	Paper Title	Presenting Author	Session Chair	Session Co-Chair
October 5th - All times in US EDT						
Adaptive and Intelligent Systems Control	11am - 12pm	DSCC2020-3211	Position and Attitude Control of Underactuated Drones Using the Adaptive Function Approximation Technique	Azin Shamshirgaran	ChengZhi Yuan	Xu Jin
		DSCC2020-3111	Further Results on Performance Guarantees in Adaptive Control of Uncertain Systems With Unmodeled Dynamics	Kadriye Merve Dogan		
		DSCC2020-3245	Sensor and Actuator Intrusion Detection for Cyber-Physical Systems via Adaptive Estimation Algorithm	Jiayi Su		
		DSCC2020-3117	Decentralized Iterative Learning Cooperative Impedance Control for a Team of Robot Manipulators	Xu Jin		
		DSCC2020-3112	A Novel Intelligent Learning Control Scheme for Discrete-Time Nonlinear Uncertain Systems in Multiple Environments	Jingting Zhang		
Advanced Driver Assistance and Autonomous Technologies	11am - 12pm	DSCC2020-3286	Control Design for Autonomous Vehicle Emergency Safe Stop System Based on Differential Dynamic Programming	Lisheng Yang	Junmin Wang	Pingen Chen
		DSCC2020-3253	Minimum Safety Distances for Emergency Braking Manuevers in Car-Following Applications	Devin Schafer		
		DSCC2020-3141	The Effects of Trailer Towing on the Dynamics of a Lane-Keeping Controller	Illes Voros		
		DSCC2020-3113	Real-Time Driver Model Parameter Identification: An Algebraic Approach	Zejiang WANG		
		DSCC2020-3115	A Lateral Motion Planning Method for Automated Vehicles Based on Sinusoids	Wei WANG		
Advances in Control Design Methods	12:10pm - 1:10pm	DSCC2020-3191	Iterative Learning Control for Hybrid Systems	Kirti Deo Mishra	Beibei Ren	Kirti Deo Mishra
		DSCC2020-3331	Output-Feedback Lpv Control of Permanent Magnet Synchronous Motors	Shahin Tasoujian		
		DSCC2020-3327	Pd Controller With Self Adaptive Gains for Quadrotor Waypoint Navigation	Madhavan Sudakar		
		DSCC2020-3267	Robust Iterative Learning Control for Interval Linear Systems	Kirti Deo Mishra		
		DSCC2020-3221	Error Dynamics Design via a Repetitive Loop for Ude-Based Robust Control to Reject Periodic Disturbances	Yeqin Wang		
Advances in Nonlinear Control	12:10pm - 1:10pm	DSCC2020-3151	Nonlinear Zero-Dynamics Attacks Targeting Nuclear Power Plants	Jacob Farber	Suresh Reddy	Peiman Naseradinmousavi
		DSCC2020-3271	Constrained Control of Input Delayed Systems With Partially Compensated Input Delays	Imoleayo Abel		
		DSCC2020-3149	New Analysis/design of Generalized Discrete Pi Controller via Discrete Time Delay Control for Nonlinear Systems	Suresh Reddy		
		DSCC2020-3144	New Stability Analysis and Design of Discrete Time Delay Control for Nonaffine Nonlinear Systems	Suresh Reddy		
		DSCC2020-3114	Experimental and Analytical Nonzero-Sum Differential Game-Based Control of a 7-Dof Robotic Manipulator	Mostafa Bagheri		
Invited: Assistive and Rehabilitation Devices Design, Modeling, Analysis and Control,	12:10pm - 1:10pm	DSCC2020-3216	Effect of Additional Weight on Human Squat Exercise Stability: Ground Reaction Forces and Centers of Pressure	Dumitru Caruntu	Dumitru Caruntu	Kamran Iqbal
		DSCC2020-3164	Angular Velocity Control of Pneumatic Soft Robotic Digits	W. Y. Shi		
		DSCC2020-3161	Modeling and Analysis of the Effects of Startle Reaction on Group Coordination	Violet Mwaffo		
		DSCC2020-3269	Optimal Realization of Endpoint Stiffness in Static Human Arm Postures	kamran iqbal		
		DSCC2020-3227	An Inconspicuous, Integrated Electronic Travel Aid for Visual Impairment	Alain Boldini		
Vehicle Dynamics, Estimation and Control	1:20pm - 2:20pm	DSCC2020-3167	Improving Passenger Comfort by Exploiting Hub Motors in Electric Vehicles: Suspension Modeling	Di Chen	YOUSEF SARDAHI	Gladys Abapo
		DSCC2020-3121	Multi-Objective Optimal Design of an Active Aeroelastic Cascade Control System for an Aircraft Wing With a Leading and Trailing Control Surface	Yousef Sardahi		
		DSCC2020-3301	A Novel Plate-Like Sensor Utilizing Curvature-Based Stiffening for Nanometrology Applications	Rafiul Shihab		
Energy and Power Systems	1:20pm - 2:20pm	DSCC2020-3146	Observer Design for the Series Interconnection of Li-Ion Battery Cells Subject to Reduced Voltage Information	Luis D. Couto	John Wagner	Baisravan HomChaudhuri
		DSCC2020-3193	Suggestion-Based Fuel Efficient Control of Connected and Automated Vehicles	Tinu Vellamattathil Baby		
		DSCC2020-3145	Adaptive Equivalent Factors of Multi-Objective Energy Management for Fuel Cell Hybrid Electric Vehicles	Yan Ma		
		DSCC2020-3110	Model Predictive Control Fot a Synchronous Machine With a Pulsed, Constant-Power Load	Adam Parry		
		DSCC2020-3108	A Traveling Wave Thermoacoustic Engine - Design and Test	Chengshi Wang		
		DSCC2020-3210	An Online Transfer Learning Approach for Identification and Predictive Control Design With Application to Rcci Engines	Yajie Bao		

Estimation and Identification I	1:20pm - 2:20pm	DSCC2020-3312	Design, Modeling, and Identification of an Experimental Liquid-Level Control System: Enabling Research in Fault Diagnosis	Hilina Workneh	IOANNIS RAPTIS	Nicole Abaid
		DSCC2020-3235	Bearing-Only Localization of a Quasi-Static Sound Source With a Binaural Microphone Array	Aidan Bradley		
		DSCC2020-3186	Modeling and Parameter Identification for Condition Monitoring of Surface-Mount Permanent Magnet Machines Under Magnet Demagnetization	Fanny Pinto Delgado		
		DSCC2020-3287	Passivity-Based Disturbance Observer Design	Ying-Chun Chen		
Advances in Motion and Vibration Control	2:30pm - 3:30pm	DSCC2020-3153	Advanced Dynamics Analysis of a Drilling Roller Reamer as a Rigid Multibody System	Opeyemi Adewuya	Bryan Maldonado	Xu Chen
		DSCC2020-3320	On the Zeros of an Undamped Three-Dof Flexible System	Siddharth Rath		
		DSCC2020-3246	New Hammerstein Modeling and Analysis for Controlling Melt Pool Width in Powder Bed Fusion Additive Manufacturing	Dan Wang		
		DSCC2020-3251	Nems Circular Plates Under Hard Electrostatic Excitations: Amplitude-Frequency Response of Superharmonic Resonance of Second Order to Include Casimir Effect	Dumitru Caruntu		
		DSCC2020-3342	Adrc-Based Model Predictive Control of Irrigation Canals	Jose Carreno		
Advances in Robotics I	2:30pm - 3:30pm	DSCC2020-3163	Steerable Needle Trajectory Following in the Lung: Torsional Deadband Compensation and Full Pose Estimation With 5dof Feedback for Needles Passing Through Flexible Endoscopes	Tayfun Efe Ertop	Peiman Naseradinmousavi	Scott Bortoff
		DSCC2020-3291	Cooperation and Null-Space Control of Networked Omni-Directional Mobile Manipulators	Michael Chua		
		DSCC2020-3158	Modelica-Based Control of a Delta Robot	Scott Bortoff		
		DSCC2020-3156	Navigation and Obstacle Avoidance of Snake-Robot Guided by a Co-Robot Uav Visual Servoing	Mahdi Haghshenas-Jaryani		
		DSCC2020-3181	Experimental and Analytical Decentralized Adaptive Control of a 7-Dof Robot Manipulator	Alexander Bertino		
Dynamics and Control of Human-Robot Systems	2:30pm - 3:30pm	DSCC2020-3125	Adaptive Trajectory Tracking During Motorized and Fes-Induced Biceps Curls via Integral Concurrent Learning	Brendon Allen	Amirhossein Ghasemi	
		DSCC2020-3296	Adaptive Impedance Control for the Haptic Shared Driving Task Based on Nonlinear Mpc	Amirhossein Ghasemi		
		DSCC2020-3311	Motorized and Functional Electrical Stimulation Induced Cycling via Switched Adaptive Concurrent Learning Control	Jonathan Casas		
		DSCC2020-3177	Galvanic Skin Response as a Measure of Engagement During Play in Virtual Reality	Roni Barak Ventura		
		DSCC2020-3131	Teleoperated Motorized Functional Electric Stimulation Actuated Rehabilitative Cycling	Kimberly Stubbs		
Advances in Sensors and Actuators	3:40pm - 4:40pm	DSCC2020-3297	Design of a Xenia Coral Robot Using a High-Stroke Compliant Linear Electromagnetic Actuator	Noah Kohls	Yi Mazumdar	
		DSCC2020-3324	Band Gap and Natural Frequency Manipulation by Magnetostrictive Material in a Sandwich Plate Structure	Soroush Korivand		
		DSCC2020-3277	The Effect of Simultaneous Auditory and Visual Sensing Cues in a Two-Dimensional Vicsek Model	Subhradeep Roy		
		DSCC2020-3337	Motion Equations for the Ball and Beam and the Ball and Arc Systems	Constance Lare		
		DSCC2020-3321	Dynamic Modeling of Voice Coil Motor-Actuated Flexible Membranes	Hongyang Shi		
Vibration and Control Systems I	3:40pm - 4:40pm	DSCC2020-3132	Stability Analysis and Controller Design for Linear Time Periodic Systems Using Normal Forms	Susheelkumar Cherangara Subramanian	Oumar Barry	Sangram Redkar
		DSCC2020-3254	The Effect of Time Delay on the Stability Control of Trailers	Hanna Zsofia Horvath		
		DSCC2020-3160	Simultaneous Vibration Mitigation and Energy Harvesting of a Nonlinear Oscillator	Paul-Camille Kakou		
		DSCC2020-3176	Effect of Electromechanical Coupling on Locally Resonant Metastructures for Simultaneous Energy Harvesting and Vibration Attenuation Applications	Mohammad Bukhari		
		DSCC2020-3209	Data Driven Feedforward Control Design and Input Shaping Techniques for Multi Actuator Drives	Prateek Shah		
Modeling and Control of Engine and After-treatment Systems	4:50pm - 5:30pm	DSCC2020-3255	Control-Oriented Modeling of Cycle-to-Cycle Combustion Variability at the Misfire Limit in Si Engines	Bryan Maldonado	Pingen Chen	
		DSCC2020-3332	A Receding-Horizon Framework to Co-Optimizing the Velocity and Power-Split of Automated Plug-in Hybrid Electric Vehicles	Di Chen		
		DSCC2020-3317	Control-Oriented Model Development and Experimental Validation for a Modern Diesel Engine	Kuo Yang		
Biomedical and Rehabilitation Systems	4:50pm - 5:30pm	DSCC2020-3129	A Cellular Automata Model for Dynamics and Control of Cardiac Arrhythmias	Min Xiong	Xiaopeng Zhao	
		DSCC2020-3128	On a Gamified Brain-Computer Interface for Cognitive Training of Spatial Working Memory	Ziming Liu		
		DSCC2020-3127	Modeling Analysis of the Wrist Dynamics via an Ellipsoidal Joint	Jiamin Wang		

October 6th - All times in US EDT

Building Energy Systems (invited)	12:25pm - 1:15pm	DSCC2020-3118	Cutting the Deployment Costs of Physics-Based Mpc in Buildings by Simulation-Based Imitation Learning	Jan Drgona	Marcello Canova	Ján Drgoňa
		DSCC2020-3294	Control Structure Design of Building Hvac Systems Using a Data-Driven Self-Optimizing Control With Active Set Change	Zhongfan Zhao		
		DSCC2020-3184	Parametric Modeling and Optimal Control of a Combined Heating and Power System With Energy Storage	Stephanie Stockar		
		DSCC2020-3229	Achieving Improved Personalization and Energy Efficiency in Cohabited Work-Spaces Through Data-Driven Predictive Control	Syed Ahsan Raza Naqvi		
Advandc Power Systems	12:25pm - 1:15pm	DSCC2020-3109	Arm Motion Dynamics to Excite a Mobile Energy Harvesting Autowinder	Abby George	Javad Mohammadpour Velni	John Wagner
		DSCC2020-3252	Development and Implementation of a New Optimal Supplemental Lighting Control Strategy in Greenhouses	Shirin Afzali		
		DSCC2020-3303	Characterization of Duty Cycles for the Peak Shaving Electric Grid Energy Storage Application	Kevin Moy		
		DSCC2020-3318	Parameter Identification and Sensitivity Analysis for Zero-Dimensional Multi-Physics Lithium-Sulfur Battery Models	Chu Xu		
Vibrations: Modeling , Analysis, and Control	12:25pm - 1:15pm	DSCC2020-3284	Including Image-Based Perception in Disturbance Observer for Warehouse Drones	Zhu Chen	Minghui Zheng	Dumitru Caruntu
		DSCC2020-3194	Performance Evaluation of Suspended Energy Harvesting Backpack Using Half-Wave Mechanical Rectification	Jia Mi		
		DSCC2020-3199	Physics Based Multi-Fidelity Data Fusion for Efficient Characterization of Mode Shape Variation Under Uncertainties	Kai Zhou		
		DSCC2020-3217	Frequency-Amplitude Response of Subharmonic Resonance of One-Third Order of Electrostatically Actuated Mems Circular Plates	Dumitru Caruntu		
Estimation and Identification II	1:20pm - 2:20pm	DSCC2020-3230	Effect of Neural Network on Reduction of Noise for Edge Detection	Diane Peters	Qingze Zou	Diane Peters
		DSCC2020-3159	Input Excitation Analysis for Black-Box Quadrotor Model System Identification	John Angarita		
		DSCC2020-3304	Adaptive Parameter Estimation With Convergence Analysis for the Prandtl-Ishlinskii Hysteresis Operator	Xiaobo Tan		
		DSCC2020-3283	An Improved Model of Height Profile for Drop-on-Demand Print of Uv Curable Ink	Yumeng Wu		

		DSCC2020-3264	Mobile Sensing of Multi-Dimensional Dynamic Field via Compressed Sensing	Tianwei Li		
Advances in Mechatronics Systems	1:20pm - 2:20pm	DSCC2020-3105	Hapticwall - an Encountered-Type Two-Dimensional Vertical System for Virtual Reality	Yuwei Li	Min Li	Yuwei Li
		DSCC2020-3306	Design Analysis of a Distributed Actuation-Sensing System Using Direct Field-Feedback for Eddy-Current Pattern Control	Min Li		
		DSCC2020-3288	Dynamic Prediction-Based Optical Localization of a Robot During Continuous Movement	Jason Greenberg		
		DSCC2020-3220	A Numerical Investigation of an Eddy Current Sensor for Detecting Small Defects in Metal Additive Manufacturing	Zhengya Guo		
		DSCC2020-3107	Control Design for an Emulator of Mechatronic Powertrain Dynamics: A Case Study	Laurens Jacobs		
Advanced Manufacturing Systems	2:30pm - 3:30pm	DSCC2020-3238	A Control-Oriented Dynamical Model of Deposited Droplet Volume in Electrohydrodynamic Jet Printing	Isaac Spiegel	Doug Bristow	Layne Clemen
		DSCC2020-3222	A Switched Adaptive Model for Layer-to-Layer Selective Laser Melting With Varying Laser Paths	Xin Wang		
		DSCC2020-3197	Physics-Informed Gaussian Process Based Optimal Control of Laser Powder Bed Fusion	Yong Ren		
		DSCC2020-3260	Application of Mimo Data Driven Feedback Control Design to Dual Stage Hard Disk Drives	Prateek Shah		
		DSCC2020-3258	Modeling Thermal Effects in Dc-Motors Using Pseudo-Bond Graphs	Layne Clemen		
Advances in Robotics II	2:30pm - 3:30pm	DSCC2020-3183	Marker Based Row Alignment Control for an Agricultural Scouting Robot	Qiang Li	Yunjun Xu	Biswanath Samanta
		DSCC2020-3305	Distributed Particle Filter With Online Model Learning for Localization Using Time-Difference-of-Arrival (Tdoa) Measurements	Chandler Panetta		
		DSCC2020-3282	Sensing and Classification of Ambient Vortex Wake From the Kinematics of a Bioinspired Swimming Robot Using Neural Networks	Phanindra Tallapragada		
		DSCC2020-3279	Visual Navigation of Wheeled Mobile Robots Using Deep Reinforcement Learning: Simulation to Real-Time Implementation	Biswanath Samanta		
		DSCC2020-3278	Design of a Parallel Elastic Hopper With a Wrapping Cam Mechanism and Template Based Virtually Tunable Damping Control	Sinan Şahin Candan		
Control and Estimation of Energy Systems	3:40pm - 4:40pm	DSCC2020-3175	Multi-Level Hierarchical Estimation for Thermal Management Systems of Electrified Vehicles	Pamela Tannous	Ellen Yi Mazumdar	Yan Chen
		DSCC2020-3190	Hierarchical Multi-Timescale Energy Management for Hybrid-Electric Aircraft	Wenqing Wang		
		DSCC2020-3203	Nonlinear Hierarchical Mpc for Maximizing Aircraft Thermal Endurance	Daniel Leister		
		DSCC2020-3233	Graph-Based Design and Control Optimization of a Hybrid Electrical Energy Storage System	Cary Laird		
Vibration and Control Systems II	3:40pm - 4:40pm	DSCC2020-3257	Vibrational Control of a 2-Link Mechanism	Zakia Ahmed	Phanindra Talla pragada	Joshua Vaughan
		DSCC2020-3276	Towards a Mobile Robot for Vibration Control and Inspection of Power Lines	Paul-Camille Kakou		
		DSCC2020-3307	Leveraging Conventional Control to Improve Performance of Systems Using Reinforcement Learning	Gerald Eaglin		
		DSCC2020-3310	Parameter Sensitivity Analysis of Peizoelectrically-Actuated Flexural/torsional Vibrating Beams	Roya Salehzadeh		
		DSCC2020-3326	Nonholonomic Systems With Redundant Degrees of Freedom Can Exploit Nonlinear Frequency Response to Improve Speed and Efficiency of Locomotion	Phanindra Tallapragada		
Estimation and Identification III	4:50pm - 5:30pm	DSCC2020-3295	Dynamic Modeling of a Steerable Drifter	Eric Gaskell	Warren White	
		DSCC2020-3292	Data-Driven Drop Formation Modeling in Nanoliter Drop-on-Demand Inkjet Printing	Jie Wang		
		DSCC2020-3298	Continuum of Motion Equations and Control Laws for the Inverted Pendulum Cart and Rotary Pendulum	Constance Lare		
Driver Assistance and Autonomous Technologies	4:50pm - 5:30pm	DSCC2020-3174	Combined Trajectory Planning and Tracking for Autonomous Vehicles on Deformable Terrains	James Dallas	Yao Ma	
		DSCC2020-3293	Switched Control Barrier Functions With Applications to Vehicle Safety Control	Yiwen Huang		
		DSCC2020-3122	Inverse Reinforcement Learning Based Driver Behavior Analysis and Fuel Economy Assessment	Mehmet Ozkan		

October 7th - All times in US EDT

Design, modeling and control of rehabitation devices	11:00am - 12:00pm	DSCC2020-3104	Numerical Simulation of Dynamic Bending Deflection of a Disc Cam Profile With Roller Follower System	Louay S. Yousuf	Nitin Sharma	Ayonga Hereid
		DSCC2020-3225	Sampled-Data Observer Based Dynamic Surface Control of Delayed Neuromuscular Functional Electrical Stimulation	Qiang Zhang		
		DSCC2020-3196	An Ultrasound Imaging Based Observer for Estimating Nmes-Induced Muscle Fatigue: Theory and Simulation	Zhiyu Sheng		
		DSCC2020-3170	Dynamic Locomotion of a Lower-Limb Exoskeleton Through Virtual Constraints Based Zmp Regulation	Victor Paredes Cauna		
		DSCC2020-3140	The Swirling Pendulum: Conceptualization, Modelling, Equilibria and Control Synthesis	Sujay Kadam		
Multi-agent and Networked Systems	11:00am - 12:00pm	DSCC2020-3178	Formation Control for Underactuated Surface Vessel Networks	Bo Wang	Hashem Ashrufiuon	Blake Buchanan
		DSCC2020-3162	Formation Control of Non-Holonomic Mobile Robots Moving on Slippery Surfaces	Violet Mwaffo		
		DSCC2020-3206	Cooperative Localization of Vehicles in Three-Dimensional Space	Juan Carlos Oliveros		
		DSCC2020-3315	Stability and Control of Chaplygin Beanies Coupled to a Platform Through Nonholonomic Constraints	Blake Buchanan		
		DSCC2020-3136	Passivity-Based Distributed Acquisition and Station-Keeping Control of a Satellite Constellation in Areostationary Orbit	Emmanuel Sin		
Path Planning and Motion Control	11:00am - 12:00pm	DSCC2020-3208	Contact-Rich Trajectory Generation in Confined Environments Using Iterative Convex Optimization	Weiye Zhao	Kooktae Lee	Changliu Liu
		DSCC2020-3241	On the Ergodicity of an Autonomous Robot for Efficient Environment Explorations	Rabiul Hasan Kabir		
		DSCC2020-3300	Trajectory Generation From Paths for Autonomous Ground Vehicles	Letian Lin		
		DSCC2020-3169	Predictive Motion Planning for Autonomous Vehicles With Geometric Constraints via Convex Optimization	Yan Ma		
		DSCC2020-3328	Interaction-Aware Behavior Planning for Autonomous Vehicles Validated With Real Traffic Data	Jinning Li		
Unmanned Ground and Aerial Vehicles I	12:10pm - 1:10pm	DSCC2020-3126	A Control Algorithm Framework for Time-of-Arrival and Arrival Airspeed Control	Shawn Stephens	Kam Leang	Manish Kumar
		DSCC2020-3239	Optimal Control of a Multirotor Unmanned Aerial Vehicle Based on a Multiphysical Model	Nicolas Michel		
		DSCC2020-3205	Autonomous Light Assessment Drone for Dark Skies Studies	Matthew N. Goodell		
		DSCC2020-3319	Developmental Reinforcement Learning of Control Policy of a Quadcopter Uav With Thrust Vectoring Rotors	Aditya Milind Deshpande		
		DSCC2020-3139	Attack-Resilient Observer Pruning for Path-Tracking Control of Wheeled Mobile Robot	Yu Zheng		
Modeling and Control of Soft Actuators and Manipulators	12:10pm - 1:10pm	DSCC2020-3232	Modeling and Simulation of Aircell Actuator Seat Cushion With Pneumatic Line Lag and Capacitative Effects	Pavan Nuthi	Ayse Tekes	Olugbenga Moses Anubi
		DSCC2020-3259	Monolithic Leg Design With Compliant Knee Joint for Bipedal Robots: Design and Preliminary Results	Ciaphus Rouse		
		DSCC2020-3313	Towards Explainable Co-Robots: Developingconfidence-Based Shared Control Paradigms	Amirhossein Ghasemi		
		DSCC2020-3204	Design and Analysis of a New Mechanism for a Snake Like Robot	Johnathon Garcia		

		DSCC2020-3198	Development of Wire Actuated Monolithic Soft Gripper Positioned by Robot Manipulator	Martin Garcia		
Unmanned Ground and Aerial Vehicles II	1:20pm - 2:20pm	DSCC2020-3212	Optimal Tuning of Single-Axis Satellite Attitude Control Parameters Using Genetic Algorithm	Amin Ghorbanpour	Xiaobo Tan	Qi Lu
		DSCC2020-3243	Dynamic Genetic Algorithm for Optimizing Movement of a Six-Limb Creature	Javier Viana		
		DSCC2020-3268	Application of Fuzzy Logic for Developing Sense and Avoid Techniques for Uav Flight Operations in National Airspace	Zoe Lee		
		DSCC2020-3308	Uncertainty and Disturbance Estimator-Based Robust Region Tracking Control for Multiple Quadrotors	Qi Lu		
		DSCC2020-3275	Fuzzy Logic Controller for Force Feedback Control of Quadcopter via Tether	Bennett Breese		
Energy Storage Systems	1:20pm - 2:20pm	DSCC2020-3124	Temperature Sensor Deployment for Scalable Battery Packs	Mengzhu Gao	Damoon Soudbakhsh	David Howey
		DSCC2020-3172	Extended Physics-Based Reduced-Order Capacity Fade Model for Lithium Ion Battery Cells	Zachary Salyer		
		DSCC2020-3180	Combining Non-Parametric and Parametric Models for Stable and Computationally Efficient Battery Health Estimation	Antti Aitio		
		DSCC2020-3188	Bending Detection of Li-Ion Pouch Cells Using Impedance Spectra	Mohsen Derakhshan		
		DSCC2020-3218	Estimation of Parameter Probability Distributions for Lithium-Ion Battery String Models Using Bayesian Methods	Luis D. Couto		
Improving Vehicle Efficiency and Reducing Emissions	1:20pm - 2:20pm	DSCC2020-3265	Data-Driven Post-Filtering of Acoustics Noise in Atomic Force Microscope Imaging	Jiarong Chen	Yan Chen	Zongxuan Sun
		DSCC2020-3274	Resilient Flocking Control for Connected and Automated Vehicles With Cyber-Attack Threats	Yan Chen		
		DSCC2020-3240	A Predictive Frontal and Oblique Collision Mitigation System for Autonomous Vehicles	Chuanyang Sun		
		DSCC2020-3213	Computationally Efficient Urea-Dosing Controllers for Urea-Scr	Kaushal Kamal Jain		
		DSCC2020-3192	Investigating Trajectory Based Combustion Control Using a Controlled Trajectory Rapid Compression and Expansion Machine (Ct-Rcem)	Abhinav Tripathi		
Advances in Robotics III	2:30pm - 3:30pm	DSCC2020-3314	Receding Horizon Control for a 2d Point-Mass Hopping Model Navigating on Terrain With Stepping Stones and Stairs	Ali Zamani	Hanz Richter	Minghui Zheng
		DSCC2020-3247	Inverse Kinematic Analysis of Muscular Hydrostat Inspired Soft Robot With Chain-Like Optimization With an Embedded Controller	Edmond Richer		
		DSCC2020-3256	Maximum Correntropy Kalman Filter for Orientation Estimation With Application to Lidar Inertial Odometry	Seyed Fakoorian		
		DSCC2020-3234	Prioritized Foraging Strategies for an Ant Colony-Inspired Swarm System	Hari R Iyer		
		DSCC2020-3200	Energy-Optimal, Direct-Phase Control of Brushless Motors for Robotic Drives	Amin Ghorbanpour		
Tracking Control Systems	2:30pm - 3:30pm	DSCC2020-3329	A Novel Approach to Time Series Forecasting Using Model-Free Adaptive Control Framework	Meenakshi Narayan	Joshua Vaughan	Meenakshi Narayan
		DSCC2020-3207	Two-Stage Robust Tracking Controller for Linear Systems With Known Uncertainty Using Filtered Basis Functions	Keval Ramani		
		DSCC2020-3263	Multiple Sliding Surface Controller for a Quadrotor for Improved Robustness Against Wind Disturbances	Madhavan Sudakar		
		DSCC2020-3316	Effect of Short-Term Weather Predictions on Model Predictive Trajectory Tracking Performance of Unmanned Surface Vessels	Joshua Vaughan		
		DSCC2020-3281	Optimal Data-Driven Modeling-Free Differential-Inversion-Based Iterative Control: A Wafer Stage Example	Zezhou Zhang		
Connected Vehicle Systems	2:30pm - 3:30pm	DSCC2020-3335	Safe Decision and Control for Connected Automated Vehicles	Sanghoon Oh	Cong Wang	GABOR OROSZ
		DSCC2020-3173	High-Fidelity Teleoperated Scaled Vehicles for Research and Development of Intelligent Transportation Technologies	Cong Wang		
		DSCC2020-3150	State-Constrained Optimal Solutions for Safe Eco-Approach and Departure at Signalized Intersections	Jihun Han		
		DSCC2020-3250	Benchmarking Fuel Economy of Connected and Automated Vehicles in Real World Driving Conditions via Monte Carlo Simulation	Shreshta Rajakumar Deshpande		
		DSCC2020-3201	Multi-Car Convex Feasible Set Algorithm in Trajectory Planning	Jing Huang		
Intelligent Transportation and Vehicles	3:40pm - 4:40pm	DSCC2020-3148	Speed Trajectory Generation for Energy Efficient Connected and Automated Vehicles	Lung En Jan	Junfeng Zhao	Yunli Shao
		DSCC2020-3138	Motion Planning for Autonomous Driving With Extended Constrained Iterative Lqr	Yutaka Shimizu		
		DSCC2020-3219	Traffic Prediction for Merging Coordination Control in Mixed Traffic Scenarios	Yunli Shao		
		DSCC2020-3244	Optimal Path Planning for a Team of Heterogeneous Drones to Monitor Agricultural Fields	Saba Faryadi		
		DSCC2020-3334	An Integrated Hardware and Software Platform for Control of Automatic Ground Vehicles	Jian Chu		
Motion and Vibration Control Applications	3:40pm - 4:40pm	DSCC2020-3106	Advanced Dynamics Analysis of a Drilling Stabilizer	Opeyemi Adewuya	Opeyemi Adewuya	Oumar Barry
		DSCC2020-3133	Head-Positioning Control in Triple-Stage-Actuator Hard Disk Drives Using Mixed H2/hinf Synthesis Methodologies	Zhi Chen		
		DSCC2020-3154	Nonlinear Modeling and Analysis of Power Lines With Stockbridge Dampers Under Vortex-Induced Vibrations	Arun Lee Malla		
		DSCC2020-3155	On the Nonlinear Vibration Analysis of a Hand-Held Impact Machine	Oreoluwa Alabi		
		DSCC2020-3338	Optimal Selection of Basis Functions for Minimum-Effort Tracking Control of Nonminimum Phase Systems Using Filtered Basis Functions	Keval Ramani		

Awards

Henry M. Paynter Outstanding Investigator Award

Jeffrey L. Stein

University of Michigan

Department of Mechanical Engineering

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Bio: Prof. Stein has been on faculty at The University of Michigan since 1983 becoming a Full Professor in 1996. He received his B.S. in premedical studies with a minor in Psychology (1973) from the Univ. of Massachusetts; his S.B. and S.M. (1976) and Ph.D. (1983) all in Mechanical Engineering and from the Massachusetts Institute of Technology. He was the PI in 2014 on a Global Challenges for a Third Century Phase I interdisciplinary project "Sustainable Transportation for a 3rd Century: An Interdisciplinary Approach to Addressing the Last Mile Problem for Enhanced Accessibility". He was also the Director of the recently completed NSF EFRI-RESIN Project "A Multi-Scale Design and Control Framework for Dynamically Coupled Sustainable and Resilient Infrastructures, with Application to Vehicle-to-Grid Integration" and he is a founding member of and former Associate Director of the Automotive Research Center (ARC). He was the Program Chair of the 2012 DSCC (Dynamic Systems and Control Conference) and a former chair of the Executive Committee and the Honors and Award Committee of the Dynamic Systems and Control Division of ASME. He is a Fellow of ASME and is currently the chair of ASME's Energy and Environmental Standards Advisory Board. Finally, he is an Associate Editor of Simulation Modeling Practice and Theory and a former Associate Editor of the ASME Transactions: Journal of Dynamics Systems Measurement and Control.

Prof. Stein's expertise is in the use of computer based modeling and simulation tools for system design and control with applications to sustainable transportation and advanced manufacturing. He recently completed an NSF EFRI RESIN grant focused on resiliency and sustainability of the power grid and transportation infrastructures as a function of the design of plug-in hybrid electric vehicles. His current work is on sustainable transportation at the nexus of autonomous vehicles, urban planning, public policy and business in solving the last mile problem of public transportation. His contributions include developing a fundamental understanding of the design and control issues for utilizing renewable energy sources for transportation including hybrid electric vehicles. He is also contributing to the control of large, fast moving

autonomous vehicles and tele- operated vehicles. In addition he is involved in global concurrent design and manufacturing with a focus on internet distributed hardware in-the-loop simulation technologies.

Prof. Stein's discipline expertise in dynamic systems modeling has lead to the concept of proper models - that is dynamic mathematical models with physical state variables and parameters that have the minimum yet sufficient complexity to meet a given engineering objective. He has also developed algorithms for automating the creation of these types of models. Prof. Stein has also made fundamental contributions to complex systems and concurrent design through his work on internet-distributed hardware in-the-loop simulation and to the state estimation literature through is work on input, state and parameter estimation. His contributions include the following application areas: automotive and truck engineering (alternative energy vehicle propulsion, electric/hybrid vehicles, vehicle mobility, engine in-the-loop simulation, vehicle parameter identification), manufacturing (machine tool cutting force estimation, machine tool spindle bearing thermal bearing load estimation and reconfigurable machine tool design), bioengineering (design and control of above-knee prostheses). He has authored or co- authored over 185 articles in journals and conference proceedings.

He has received numerous honors and awards including: Three doctoral students (one twice) being selected as Best Student Paper Finalist at the 2009, 2013, 2014 and 2015 Dynamic Systems and Control Conferences; Invited Speaker, Congressional Briefing, "The Road to the New Energy Economy: Electric Cars", March 23, 2011, Rayburn Office Bldg., Washington, DC. Invited Plenary Speaker, 2010 International Conference on Bond Graph Modeling, Orlando, FL, DSC ASME DSCD Michael J. Rabins Leadership Award, 2012, ASME Dedicated Service Award (2010), ASME Fellow (2006), Outstanding Teacher, Department of Mechanical Engineering Teacher Incentive Program, (1999-2000), Invited manuscript in the Special 50th Anniversary Issue of the Journal of Dynamic Systems Measurement and Control (1993), Presidential Young Investigator Award, National Science Foundation (1987).

Charles Stark Draper Innovative Practice Award

Reza Moheimani

Department of Systems Engineering

The University of Texas at Dallas

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Bio: Reza Moheimani holds the James Von Ehr Distinguished Chair in Science and Technology in the Department of Systems Engineering at the University of Texas at Dallas with appointments in Electrical and Computer Engineering and Mechanical Engineering Departments. He is the founding Director of UTD Center for Atomically Precise Fabrication of Solid-State Quantum Devices and founder and Director of Laboratory for Dynamics and Control of Nanosystems. He is Editor-in-Chief of Mechatronics, and a past associate editor of IEEE Transactions on Control Systems Technology, IEEE Transactions on Mechatronics and Control Engineering Practice. He received the Nathaniel B. Nichols Medal (IFAC, 2014), IEEE Control Systems Technology Award (IEEE CSS, 2009) and IEEE Transactions on Control Systems Technology Outstanding Paper Award (IEEE CSS, 2007 and 2018). He is a Fellow of IEEE, IFAC and Institute of Physics (UK).

Moheimani received the B.Sc degree in Electrical Engineering from Shiraz University, Iran in 1990 and M.Eng.Sc and Ph.D. degrees in Electrical Engineering from University of New South Wales, Australia in 1993 and 1996, respectively. His current research interests include applications of control and estimation in high-precision mechatronic systems, high-speed scanning probe microscopy and atomically precise manufacturing. He is leading a multidisciplinary effort to develop new tools and methods for fabrication of solid-state quantum devices with atomic precision based on ultra-high vacuum scanning tunneling microscope.

Michael J. Rabins Leadership Award

Jordan Berg

National Science Foundation

Program Director, CMMI Division

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Bio: Jordan M. Berg serves as a Program Officer in the Engineering Directorate of the US National Science Foundation. His research interests include nonlinear and geometric control, soft robotics, human-machine systems, and the modeling, simulation, design, and control of nano- and micro-systems. He received the BSE and MSE in Mechanical and Aerospace Engineering from Princeton University in 1981 and 1984, and the PhD in Mechanical Engineering and Mechanics and the MS in Mathematics and Computer Science from Drexel University in 1992. In 1996 he joined the faculty of the Mechanical Engineering Department of Texas Tech University, where he remained until 2018. He began at NSF as a rotator in 2014, and returned as a permanent employee in 2018. At NSF he co-directs the Dynamics, Control, and Systems Diagnostics program in the Division of Civil, Mechanical, and Manufacturing Innovation, and has served on several cross-cutting programs, including the Future of Work at the Human-Technology Frontier: Core Research, Foundational Research in Robotics, EFRI Continuum, Compliant, and Configurable Soft Robotics Engineering, National Robotics Initiative 2.0, Cyber Physical Systems, and the National Artificial Intelligence Research Institutes. In 2008 he studied and taught in Sri Lanka as a Fulbright Scholar. He was Program Chair of the 2014 ASME Dynamic Systems & Control Conference, and General Chair of the 2015 International Conference on Advanced Intelligent Mechatronics, and the 2018 American Control Conference. He is a Fellow of ASME.

Rudolf Kalman Best Paper Award

The Winners of the 2020 Rudolf Kalman Best Paper Award are:

Patrick M. Sammons

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for their paper:

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Bio: Patrick Sammons earned his B.S. in Mechanical Engineering from University of Missouri - Columbia in 2009. He earned his M.S. and PhD, both in mechanical engineering, from Missouri University of Science and Technology (Missouri S&T), Rolla, Missouri, USA in 2012 and 2016, respectively, with a focus on modeling, estimation, and control for manufacturing processes. In 2016, he joined the University of Michigan as a Postdoctoral Research Fellow conducting research focused on iterative process control and micro-scale manufacturing. Currently, he is an Associate Director of Data Science at Veterans United Home Loans.

Bio: Dr. Douglas A. Bristow is currently a Professor in the Department of Mechanical and Aerospace Engineering at the Missouri University of Science and Technology (Missouri S&T). He received his B.S. in Mechanical Engineering from Missouri S&T in 2001. He received his M.S. and Ph.D., also in Mechanical Engineering, from the University of Illinois at Urbana-Champaign in 2003 and 2007, respectively. Dr. Bristow is the Director of the Center for Aerospace M anufacturing Technologies, an industry consortium focused on developing and implementing next generation manufacturing technologies, primarily in additive manufacturing and robotic manufacturing. He has more than 100 peer-reviewed publications and his research interests include precision motion control and iterative process control with applications in additive manufacturing, atomic force microscopy, and machine tools and robotics. Dr. Bristow's research is funded by the National Science Foundation, the Department of Energy, MxD, and multiple companies. He is an Associate Editor at the ASME Journal of Dynamic Systems, Measurement and Control.

Bio: Dr. Robert G. Landers (landersr@mst.edu) is a Curators' Distinguished Professor of Mechanical Engineering in the Department of Mechanical and Aerospace Engineering at the Missouri University of Science and Technology. He is currently a program manager at the National Science Foundation working in the Dynamics, Controls, and System Diagnostics, Robotics, Cyber Physical Systems, and Future Manufacturing programs. He received his Ph.D. degree in Mechanical Engineering from the University of Michigan in 1997. His research interests are in the areas of modeling, analysis, monitoring, and control of manufacturing processes, and in the estimation and control of lithium ion batteries and hydrogen fuel cells. He received the Society of Manufacturing Engineers' Outstanding Young Manufacturing Engineer Award in 2004 and the *ASME Journal of Manufacturing Science and Engineering's* Best Paper Award in 2014. He is a Fellow of ASME, and a senior member of IEEE and SME.

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