ASME® 2019 DSCC

Dynamic Systems and Control Conference
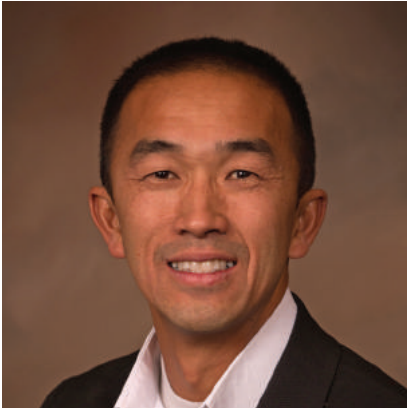
CONFERENCE
October 8–11, 2019

Grand Summit Hotel,
Park City, Utah

Program

www.asme.org/events/dscc

Welcome

Kam K. Leang
University of Utah
Conference General Chair

Garrett Clayton
Villanova University
Technical Program Chair

On behalf of the Organizing Committee, it is our pleasure to welcome you to the 2019 ASME Dynamic Systems and Control Conference (DSCC) held at the Grand Summit Hotel in Park City, Utah, on October 8–11, 2019. DSCC is the flagship conference of the ASME Dynamic Systems and Control Division (DSCD). Park City itself is a world-class resort town, famous for hosting the Sundance Film Festival and the 2002 Winter Olympics. In between meetings, you will find an array of activities in and around Park City, including shopping, hiking, fishing, balloon rides, mountain biking, scenic drives, golfing, touring the Utah Olympic Park, and strolling through Park City Historic Main Street district.

This year's technical program contains 212 original papers organized in 11 invited sessions, 14 contributed sessions, and 6 Rapid-Fire-Interactive (RFI) sessions, which span all core areas of interest to the dynamic systems and control community. New this year is a pilot of RFI sessions, where each session contains 12 pitch-style five-minute technical talks, back-to-back, followed by a 45-minute interactive session with digital posters. This new format is designed to help expose researchers' work to a larger audience and promote interaction and networking during the interactive component. In addition, the conference features four exciting plenary talks given by our distinguished colleagues: Professor Allison Okamura from Stanford University speaking on making soft robots that can be deployed to benefit human health, safety, and quality of life; Professor Santosh Devasia from the University of Washington talking about synchronization and cohesiveness of multi-agent networks and the impact on natural and engineered swarm systems; Professor Huei Peng from the University of Michigan delivering his Oldenburger

Lecture on the future of control research and education; and Professor Lucy Pao from the University of Colorado Boulder delivering her Nyquist Lecture on design and control of extreme-scale wind turbines. The conference also offers four workshops on topics for researchers and educators: Practical Methods for Real World Mechatronic Control Systems, Adaptive Control Systems with Stability and Performance Guarantees, Stability Analysis of LTI Systems with Time Delays, and A Short Course on Robot Control.

By design, the conference activities offer many opportunities for attendees to catch up and network, including the welcome reception, awards ceremony and banquet, RFI interactive sessions, and daily coffee breaks. A number of student activities are built into the program to facilitate the participation, professional development, and networking for students, including a student-led special session, student travel support program, Best Student Paper competition, and separate events for networking with academia and industry. For early-career faculty members, postdocs, and graduate students, we organize an Early Academic Career Panel with past NSF CAREER Awardees sharing their insight and tips. A special session on research funding programs is planned for attendees to learn funding programs of interest and interact with program directors. On the last day of the conference, interested attendees will have an opportunity to tour the area.

Preparation of a high-quality 2019 DSCC would not be possible without contributions from all of you. Specifically, we want to thank the authors for contributing their quality work, the foundation of the technical program; the DSCD Technical Committees for

organizing invited sessions; and the reviewers and the Conference Editorial Board members for reviewing the submissions and providing valuable feedback. We want to thank the sponsors for supporting the conference, both industry and academic institutions. We recognize the tireless effort of the Organizing Committee members: Rifat Sipahi, Conference Editorial Board Chair; Steve Mascaro, Local Arrangements and Industry Liaison and Exhibits Chair; Zheng Chen, Publicity Chair; Mohammad Al Janaideh, Publications Chair; Reza Moheimani, Workshops and Tutorials Chair; Carrie Hall, Invited/Special Sessions Chair; and Nicole Abaid and Matteo Aureli, Students and Young Members Chairs. We gratefully acknowledge the contributions from our ASME staff. In particular, we thank Edmond Valpoort, ASME Conference Program Manager, who worked tirelessly to coordinate all of the logistical details of the conference, and Stacey Cooper, ASME Conference Webtool Manager, who work diligently to accommodate and address our needs. We also thank Timothy Graves, ASME Technical Conferences and Events Managing Director, who supported the operations between ASME and DSCD.

Finally, we want to especially thank the past and current members of the ASME DSCD Executive Committee, who are committed and have worked hard to ensure the quality and growth of the DSCC. The newly formed DSCC Steering Committee deserves recognition for providing support and guidance during the planning and execution of DSCC.

We wish you an enjoyable and productive experience here at Park City, Utah!

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General Information

Registration

Registration will be located in the Grand Ballroom Foyer, located on the Ground Floor of the hotel. The hours are as follows:

Tuesday
October 8   7:00AM–5:00PM

Wednesday
October 9   7:00AM–5:00PM

Thursday
October 10   7:00AM–5:00PM

Friday
October 11   7:00AM–12:00PM

Acknowledgment

This event is supported by the ASME Dynamic Systems and Control Division. Dynamic Systems and Control is a fast growing and pervasive engineering field. There is rarely an engineering endeavor that does not involve the careful control, analysis, and/or synthesis of physical, dynamic systems. Be it fluids, thermodynamics, heat transfer, machine design, or materials engineering, systems and control contributions are essential. The DSC division, via this conference, provides a national and international forum to evaluate, discuss, analyze, and publish new technical results in the field; stimulate and encourage research and education innovations; enhance manpower in research and engineering education in dynamic systems and control; and lead in setting directions for the field in the future.

Park City, Utah

Park City has a reputation for being the "perfect mountain town." Founded in the late 1860s after the discovery of silver, gold, and lead in the area, Park City strikes a balance between athletics, arts, and community. Outdoor enthusiasts from all over the world visit Park City to enjoy hiking, mountain biking, fishing, and camping. The town is also famous for hosting the Sundance Film Festival and the 2002 Winter Olympics. Park City is the home of the United States Ski Team and the Utah Olympic Park training center. Visitors can experience the glory of the 2002 Olympic Winter Games through a gallery of visual highlights and artifacts from the 2002 games at the Joe Quinney Winter Sports Center, home to the Alf Engen Ski Museum and the George S. and Dolores Doré Eccles Salt Lake 2002 Olympic Winter Games Museum. This world-class facility highlights the history of all skiing disciplines in the intermountain region through interactive touch screen displays, videos, virtual reality ski theater, games, and topographical maps.

Along Park City's Historic Main Street, you will find vibrant Victorian architecture of old mining cabins, lovingly restored and maintained by residents. Additionally, you will find a diverse collection of fine restaurants and you'll want to wind down after a long day with the craft whiskeys and vodkas at the High West Distillery and Saloon.

HOTEL

DSCC 2019 is held at the Grand Summit Hotel, located at the Canyons Village on Park City Mountain Resort. Grand Summit Hotel is now open after a $15 million renovation. From luxurious guest suites, the new RockResorts Spa, and the First Tracks Café open concept, no stone was left unturned in the rebirth of this iconic ski-in/ski-out property. Nestled in the heart of Park City Resort's Canyons Village, the Grand Summit is steps away from America's largest ski resort. Guests will find an elegant ambience throughout this distinctive property, now part of Vail Resorts' premium RockResorts lodging collection. Canyons Village Unit Size Ranges: King and Queen guest rooms, studios, one- to three-bedroom condos, and three- and four-bedroom penthouses. Top Property Amenities: Ski-in/ski-out, outdoor pool, Resort Spa & Health Club, valet and concierge service, child care center, and 24-hour front desk. Top Unit Amenities: Suites with kitchens, gas fireplaces (suites only), and complimentary wireless Internet.

Canyons Village

4000 Canons Resort Drive
Park City, Utah 84098
Tel: 435.615.8040

QUESTIONS ABOUT THE MEETING

If you have any questions or need assistance, an ASME representative will be located at the conference registration area.

General Information

Name Badges

Please wear your name badge at all times. Admission to all conference functions will be by the badges only (unless noted otherwise). Your badge also provides a helpful introduction to other attendees.

Registrants with Disabilities

Whenever possible, we are pleased to make arrangements for registrants with disabilities. Advance notice may be required for certain requests. For on-site assistance, please visit the conference registration area and ask to speak with a conference representative.

Ticketed Functions

Access to workshops, receptions, and awards banquet will be confirmed by tickets included in your registration packets. If you wish to bring a guest to a luncheon, reception, or the conference banquet, you must purchase additional tickets accordingly. Guests are NOT permitted to attend technical sessions, workshops, tutorials, or committee

meetings. For questions regarding any possible ticketed items, you can ask a conference representative located in the registration area.

Conference Presentations

Registered attendees will receive an email from ASME Publications prior to the start of the conference. This email includes a link to the online access for all scheduled presentations for DSCC. The official 2019 Dynamic Systems and Control Conference proceedings will be produced at the conclusion of the conference. Papers that are not presented on-site in Park City will be removed and not be published.

Conference App

Downloading the app

1. Go to your app store. Search for CrowdCompass AttendeeHub and install it.

Note: If you are using a Blackberry, Windows phone, an Android version older than 6.0, or iOS older than version 10, you will need to use the web version of the app found here:

https://crowd.cc/dscc2019

2. After installing, the AttendeeHub icon will appear on your home screen.

3. Search the AttendeeHub for **dscc2019** and download it.

4. Tap the name of the event to open it.

Logging In

1. Enter your first and last name where prompted, then tap Next. Enter an email address where you'd like your verification email sent, then tap Next one more time.

2. Retrieve your six-digit verification code from your email.

3. Enter the code in the app.

Conference Wi-Fi

Choose Canyons Event wireless and accept the terms and conditions.

Sponsors

With great appreciation we thank all of our sponsors for their most generous support! Please be sure to visit their Exhibit in the Grand Ballroom Foyer, by Registration.

Gold Sponsors

College Of Engineering, University Of Utah

The University of Utah's College of Engineering is nestled against the scenic Rocky Mountains in downtown Salt Lake City and rapidly growing into one of the nation's top engineering institutions. With engineering-related research expenditures reaching $95 million in 2018, the college has world-renowned faculty and students that turn innovative technological ideas into marketable solutions. We are focused on preparing students for leadership positions and professional practice in academia, industry and government so they can move into the workforce and improve the productivity, health, safety and enjoyment of people around the world through leading-edge research.

For more information please visit our website: https://www.coe.utah.edu

Department Of Mechanical Engineering, University Of Utah

Challenge. Opportunity. Choice. Excellence. The Future.

The Department of Mechanical Engineering at the University of Utah is a world-class research and teaching organization that graduates Ph.D., M.S. and B.S. engineers to energize the economics of the state, the nation and many foreign countries. Working with state-of-the-art equipment and guided by exceptional faculty members, you can become part of a cutting-edge research team with the potential to make a significant impact on a variety of technical fields, change the future, and improve human lives. Our main research areas include: Design, Ergonomics, Manufacturing, & Systems; Robotics, Controls, &

Mechatronics; Solid Mechanics; and, Thermal-Fluids & Energy Systems. Within each group you will find faculty with unique interests and cutting-edge research. In fact in the last several years we have added 18 new faculty members–6 since 2017, making this an especially exciting time to be a member of our team. The University of Utah campus is situated in Salt Lake City, a diverse, cosmopolitan city with a population of 1M nestled against the backdrop of the beautiful Wasatch Mountains. Salt Lake City residents have unparalleled access to national parks (eight within a half day's drive: Arches, Bryce Canyon, Canyonlands, Capitol Reef, Grand Teton, Great Basin, Yellowstone, and Zion), skiing/snowboarding (10 world-class resorts within 30 minutes), hiking, fishing, biking, rafting/kayaking, NBA basketball, MLS soccer, PAC-12 sports, and numerous cultural events including opera, dance, symphony, theater, and outdoor concerts, amongst others. In addition, there's the convenience of an international airport located only 15 minutes from campus.

For more information please visit: http://www.mech.utah.edu

University Of Utah Robotics Center

The University of Utah Robotics Center (UURC) consists of faculty and graduate students from the School of Computing and the Department of Mechanical Engineering, with the Robotics Track curriculum that imparts fundamental knowledge about robotics and specific courses in perception, cognition, and action. Current research topics include: aerial robotics, autonomous mobile robotics, bioinstrumentation, computer vision, haptics for tele-operation and virtual environments manipulation, medical and rehabilitation robotics, microrobotics, prosthetics, robot learning, and robot sensors and actuators.

For more information please visit: https://robotics.coe.utah.edu/

Bronze Sponsors

Deseret Unmanned Aerial Systems (UAS)

Deseret Unmanned Aerial Systems (UAS) is a nonprofit corporation in Utah created jointly by Tooele and Box Elder Counties in close partnership with Ogden City to bring commercial Urban Air Mobility (UAM) technology to Utah. As the premier organization in Utah dedicated to UAM, we offer a centralized source of information on Utah UAS & UAM industry, promote Utah UAS/UAM companies, foster research and develop UAM flight test ranges to advance UAM commercial operations.

For more information please visit: http://www.deseretuas.org

Quanser

Quanser is the global leader in developing lab solutions and products that have transformed the way educators teach the theory, application, and implementation of controls, robotics, and mechatronics. Quanser is driven to create more enriching and advanced research and learning experiences. We believe our concept of Transformational Labs creates a collaborative, multi-disciplinary, and progressive environment, one that faithfully brings to life the math and engineering theory, and is consistent with modern educational methods. Whether you are researching advanced algorithms or require state-of-the-art technology to teach the next generation of engineering heroes, Quanser offers a diverse spectrum of customizable solutions to make your work more efficient.

For more information please see: http://www.quanser.com

College Of Engineering, Villanova University

Villanova engineers are rigorously educated, socially grounded, conscientious thinkers and doers who are professionally prepared to make meaningful change in the world.

Our collaboratively competitive community of undergraduate through doctoral students benefits from faculty members who are experts in their fields and recognized for excellence in teaching, applied learning techniques and scholarly research. They prepare and educate engineers to be society's future innovators and technical leaders, and help students develop the broad-based leadership skills they need to grow professionally and collaborate effectively across disciplines.

Built on a foundation of academic excellence, community, ethical leadership and service, Villanova University College of Engineering offers an engineering education that ignites both hearts and minds, creating wisdom to shape the world.

Villanova Center For Analytics Of Dynamic Systems (VCADS)

Founded in 2015, the Center for Analytics of Dynamic Systems (VCADS) was formed to determine how best to make use of this data to divine the underlying dynamics for analysis, diagnostics, prognostics, and health management.

VCADS possesses a unique set of tools—which have been developed over the past decade at Villanova University—that seek to forge an optimal synthesis of nonlinear science and machine learning. The center is expected to make many fundamental advances in this field of research and its areas of application are diverse and vast and offer an exciting vista of opportunities.

In addition to a natural synergy with the College of Engineering's existing research centers, VCADS expects to work closely with others at the University, including the Center for Business Analytics in the Villanova School of Business and Center for Statistics Education in the College of Liberal Arts & Sciences.

The center is headed by Dr. C. Nataraj with collaborating faculty from engineering, math and business.

Villanova Center For Nonlinear Dynamic And Control (CENDAC)

The Center for Nonlinear Dynamics and Control (CENDAC) at Villanova University has one of the highest concentrations of controls-oriented faculty in the region. CENDAC is distinguished by its strong interdisciplinary teams, close collaboration with sponsors, and expertise in nonlinear dynamic systems theory and applications. The Center also creates an inclusive environment for doctorate, graduate and undergraduate students, as well as faculty from different engineering disciplines, to collaborate on a broad range of applications in the area of nonlinear dynamics and control.

Conference Organizing Committee

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Conference Editorial Board

Conference Editorial Board

Member	e-mail	Affiliation	Title	Keywords
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Yildiray Yildiz	yyildiz@bilkent.edu.tr	Bilkent University (Turkey)	Assistant Professor	robust control, adaptive control, nonlinear systems, delay systems, human in the loop control
Qian Wang	quw6@psu.edu	Penn State	Professor	Robust control, optimization, application to aerospace, mechanical, and computer systems.
Beibei Ren	beibei.ren@ttu.edu	Texas Tech University	Assistant Professor	Robust and adaptive control, neural networks
John Wagner	JWAGNER@clemson.edu	Clemson	Prof	mechatronics, vehicle dynamics, wind turbines
Nader Sadegh	nader.sadegh@me.gatech.edu	Georgia Tech	Associate Professor	Automation, robotics, design, Vibrations

2019 DSCC Technical Sessions at a Glance

Wednesday, October 9

ROOM	9:30AM–11:30AM	1:15PM–3:15PM	3:30PM–5:30PM
Kokopelli Ballroom	**W1-1 RFI:** Soft Mechatronic Actuators and Sensors		
White Pine Ballroom	**W1-2 RFI:** Automotive and Transportation Systems		
Painted Horse I		**W2-3** Advances in Robotics I	**W3-3** Advances in Robotics II
Painted Horse II		**W2-5** Invited Session: Vibrations: Modeling, Analysis, and Control I	**W3-5** Invited Session: Vibrations: Modeling, Analysis, and Control II
Arrow Head I		**W2-4** Invited Session: Advanced Driver Assistance and Autonomous Technologies	**W3-4** Invited Session: Vehicle Dynamics and Stability
Arrow Head II		**W2-2** Manufacturing Systems	**W3-2** Dynamics and Control of Human-Robot Systems
Bobcat I		**W2-6** Invited Session: Thermal Energy Systems	**W3-6** Invited Session: Renewable and Smart Energy Systems
Bobcat II & III		**W2-1** Estimation and Identification	**W3-1** Uncertain Systems and Robustness
Grand Ballroom Foyer			**W4-1** Poster Session 6:30PM–7:15PM

2019 DSCC Technical Sessions at a Glance

Thursday, October 10

ROOM	9:30AM–11:30AM	1:15PM–3:15PM	3:30PM–5:30PM
Kokopelli Ballroom	**T1-1 RFI:** Unmanned Ground and Aerial Vehicles		
White Pine Ballroom	**T1-2 RFI:** Advances in Control Systems		
Painted Horse I		T2-3 Unmanned Vehicles	T3-1 Multi-Agent and Networked Systems
Painted Horse II		T2-2 Modeling and Validation	T3-2 Diagnostics and Detection
Arrow Head I		T2-4 Automotive Systems	T3-5 Invited Session: Energy Optimization for Intelligent Vehicle Systems
Arrow Head II		T2-6 Invited Session: Design, Modeling, Analysis and Control of Assistive and Rehabilitation Devices I	T3-6 Invited Session: Design, Modeling, Analysis and Control of Assistive and Rehabilitation Devices II
Bobcat I		T2-1 Advances in Control Design Methods	T3-4 Motion Planning and Tracking Control
Bobcat II & III		T2-5 Invited Session: Modeling and Control of Engine and Aftertreatment Systems	T3-3 Modeling and Control of IC Engines and Aftertreatment Systems

Friday, October 11

ROOM	9:30AM–11:30AM	1:15PM–3:15PM
Kokopelli Ballroom	**F1-1 RFI:** Motion Planning and Trajectory Tracking	
White Pine Ballroom	**F1-2 RFI:** Advances in Robotics and Mechatronics	

Workshop, Plenary, and Special Sessions

Tuesday, October 8

1:00PM–5:00PM (White Pine I)
Workshop #1: **Adaptive Control Systems with Stability and Performance Guarantees**

9:00AM–5:00PM (University of Utah)
Workshop #2: **A Short Course on Robot Control**

1:00PM–5:00PM (Painted Horse I)
Workshop #3: **Mastering Frequency Domain Techniques for the Stability Analysis of LTI Time Delay Systems**

1:00PM–5:00PM (Painted Horse II)
Workshop #4: **Practical Methods for Real World Mechatronic Control Systems**

6:00PM–8:30PM (Sundial Pavilion)
Opening Reception

Wednesday, October 9

8:00AM–9:00AM (Kokopelli Grand Ballroom)
Plenary Talk: Allison Okamura, Stanford University

9:00AM–9:30AM (Grand Ballroom Foyer)
AM Coffee Break

11:30AM–1:15PM (Sundial Pavilion)
Lunch

11:40AM–1:10PM (Arrow Head II)
Industry Perspectives on Controls in Autonomous Systems

12:10PM–1:10PM (Painted Horse II)
Best Student Paper Competition

1:15PM–3:15PM (White Pine Ballroom))
Proposal Writing Tips for Young Investigators

3:15PM–3:30PM (Grand Ballroom Foyer)
PM Coffee Break

Workshop, Plenary, and Special Sessions

Thursday, October 10

8:00AM–9:00AM (Kokopelli Grand Ballroom)
Plenary Talk: Santosh Devasia, University of Washington

9:00AM–9:30AM (Grand Ballroom Foyer)
AM Coffee Break

11:30AM–1:15PM (Sundial Pavilion)
Lunch

12:10PM–1:10PM (Painted Horse II)
Networking/Student Career Advising Session

12:10PM–1:10PM (Bobcat I)
NSF CAREER Award Panel

3:15PM–3:30PM (Grand Ballroom Foyer)
PM Coffee Break

3:30PM–5:30PM (White Pine Ballroom)
Federal Funding Opportunities

6:30PM–9:30PM (Kokopelli Grand Ballroom)
Awards Ceremony
Oldenburger Lecturer (Huei Peng, University of Michigan)
Banquet

Friday, October 11

8:00AM–9:00AM (Kokopelli Grand Ballroom I & II)
Nyquist Lecturer: Lucy Pao, University of Colorado, Boulder

9:00AM–9:30AM (Grand Ballroom Foyer)
AM Coffee Break

1:00PM–4:00PM
(Sign up at Registration Desk)
Local Area Tour

Social & Networking Activities

Opening Reception

Tuesday, October 8
6:00PM–8:30PM
Sundial Pavilion

Start this year's conference off right! Enjoy reconnecting with your friends and colleagues over cocktails and hors d'oeuvres and take this opportunity to also meet with this year's sponsors and exhibitors.

Tickets and/or Badges are required.

Extended Coffee Breaks

Daily (Wednesday through Friday, with no PM break on Friday)
9:00AM–9:30AM and 3:15PM–3:30PM
Grand Lobby Foyer, Ground Floor

Morning and afternoon coffee breaks are scheduled daily in the Registration Area. Coffee, tea, lemonade, iced tea and light breakfast snacks will be served.

Lunches

Wednesday, October 9 and Thursday, October 10
11:30AM–1:15PM
Sundial Pavilion

This year's conference program includes group lunches and they are scheduled for Wednesday and Thursday.

Late-Breaking News Poster Session

Wednesday, October 9
6:30PM–7:15PM
Grand Lobby Foyer, Ground Floor

This year's conference program includes a Late-Breaking News Poster session on Wednesday, October 9. Researchers will present their latest results in a poster format, and attendees and presenters will have an opportunity to interact, discuss, and share ideas.

Student Career Advising/Networking Event (Academia and Industry)

Thursday, October 10
12:10PM–1:10PM
Painted Horse II

This session will be a panel of approximately 9 panelists from academia, industry, and national labs who can offer advice and interact with students in a rotating roundtable discussion format.

Awards Banquet and Oldenburger Lecture

Thursday, October 10
6:30PM–9:30PM
Kokopelli Grand Ballroom

The Awards Banquet will recognize the exceptional achievements and dedication of the numerous leaders within the Dynamic Systems and Control Community. Award presentations include: Outstanding Young Investigator Award given to Sandipan Mishra, Takahashi Education Award given to Huei Peng; Rudolf Kalman Best Paper Award given to Nurali Virani, Devesh K. Jha, Zhenyuan Yuan, Ishana Shekhawat, Asok Ray, Mitchell Cobb, Nihar Deodhar, and Christopher Vermillion; and The Soichiro Honda Medal, given to Masayoshi Tomizuka. The Nyquist Lecturer and Plenary speakers will be acknowledged. The Student Best Paper finalists will be introduced, and the winner will be announced. The awards ceremony will be concluded by the presentation and acceptance of the ASME Rufus Oldenberger Medal.

Committee Meetings

DSCC STEERING COMMITTEE

Wednesday, October 9
11:00AM–1:00PM
Bobcat I

ASME AUTOMOTIVE AND TRANSPORTATION SYSTEMS (ATS) TC PAPER COMPETITION

Wednesday, October 9
12:00PM–1:30PM
Bobcat III

DSCD EXECUTIVE COMMITTEE (Closed Door)

Wednesday, October 9
1:30PM–5:00PM
Arrow Head I

AUTOMOTIVE AND TRANSPORTATION SYSTEMS (ATS) TECHNICAL COMMITTEE

Wednesday, October 9
5:30PM–6:30PM
Painted Horse I

BIO-SYSTEMS & HEALTH CARE (BSHC) TECHNICAL COMMITTEE

Wednesday, October 9
5:30PM–6:30PM
Painted Horse II

MECHATRONICS TECHNICAL COMMITTEE

Wednesday, October 9
5:30PM–6:30PM
Bobcat II

DSCD GENERAL MEETING

Wednesday, October 9
7:30PM–10:00PM
Arrow Head

JOINT 2019/2020 DSCC ORGANIZING COMMITTEES MEETING

Thursday, October 10
3:30PM–4:30PM
Bobcat III

ENERGY SYSTEMS (ES) TECHNICAL COMMITTEE

Thursday, October 10
5:30PM–6:30PM
Painted Horse I

ROBOTICS TECHNICAL COMMITTEE

Thursday, October 10
5:30PM–6:30PM
Painted Horse II

VIBRATIONS TECHNICAL COMMITTEE

Thursday, October 10
5:30PM–6:30PM
Arrow Head I

Plenary Sessions

Soft Robots for Humanity

Allison Okamura
Stanford University

Wednesday, October 9
8:00AM–9:00AM
Kokopelli Grand Ballroom
(Ground Floor)

Abstract:

While traditional robotic manipulators are constructed from rigid links and simple joints, a new generation of robotic devices are soft, using flexible, deformable materials. The growing field of soft robotics offers exciting new approaches for bio-inspired design, fast and low-cost prototyping, and integrating novel materials with digital control. These soft robots have the potential to benefit humanity in a wide variety of applications, ranging from medical devices that interface gently with the human body to robot explorers for remote or dangerous environments. Yet, soft robots face many challenges toward implementation in the real world, including practical actuation, physical robustness, and reliable control. This talk will describe several robotic systems that leverage softness to achieve novel shape control, provide a compliant interface to the human body, and access hard-to-reach locations. Knowing when to exploit and when to alter some of the inherent consequences of softness is key to making soft robots that can be deployed to benefit human health, safety, and quality of life.

Biography:

Allison M. Okamura received a B.S. degree from the University of California, Berkeley, and M.S. and Ph.D. degrees from Stanford University, all in mechanical engineering. She is currently Professor in the mechanical engineering department at Stanford University, with a courtesy appointment in computer science. She is an IEEE Fellow and Editor-in-Chief of the journal *IEEE Robotics and Automation Letters*. Her awards include the 2016 Duca Family University Fellow in Undergraduate Education, 2009 IEEE Technical Committee on Haptics Early Career Award, 2005 IEEE Robotics and Automation Society Early Academic Career Award, and 2004 NSF CAREER Award. Her academic interests include haptics, teleoperation, virtual environments and simulators, medical robotics, neuromechanics and rehabilitation, prosthetics, and engineering education. Outside academia, she enjoys spending time with her husband and two children, running, and playing ice hockey. For more information about her research, please see the CHARM Laboratory website http://charm.stanford.edu/.

Cohesive Networks Using Delayed Self-Reinforcement

Santosh Devasia
University of Washington

Thursday, October 10
8:00AM–9:00AM
Kokopelli Grand Ballroom
(Ground Floor)

Abstract:

Synchronization is important in many multi-agent networks including velocity synchronization to maintain inter-vehicle spacing in connected automated transportation systems, alignment synchronization to help maintain formations during maneuvers of flocks and swarms in nature, and maintaining formation of engineered networks such as satellites, unmanned autonomous vehicles, and collaborative robots. While current network theories focus on the use of neighbor-based distributed strategies for asymptotic synchronization of the overall response, it is more challenging to maintain cohesion of the responses during rapid network maneuvers. This is because information about the desired response (such as the desired orientation or speed of the agents) might be available to only a few agents. The desired-response information needs to be propagated through the network to other agents, which results in response-time delays between agents that are "close to" the information source and those that are "farther away." The talk will present a delayed self-reinforcement (DSR) approach, where each individual augments its neighbor-based information update using its previously available updates, to (i) increase the information-transfer rate without requiring an increased, individual update-rate; (ii) enable superfluid-like information transfer seen in biological systems; and (iii) improve cohesiveness of the response during transitions. Such improvements can enable better understanding of cohesiveness of flocking in nature, as well as improve the performance of engineered swarms such as unmanned mobile systems.

Biography:

Santosh Devasia received the B.Tech. (Hons) from the Indian Institute of Technology, Kharagpur, India, in 1988, and the M.S. and Ph.D. degrees in Mechanical Engineering (ME) from the University of California at Santa Barbara in 1990 and 1993 respectively. He is the Director of the Boeing Advanced Research Center (BARC) at the University of Washington (UW) and a Professor of Mechanical Engineering at the UW, Seattle where he joined in 2000 after teaching from 1994 to 2000 in the ME Department at the University of Utah, Salt Lake City. He served as the Associate Chair of the ME Department at UW from 2010-2013, and as the Associate

Dean of Research and Faculty Affairs in the College of Engineering at UW from 2013-2017. He is the General Chair for the 2020 American Control Conference and the 2023 Advanced Intelligent Mechatronics Conference. He is a fellow of ASME and IEEE. His current research interests include control of multi-agent systems and precision human-machine systems. Additional details of current efforts can be found here: http://faculty.washington.edu/devasia/.

Rufus Oldenburger Lecture

Perfect Storm: Time to Rethink the Future of Control Research and Education.

Huei Peng
University of Michigan

Thursday, October 10
7:00PM–7:45PM
Kokopelli Grand Ballroom
(Ground Floor)

Award:

The Rufus Oldenburger Medal is a prestigious Society award for lifetime achievements in automatic control. Inaugurated in 1968, the medal recognizes significant contributions and outstanding achievements in the field of automatic control. Such achievements may be, for example, in the areas of education, research, development, innovation, and service to the field and profession.

The award was established to honor Rufus Oldenburger for his distinctive achievements in the field and for his service to the Society and the Division. The list of recipients is a true honor role of major contributors to the science and profession of control.

Abstract:

Automatic Control is a relatively new field and has been my core discipline, and what I practice every day for more than 30 years. Increasingly, it feels to me that it is time for us to have a serious discussion about the future of "Controls," in terms of how we define and teach its core knowledge and how we best apply what we know to solve impactful research problems. There are several external factors that seem to impact our field of discipline at this very moment. One is the rapid rising of "data-driven" and "computation-driven" tools and methods, including deep-neural-network and reinforcement learning. These methods are quite different from the traditional dynamic modeling, and subsequent "model-based" analysis and synthesis methodologies that dominate what we teach in undergraduate and graduate control courses. Another mega-trend is that many "grand challenge" problems emerge and need to be solved quickly, including climate change, clean energy, etc. Due to the urgency and multi-disciplinary nature of these problems, the cry for "problem-centric" research vs. "domain-centric" research is stronger and Federal funding seems to be shifting very quickly. We need to think carefully how to best-preparing our students to be ready to take on these grand challenges. The evolution of my research areas and some preliminary experience and thoughts will be presented in this talk.

Biography:

Huei Peng received his Ph.D. in Mechanical Engineering from the University of California, Berkeley in 1992. He is now a Professor at the Department of Mechanical Engineering at the University of Michigan. He currently serves as the Director of Mcity (http://mcity.umich.edu/), which studies connected and autonomous vehicle technologies and promotes their deployment. His research interests include adaptive control and optimal control, with emphasis on their applications to vehicular and transportation systems. His current research focuses include design and control of electrified vehicles and connected/automated vehicles.

In the last 10 years, he was involved in the design of several military and civilian concept vehicles, including FTTS, FMTV, Eaton/Fedex, and Super-HUMMWV—for both electric and hydraulic hybrid concepts. He served as the U.S. Director of the DOE sponsored Clean Energy Research Center—Clean Vehicle Consortium, which supports more than 30 research projects related to the development of clean vehicles in the U.S. and in China.

He has served as the PI or co-PI of more than 50 research projects, with a total funding of more than 55 million dollars. He has more than 300 technical publications, including 150 in refereed journals and transactions and four books. His h-index is 74 according to the Google scholar analysis. The total number of citations to his work is more than 21,000. He believes in setting high expectations and helping students to exceed it by selecting innovative research topics with high impact. One of his proudest achievements is that more than half of his Ph.D. students have each published at least one paper cited more than 100 times. Huei Peng has been an active member of the Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineers (ASME). He is both an SAE fellow and an ASME Fellow. He is a ChangJiang Scholar at the Tsinghua University of China.

Design and Control of Extreme-Scale Wind Turbines

Lucy Pao
University of Colorado Boulder

Friday, October 11
8:00AM–9:00AM
Kokopelli Grand Ballroom
(Ground Floor)

Abstract:

Wind energy is recognized worldwide as cost-effective and environmentally friendly and is among the fastest-growing sources of electrical energy. To further decrease the cost of wind energy, wind turbines are being designed at ever larger scales, which is challenging due to greater structural loads and deflections. Large-scale systems such as modern wind turbines increasingly require a control co-design approach, whereby the system design and control design are performed in a more integrated fashion. We will overview a two-bladed downwind morphing rotor concept that is expected to lower the cost of energy at wind turbine sizes beyond 13 MW compared to continued upscaling of traditional three-bladed upwind rotor designs. We will describe an aero-structural-control co-design process that we have used in designing such extreme-scale wind turbines. We will also highlight some of the control systems issues for wind turbines at these scales and outline selected advanced control methods we are developing to address these issues. We shall close by discussing continuing challenges and ongoing and future research avenues that can further facilitate the growth of wind energy.

Biography:

Lucy Pao is the Palmer Endowed Chair Professor in the Electrical, Computer, and Energy Engineering Department at the University of Colorado Boulder. She earned B.S., M.S., and Ph.D. degrees in Electrical Engineering from Stanford University. Her research has primarily focused on engineering control systems, with applications ranging from atomic force microscopes to multi-megawatt wind energy systems. She is a Fellow of the IEEE and the International Federation of Automatic Control (IFAC). Selected recent awards include the 2012 IEEE Control Systems Magazine Outstanding Paper Award (with K. Johnson), the 2015 Society for Industrial and Applied Mathematics (SIAM) Journal on Control and Optimization Best Paper Prize (with J. Marden and H.P. Young), the 2017 Control Engineering Practice Award from the American Automatic Control Council, and the Scientific Award 2017 from the European Academy of Wind Energy. Selected recent and current professional society activities include being a Fellow of the Renewable and Sustainable Energy Institute (2009–present), General Chair of the 2013 American Control Conference, member of the IEEE Control Systems Society (CSS) Board of Governors (2011–2013 and 2015), IEEE CSS Fellow Nominations Chair (2016–2018), member of the IFAC Fellow Selection Committee (2014–2017 and 2017–2020), and member of the IFAC Executive Board (2017–2020).

Special Sessions

Industry Perspectives on Controls in Autonomous Systems (Organized by the Automotive and Transportation Systems TC)

Wednesday, October 9
11:40AM–1:10PM
Arrow Head II

Speakers: Jack Weast (Intel), Hoseinali Borhan (Cummins, Inc.), Claus Danielson (Mitsubishi Electric Research Laboratories), Kevin Zaseck (Toyota Research Institute), Nicholas Kohut (Zoox, Inc.)

Autonomous systems, particularly ground vehicles, now occupy a significant portion of the engineering industry's resources. Previously confined to the automotive industry, autonomous vehicles and robots are now at the forefront of automotive companies, tech companies, and startups. The original DARPA challenge began the race to develop autonomous vehicles, which still occupies a great deal of company attention, but many new topics have branched forth from this original pursuit, from rigorous safety process development to control of heavy duty trucks to reflection on the blurring of lines between of industry and academic research in these rapidly-growing areas of automation. It is of great value for those in the academic community to learn about the work and perspective from their industry colleagues in terms of how open research questions are being tackled in a product and for-profit setting. This special industry session brings together a group of five speakers with strong academic training in controls who now work in industry at a variety of different types of companies to share their experiences at DSCC 2019.

Proposal Writing Tips for Young Investigators

Wednesday, October 9
1:15PM–3:15PM
White Pine Ballroom

Speaker: Irina Dolinskaya (National Science Foundation)

The presentation will present guidelines and helpful tips from NSF program managers for junior faculty and newer PIs. This session will include both a mini-proposal writing workshop as well as time for Q&A with the program managers.

NSF CAREER Award Panel

Thursday, October 10
12:10PM–1:10PM
Bobcat I

Speakers: Matteo Aureli, Chris Vermillion, Xu Chen , and Marcello Canova

This event is geared toward junior faculty members who are interested in pursuing the NSF CAREER award. Graduate students and postdocs are also welcome. A panel formed by previous NSF CAREER awardees will share their experiences and tips on proposal preparation. The event will begin with a moderated panel discussion followed by time for questions and answers.

Federal Funding Opportunities

Thursday, October 10
3:30PM–5:30PM
White Pine Ballroom

Speakers: Irina Dolinskaya (National Science Foundation), Jordan Berg (National Science Foundation), Robert Landers (National Science Foundation)

The goal of this special session is to provide an update on funding opportunities of interest to the dynamic systems and control community. Program managers from the National Science Foundation will present existing and upcoming opportunities and new cross-cutting initiatives. A question-and-answer session will follow the presentations.

Awards

Awards Ceremony

Thursday, October 10
6:30 PM–7:00PM
Kokopelli Grand Ballroom

ASME DSCD RUDOLF KALMAN BEST PAPER AWARD

"Imitation of Demonstrations Using Bayesian Filtering with Nonparametric Data-Driven Models," by Nurali Virani, Devesh K. Jha, Zhenyuan Yuan, Ishana Shekhawat, Asok Ray, published in *ASME Journal of Dynamic Systems, Measurement, and Control*, March 2018, Vol. 140, 030906.

"Lab-Scale Experimental Characterization and Dynamic Scaling Assessment for Closed-Loop Crosswind Flight of Airborne Wind Energy Systems," by Mitchell Cobb, Nihar Deodhar, Christopher Vermillion, published in *ASME Journal of Dynamic Systems, Measurement, and Control*, July 2018, Vol. 140, 071005

NYQUIST LECTURER

Lucy Pao
University of Colorado Boulder

Lucy Pao is the Palmer Endowed Chair Professor in the Electrical, Computer, and Energy Engineering Department at the University of Colorado Boulder. She earned B.S., M.S., and Ph.D. degrees in Electrical Engineering from Stanford University. Her research has primarily focused on engineering control systems, with applications ranging from atomic force microscopes to multi-megawatt wind energy systems. She is a Fellow of the IEEE and the International Federation of Automatic Control (IFAC). Selected recent awards include the 2012 IEEE Control Systems Magazine Outstanding Paper Award (with K. Johnson), the 2015 Society for Industrial and Applied Mathematics (SIAM) Journal on Control and Optimization Best Paper Prize (with J. Marden and H.P. Young), the 2017 Control Engineering Practice Award from the American Automatic Control Council, and the Scientific Award 2017 from the European Academy of Wind Energy. Selected recent and current professional society activities

include being a Fellow of the Renewable and Sustainable Energy Institute (2009–present), General Chair of the 2013 American Control Conference, member of the IEEE Control Systems Society (CSS) Board of Governors (2011–2013 and 2015), IEEE CSS Fellow Nominations Chair (2016–2018), member of the IFAC Fellow Selection Committee (2014–2017 and 2017–2020), and member of the IFAC Executive Board (2017–2020).

OLDENBURGER MEDALIST

Huei Peng
University of Michigan

Dr. Huei Peng received his Ph.D. in Mechanical Engineering from the University of California, Berkeley in 1992. He is now a Professor at the Department of Mechanical Engineering at the University of Michigan. His research interests include adaptive control and optimal control, with emphasis on their applications to vehicular and transportation systems. His current research focuses include design and control of electrified vehicles, and connected/automated vehicles. In the last 10 years, he was involved in the design of several military and civilian concept vehicles, including FTTS, FMTV, Eaton/Fedex, and Super-HUMMWV --for both electric and hydraulic hybrid concepts. He served as the US Director of the DOE sponsored Clean Energy Research Center --Clean Vehicle Consortium, which supports more than 30 research projects related to the development of clean vehicles in the US and in China. He currently serves as the Director of Mcity, which studies connected and autonomous vehicle technologies and promotes their deployment. He has served as the PI or co-PI of more than 50 research projects, with a total funding of more than 50 million dollars. He has more than 250 technical publications, including 110 in referred journals and transactions and four books. His h-index is 69 according to the Google scholar analysis. The total number of citations to his work is more than 18,000. Huei Peng has been an active member of the Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineers (ASME). He is both an SAE fellow and an ASME Fellow. He is a ChangJiang Scholar at the Tsinghua University of China.

OUTSTANDING YOUNG INVESTIGATOR AWARD

Sandipan Mishra
Rensselaer Polytechnic Institute

Professor Sandipan Mishra joined RPI's faculty in the Mechanical, Aerospace, and Nuclear Engineering Department in Fall 2010, and was promoted to Associate Professor with tenure in 2016.

He was a member of the 2010 Japan MEXT-NSF Young investigator exchange program for nanomanufacturing and the recipient of the NSF Early CAREER award in 2013 on additive manufacturing. His research interests are in the area of systems and control theory, learning control, nonlinear estimation, and precision mechatronics, as applied to additive manufacturing, unmanned aerial vehicles and smart buildings. He is the PI of the HYPERLINK (http://rpi.edu/~mishrs2) ISAaC laboratory at RPI, which is supported by grants from government agencies including NSF, the DoD, and DoE, along with industrial partners including Hewlett Packard Labs, Sikorsky Inc, Mathworks Inc., National Instruments, Simmetrix, and Vivonics Inc. Professor Mishra's teaching portfolio includes Systems Analysis Techniques, Feedforward and Learning Algorithms, Advanced Manufacturing Systems and Processes, Mechatronics, Modeling and Control of Dynamical Systems, and Introduction to Engineering Analysis. He was the recipient of the Class of 1951 Teaching Award for 2015, the School of Engineering Education Innovation Award in 2017 and the School of Engineering Research Team Award in 2017.

THE SOICHIRO HONDA MEDAL

Masayoshi Tomizuka
University of California, Berkeley

The Soichiro Honda Medal recognizes an individual for an outstanding achievement or a series of significant engineering contributions in developing improvements in the field of personal transportation.

Professor Tomizuka is recognized for pioneering and sustained contributions in applying modern systems and control theory to the comprehensive analysis and control algorithm development of automated vehicle lateral guidance, which has inspired further developments in the field.

YASUNDO TAKAHASHI EDUCATION AWARD

Huei Peng
University of Michigan

Dr. Huei Peng received his Ph.D. in Mechanical Engineering from the University of California, Berkeley in 1992. He is now a Professor at the Department of Mechanical Engineering at the University of Michigan. His research interests include adaptive control and optimal control, with emphasis on their applications to vehicular and transportation systems. His current research focuses include design and control of electrified vehicles, and connected/automated vehicles. In the last 10 years, he was involved in the design of several military and civilian concept vehicles, including FTTS, FMTV, Eaton/Fedex, and Super-HUMMWV --for both electric and hydraulic hybrid concepts. He served as the US Director of the DOE sponsored Clean Energy Research Center --Clean Vehicle Consortium, which supports more than 30 research projects related to the development of clean vehicles in the US and in China. He currently serves as the Director of Mcity, which studies connected and autonomous vehicle technologies and promotes their deployment. He has served as the PI or co-PI of more than 50 research projects, with a total funding of more than 50 million dollars. He has more than 250 technical publications, including 110 in referred journals and transactions and four books. His h-index is 69 according to the Google scholar analysis. The total number of citations to his work is more than 18,000. Huei Peng has been an active member of the Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineers (ASME). He is both an SAE fellow and an ASME Fellow. He is a ChangJiang Scholar at the Tsinghua University of China.

Awards

ASME DSCC 2019 BEST STUDENT PAPER AWARD COMPETITION FINALISTS

The Best Student Paper Award Competition recognizes students who have authored extraordinary papers in the 2019 ASME DSCC as the first author. The following five finalists will present their work at the Best Student Paper Competition session on Wednesday, October 9, between 12:10PM and 1:10PM, in Painted Horse II. Everyone is welcome to attend.
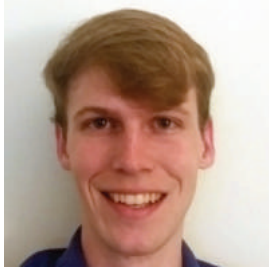
Jake Buzhardt from Clemson University for paper DSCC2019-9015, "Magnetically Actuated Artificial Microswimmers as Mobile Microparticle Manipulators," coauthored with Phanindra Tallapragada from Clemson University

Jake Buzhardt received a B.S. degree in mechanical engineering from Clemson University, Clemson, SC in 2017, where he is currently working toward the degree of Ph.D. in mechanical engineering in the Department of Mechanical Engineering. His research interests include nonlinear dynamics and control and low Reynolds number hydrodynamics.

Abstract: Robotic microswimmers have been envisaged for many medical applications such as targeted drug delivery, where the microswimmers will be expected to navigate through channels carrying a payload. An alternative to this is one where a payload is not physically bound to the swimmer, but it is instead manipulated and steered through the channel by the microswimmer. We investigate this problem of contactless manipulation of a microparticle by mobile microswimmer in a fluid at low Reynolds number. We consider a model of a magnetically actuated microswimmer, whose locomotion through a fluid induces a disturbance velocity field in the fluid, that then acts to propel a cargo particle in its vicinity. The problem investigated in this paper is therefore one of coupled locomotion-manipulation of two bodies in a fluid. The magnetic swimmer's motion is actuated by an external applied magnetic field of constant strength but whose direction rotates at a constant rate in a plane. The swimmer propels itself in a direction perpendicular to this plane if the frequency associated with the periodic magnetic field is above a critical frequency. Below the critical frequency, the swimmer only spins without net locomotion. The coupled fluid-swimmer-cargo particle dynamics are solved numerically using the method of Stokesian dynamics. The induced motion of the cargo particle is shown to be controllable. This is achieved switching the planes of rotation of the magnetic field and switching frequency of the magnetic field above and below the critical frequency. While a swimmer with a specific geometry has been used in the model, the results of this paper are applicable to swimmers with other geometries and means of propulsion. The results of this paper show that microswimmers can be utilized as mobile manipulators of micro particles in a fluid.

Jiaoying Jiang from Huazhong University of Science and Technology for paper DSCC2019-9207, "Asymmetric Kinematic and Dynamic Models of Robotic Assisted Sit-To-Stand System for Stroke Rehabilitation," coauthored with Guangzhou Hu from Huazhong University of Science and Technology and Kok-Meng Lee from Georgia Institute of Technology

Jiaoying Jiang received a Bachelor's degree of Engineering from the School of Mechanical Science and Engineering, Huazhong University of Science and Technology (HUST), Wuhan, Hubei, China, in 2017. She is currently a graduate research assistant working towards her Ph.D. degree in the State Key Laboratory of Digital Manufacturing Equipment and Technology in HUST. Her current research interests include mechatronics, machine perception and rehabilitation robotics.

Abstract: The loss of muscular strength and balancing disability make it difficult for stroke patients to move their body against gravity or to maintain balance. The asymmetrical kinematics and dynamics between the healthy and affected sides of stroke patients increase the risks of falls. This paper presents the development of a robotic-assisted Sit-to-Stand (RA-STS) mechanism to help stroke patients complete the STS movement essential for subsequent training and restore muscle functions. To provide a rational basis for the design/control of a RA-STS system, a relatively complete set of analytical models is presented for analyzing the asymmetric effects on the human joints during STS. Experiments were conducted to validate the concept feasibility and the kinematic and dynamic models by comparing simulations with experimentally measured results.

Hongjip Kim from Virginia Tech for paper DSCC2019-9000, "Self Resonant Energy Harvester With a Passively Tuned Sliding Mass," coauthored with Lei Zuo, Arthur Smith, and Oumar Barry from Virginia Tech

Hongjip Kim is currently working toward the Ph.D. degree in mechanical engineering at the Energy Harvesting and Mechatronics Laboratory, Virginia Tech, Blacksburg, Virginia. His current research interests include the design of self-tuning energy harvester for various applications, including oil drilling, smart tires, and power lines.

Abstract: Passive tuning phenomenon with a sliding mass on a vibrating beam has been observed and studied in the

Awards

literature. Such a phenomenon can be extended to self-resonant energy harvesting, where the natural frequency can be favorably adjusted to the excitation frequency for enhanced energy harvesting. In this paper, we consider the nonlinear dynamic coupling of a piezoelectric clamped-clamped beam with sliding mass and study experimentally and numerically how these nonlinear interactions affect the performance of the energy harvester. We derive the mathematical model using the extended Hamilton principle. The governing equations of motion are obtained as three coupled nonlinear partial differential equations. The Galerkin method is employed to obtain a reduced order model. Our mathematical formulation is validated via experiments and the results show very good agreement between the simulation and the experiment. Parametric studies are carried out to examine how key parameters affect the performance of the energy harvester. The findings suggest that a passively tuned mechanism with a small sliding mass can increase the power output even when the excitation frequency is far off the original resonance.

Shreyas Kousik from University of Michigan for paper DSCC2019-9214, "Safe, Aggressive Quadrotor Flight via Reachability-Based Trajectory Design," coauthored with Patrick Holmes and Ramanarayan Vasudevan from University of Michigan

Shreyas Kousik is a Ph.D. candidate in Mechanical Engineering at the University of Michigan, with Prof. Ram Vasudevan's ROAHM Lab. In his research, Shreyas has developed a method called Reachability-based Trajectory Design, a novel control algorithm for mobile robots such as autonomous cars and quadrotors. This approach enables formal guarantees about safety and performance by leveraging optimization and geometry to solve inverse dynamics, an often intractable problem in robotics.

Abstract: Quadrotors can provide services such as infrastructure inspection and search-and-rescue, which require operating autonomously in cluttered environments. Autonomy is typically achieved with receding-horizon planning, where a short plan is executed while a new one is computed, because sensors receive limited information at any time. To ensure safety and prevent robot loss, plans must be verified as collision free despite uncertainty (e.g., tracking error). Existing spline-based planners dilate obstacles uniformly to compensate for uncertainty, which can be conservative. On the other hand, reachability-based planners can include trajectory-dependent uncertainty as a function of the planned trajectory. This work applies Reachability-based Trajectory Design (RTD) to plan quadrotor trajectories that are safe despite trajectory-dependent tracking error. This is achieved by using

zonotopes in a novel way for online planning. Simulations show aggressive flight up to 5 m/s with zero crashes in 500 cluttered, randomized environments.

Jiamin Wang from Virginia Tech for paper DSCC2019-9118, "On the Dynamics and Control of a Full Wrist Exoskeleton for Tremor Alleviation," coauthored with Oumar Barry, Andrew J. Kurdila, and Sujith Vijayan.
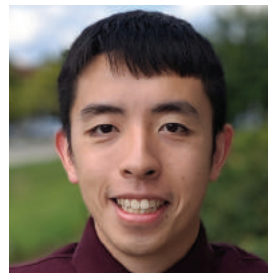
Jiamin Wang received his B.Eng. degree in Mechanical Engineering from East China University of Science and Technology in 2015, and his M.S. degree in Mechanical and Aerospace Engineering from the University of Missouri-Columbia in 2017. He is now pursuing a Ph.D. in Mechanical Engineering at Virginia Tech. His current research focuses on the development of robotic devices for human tremor analysis and suppression.

Abstract: This paper introduces a novel wearable full wrist exoskeleton designed for the alleviation of tremor in patients suffering from Parkinson's Disease and Essential Tremor. The design introduces a structure to provide full observation of wrist kinematics as well as actuation in wrist flexion/extension and radial/ulnar deviation. To examine the feasibility of the design, the coupled dynamics of the device and the forearm is modeled via a general multibody framework. The dynamic analysis considers human motion, wrist stiffness, and tremor dynamics. The analysis of the model reveals that the identification of the wrist kinematics is indispensable for the controller design. Nonlinear regression based on the Levenberg-Marquardt algorithm has been applied to estimate the unknown parameters in a kinematic structural function designed to approximate the wrist kinematics, which leads to the construction of the control system framework. Finally, several simulation cases are demonstrated to conclude the study.

Workshops

Workshop #1: Practical Methods for Real World Mechatronic Control System

Tuesday, October 8
1:00PM–5:00PM
Painted Horse II

Organizer

Daniel Abramovitch
Agilent Technology

Abstract:

The proverbial "gap" between control theory and practice has been discussed since the 1960s, but it shows no signs of being any smaller today than it was back then. Despite this, the growing ubiquity of powerful and inexpensive computation platforms, of sensors, actuators, and small devices, the "Internet of Things," of automated vehicles and quadcopter drones, means that there is an exploding application of control in the world. Any material that allows controls researchers to more readily apply their work and/or allows practitioners to improve their devices through best practices consistent with well-understood theory should be a good contribution to both the controls community and the users of control. This workshop is intended as a small but useful step in that direction.

Workshop #2: A Short Course on Robot Control

Tuesday, October 8
9:00AM–5:00PM
University of Utah (Contact Prof. Mascaro for details)

Organizer

Stephen Mascaro
University of Utah

Abstract:

Over the last decade, Prof. Mascaro has developed a unique hands-on curriculum for a course in *Robot Control* at the University of Utah. This curriculum covers the fundamentals of dynamic motion control and force/interaction control. In cooperation with Quansar Consulting, Inc., Prof. Mascaro has designed a modular open-architecture 2-DOF robot, where the motor torques can be directly and safely controlled using MATLAB/Simulink. Using a MATLAB Graphical User Interface (GUI) and series of Simulink Models, students can first simulate and then experimentally implement a variety of dynamic robot control techniques. Motion control techniques, such as feedforward computed torque control, inverse dynamics control, robust sliding mode control, and adaptive control, are used to demonstrate how to compensate for the nonlinear robot kinematics and dynamics to achieve fast and accurate trajectory tracking in joint space or operational space. Various force and interaction control techniques, such as impedance control, admittance control, hybrid position/force control, multi-robot cooperation, master/slave teleoperation, and visual services, are used to demonstrate how robots can dynamically interact with their environment.

This workshop is intended to serve as a short course based on Prof. Mascaro's Robot Control curriculum that will give participants an accelerated hands-on learning experience in the theory, simulation, and experimental implementation of robot motion and force control. The organizer anticipates this workshop will be of use to faculty who may wish to adopt and implement similar coursework at other institutions, as well as students and researchers who would benefit from training in Robot Control. Course materials, including MATLAB GUI and Simulink Models, will be shared with participants.

Workshops

Workshop #3: Adaptive Control Systems with Stability and Performance Guarantees

Tuesday, October 8
1:00PM–5:00PM
White Pine I (Ground Floor)

Organizer

Tansel Yucelen
University of South Florida

K. Merve Dogan
University of South Florida

Benjamin C. Gruenwald
Army Research Laboratory

Ehsan Arabi
University of Michigan

Abstract:

Adaptive control systems offer closed-loop system stability and performance in the presence of adverse conditions resulting from exogenous disturbances, imperfect system modeling, degraded modes of operation, and changes in system dynamics. In contrast to robust control systems, they have the capability to deal with such adverse conditions in an online fashion. This implies that they are not tuned to a worst-case scenario as robust control systems and they can continuously improve their performance through learning. From a general point of view, adaptive control methods are classified as either direct or indirect. In this workshop, we focus on model reference adaptive control architectures, a well-known class of direct adaptive control methods. Specifically, starting from the basic concepts in the design and analysis of model reference adaptive control systems, we will present novel methods for their safe implementation in practical applications with stability and performance guarantees.

Workshop #4: Stability Analysis of LTI Systems with Time Delays

Tuesday, October 8
1:00PM–5:00PM
Painted Horse I

Organizer

Rifat Sipahi
Northeastern University

Abstract:

For decades, researchers in many fields investigated the influence of time delays on the behavior of dynamical systems. On Linear Time Invariant (LTI) systems, there has been tremendous progress from stability and control design points of views. Specifically, main questions in these efforts include: (i) what is the largest delay that a closed loop system can withstand without losing stability; (ii) for a given delay in the closed loop system, how should the controller gains be selected to prevent instability; and (iii) how could closed loop system eigenvalues be computed in order to assess and approximate closed loop performance.

This workshop will focus on continuous time LTI systems from an eigenvalue-based approach to cover materials for the audience to be able to answer the questions (i)–(iii) and develop their own approaches to analyze similar classes of systems. The lecture will also provide sufficient and concise background starting from the 1960s to date, will discuss the challenges and limitations, and demonstrate how to solve benchmark problems step by step using Maple and Matlab software.

WEDNESDAY, OCTOBER 9

Morning Rapid Fire Interactive Sessions

W1-1 RFI SESSION:
SOFT MECHATRONIC ACTUATORS AND SENSORS (INCLUDES INVITED SESSION*)
Kokopelli Grand Ballroom   9:30AM–11:30AM

Session Chair: **Matteo Aureli**, *University of Nevada, Reno, Reno, NV, United States*

*This session contains papers from the Invited Session "Modeling and Control of Soft Actuators and Manipulators," organized by **Kam K. Leang**, University of Utah, and **Matteo Aureli**, University of Nevada, Reno.

Toward Magneto-Electroactive Endoluminal Soft (MEESo) Robots (Invited paper)
Technical Paper Publication. DSCC2019-9029

Jake A. Steiner, Omar A. Hussain, Lan N. Pham, Jake J. Abbott, Kam K. Leang, University of Utah, Salt Lake City, UT, United States

Adaptive Control of Large-Scale Soft Robot Manipulators With Unknown Payloads (Invited paper)
Technical Paper Publication. DSCC2019-9037

Jonathan S. Terry, Justin Whitaker, Randal W. Beard, Marc D. Killpack, Brigham Young University, Provo, UT, United States

Modeling Actuation of Ionomer Cilia in Salt Solution Under an External Electric Field (Invited paper)
Technical Paper Publication. DSCC2019-9060

Alain Boldini, Maxwell H. Rosen, New York University Tandon School of Engineering, Brooklyn, NY, United States, Youngsu Cha, Korea Institute of Science and Technology, Seoul, Korea (Republic), Maurizio Porfiri, New York University Tandon School of Engineering, Brooklyn, NY, United States

Modelling and Experimental Study for PVC Gel Actuators (Invited paper)
Technical Paper Publication. DSCC2019-9100

Zachary Frank, Zakai Olsen, Taeseon Hwang, Kwang J. Kim, University of Nevada Las Vegas, Las Vegas, NV, United States

The Effects of Nylon Polymer Threads on Strain-Loading Hysteresis Behavior of Supercoiled Polymer (SCP) Artificial Muscles (Invited paper)
Technical Paper Publication. DSCC2019-9169

Revanth Konda, Jun Zhang, University of Nevada, Reno, Reno, NV, United States

A New Approach to Model Constant Curvature Continuum Robot Dynamics
Technical Paper Publication. DSCC2019-8999

Yujiong Liu, Pinhas Ben-Tzvi, Virginia Tech, Blacksburg, VA, United States

Neural-Based Control of Compliant Foils With Spanwise Flexibility
Technical Paper Publication. DSCC2019-9045

Annika-verena Haecker, Ilmenau University of Technology, Ilmenau, Germany, Gabe Carryon, James Tangorra, Drexel University, Philadelphia, PA, United States, Thomas Sattel, Ilmenau University of Technology, Ilmenau, Germany

Completing Complex Contact Tasks Using Integrated Active and Passive Compliant Control Methodologies
Technical Paper Publication. DSCC2019-9062

Adam Pettinger, Mitch Pryor, University of Texas at Austin, Austin, TX, United States

Path Following for the Soft Origami Crawling Robot
Technical Paper Publication. DSCC2019-9175

Oyuna Angatkina, University of Illinois at Urbana-Champaign, Urbana, IL, United States, Kimberly Gustafson, University of Illinois at Urbana-Champaign, Champaign, IL, United States, Aimy Wissa, Andrew Alleyne, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Cooperative Collision Avoidance Control of Robotic Fish Propelled by a Servo/IPMC Driven Hybrid Tail
Technical Paper Publication. DSCC2019-9228

Xiongfeng Yi, Zheng Chen, University of Houston, Houston, TX, United States, Animesh Chakravarthy, University of Texas at Arlington, Arlington, TX, United States

Distributed Control of a Planar Discrete Elastic Rod Model for Caterpillar-Inspired Locomotion
Technical Paper Publication. DSCC2019-9220

Helene Nguewou-Hyousse, University of Maryland, Greenbelt, MD, United States, William Scott, University of Maryland, Wilmington, DE, United States, Derek Paley, University of Maryland, College Park, MD, United States

A Fuzzy Indirect Adaptive Robust Control for Upper Extremity Exoskeleton Driven by Pneumatic Artificial Muscle
Technical Paper Publication. DSCC2019-8987

Haoshu Cheng, Hao Liu, Pingang Han, Zhenyu Niu, Zhejiang University, Hangzhou, Zhejiang, China

Technical Sessions

W1-2 RFI SESSION:
AUTOMOTIVE AND TRANSPORTATION SYSTEMS
White Pine Ballroom   9:30AM–11:30AM

Session Chair: **Carrie M. Hall**, *Illinois Institute of Technology, Chicago, IL, United States*

Shared Control Between Human Driver and Automation in Cooperative Driving Based on Game Theoretic Model Predictive Control
Technical Paper Publication. DSCC2019-9053

Sangjin Ko, **Reza Langari**, *Texas A&M University, College Station, TX, United States*

Deep Reinforcement Learning for Adaptive Traffic Signal Control
Technical Paper Publication. DSCC2019-9076

Kai Liang Tan, Subhadipto Poddar, Soumik Sarkar, Anuj Sharma, *Iowa State University, Ames, IA, United States*

Surface Recognition for Cars: A Comprehensive Approach for Neural Networks
Technical Paper Publication. DSCC2019-9148

Ashkan Pourkand, *University of Utah, Salt Lake City, UT, United States*, **Chris White**, *High Consequence Automation and Robotics Group, Albuquerque, NM, United States*, **Naghmeh Zamani**, *Department of Computer Science, Los Angeles, CA, United States*, **David Grow**, *Department of Mechanical Engineering, Socorro, NM, United States*

Combining Reachability Analysis and Importance Sampling for Accelerated Evaluation of Highly Automated Vehicles at Pedestrian Crossing
Technical Paper Publication. DSCC2019-9179

Xinpeng Wang, Huei Peng, *University of Michigan, Ann Arbor, MI, United States*, **Ding Zhao**, *Carnegie Mellon University, Pittsburgh, PA, United States*

Analysis of a Novel Command Governor-Based Adaptive Cruise Controller for Non-Cooperative Vehicle Following
Technical Paper Publication. DSCC2019-9196

Ben Groelke, Christian Earnhardt, *North Carolina State University, Raleigh, NC, United States*, **John Borek**, *University of North Carolina at Charlotte, Charlotte, NC, United States*, **Christopher Vermillion**, *North Carolina State University, Raleigh, NC, United States*

Lane Keeping Control Using Finite Spectrum Assignment With Modeling Errors
Technical Paper Publication. DSCC2019-8960

Illés Vörös, Balázs Várszegi, *Budapest University of Technology and Economics, Budapest, Hungary*, **Dénes Takács**, *MTA-BME Research Group on Dynamics of Machines and Vehicles, Budapest, Hungary*

Human Driver Modeling Based on Analytical Optimal Solutions: Stopping Behaviors at the Intersections
Technical Paper Publication. DSCC2019-9178

Jihun Han, *Argonne National Laboratory, Lemont, IL, United States*, **Dominik Karbowski**, *Argonne National Laboratory, Argonne, IL, United States*, **Namdoo Kim, Aymeric Rousseau**, *Argonne National Laboratory, Lemont, IL, United States*

Optimal Lane Management in Heterogeneous Traffic Network
Technical Paper Publication. DSCC2019-9040

Pouria Karimi Shahri, Shubhankar Chintamani Shindgikar, *University of North Carolina Charlotte, Charlotte, NC, United States*, **Baisravan HomChaudhuri**, *Illinois Institute of Technology, Chicago, IL, United States*, **Amirhossein Ghasemi**, *University of North Carolina Charlotte, Charlotte, NC, United States*

Hierarchical Estimator of Dual Clutch Torques for a Power-Split Hybrid Electric Vehicle
Technical Paper Publication. DSCC2019-8927

Jianwu Zhang, Defeng Xu, *Shanghai Jiao Tong University, Shanghai, China*

Hierarchical Nonlinear Moving Horizon Estimation of Vehicle Lateral Speed and Road Friction Coefficient
Technical Paper Publication. DSCC2019-9069

Chi Jin, Anson Maitland, John McPhee, *University of Waterloo, Waterloo, ON, Canada*

Lifetime Optimization for a Grid-Friendly DC Fast Charge Station With Second Life Batteries
Technical Paper Publication. DSCC2019-9105

Matilde D'Arpino, Massimo Cancian, *Ohio State University, Columbus, OH, United States*

Analysis of Reference Shaping Control for Improved Yaw Stability in a Steer-by-Wire Vehicle
Technical Paper Publication. DSCC2019-9153

Srivatsan Srinivasan, Matthias J. Schmid, Venkat N. Krovi, *Clemson University, Greenville, SC, United States*

Afternoon Contributed Sessions

W2-1 CONTRIBUTED SESSION: ESTIMATION AND IDENTIFICATION
Bobcat II & III   1:15PM–3:15PM

Session Chair: **Chengzhi Yuan**, *University of Rhode Island, Kingston, RI, United States*
Session Co-Chair: **Marco P. Schoen**, *Idaho State University, Pocatello, ID, United States*

A Coupled Adaptive Measurement Delay Estimation and Iterative Learning Control Algorithm
Technical Paper Publication. DSCC2019-9210

Florian Browne, George Chiu, Neera Jain, Purdue University, West Lafayette, IN, United States

Moving Sound Source Localization and Tracking Using a Self Rotating Bi-Microphone Array
Technical Paper Publication. DSCC2019-9024

Deepak Gala, Liang Sun, New Mexico State University, Las Cruces, NM, United States

Kinect-Based Human Gait Recognition Using a Novel Adaptive Dynamics Learning Approach
Technical Paper Publication. DSCC2019-8920

Xiaotian Chen, Xiaonan Dong, Paolo Stegagno, Chengzhi Yuan, University of Rhode Island, Kingston, RI, United States

Temperature Dependent Hysteresis Modeling of a Piezotube Actuator Using Elman Neural Network
Technical Paper Publication. DSCC2019-9184

Mohammad Al Janaideh, Memorial University, St John's, NL, Canada, *Mohammad Al Saaideh*, University of Jordan, Amman, Jordan, *Micky Rakotondrabe*, Femto, Besançon, France

Real-Time Determination of the Cardiovascular Mechanical Determinants Using the Intra-Aortic Balloon Pump Mechanism
Technical Paper Publication. DSCC2019-9229

Ghazwan Alwan, Craig Emter, Aws Anaz, Noah Manring, YounesAalwan, University of Missouri-Columbia, Columbia, MO, United States, *Ali Salim*, Tikrit University, Tikrit, Iraq, *Emily Leary, Patrick Delafontaine*, University of Missouri-Columbia, Columbia, MO, United States, *Azad Hassan*, Michigan State University, East Lansing, MI, United States

Allowing Type-3 Wind Turbines to Participate in Frequency Regulation Using a Genetic Algorithm for Parameter Tuning
Technical Paper Publication. DSCC2019-9157

Shat Pratoomratana, Marco P. Schoen, Idaho State University, Pocatello, ID, United States

W2-2 CONTRIBUTED SESSION: MANUFACTURING SYSTEMS
Arrow Head II   1:15PM–3:15PM

Session Chair: **Qian Wang**, *Penn State University, University Park, PA, United States*
Session Co-Chair: **Kira Barton**, *University of Michigan, Ann Arbor, MI, United States*

A Control-Oriented Model for Melt-Pool Volume in Laser Powder Bed Fusion Additive Manufacturing
Technical Paper Publication. DSCC2019-9111

Qian Wang, Penn State University, University Park, PA, United States

Which Way Is the Best?: Evaluation and Optimization of Dual-Arm Robot Path Planning for Human-Robot Collaborative Tasks in Smart Manufacturing Contexts
Technical Paper Publication. DSCC2019-9143

Weitian Wang, Yi Chen, Yunyi Jia, Clemson University, Greenville, SC, United States

Spatial Iterative Learning Control for Multi-Material 3D-Structures
Technical Paper Publication. DSCC2019-9192

Zahra Afkhami, Christopher Pannier, University of Michigan, Ann arbor, MI, United States, *Leontine Aarnoudse*, Eindhoven University of Technology, Eindhoven, North Brabant, Netherlands, *David Hoelzle*, Ohio State University, Columbus, OH, United States, *Kira Barton*, University of Michigan, Ann Arbor, MI, United States

Data-Based Learning for Control of Elastic Interactions Between Robot and Workpiece
Technical Paper Publication. DSCC2019-9200

Lance McCAnn, Chia-Ning Lee, Yoshua Gombo, Joseph Garbini, Santosh Devasia, University of Washington, Seattle, WA, United States

Model Predictive Height Control for Direct Energy Deposition
Technical Paper Publication. DSCC2019-9217

Michelle Gegel, Missouri University of Science and Technology, Kirkwood, MO, United States, *Douglas Bristow, Robert Landers*, Missouri University of Science and Technology, Rolla, MO, United States

Machine-Learning Based Thermal-Geometric Predictive Modeling of Laser Powder Bed Fusion Additive Manufacturing
Technical Paper Publication. DSCC2019-8995

Yong Ren, Qian Wang, Penn State University, University Park, PA, United States, *Panagiotis Michaleris*, Autodesk, State College, PA, United States

Technical Sessions

W2-3 CONTRIBUTED SESSION:
ADVANCES IN ROBOTICS I
<u>**Painted Horse I 1:15PM–3:15PM**</u>

Session Chair: **Kok-Meng Lee**, *Georgia Institute of Technology, Norcross, GA, United States*
Session Co-Chair: **Yan Gu**, *University of Massachusetts Lowell, Lowell, MA, United States*

Asymmetric Kinematic and Dynamic Models of Robotic Assisted Sit-to-Stand System for Stroke Rehabilitation
Technical Paper Publication. DSCC2019-9207 (Student Best Paper Award Finalist)

Jiaoying Jiang, Guangzhou Hu, Huazhong University of Science and Technology, Wuhan, Hubei, China, **Kok-Meng Lee**, *Georgia Institute of Technology, Norcross, GA, United States*

A Variable-Structure Mass-Elastica Hopper
Technical Paper Publication. DSCC2019-8912

Sheryl Chau, Ranjan Mukherjee, Michigan State University, East Lansing, MI, United States

Apex Height Control of a Two-DOF Ankle-Knee-Hip Robot Hopping on a Rigid Foundation
Technical Paper Publication. DSCC2019-8921

Amer Allafi, Ranjan Mukherjee, Michigan State University, East Lansing, MI, United States

Optimal Mini Segway Control Using Non-Minimum Phase Sample and Hold Input
Technical Paper Publication. DSCC2019-8962

Yingxu Wang, Guoming Zhu, Michigan State University, East Lansing, MI, United States

Ankle-Knee-Hip Robot Hopping on an Elastic Foundation and a Viscoelastic Foundation With Inertia
Technical Paper Publication. DSCC2019-9072

Amer Allafi, Ranjan Mukherjee, Michigan State University, East Lansing, MI, United States

Global-Position Tracking Control of Multi-Domain Planar Bipedal Robotic Walking
Technical Paper Publication. DSCC2019-9117

Yuan Gao, Yan Gu, University of Massachusetts Lowell, Lowell, MA, United States

Afternoon Invited Sessions
W2-4 INVITED SESSION:
ADVANCED DRIVER ASSISTANCE AND AUTONOMOUS TECHNOLOGIES
<u>**Arrow Head I   1:15PM–3:15PM**</u>

Session Chair: **Amirhossein Ghasemi**, *University of North Carolina Charlotte, Charlotte, NC, United States*
Session Co-Chair: **Junfeng Zhao**, *General Motors, Warren, MI, United States*, **Carrie M. Hall**, *Illinois Institute of Technology, Chicago, IL, United States*, **Hoseinali Borhan**, *Cummins Inc., Columbus, IN, United States*

Two Segments (Plus) Path Planning of Automatic Parking Assist System for 4WS Vehicles
Technical Paper Publication. DSCC2019-9005

Yiwen Huang, Arizona State University, Gilbert, AZ, United States, **Thiagarajan Chidambareswaran, Chuan Chang, Yan Chen**, *Arizona State University, Mesa, AZ, United States*

Point-Clouds Fusion Based Obstacle Detection for Autonomous Ground Vehicles With Velodyne and Ibeo Lidar Sensors
Technical Paper Publication. DSCC2019-9006

Mingcong Cao, Southeast University, Nanjing, Jiangsu, China, **Junmin Wang**, **Chuan Hu**, *University of Texas at Austin, Austin, TX, United States*

Ensured Collision Avoidance Over a Finite Time Horizon for Autonomous Vehicles in Presence of Uncertainty
Technical Paper Publication. DSCC2019-9065

Seyedeh Mahsa Sotoudeh, Baisravan HomChaudhuri, Illinois Institute of Technology, Chicago, IL, United States

Experimental Results and Analysis of a Longitudinal Controlled Cooperative Adaptive Cruise Control (CACC) Truck Platoon
Technical Paper Publication. DSCC2019-9135

Patrick Smith, Jacob Ward, John Pierce, David Bevly, Auburn University, Auburn, AL, United States, **Rob Daily**, *Integrated Solutions for Systems, Auburn, AL, United States*

Analyzing the Effects of Geometric Lane Constraints on RADAR-Based Sensing of Available Vehicle Headway Using Mapped Lane Geometry and Camera Registration of Lane Position
Technical Paper Publication. DSCC2019-9167

Krishna Varadarajan, Penn State University, University Park, PA, United States, **Robert Leary**, *Penn State University, State College, PA, United States*, **Evan Pelletier**, *Pennsylvania State University, University Park, PA, United States*, **Mohamed Wahba**, *Pennsylvania State University, State College, PA, United States*, **Sean N. Brennan**, *Pennsylvania State University, University Park, PA, United States*

Resilient Control Under Cyber-Attacks in Connected ACC Vehicles
Technical Paper Publication. DSCC2019-9096

Woongsun Jeon, *University of Minnesota, Minneapolis, MN, United States*, *Ali Zemouche*, *University of Lorraine, Cosnes et Romain, France*, *Rajesh Rajamani*, *University of Minnesota, Minneapolis, MN, United States*

W2-5 INVITED SESSION:
VIBRATIONS – MODELING, ANALYSIS, AND CONTROL I
Painted Horse II   1:15PM–3:15PM

Session Chair: **Xu Chen**, *University of Washington, Seattle, WA, United States*
Session Co-Chair: **Minghui Zheng**, *University at Buffalo, Buffalo, NY, United States*, **Verica Radisavljevic-Gajic**, *Villanova University, Villanova, PA, United States*, **S. Nima Mahmoodi**, *University of Alabama, Tuscaloosa, AL, United States*, **Oumar Barry**, *Virginia Tech, Blacksburg, VA, United States*

Performance Study of a Bat Searching Algorithm From System Dynamics Perspective
Technical Paper Publication. DSCC2019-9017

Haopeng Zhang, *Nathan Schutte*, *University of Louisville, Louisville, KY, United States*

Voltage Response of Parametric Resonance of MEMS Circular Plates Under Hard Excitations
Technical Paper Publication. DSCC2019-9059

Julio S. Beatriz, Dumitru Caruntu, *University of Texas Rio Grande Valley, Edinburg, TX, United States*

Hydraulic Integrated Interconnected Regenerative Suspension: Ride Performance and Parameter Sensitivity
Technical Paper Publication. DSCC2019-9064

Junyi Zou, *Wuhan University of Technology, Mafangshan Campus, Hubei, China*, *Sijing Guo*, *Wuhan University of Technology, Wuhan, China*, *Lin Xu, Xuexun Guo*, *Wuhan University of Technology, Mafangshan Campus, Hubei, China*

On the Modeling and Optimization of Anti-Vibration Gloves for Hand-Arm Vibration Control
Technical Paper Publication. DSCC2019-9094

Sunit K Gupta, Oreoluwa Alabi, Paul-camille Kakou, Oumar Barry, *Virginia Tech, Blacksburg, VA, United States*

Configuration Optimization for End-Point Stabilization of Redundant Manipulators With Base Flexibility
Technical Paper Publication. DSCC2019-9129

Michael LiBretto, Yong K. Cho, *Georgia Institute of Technology, Atlanta, GA, United States*, *Yong Han Ahn*, *Hanyang University, Seoul, Korea (Republic)*, *Chang Soo Han*, *Hanyang University, Ansan, Kyonggi Do*, *Jun Ueda*, *Georgia Institute of Technology, Atlanta, GA, United States*

On the Dynamics and Control of a Full Wrist Exoskeleton for Tremor Alleviation
Technical Paper Publication. DSCC2019-9118 (Student Best Paper Award Finalist)

Jiamin Wang, *Oumar Barry*, *Andrew J. Kurdila*, *Sujith Vijayan*, *Virginia Polytechnic Institute and State University, Blacksburg, VA, United States*

W2-6 INVITED SESSION:
THERMAL ENERGY SYSTEMS
Bobcat I   1:15PM–3:15PM

Session Chair: **Stephanie Stockar**, *Penn State University, University Park, PA, United States*
Session Co-Chair: **Mahdi Shahbakhti**, *Michigan Technological University, Houghton, MI, United States*, **Christopher Vermillion**, *North Carolina State University, Raleigh, NC, United States*, **Jason Siegel**, *University of Michigan, Ann Arbor, MI, United States*, **Zoleikha Abdollahi Biron**, *Clemson University, Greenville, SC, United States*

A Hybrid Electro-Thermal Energy Storage System for High Ramp Rate Power Applications
Technical Paper Publication. DSCC2019-9089

Cary Laird, *Andrew Alleyne*, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

Design and Verification of a Small-Scale District Heating Network Experiment
Technical Paper Publication. DSCC2019-9101

Melissa Krieger, Dylan Stecklair, Stephen Peluso, Stephanie Stockar, *Penn State University, University Park, PA, United States*

Model Predictive Control of Micro-CSP Integrated Into a Building HVAC System for Load Following Demand Response Programs
Technical Paper Publication. DSCC2019-9106

Mohamed Toub, *Mohammadia School of Engineering, Rabat, Rabat, Morocco*, *Mahdi Shahbakhti, Rush D. Robinett III*, *Michigan Technological University, Houghton, MI, United States*, *Ghassane Aniba*, *Mohammadia School of Engineering, Rabat, Morocco*

Dynamic Design Optimization for Thermal Management: A Case Study on Shell and Tube Heat Exchangers
Technical Paper Publication. DSCC2019-9212

Austin Nash, *Purdue University, Sullivan, IN, United States*, *Neera Jain*, *Purdue University, West Lafayette, IN, United States*

Modeling of Thermal Dynamics of a Connected Hybrid Electric Vehicle for Integrated HVAC and Powertrain Optimal Operation
Technical Paper Publication. DSCC2019-9223

Nehal Doshi, Drew Hanover, Sadra Hemmati, Chris Morgan, Mahdi Shahbakhti, *Michigan Technological University, Houghton, MI, United States*

Technical Sessions

Switched Linear Model of a Stratified Hot Water Tank for Control of Micro-CHP Systems
Technical Paper Publication. DSCC2019-9236

Trevor J. Bird, Catherine Weaver, Neera Jain, Purdue University, West Lafayette, IN, United States

Evening Contributed Sessions

W3-1 CONTRIBUTED SESSION: UNCERTAIN SYSTEMS AND ROBUSTNESS
Bobcat II & III   3:30PM–5:30PM

Session Chair: **Roberto Rocchetta**, National Institute of Aerospace, NIA, Hampton, VA, United States
Session Co-Chair: **Aleksandar Haber**, City University of New York-CSI, Staten Island, NY, United States

A Stabilizing Control Algorithm for Asynchronous Parallel Quadratic Programming via Dual Decomposition
Technical Paper Publication. DSCC2019-9047

Kooktae Lee, New Mexico Institute of Mining and Technology, Socorro, NM, United States

Solution of the Benchmark Control Problem by Scenario Optimization
Technical Paper Publication. DSCC2019-8949

Roberto Rocchetta, National Institute of Aerospace, Hampton, VA, United States, **Luis Crespo, Sean Kenny**, NASA Langley Research Center, Hampton, VA, United States

Reference Governors Based on Online Learning of Maximal Output Admissible Set
Technical Paper Publication. DSCC2019-8950

Manuel Lanchares, Ilya Kolmanovsky, Anouck Girard, University of Michigan, Ann Arbor, MI, United States, **Denise Rizzo**, U.S. Army RDE-COM TARDEC, Warren, MI, United States

Identification of Temperature Dynamics Using Subspace and Machine Learning Techniques
Technical Paper Publication. DSCC2019-9007

Aleksandar Haber, Francesco Pecora, Mobin Uddin Chowdhury, Melvin Summerville, City University of New York-College of Staten Island, Staten Island, NY, United States

Bidirectional LSTM Recurrent Neural Network Plus Hidden Markov Model for Wearable Sensor Based Dynamic State Estimation
Technical Paper Publication. DSCC2019-9198

Ritika Sibal, Ding Zhang, University of Michigan, Ann Arbor, MI, United States, **Julie Rocho-Levine**, Dolphin Quest Oahu, Honolulu, HI, United States, **K. Alex Shorter, Kira Barton**, University of Michigan, Ann Arbor, MI, United States

Modeling Peripheral Artery Behavior Beneath a Non-Invasive Wearable Sensor Subject to Varying Outside Pressure
Technical Paper Publication. DSCC2019-9221

Lu Wang, Sardar Ansari, Yingjie Cai, Kevin R. Ward, Kayvan Najarian, Kenn Oldham, University of Michigan, Ann Arbor, MI, United States

W3-2 CONTRIBUTED SESSION: DYNAMICS AND CONTROL OF HUMAN-ROBOT SYSTEMS
Arrow Head II   3:30PM–5:30PM

Session Chair: **Jun Ueda**, Georgia Institute of Technology, Atlanta, GA, United States
Session Co-Chair: **Yunyi Jia**, Clemson University, Greenville, SC, United States

A Strategy of Human Balancing Based on Lissajous Curves
Technical Paper Publication. DSCC2019-9066

Angel Cerda Lugo, Alejandro Gonzalez, Antonio Cardenas, Universidad Autonoma de San Luis Potosi, San Luis Potosi, Mexico, **Davide Piovesan**, Gannon University, Erie, PA, United States

Modeling, Analysis, and Control of Slip Running on Dynamic Platforms
Technical Paper Publication. DSCC2019-9115

Amir Iqbal, Zhu Mao, Yan Gu, University of Massachusetts Lowell, Lowell, MA, United States

Natural Language and Gesture Perception Based Robot Companion Teaching for Assisting Human Workers in Assembly Contexts
Technical Paper Publication. DSCC2019-9177

Rui Li, Weitian Wang, Yi Chen, Yunyi Jia, Clemson University, Greenville, SC, United States

Encrypted Motion Control of a Teleoperation System With Security-Enhanced Controller by Deception
Technical Paper Publication. DSCC2019-9243

Yingxin Qiu, Jun Ueda, Georgia Institute of Technology, Atlanta, GA, United States

Convolutional Neural Networks for Environmentally Aware Locomotion Mode Recognition of Lower-Limb Amputees
Technical Paper Publication. DSCC2019-9180

Gholamreza Khademi, Dan Simon, Cleveland State University, Cleveland, OH, United States

Technical Sessions

User Intent Recognition for Transfemoral Amputees With Prosthetic Legs Using Evolutionary Algorithms
Technical Paper Publication. DSCC2019-9150

Hanieh Mohammadi, Gholamreza Khademi, Cleveland State University, Cleveland, OH, United States, Elizabeth C. Hardin, Cleveland VA Medical Center, Cleveland, OH, United States, Dan Simon, Cleveland State University, Cleveland, OH, United States

W3-3 CONTRIBUTED SESSION: ADVANCES IN ROBOTICS II
Painted Horse I 3:30PM–5:30PM

Session Chair: **Edmond Richer**, *Southern Methodist University, Dallas, TX, United States*
Session Co-Chair: **Vivek Sangwan**, *Indian Institute of Technology Bombay, Mumbai, India*

Calibration and Validation of Dynamic Model for Simulating Robotic Finger Kinematics and Contact Forces
Technical Paper Publication. DSCC2019-8961

James Tigue, Stephen Mascaro, University of Utah, Salt Lake City, UT, United States

Effect of Manipulator's Joints Flexibility on the Positioning Precision of the End-Effector of the UVMS
Technical Paper Publication. DSCC2019-9077

Umer Hameed Shah, Mansour Karkoub, Hong-Du Wang, Deniz Kerimoglu, Texas A&M University at Qatar, Doha, Qatar

Locomotion of an Origami Inspired Nonholonomic System
Technical Paper Publication. DSCC2019-9016

Vitaliy Fedonyuk, Clemson University, Lexington, SC, United States, Priyanka Bhovad, Suyi Li, Phanindra Tallapragada, Clemson University, Clemson, SC, United States

Dynamic Modeling and Control of Flexible Cables for Shape Forming
Technical Paper Publication. DSCC2019-9049

Naijing Lv, Clemson University, Greenville, SC, United States, Jianhua Liu, Huanxiong Xia, Beijing Institute of Technology, Beijing, Beijing, China, Yunyi Jia, Clemson University, Greenville, SC, United States

Lumped Parameter Modeling and Snap-Through Stability Analysis of Planar Hydraulically Amplified Dielectric Elastomer Actuators
Technical Paper Publication. DSCC2019-9219

Amir Hosein Zamanian, David Y. Son, Paul Krueger, Edmond Richer, Southern Methodist University, Dallas, TX, United States

Contact Force and Position Tracking With a Planar Aerial Manipulator
Technical Paper Publication. DSCC2019-9132

Varun R. Mittal, Vivek Sangwan, Indian Institute of Technology Bombay, Mumbai, India

Evening Invited Sessions

W3-4 INVITED SESSION: VEHICLE DYNAMICS AND STABILITY
Arrow Head I   3:30PM–5:30PM

Session Chair: **Selina Pan**, *Toyota Research Institute, Los Altos, CA, United States*
Session Co-Chair: **Pingen Chen**, *Tennessee Tech University, Cookeville, TN, United States*, **Carrie M. Hall**, *Illinois Institute of Technology, Chicago, IL, United States*, **Zhaojian Li**, *Michigan State University, East Lansing, MI, United States*

Enhanced Tire Blowout Modeling Using Vertical Load Redistribution and Self-Alignment Torque
Technical Paper Publication. DSCC2019-8997

Ao Li, Yan Chen, Arizona State University, Mesa, AZ, United States, Xinyu Du, Wen-Chiao Lin, General Motors, Warren, MI, United States

Influence of Tire Inflation Pressure on Vehicle Dynamics and Handling Performance
Technical Paper Publication. DSCC2019-9055

Jianyang Wu, University of Texas at Austin, Austin, TX, United States, Zhenpo Wang, Beijing Institute of Technology, Beijing, China, Junmin Wang, University of Texas at Austin, Austin, TX, United States

Structured Robust Linear Parameter-Varying Vehicle Sideslip Angle Estimation
Technical Paper Publication. DSCC2019-9021

Jingqiang Zha, Junmin Wang, University of Texas at Austin, Austin, TX, United States, Min Li, Xin Zhang, Xiao Yu, F. Tech Inc., Troy, OH, United States

Modeling and Control of Wheel Motor Based Articulated Vehicle System
Technical Paper Publication. DSCC2019-9239

Taehyun Shim, Heeseong Kim, University of Michigan-Dearborn, Dearborn, MI, United States, Byungjun Sung, Hyundai Motor Group, Gyeonggi-do, Korea (Republic)

A Supervisory Lateral Slip Prevention Controller for Autonomous Vehicles
Technical Paper Publication. DSCC2019-9166

Nikunj Kumbhani, Saeid Bashash, San Jose State University, San Jose, CA, United States

Technical Sessions

W3-5 INVITED SESSION:
VIBRATIONS – MODELING, ANALYSIS, AND CONTROL II
Painted Horse II   3:30PM–5:30PM

Session Chair: **Xu Chen**, *University of Washington, Seattle, WA, United States*
Session Co-Chair: **Oumar Barry**, *Virginia Tech, Blacksburg, VA, United States*, **Verica Radisavljevic-Gajic**, *Villanova University, Villanova, PA, United States*, **Minghui Zheng**, *University at Buffalo, Buffalo, NY, United States*, **S. Nima Mahmoodi**, *University of Alabama, Tuscaloosa, AL, United States*

Control-Oriented Modeling and Repetitive Control in In-Layer and Cross-Layer Thermal Interactions in Selective Laser Sintering
Technical Paper Publication. DSCC2019-8976

Dan Wang, Tianyu Jiang, *University of Connecticut, Storrs, CT, United States*, *Xu Chen*, *University of Washington, Seattle, WA, United States*

Self-Resonant Energy Harvester With a Passively Tuned Sliding Mass
Technical Paper Publication. DSCC2019-9000 (Student Best Paper Award Finalist)

Hongjip Kim, Lei Zuo, Arthur Smith, Oumar Barry, *Virginia Tech, Blacksburg, VA, United States*

Dynamics of a Vibration Driven Bristlebot
Technical Paper Publication. DSCC2019-9018

Chandravamsi Gandra, Phanindra Tallapragada, *Clemson University, Clemson, SC, United States*

Multiple-Scale Analysis of a Novel Piezoelectric Energy Harvester With a Tunable Potential Function
Technical Paper Publication. DSCC2019-9091

Feng Qian, Nicole Abaid, Lei Zuo, *Virginia Tech, Blacksburg, VA, United States*

Comparison of Frequency Response of Parametric Resonance of DWCNT and SWCNT Under Electrostatic Actuation
Technical Paper Publication. DSCC2019-9171

Dumitru Caruntu, Ezequiel Juarez, *University of Texas Rio Grande Valley, Edinburg, TX, United States*

Amplitude-Frequency Response of Superharmonic Resonance of Third Order of Electrostatically Actuated MEMS Cantilever Resonators
Technical Paper Publication. DSCC2019-9172

Dumitru Caruntu, Christopher Reyes, *University of Texas Rio Grande Valley, Edinburg, TX, United States*

W3-6 INVITED SESSION:
RENEWABLE AND SMART ENERGY SYSTEMS
Bobcat I   3:30PM–5:30PM

Session Chair: **Neera Jain**, *Purdue University, West Lafayette, IN, United States*
Session Co-Chair: **Youngki Kim**, *University of Michigan at Dearborn, Dearborn, MI, United States*, **Jason Siegel**, *University of Michigan, Ann Arbor, MI, United States*, **Satadru Dey**, *University of Colorado Denver, Aurora, CO, United States*, **Scott Moura**, *University of California, Berkeley, Berkeley, CA, United States*, **Xinfan Lin**, *University of California, Davis, Davis, CA, United States*, **Zoleikha Abdollahi Biron**, *Clemson University, Greenville, SC, United States*

Empirical Regret Bounds for Control in Spatiotemporally Varying Environments: A Case Study in Airborne Wind Energy
Technical Paper Publication. DSCC2019-9068

Ben Haydon, Jack Cole, *North Carolina State University, Raleigh, NC, United States*, *Laurel Dunn, Patrick Keyantuo, Tina Chow, Scott Moura*, *University of California, Berkeley, Berkeley, CA, United States*, *Christopher Vermillion*, *North Carolina State University, Raleigh, NC, United States*

Optimal Maintenance of Electric Vehicle Battery System Through Overnight Home Charging
Technical Paper Publication. DSCC2019-9004

Sidharth Jangra, Chien-Hsin Chung, Qingzhi Lai, Xinfan Lin, *University of California, Davis, Davis, CA, United States*

Fused Model Predictive Control Techniques for Strategic Platooning Amongst Heterogeneous Pairs of Heavy-Duty Trucks
Technical Paper Publication. DSCC2019-9071

Christian Earnhardt, Ben Groelke, *North Carolina State University, Raleigh, NC, United States*, *John Borek*, *University of North Carolina at Charlotte, Charlotte, NC, United States*, *Christopher Vermillion*, *North Carolina State University, Raleigh, NC, United States*

Understanding the Role of Microgrid Topology for Decentralized Model-Based Control
Technical Paper Publication. DSCC2019-9103

Matthew Chu Cheong, *University of Texas at Austin, Levittown, NY, United States*, *Dongmei Chen, Pengwei Du*, *University of Texas at Austin, Austin, TX, United States*

Auto-Tuning Control of PEM Water Electrolyzer
Technical Paper Publication. DSCC2019-9156

Alicia Keow, Zheng Chen, *University of Houston, Houston, TX, United States*

Flight Dynamics and Control of a Farm of Tethered Energy Systems in a Turbulent Field
Technical Paper Publication. DSCC2019-9168

Ayaz Siddiqui, North Carolina State University, Raleigh, NC, United States, *Praveen Ramaprabhu, Joseph Deese*, University of North Carolina at Charlotte, Charlotte, NC, United States, *Christopher Vermillion*, North Carolina State University, Raleigh, NC, United States

Evening Poster Session

W4-1 POSTER SESSION
Grand Ballroom Foyer   6:30PM–7:15PM

System Identification of a Multi-Axis Dual-Stage Precision Positioning Platform
Poster Presentation. DSCC2019-9270

William S. Nagel, Kam K. Leang, University of Utah, Salt Lake City, UT, United States

Fabrication and Dynamic Response Characterization of Tailored 3D-Structured IPMC Sensors
Poster Presentation. DSCC2019-9277

Justin Ngo, University of Utah, West Jordan, UT, United States, *Rebecca Histed*, University of Nevada, Reno, Reno, NV, United States, *Omar A. Hussain, William S. Nagel*, University of Utah, Salt Lake City, UT, United States, *Yiliang Liao*, *Matteo Aureli*, University of Nevada, Reno, Reno, NV, United States, *Kam K. Leang*, University of Utah, Salt Lake City, UT, United States

Cooperative Transport of a Payload With Offset CG Using Multiple UAVs
Poster Presentation. DSCC2019-9252

Shraddha Barawkar, Manish Kumar, University of Cincinnati, Cincinnati, OH, United States

Robust Stability of Linear Time Invariant Systems on Physical System
Poster Presentation. DSCC2019-9253

Eduardo Hernandez, Mr, Morelia, Michoacan, Mexico

On Receding Horizon Chance Constraint Motion Planning for Uncertain Multi-Agent Systems
Poster Presentation. DSCC2019-9254

Yash Bagla, Michigan State University, Ann Arbor, MI, United States, *Vaibhav Srivastava*, Michigan State University, East Lansing, MI, United States

Human UGV Interaction by Arm Gesture Recognition: A New Adaptive Dynamics Learning Approach
Poster Presentation. DSCC2019-9255

Xiaotian Chen, Chengzhi Yuan, Paolo Stegagno, University of Rhode Island, Kingston, RI, United States

StopTheSpread: A Mobile Application to Teach Best Practices to Prevent Flu Spreading
Poster Presentation. DSCC2019-9256

Matthieu Nadini, *Samuel Richmond, Jiayi Huang*, New York University, Brooklyn, NY, United States, *Alessandro Rizzo*, Politecnico di Torino, Torino, Italy, *Maurizio Porfiri*, New York University, Brooklyn, NY, United States

Optimal Strategy for Multiple Evaders Against an Agile Pursuer
Poster Presentation. DSCC2019-9257

Chunsheng Liu, Mark V. Trevorrow, Defence R&D Canada, Dartmouth, NS, Canada

Dynamic Modeling and Passivity-Based Control of a Tower Crane
Poster Presentation. DSCC2019-9259

Ping-Yen Shen, Ryan J. Caverly, University of Minnesota, Minneapolis, MN, United States

A Fuzzy Indirect Adaptive Robust Control for Upper Extremity Exoskeleton Driven by Pneumatic Artificial Muscle
Poster Presentation. DSCC2019-9260

Haoshu Cheng, Hao Liu, Pingang Han, Zhenyu Niu, Zhejiang University, Hangzhou, Zhejiang, China

Convergence of the Matrix Lambert W Approach to Solution of Systems of Delay Differential Equations
Poster Presentation. DSCC2019-9261

A. Galip Ulsoy, *Rita Gitik*, University of Michigan, Ann Arbor, MI, United States

Cohesive Velocity Transitions in Platoons Without Centralized Communication using Delayed Self Reinforcement
Poster Presentation. DSCC2019-9262

Anuj Tiwari, *Santosh Devasia*, University of Washington, Seattle, WA, United States

Closed-Loop Finite Element Modeling of Thermal Fields in Powder Bed Fusion Additive Manufacturing
Poster Presentation. DSCC2019-9263

Dan Wang, *Xu Chen*, University of Washington, Seattle, WA, United States

Technical Sessions

Closed-loop Finite Element Modeling of Thermal Fields in Powder Bed Fusion Additive Manufacturing
Poster Presentation. DSCC2019-9264

Dan Wang, *Xu Chen*, *University of Washington, Seattle, WA, United States*

Using Physical Properties to Find the Likelihood of Falling in the Act of Sitting to Standing
Poster Presentation. DSCC2019-9266

Robert Felmlee, *Jordan Smith*, *Gannon University, Erie, PA, United States*, *Mary Crowe*, *Lake Erie College of Osteopathic Medicine, Erie, PA, United States*, *Scott Steinbrink*, *Davide Piovesan*, *Gannon University, Erie, PA, United States*

Negotiation of Control Authority in a Physical Human-Robot Interactive Task
Poster Presentation. DSCC2019-9267

Vahid Izadi, *Amirhossein Ghasemi*, *University of North Carolina at Charlotte, Charlotte, NC, United States*

Design a High Efficiency and Low Ripple BLDC Motor Based on Multi-Objective Optimization Methods
Poster Presentation. DSCC2019-9268

Vahid Izadi, *Pouria Karimi Shahri*, *Amirhossein Ghasemi*, *University of North Carolina at Charlotte, Charlotte, NC, United States*

Scalable Robust and Adaptive Control Strategies for Heterogeneous Multi-Vehicle Networks
Poster Presentation. DSCC2019-9269

Pouria Karimi Shahri, *Amirhossein Ghasemi*, *University of North Carolina at Charlotte, Charlotte, NC, United States*

A High-Performance Helically Wrapped Supercoiled Polymer (HW-SCP) Artificial Muscle
Poster Presentation. DSCC2019-9271

Ryan Coulter, Christopher Mullen, Scott Wade, Thulani Tsabedze, *Jun Zhang*, *University of Nevada, Reno, Reno, NV, United States*

Convolutional Neural Network Enhanced Simultaneous Localization and Mapping for Robot Navigation
Poster Presentation. DSCC2019-9272

Olusola Olojed, Biswanath Samanta, *Georgia Southern University, Statesboro, GA, United States*

An Online Model Learning Approach for Inkjet 3D Printing
Poster Presentation. DSCC2019-9273

Uduak Inyang-Udoh, Sandipan Mishra, *Rensselaer Polytechnic Institute, Troy, NY, United States*

Flocking in Three Dimensions With Eavesdropped Sensing
Poster Presentation. DSCC2019-9274

Masoud Jahromi Shirazi, Nicole Abaid, *Virginia Tech, Blacksburg, VA, United States*

Inkjet 3D Printing of Ionic Polymer Metal Composite Sensors With Engineered Interfaces
Poster Presentation. DSCC2019-9278

Rebecca Histed, *University of Nevada Reno, Reno, NV, United States*, *Justin Ngo*, *Kam K. Leang*, *University of Utah, Salt Lake City, UT, United States*, *Yiliang Liao*, *Matteo Aureli*, *University of Nevada, Reno, Reno, NV, United States*

Multi-Time Scale Control of Dual-Stage Nanopositioning Systems
Poster Presentation. DSCC2019-9258

Aleksandra Mitrovic, *Villanova University, Villanova, PA, United States*, *Milos Milanovic*, *Villanova University, Villanova, PA, United States*, *Verica Radisavljevic-Gajic*, *Villanova University, Villanova, PA, United States*, *Kam K. Leang*, *University of Utah, Salt Lake City, UT, United States*, *Garrett Clayton*, *Villanova University, Villanova, PA, United States*

Trajectory Design for a Multi-Beam Lidar Systems With Added Degrees of Freedom
Poster Presentation. DSCC2019-9275

Michael Benson, Garrett Clayton, *Villanova University, Villanova, PA, United States*

Comparing Terrestrial Lidar Data Resolution in Civil Engineering Applications
Poster Presentation. DSCC2019-9276

Michael Crimmins, Michael Benson, Jeremy Palme, Garrett Clayton, Seri Park, Virginia Smith, *Villanova University, Villanova, PA, United States*

Technical Sessions

Morning Rapid Fire Interactive Sessions

T1-1 RFI SESSION:
UNMANNED GROUND AND AERIAL VEHICLES
Kokopelli Grand Ballroom   9:30AM–11:30AM

Session Chair: **Manish Kumar**, *University of Cincinnati, Cincinnati, OH, United States*

Bayesian Estimation of Snow-Avalanche Victim Pose: A Method to Assist Human and/or Robot First Responders to Quickly Locate a Buried Victim
Technical Paper Publication. DSCC2019-8946

Joseph R. Bourne, Kam K. Leang, University of Utah, Salt Lake City, UT, United States

A Probabilistic Technique for Allocation of Tasks With Priorities in a School of Autonomous Mobile Robots
Technical Paper Publication. DSCC2019-8970

Soovadeep Bakshi, Tianheng Feng, Zeyu Yan, Dongmei Chen, University of Texas at Austin, Austin, TX, United States

A New Quasi-Steady In-Ground Effect Model for Rotorcraft Unmanned Aerial Vehicles
Technical Paper Publication. DSCC2019-9025

Xiang He, Kam K. Leang, University of Utah, Salt Lake City, UT, United States

Gaussian-Based Kernel for Multi-Agent Aerial Chemical-Plume Mapping
Technical Paper Publication. DSCC2019-9027

Xiang He, Jake A. Steiner, Joseph R. Bourne, Kam K. Leang, University of Utah, Salt Lake City, UT, United States

Self-Reflective Learning Strategy for Persistent Autonomy of Aerial Manipulators
Technical Paper Publication. DSCC2019-9086

*Xu Zhou, Colorado School of Mines, Golden, CO, United States, **Jiucai Zhang**, GAC R&D Center Silicon Valley, Sunnyvale, CA, United States, **Xiaoli Zhang**, Colorado School of Mines, Golden, CO, United States*

Chemical-Source Localization Using a Swarm of Decentralized Unmanned Aerial Vehicles for Urban/Suburban Environments
Technical Paper Publication. DSCC2019-9099

*Jake A. Steiner, Joseph R. Bourne, Xiang He, University of Utah, Salt Lake City, UT, United States, **Donald M. Cropek**, U.S. Army Corps of Engineers, Champaign, IL, United States, **Kam K. Leang**, University of Utah, Salt Lake City, UT, United States*

Integrated Forward and Reverse Trajectory Tracking Control for Car-Like Ground Vehicle
Technical Paper Publication. DSCC2019-9104

*Yuanyan Chen, Ohio University, Logan, OH, United States, **J.Jim Zhu, Letian Lin**, Ohio University, Athens, OH, United States*

Cooperative Transport of a Payload With Offset CG Using Multiple UAVs
Technical Paper Publication. DSCC2019-9131

*Shraddha Barawkar, University of Cincinnati, Cincinnati, OH, United States, **Manish Kumar**, University of Cincinnati, Wyoming, OH, United States*

Sub-Optimal Control of Autonomous Wheel Loader With Approximate Dynamic Programming
Technical Paper Publication. DSCC2019-9248

Tohid Sardarmehni, Xingyong Song, Texas A&M University, College Station, TX, United States

Modeling and Predictive Control of an Unmanned Underwater Vehicle
Technical Paper Publication. DSCC2019-9154

Renato Rodriguez Nunez, Damoon Soudbakhsh, Temple University, Philadelphia, PA, United States

Modelling and Simulation of Perching With a Quadrotor Aerial Robot With Passive Bio-Inspired Legs and Feet
Technical Paper Publication. DSCC2019-9241

David Dunlop, Mark Minor, University of Utah, Salt Lake City, UT, United States

Compressive Sensing-Based Reconstruction of Lissajous-Like Nodding Lidar Data
Technical Paper Publication. DSCC2019-9201

*Michael Benson, Villanova University, Villanova, PA, United States, **Harish Sathishchandra**, Boston University, Boston, MA, United States, **Garrett Clayton**, Villanova University, Villanova, PA, United States, **Sean B. Andersson**, Boston University, Boston, MA, United States*

Technical Sessions

Session Chair: **Nicole Abaid**, *Virginia Tech, Blacksburg, VA, United States*

A Strictly Defined Orthogonal Global Task Coordinate Frame and Its Contouring Control Application on Biaxial Systems
Technical Paper Publication. DSCC2019-8988

Can Yang, *Zhejiang University, Hangzhou, Zhejiang, China*, **Zheng Chen**, *Zhejiang University, Zhoushan, Zhejiang, China*, **Bin Yao**, *Purdue University, West Lafayette, IN, United States*, **Bobo Helian**, *Zhejiang University, Hangzhou, China*

Delay-Dependent Output-Feedback Control for Blood Pressure Regulation Using LPV Techniques
Technical Paper Publication. DSCC2019-9098

Shahin Tasoujian, *Karolos Grigoriadis*, *Matthew Franchek*, *University of Houston, Houston, TX, United States*

Time Delay Control of a High-DOF Robot Manipulator Through Feedback Linearization Based Predictor
Technical Paper Publication. DSCC2019-8915

Peiman Naseradinmousavi, *San Diego State University, San Diego, CA, United States*, **Miroslav Krstic**, *University of California, San Diego, La Jolla, CA, United States*, **Mostafa Bagheri**, *University of California, San Diego and SDSU, La Jolla, CA, United States*

Output Feedback Control Synthesis for a Helicopter Using Explicit Nonlinear Model Predictive Control, Dynamic Inversion and Extended High Gain Observers
Technical Paper Publication. DSCC2019-9036

Joohwan Seo, *Jongeun Choi*, *Yonsei University, Seoul, Korea (Republic)*

The Restricted Newton Method for Fast Nonlinear Model Predictive Control
Technical Paper Publication. DSCC2019-9067

Anson Maitland, Chi Jin, *John McPhee*, *University of Waterloo, Waterloo, ON, Canada*

Adaptive NN Learning Control of Discrete-Time Nonlinear Uncertain Systems
Technical Paper Publication. DSCC2019-8923

Jingting Zhang, Chengzhi Yuan, Paolo Stegagno, *University of Rhode Island, Kingston, RI, United States*

Comparison of Adaptive Control Laws for Wind Rejection in Quadrotor UAVs
Technical Paper Publication. DSCC2019-8957

Johannes Verberne, Hever Moncayo, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*

Learning Flatness-Based Controller Using Neural Network
Technical Paper Publication. DSCC2019-8998

Hailin Ren, Jingyuan Qi, Pinhas Ben-Tzvi, *Virginia Tech, Blacksburg, VA, United States*

Evaluating the Performance of Foot Control of a Supernumerary Robotic Limb
Technical Paper Publication. DSCC2019-8941

Zachary Dougherty, *Epic Systems Corporation, Verona, WI, United States*, **Ryder Winck**, *Rose-Hulman Institute of Technology, Terre Haute, IN, United States*

Comparison of Position Control With and Without Friction on a Foot Interface
Technical Paper Publication. DSCC2019-9019

Brandon Rudolph, Ryder Winck, *Rose-Hulman Institute of Technology, Terre Haute, IN, United States*

Design and Control of a Power-Electronic Interface for Regenerative Suspension Systems
Technical Paper Publication. DSCC2019-9081

Abdullah Algethami, *Taif University, Taif, Makkah, Saudi Arabia*, **Wonjong Kim**, *Texas A&M University, College Station, TX, United States*

Model Reference Control With Command Shaping for a Micro-Electromagnetic Actuator With Input Constraints
Technical Paper Publication. DSCC2019-9162

Gerald Eaglin, *University of Louisiana at Lafayette, Opelousas, LA, United States*, **Joshua Vaughan**, *University of Louisiana at Lafayette, Lafayette, LA, United States*

Technical Sessions

Afternoon Contributed Sessions

T2-1 CONTRIBUTED SESSION:
ADVANCES IN CONTROL DESIGN METHODS
Bobcat I   1:15PM–3:15PM

Session Chair: **Eric Barth**, *Vanderbilt University, Nashville, TN, United States*
Session Co-Chair: **Jonathon Slightam**, *Marquette University, Milwaukee, WI, United States*

Analytical Statistical Study of Linear Parallel Feedforward Compensators for Nonminimum-Phase Systems
Technical Paper Publication. DSCC2019-9126

Keyvan Noury, Bingen (Ben) Yang, University of Southern California, Los Angeles, CA, United States

Class of Stabilizing Parallel Feedforward Compensators for Nonminimum-Phase Systems
Technical Paper Publication. DSCC2019-9240

Keyvan Noury, Bingen (Ben) Yang, University of Southern California, Los Angeles, CA, United States

Temperature Control of a Guard Heater Using Fuzzy Logic
Technical Paper Publication. DSCC2019-8906

Shahin Nudehi, Luke Venstrom, Valparaiso University, Valparaiso, IN, United States

Sliding Mode Impedance and Stiffness Control of a Pneumatic Cylinder
Technical Paper Publication. DSCC2019-9009

Jonathon Slightam, Mark Nagurka, Marquette University, Milwaukee, WI, United States, Eric Barth, Vanderbilt University, Nashville, TN, United States

Adaptive Control of Nanowires Motion Using Electric Fields in Fluid Suspension
Technical Paper Publication. DSCC2019-9051

Juan Wu, Kaiyan Yu, Binghamton University, Binghamton, NY, United States

Adaptive Single Action Control Policies for Linearly Parameterized Systems
Technical Paper Publication. DSCC2019-9134

Osama Ennasr, Michigan State University, Fairfax, VA, United States, Giorgos Mamakoukas, Northwestern University, Evanston, IL, United States, Maria Castano, Demetris Coleman, Michigan State University, East Lansing, MI, United States, Todd Murphey, Northwestern University, Evanston, IL, United States, Xiaobo Tan, Michigan State University, East Lansing, MI, United States

T2-2 CONTRIBUTED SESSION:
MODELING AND VALIDATION
Painted Horse II   1:15PM–3:15PM

Session Chair: **Tuhin Das**, *University of Central Florida, Orlando, FL, United States*
Session Co-Chair: **Ranjan Mukherjee**, *Michigan State University, East Lansing, MI, United States*

Torsional Oscillations of a Shape-Morphing Plate in Viscous Fluids
Technical Paper Publication. DSCC2019-9187

Syed N. Ahsan, University of Connecticut, Storrs, CT, United States, Matteo Aureli, University of Nevada, Reno, Reno, NV, United States

An Agent-Based Model of Lost Person Dynamics for Enabling Wilderness Search and Rescue
Technical Paper Publication. DSCC2019-9222

Amanda Hashimoto, Nicole Abaid, Virginia Tech, Blacksburg, VA, United States

Modeling Height Profile for Drop-on-Demand Print of UV Curable Ink
Technical Paper Publication. DSCC2019-9242

Yumeng Wu, George Chiu, Purdue University, West Lafayette, IN, United States

Kinetic to Potential Energy Transformation Using an Elastica
Technical Paper Publication. DSCC2019-8929

Sheryl Chau, Ranjan Mukherjee, Michigan State University, East Lansing, MI, United States

Multi-Physics Dynamic Modeling and Transient Simulation of a Multi-Stage Heat Recovery Steam Generator (HRSG)
Technical Paper Publication. DSCC2019-9084

Jonathan McConnell, Tuhin Das, University of Central Florida, Orlando, FL, United States, Andres Caesar, James Hoy, Prithvi Gopinath Veeravalli, Siemens Energy, Inc., Orlando, FL, United States

Model-Based Analysis of a Photovoltaic Array Powering a Flywheel Energy Storage System
Technical Paper Publication. DSCC2019-9195

Mohamed Mohamed, Reza Tafreshi, Zurwa Khan, Texas A&M University at Qatar, Doha, Qatar

Technical Sessions

T2-3 CONTRIBUTED SESSION:
UNMANNED VEHICLES
Painted Horse | 1:15PM–3:15PM

Session Chair: **Hashem Ashrafiuon**, *Villanova University, Villanova, PA, United States*
Session Co-Chair: **Javad Mohammadpour Velni**, *University of Georgia, Athens, GA, United States*

Trajectory Tracking of 3D Autonomous Vehicles Using Backstepping Control
Technical Paper Publication. DSCC2019-8954

Karl Fetzer, Sergey Nersesov, Hashem Ashrafiuon, Villanova University, Villanova, PA, United States

Multi-Objective Optimal Design of a PID Sliding Mode Controller With Three Different Reaching Laws
Technical Paper Publication. DSCC2019-8990

Xiaotian Xu, University of Maryland, College Park, College Park, MD, United States, ***Yousef Sardahi, Almuatazbellah Boker***, *Marshall University, Huntington, WV, United States*

Agricultural Field Coverage Using Cooperating Unmanned Ground Vehicles
Technical Paper Publication. DSCC2019-8992

Saba Faryadi, Mohammadreza Davoodi, Javad Mohammadpour Velni, University of Georgia, Athens, GA, United States

Behavior Identification and Prediction for a Probabilistic Risk Framework
Technical Paper Publication. DSCC2019-9097

Jasprit Singh Gill, Pierluigi Pisu, Venkat N. Krovi, Matthias J. Schmid, Clemson University, Greenville, SC, United States

Autonomous Real-Time Monitoring of Crops in Controlled Environment Agriculture
Technical Paper Publication. DSCC2019-9176

Saba Faryadi, Mohammadreza Davoodi, Javad Mohammadpour Velni, University of Georgia, Athens, GA, United States

The Effect of Wing-Motor Connection Mechanism on the Payload Capacity of Flapping Flight Hovering Robots
Technical Paper Publication. DSCC2019-9203

Victoria Pellerito, Hamid Vejdani, Lawrence Technological University, Southfield, MI, United States

T2-4 CONTRIBUTED SESSION:
AUTOMOTIVE SYSTEMS
Arrow Head | 1:15PM–3:15PM

Session Chair: **Yan Chen**, *Arizona State University, Mesa, AZ, United States*
Session Co-Chair: **Azim Eskandarian**, *Virginia Tech, Blacksburg, VA, United States*

A Model Predictive Approach for the Coordination of Powertrain Control Systems
Technical Paper Publication. DSCC2019-9146

Stephanie Stockar, Penn State University, University Park, PA, United States, ***Cristian Rostiti, Marcello Canova***, *Ohio State University, Columbus*, ***Michael Prucka***, *FCA US LLC, Auburn Hills, MI, United States*

Comparison of Estimation Techniques for the Crankshaft Dynamics of an Opposed Piston Engine
Technical Paper Publication. DSCC2019-9206

Joseph Drallmeier, Jason Siegel, Anna Stefanopoulou, University of Michigan, Ann Arbor, MI, United States

An Experimental Study of Longitudinal Tire Relaxation Constants for Vehicle Traction Dynamics Modeling
Technical Paper Publication. DSCC2019-8994

Vladimir Vantsevich, University of Alabama at Birmingham, Birmingham, AL, United States, ***Lyubomyr Demkiv, Sviatoslav Klos***, *Lviv Polytechnic National University, Lviv, Ukraine*, ***Samuel Misko, Lee Moradi***, *University of Alabama at Birmingham, Birmingham, AL, United States*

Emission Aware Eco-Driving on Country Roads
Technical Paper Publication. DSCC2019-8963

Junpeng Deng, Philipp Polterauer, Luigi del Re, Johannes Kepler University Linz, Linz, Austria

Experimental Validations on Vision-Based Path Tracking With Preview Four Wheel Steering Control
Technical Paper Publication. DSCC2019-9159

Yansong Peng, Fengchen Wang, Saikrishna Gurumoorthy, Yan Chen, Arizona State University, Mesa, AZ, United States, ***Mutian Xin***, *Desert Vista High School, Phoenix, AZ, United States*

An Improved Small-Scale Connected Autonomous Vehicle Platform
Technical Paper Publication. DSCC2019-9121

Xihui Wu, Virginia Tech, Blacksburg, VA, United States, ***Azim Eskandarian***, *Virginia Tech University, Blacksburg, VA, United States*

Afternoon Invited Sessions

T2-5 INVITED SESSION:
MODELING AND CONTROL OF ENGINE AND AFTERTREATMENT SYSTEMS
Bobcat II & III   1:15PM–3:15PM

Session Chair: **Pingen Chen**, *Tennessee Tech University, Cookeville, TN, United States*
Session Co-Chair: **Zhaojian Li**, *Michigan State University, East Lansing, MI, United States*, **Hamid R. Ossareh**, *University of Vermont, Burlington, VT, United States*, **Carrie M. Hall**, *Illinois Institute of Technology, Chicago, IL, United States*

IMC-Based Calibration of the Boost Pressure Controller in an Electrically Assisted Turbocharged Gasoline Engine
Technical Paper Publication. DSCC2019-9038

Baitao Xiao, Tyler Kelly, Timothy Stolzenfeld, Chenliu Lu, Ford Motor Company, Dearborn, MI, United States, *David Bell*, Ford Motor Company, Plymouth, MI, United States, *Mrdjan Jankovic, Julia Buckland, John Rollinger*, Ford Motor Company, Dearborn, MI, United States

Modeling the Gas Exchange Processes of a Modern Diesel Engine With an Integrated Physics-Based and Data-Driven Approach
Technical Paper Publication. DSCC2019-9226

Jorge Pulpeiro Gonzalez, King Ankobea-Ansah, Elena Escuder Milian, Carrie M. Hall, Illinois Institute of Technology, Chicago, IL, United States

A Torque Balance Method for Multi-Cylinder Gasoline Engines With Non-Uniform Cylinder-to-Cylinder Combustion Strategies
Technical Paper Publication. DSCC2019-9231

Qinghua Lin, *Pingen Chen*, Tennessee Technological University, Cookeville, TN, United States

Diesel Engine Characterization and Performance Scaling via Brake Specific Fuel Consumption Map Dimensional Analysis
Technical Paper Publication. DSCC2019-9110

Evan Pelletier, Sean N. Brennan, Pennsylvania State University, University Park, PA, United States

Online Nonlinear System Identification With Parameter Constraints: Application to Automotive Engine Systems
Technical Paper Publication. DSCC2019-9092

Kaian Chen, Zhaojian Li, Michigan State University, East Lansing, MI, United States, *Yan Wang, Jing Wang, Kai Wu, Dimitar Filev*, Ford Motor Company, Dearborn, MI, United States

T2-6 INVITED SESSION:
DESIGN, MODELING, ANALYSIS, AND CONTROL OF ASSISTIVE AND REHABILITATION DEVICES I
Arrow Head II   1:15PM–3:15PM

Session Chair: **Davide Piovesan**, *Gannon University, Erie, PA, United States*
Session Co-Chair: **Jongeun Choi**, *Yonsei University, Seoul, Korea (Republic)*, **Wenlong Zhang**, *Arizona State University, Mesa, AZ, United States*, **Biswanath Samanta**, *Georgia Southern University, Statesboro, GA, United States*, **Amirhossein Ghasemi**, *University of North Carolina at Charlotte, Charlotte, NC, United States*

Penalized Nonlinear Regression With Application to Head-Neck Position Tracking
Technical Paper Publication. DSCC2019-9189

Kyubaek Yoon, Jongeun Choi, Yonsei University, Seoul, Korea (Republic)

Development of a Compact Velocity-Based Mechanical Safety Device for an Elbow Joint Assist Suit
Technical Paper Publication. DSCC2019-9026

Yoshihiro Kai, Keisuke Ikeda, Tsubasa Kaneda, Tokai University, Hiratsuka, Japan, *Kenichi Sugawara*, Kanagawa University of Human Services, Yokosuka, Japan, *Masayoshi Tomizuka*, University of California, Berkeley, Berkeley, CA, United States

End-Effector Stabilization of a Wearable Robotic Arm Using Time Series Modeling of Human Disturbances
Technical Paper Publication. DSCC2019-8985

Vighnesh Vatsal, Guy Hoffman, Cornell University, Ithaca, NY, United States

Exploring the Usability of Retrofit Hardware to Reduce Compensatory Movements in Game Controller-Mediated Telerehabilitation
Technical Paper Publication. DSCC2019-9041

Roni Barak Ventura, Oded Nov, Maurizio Porfiri, New York University, Brooklyn, NY, United States

Combining Gait Trainers and Partial Weight Bearing Lifters: Passive Modulation of Lift Force via Cam Profile
Technical Paper Publication. DSCC2019-9013

Michael Yagiela, Scott Steinbrink, Davide Piovesan, Gannon University, Erie, PA, United States

Determination of Roles and Interaction Modes in a Haptic Shared Control Framework
Technical Paper Publication. DSCC2019-9042

Vahid Izadi, Arjun Yeravdekar, Amirhossein Ghasemi, University of North Carolina at Charlotte, Charlotte, NC, United States

Technical Sessions

Evening Contributed Sessions

T3-1 CONTRIBUTED SESSION:
MULTI-AGENT AND NETWORKED SYSTEMS
Painted Horse I 3:30PM–5:30PM

Session Chair: **Qingze Zou**, *Rutgers University, Piscataway, NJ, United States*
Session Co-Chair: **Ioannis Raptis**, *University of Massachusetts Lowell, Lowell, MA, United States*

Contagion Processes Over Temporal Networks With Time-Varying Backbones
Technical Paper Publication. DSCC2019-9054

Matthieu Nadini, *New York University, Brooklyn, NY, United States*, *Alessandro Rizzo*, *Politecnico di Torino and New York University, Torino, Italy*, *Maurizio Porfiri*, *New York University Tandon, Brooklyn, NY, United States*

Observability of Multi-Agent Network Sensing Systems
Technical Paper Publication. DSCC2019-9138

Ioannis Raptis, *University of Massachusetts Lowell, Lowell, MA, United States*, *Clark Taylor*, *Air Force Institute of Technology, WPAFB, Dayton, OH, United States*

Comparing Collective Foraging With Interactions Inspired by Pheromones and Sonar
Technical Paper Publication. DSCC2019-9190

Aidan Bradley, Masoud Jahromi Shirazi, Nicole Abaid, *Virginia Tech, Blacksburg, VA, United States*

Multi-Mobile Sensing With Temporal-Spatial Coupling via Compressed Sensing
Technical Paper Publication. DSCC2019-9218

Tianwei Li, *Qingze Zou*, *Rutgers University, Piscataway, NJ, United States*

Energy-Balanced Leader-Switching Policy for Formation Rotation Control of Multi-Agent Systems Inspired by Bird Flocks
Technical Paper Publication. DSCC2019-9044

Corey Dotson, Geronimo Macias, *Kooktae Lee*, *New Mexico Institute of Mining and Technology, Socorro, NM, United States*

Thermodynamics-Inspired Modeling of Macroscopic Swarm States
Technical Paper Publication. DSCC2019-8979

Hossein Haeri, Kshitij Jerath, *University of Massachusetts Lowell, Lowell, MA, United States*, *Jacob Leachman*, *Washington State University, Pullman, WA, United States*

T3-2 CONTRIBUTED SESSION:
DIAGNOSTICS AND DETECTION
Painted Horse II   3:30PM–5:30PM

Session Chair: **Mohamed Khalil**, *Siemens AG, Munich, Bayern, Germany*
Session Co-Chair: **Alireza Mohammadi**, *University of Michigan-Dearborn, Canton, MI, United States*

Generalization of Spectral Methods for High-Cycle Fatigue Analysis to Accommodate Non-Stationary Random Processes
Technical Paper Publication. DSCC2019-9074

Mohamed Khalil, *Siemens AG, Munich, Bayern, Germany*, *Roland Wüchner, Kai-Uwe Bletzinger*, *Technical University in Munich, Munich, Bayern, Germany*

Automotive Damper Defect Detection Using Novelty Detection Methods
Technical Paper Publication. DSCC2019-9188

Thomas Zehelein, Sebastian Schuck, Markus Lienkamp, *Technical University of Munich, Garching, Germany*

Feature Learning Using Deep Neural Networks for Fault Diagnosis in Electromechanical Systems
Technical Paper Publication. DSCC2019-8942

Mehrdad Heydarzadeh, *University of Texas at Dallas, Dallas, TX, United States*, *Alireza Mohammadi*, *University of Michigan-Dearborn, Canton, MI, United States*, *Shahin Hedayati Kia*, *Université de Picardie Jules Verne, Amiens, France*, *Mehrdad Nourani*, *University of Texas at Dallas, Richardson, TX, United States*, *Humberto Henao*, *Gerard-Andre Capolino*, *University of Picardie Jules Verne, Amiens, France*

Adaptive Dynamics Learning for Small Fault Detection of Discrete-Time Nonlinear Uncertain Systems
Technical Paper Publication. DSCC2019-8913

Jingting Zhang, Chengzhi Yuan, Paolo Stegagno, *University of Rhode Island, Kingston, RI, United States*

Optimal Sensor Configuration for Fatigue Life Prediction in Structural Applications
Technical Paper Publication. DSCC2019-8909

Mohamed Khalil, Ioannis Kouroudis, *Siemens AG, Munich, Bayern, Germany*, *Roland Wüchner, Kai-Uwe Bletzinger*, *Technical University of Munich, Munich, Bayern, Germany*

Technical Sessions

T3-3 CONTRIBUTED SESSION: MODELING AND CONTROL OF IC ENGINES AND AFTER-TREATMENT SYSTEMS
Bobcat II & III   3:30PM–5:30PM

Session Chair: **Pingen Chen**, *Tennessee Technological University, Cookeville, TN, United States*
Session Co-Chair: **Baitao Xiao**, *Ford Motor Company, Dearborn, MI, United States*

Control-Oriented Model-Based Burn Duration and Ignition Timing Prediction With Recursive-Least-Square Adaptation for Closed-Loop Combustion Phasing Control of a Spark-Ignition Engine
Technical Paper Publication. DSCC2019-9073

Xin Wang, Amir Khameneian, Paul Dice, Bo Chen, Mahdi Shahbakhti, Jeffrey Naber, Michigan Technological University, Houghton, MI, United States, *Chad Archer, Qiuping Qu, Chris Glugla, Garlan Huberts*, Ford Motor Company, Dearborn, MI, United States

A Real-Time Pressure Wave Model for Predicting Engine Knock
Technical Paper Publication. DSCC2019-9147

Ruixue Li, Guoming Zhu, Michigan State University, East Lansing, MI, United States

Control-Oriented Physics-Based NOx Emission Model for a Diesel Engine With Exhaust Gas Recirculation
Technical Paper Publication. DSCC2019-9247

Saravanan Duraiarasan, Rasoul Salehi, Anna Stefanopoulou, University of Michigan, Ann Arbor, MI, United States, *Siddharth Mahesh, Marc Allain*, Detroit Diesel Corporation, Detroit, MI, United States

Engine Calibration Optimization Based on Its Surrogate Models
Technical Paper Publication. DSCC2019-8984

Anuj Pal, Michigan State University, East Lansing, MI, United States, *Yan Wang, Ling Zhu*, Ford Motor Company, Dearborn, MI, United States, *Guoming Zhu*, Michigan State University, East Lansing, MI, United States

A Numerical Study of an Electrically Assisted Boosting System for Turbocharged Diesel Engines
Technical Paper Publication. DSCC2019-9039

Yifan Men, Michigan State University, East Lansing, MI, United States, *Jason Martz*, Ford Motor Company, Dearborn, MI, United States, *Eric Curtis*, Ford Motor Company, Milan, MI, United States, *Guoming Zhu*, Michigan State University, East Lansing, MI, United States

Optimal Transient Real-Time Engine-Generator Control in the Series-Hybrid Vehicle
Technical Paper Publication. DSCC2019-8964

Jonathan Lock, Rickard Arvidsson, Tomas McKelvey, Chalmers University of Technology, Gothenburg, Sweden

T3-4 CONTRIBUTED SESSION: MOTION PLANNING AND TRACKING CONTROL
Bobcat I   3:30PM–5:30PM

Session Chair: **Peiman Naseradinmousavi**, *San Diego State University, San Diego, CA, United States*
Session Co-Chair: **Baisravan HomChaudhuri**, *Illinois Institute of Technology, Chicago, IL, United States*

Magnetically Actuated Artificial Microswimmers as Mobile Microparticle Manipulators
Technical Paper Publication. DSCC2019-9015 (Student Best Paper Award Finalist)

Jake Buzhardt, Phanindra Tallapragada, Clemson University, Clemson, SC, United States

Experimental Autonomous Deep Learning-Based 3D Path Planning for a 7-DOF Robot Manipulator
Technical Paper Publication. DSCC2019-8951

Peiman Naseradinmousavi, San Diego State University, San Diego, CA, United States, *Miroslav Krstic*, University of California, San Diego, La Jolla, CA, United States, *Mostafa Bagheri*, University of California, San Diego and SDSU, La Jolla, CA, United States, *Alexander Bertino*, San Diego State University, San Diego, CA, United States

Distributionally Robust Stochastic Model Predictive Control for Collision Avoidance
Technical Paper Publication. DSCC2019-9160

Baisravan HomChaudhuri, Illinois Institute of Technology, Chicago, IL, United States

Dynamic Control of Soft Robots Using Reinforcement Learning
Technical Paper Publication. DSCC2019-9181

Ben Pawlowski, Charles W. Anderson, Jianguo Zhao, Colorado State University, Fort Collins, CO, United States

Towards Cooperative Transportation of Multiple Mecanum-Wheeled Automated Guided Vehicles
Technical Paper Publication. DSCC2019-9141

Jih-Sien Peng, Yen-Chen Liu, National Cheng Kung University, Tainan, East Dist., Taiwan

Data-Driven ILC for Trajectory Tracking in Nonlinear Dynamic Systems
Technical Paper Publication. DSCC2019-8926

Yu-Hsiu Lee, Tsu-Chin Tsao, University of California, Los Angeles, Los Angeles, CA, United States

Technical Sessions

Evening Invited Sessions

T3-5 INVITED SESSION:
ENERGY OPTIMIZATION FOR INTELLIGENT VEHICLE SYSTEMS
Arrow Head I   3:30PM–5:30PM

Session Chair: **Youngki Kim**, *University of Michigan-Dearborn, Dearborn, MI, United States*
Session Co-Chairs: **Chen Zhang**, *University of Minnesota, Twin City, MN, United States,* **Carrie M. Hall**, *Illinois Institute of Technology, Chicago, IL, United States,* **Mohammad Reza Amini**, *University of Michigan, Ann Arbor, MI, United States*

Combined Energy and Comfort Optimization of Air Conditioning System in Connected and Automated Vehicles
Technical Paper Publication. DSCC2019-8969

Hao Wang, Mohammad Reza Amini, Ziyou Song, Jing Sun, Ilya Kolmanovsky, University of Michigan, Ann Arbor, Ann Arbor, MI, United States

Optimal Speed Control for a Connected and Autonomous Electric Vehicle Considering Battery Aging and Regenerative Braking Limits
Technical Paper Publication. DSCC2019-9075

Yunli Shao, Zongxuan Sun, University of Minnesota, Minneapolis, MN, United States

Energy Optimization of Lateral Motions for Autonomous Ground Vehicles With Four-Wheel Steering Control
Technical Paper Publication. DSCC2019-9003

Fengchen Wang, Peidong Xu, Ao Li, Yan Chen, Arizona State University, Mesa, AZ, United States

Energy Optimal Routing of a Delivery Vehicle Fleet With Diverse Powertrains
Technical Paper Publication. DSCC2019-9056

Mukilan Arasu, Hamza Anwar, Qadeer Ahmed, Giorgio Rizzoni, Ohio State University, Columbus, OH, United States

Influence of Speed Forecasting on the Performance of Ecological Adaptive Cruise Control
Technical Paper Publication. DSCC2019-9046

Eunjeong Hyeon, University of Michigan, Ann Arbor, MI, United States, Youngki Kim, University of Michigan-Dearborn, Dearborn, MI, United States, Niket Prakash, Anna Stefanopoulou, University of Michigan, Ann Arbor, MI, United States

Temperature Control to Reduce Capacity Mismatch in Parallel-Connected Lithium Ion Cells
Technical Paper Publication. DSCC2019-9151

Mayank Garg, Penn State, Union City, CA, United States, Tanvir Tanim, Idaho National Lab, Idaho Falls, ID, United States, Christopher D. Rahn, Penn State, University Park, PA, United States, Hanna Bryngelsson, Volvo Group Trucks Technology, Göteborg, Sweden, Niklas Legnedahl, China Euro Vehicle Technology AB, Göteborg, Sweden

T3-6 INVITED SESSION:
DESIGN, MODELING, ANALYSIS, AND CONTROL OF ASSISTIVE AND REHABILITATION DEVICES II
Arrow Head II   3:30PM–5:30PM

Session Chair: **Amirhossein Ghasemi**, *University of North Carolina Charlotte, Charlotte, NC, United States*
Session Co-Chair: **Biswanath Samanta**, *Georgia Southern University, Statesboro, GA, United States,* **Davide Piovesan**, *Gannon University, Erie, PA, United States,* **Jongeun Choi**, *Yonsei University, Seoul, Korea (Republic),* **Wenlong Zhang**, *Arizona State University, Mesa, AZ, United States*

Cadence Tracking for Switched FES-Cycling With Unknown Time-Varying Input Delay
Technical Paper Publication. DSCC2019-9078

Brendon C. Allen, Christian Cousin, Courtney A. Rouse, Warren Dixon, University of Florida, Gainesville, FL, United States

Design and Characterization of a Passive Instrumented Hand
Technical Paper Publication. DSCC2019-9082

Saad Yousaf, Victoria Joshi, John E. Britt, Rice University, Houston, TX, United States, Chad Rose, University of Texas at Austin, Austin, TX, United States, Marcia K. O'Malley, Rice University, Houston, TX, United States

Statistical Determination of Decision-Making Regions for Branching Paths: An Algorithm With a Wheelchair Assistance Application
Technical Paper Publication. DSCC2019-9114

Kelilah L. Wolkowicz, Pennsylvania State University, University Park, PA, United States, Robert Leary, Penn State University, State College, PA, United States, Jason Z. Moore, Sean N. Brennan, Pennsylvania State University, University Park, PA, United States

Real-Time Path-Based Fusion of Spatial Databases With Temporal Control Inputs for Assistive Operation of Wheelchairs
Technical Paper Publication. DSCC2019-9120

Kelilah L. Wolkowicz, Pennsylvania State University, University Park, PA, United States, Robert Leary, Penn State University, State College, PA, United States, Jason Z. Moore, Sean N. Brennan, Pennsylvania State University, University Park, PA, United States

Neural-Network Based Iterative Learning Control of a Hybrid Exoskeleton With an MPC Allocation Strategy
Technical Paper Publication. DSCC2019-9191

Vahidreza Molazadeh, *Qiang Zhang*, *Xuefeng Bao*, *Nitin Sharma*, *University of Pittsburgh, Pittsburgh, PA, United States*

Force and Stiffness Controller Design for a Pneumatic Haptic Glove for Virtual Palpation
Technical Paper Publication. DSCC2019-9211

Matt E. Galla, *Ehab I. Al Khatib*, *Yildirim Hurmuzlu*, *Edmond Richer*, *Southern Methodist University, Dallas, TX, United States*

FRIDAY, OCTOBER 11

Morning Rapid Fire Interactive Sessions

F1-1 RFI SESSION:
MOTION PLANNING AND TRAJECTORY TRACKING
White Pine Ballroom 9:30AM–11:30amAM

Session Chair: **S.O. Reza Moheimani**, *University of Texas at Dallas, Richardson, TX, United States*

Optimal Strategy for Multiple Evaders Against an Agile Pursuer
Technical Paper Publication. DSCC2019-8924

Chunsheng Liu, Mark V. Trevorrow, *Defence R&D Canada, Dartmouth, NS, Canada*

Geometric Trajectory Planning for Robot Motion Over a 3D Surface
Technical Paper Publication. DSCC2019-9063

Bashir Hosseini Jafari, *Nolan Walker*, *University of Texas at Dallas, Dallas, TX, United States*, *Ronald A. Smaldone*, *University of Texas at Dallas, Richardson, TX, United States*, *Nicholas Gans*, *University of Texas at Arlington, Fort Worth, TX, United States*

Line-of-Sight Pure Pursuit Guidance Stability Analysis and Design Guideline for Car-Like Autonomous Ground Vehicles
Technical Paper Publication. DSCC2019-9108

Letian Lin, J.Jim Zhu, *Ohio University, Athens, OH, United States*

Motion Planning for Industrial Mobile Robots With Closed-Loop Stability Enhanced Prediction
Technical Paper Publication. DSCC2019-9208

Jessica Leu, *Masayoshi Tomizuka*, *University of California, Berkeley, Berkeley, CA, United States*

Safe, Aggressive Quadrotor Flight via Reachability-Based Trajectory Design
Technical Paper Publication. DSCC2019-9214 (Student Best Paper Award Finalist)

Shreyas Kousik, Patrick Holmes, Ramanarayan Vasudevan, *University of Michigan, Ann Arbor, MI, United States*

On Receding Horizon Chance Constraint Motion Planning for Uncertain Multi-Agent Systems
Technical Paper Publication. DSCC2019-9237

Yash Bagla, *Michigan State University, Ann Arbor, MI, United States*, *Vaibhav Srivastava*, *Michigan State University, East Lansing, MI, United States*

Periodic Tracking Control Using Gain-Scheduled Fourier Series-Based Internal Models
Technical Paper Publication. DSCC2019-8945

Dylan Caverly, *University of Illinois, Urbana, IL, United States*, *Ryan J. Caverly*, *University of Minnesota, Minneapolis, MN, United States*, *James Richard Forbes*, *McGill University, Montreal, QC, Canada*

Sliding-Mode Control With Switching-Gain Adaptation for Trajectory Tracking of Underactuated Unmanned Surface Vessels
Technical Paper Publication. DSCC2019-8959

Rui Yu, Haochen Qi, Kamal Upadhyay, Hua Zhou, *Zhejiang University, Hangzhou, Zhejiang, China*

Following Fast-Dynamic Targets With Only Slow and Delayed Visual Feedback: A Kalman Filter and Model-Based Prediction Approach
Technical Paper Publication. DSCC2019-9022

Hui Xiao, *University of Connecticut, Storrs, CT, United States*, *Xu Chen*, *University of Washington, Seattle, WA, United States*

Backstepping-Based Trajectory Tracking for Underwater Gliders
Technical Paper Publication. DSCC2019-9028

Demetris Coleman, Maria Castano, *Michigan State University, East Lansing, MI, United States*, *Osama Ennasr*, *Michigan State University, Fairfax, VA, United States*, *Xiaobo Tan*, *Michigan State University, East Lansing, MI, United States*

Observer-Based Control of a Dual-Stage Piezoelectric Scanner
Technical Paper Publication. DSCC2019-9163

Yuhe Chang, Sean B. Andersson, *Boston University, Boston, MA, United States*

Technical Sessions

Sub-Optimal Tracking in Switched Systems With Controlled Subsystems and Fixed-Mode Sequence Using Approximate Dynamic Programming
Technical Paper Publication. DSCC2019-9216

Tohid Sardarmehni, Xingyong Song, Texas A&M University, College Station, TX, United States

F1-2 RFI SESSION:
ADVANCES IN ROBOTICS AND MECHATRONICS
<u>Kokopelli Grand Ballroom</u>   9:30AM–11:30AM

Session Chair: **Stephen Mascaro**, University of Utah, Salt Lake City, UT, United States

Drop Volume Control in Drop-on-Demand Inkjet Printing
Technical Paper Publication. DSCC2019-9233

Jie Wang, Purdue University, West Lafayette, IN, United States, *Xia Chen*, Carnegie Mellon University, Pittsburgh, PA, United States, *George Chiu*, Purdue University, West Lafayette, IN, United States

Learning Hyperparameters in Efficient Spatial Model by Robotic Sensors
Technical Paper Publication. DSCC2019-9170

Jinho Jeong, Yonsei University, Seoul, Korea (Republic), *Soo Jeon*, University of Waterloo, Waterloo, ON, Canada, *Jongeun Choi*, Yonsei University, Seoul, Korea (Republic)

Assembly Planning Using a Two-Arm System for Polygonal Furniture
Technical Paper Publication. DSCC2019-9173

Seth Payne, C. Fletcher Garrison IV, Steven E. Markham, Tucker Hermans, Kam K. Leang, University of Utah, Salt Lake City, UT, United States

Feasibility Study of Force Measurement for Multi-Digit Unconstrained Grasping via Fingernail Imaging and Visual Servoing
Technical Paper Publication. DSCC2019-8955

Navid Fallahinia, Stephen Mascaro, University of Utah, Salt Lake City, UT, United States

Design of a Kangaroo Inspired Hopping Robot for Unrestricted Locomotion and Controller Development
Technical Paper Publication. DSCC2019-9083

Austin Curtis, James Mynderse, Hamid Vejdani, Lawrence Technological University, Southfield, MI, United States

Instantaneous Center of Rotation-Based Master-Slave Kinematic Modeling and Control
Technical Paper Publication. DSCC2019-9123

Vikram Ramanathan, Andy Zelenak, Mitch Pryor, University of Texas at Austin, Austin, TX, United States

A Novel Buoyancy Control Device Using Reversible PEM Fuel Cells
Technical Paper Publication. DSCC2019-9155

Jalal Yazji, Hamza Zaidi, Luke T. Torres, Christopher Leroy, Alicia Keow, Zheng Chen, University of Houston, Houston, TX, United States

A Preliminary Study on a Physical Model Oriented Learning Algorithm With Application to UAVs
Technical Paper Publication. DSCC2019-9186

Minghui Zheng, Zhu Chen, Xiao Liang, University at Buffalo, Buffalo, NY, United States

A Passive Jumping Mechanism
Technical Paper Publication. DSCC2019-9194

Phanindra Tallapragada, Jake Buzhardt, Robert Seney, Clemson University, Clemson, SC, United States

Educational Force Control Using a Modular 2-DOF Serial Robot Manipulator and Low-Cost 2-DOF Force Sensor
Technical Paper Publication. DSCC2019-9245

Stephen Mascaro, University of Utah, Salt Lake City, UT, United States

A Series Elastic Actuator Design and Control in a Linkage Based Hand Exoskeleton
Technical Paper Publication. DSCC2019-8996

Raghuraj Chauhan, Virginia Tech, Fairfax, VA, United States, *Pinhas Ben-Tzvi*, Virginia Tech, Blacksburg, VA, United States

Active Vibration Rejection in Multi Actuator Drives: Data Driven Approach
Technical Paper Publication. DSCC2019-8983

Prateek Shah, Roberto Horowitz, University of California, Berkeley, CA, United States

Sessions Chairs and Co-Chairs

Session Number	Session Chair First Name	Session Chair Last Name	Organizer Company	Session Organizer Role
T1-2	Nicole	Abaid	Virginia Tech	Session Chair
W2-6	Zoleikha	Abdollahi Biron	Clemson University	Session Co-Chair
W3-6	Zoleikha	Abdollahi Biron	Clemson University	Session Co-Chair
T3-5	Mohammad Reza	Amini	University of Michigan	Session Co-Chair
T2-3	Hashem	Ashrafiuon	Villanova University	Session Chair
W1-1	Matteo	Aureli	University of Nevada, Reno	Session Chair
W2-5	Oumar	Barry	Virginia Tech	Session Co-Chair
W3-5	Oumar	Barry	Virginia Tech	Session Co-Chair
T2-1	Eric	Barth	Vanderbilt University	Session Chair
W2-2	Kira	Barton	University of Michigan	Session Co-Chair
W2-4	Hoseinali	Borhan	Cummins Inc.	Session Co-Chair
T3-3	Pingen	Chen	Tennessee Tech University	Session Chair
T2-4	Yan	Chen	Arizona State University	Session Chair
T2-5	Pingen	Chen	Tennessee Tech University	Session Chair
W3-4	Pingen	Chen	Tennessee Tech University	Session Co-Chair
W2-5	Xu	Chen	University of Washington at Seattle	Session Chair
W3-5	Xu	Chen	University of Washington at Seattle	Session Chair
T2-6	Jongeun	Choi	Yonsei University	Session Co-Chair
T3-6	Jongeun	Choi	Yonsei University	Session Co-Chair
T2-2	Tuhin	Das	University of Central Florida	Session Chair
W3-6	Satadru	Dey	University of Colorado Denver	Session Co-Chair
T2-4	Azim	Eskandarian	Virginia Tech	Session Co-Chair
T2-6	Amirhossein	Ghasemi	University of North Carolina Charlotte	Session Co-Chair
T3-6	Amirhossein	Ghasemi	University of North Carolina Charlotte	Session Chair
W2-4	Amirhossein	Ghasemi	University of North Carolina Charlotte	Session Chair
W2-3	Yan	Gu	University of Massachusetts Lowell	Session Co-Chair
W3-1	Aleksandar	Haber	City University of New York-CSI	Session Co-Chair
T3-5	Carrie M.	Hall	Illinois Institute of Technology	Session Co-Chair
W2-4	Carrie M.	Hall	Illinois Institute of Technology	Session Co-Chair
T2-5	Carrie M.	Hall	Illinois Institute of Technology	Session Co-Chair
W3-4	Carrie M.	Hall	Illinois Institute of Technology	Session Co-Chair
W1-2	Carrie M.	Hall	Illinois Institute of Technology	Session Chair
T3-4	Baisravan	HomChaudhuri	Illinois Institute of Technology	Session Co-Chair
W3-6	Neera	Jain	Purdue University	Session Chair
T3-2	Yunyi	Jia	Clemson University	Session Co-Chair
T3-2	Mohamed	Khalil	Siemens AG	Session Chair
T3-5	Youngki	Kim	University of Michigan at Dearborn	Session Chair
W3-6	Youngki	Kim	University of Michigan at Dearborn	Session Co-Chair
T1-1	Manish	Kumar	University of Cincinnati	Session Chair
W2-3	Kok-Meng	Lee	Georgia Institute of Technology	Session Chair
T2-5	Zhaojian	Li	Michigan State University	Session Co-Chair
W3-4	Zhaojian	Li	Michigan State University	Session Co-Chair

Sessions Chairs and Co-Chairs

Session Number	Session Chair First Name	Session Chair Last Name	Organizer Company	Session Organizer Role
W3-6	Xinfan	Lin	University of California, Davis	Session Co-Chair
W2-5	S. Nima	Mahmoodi	University of Alabama	Session Co-Chair
W3-5	S. Nima	Mahmoodi	University of Alabama	Session Co-Chair
F1-2	Stephen	Mascaro	University of Utah	Session Chair
T3-2	Alireza	Mohammadi	University of Michigan-Dearborn	Session Co-Chair
T2-3	Javad	Mohammadpour Velni	University of Georgia	Session Co-Chair
F1-1	S.O. Reza	Moheimani	University of Texas at Dallas	Session Chair
W3-6	Scott	Moura	University of California, Berkeley	Session Co-Chair
T2-2	Ranjan	Mukherjee	Michigan State University	Session Co-Chair
T3-4	Peiman	Naseradinmousavi	San Diego State University	Session Chair
W3-4	Selina	Pan	Toyota Research Institute	Session Chair
T2-6	Davide	Piovesan	Gannon University	Session Chair
T3-6	Davide	Piovesan	Gannon University	Session Co-Chair
W2-5	Verica	Radisavljevic-Gajic	Villanova University	Session Co-Chair
W3-5	Verica	Radisavljevic-Gajic	Villanova University	Session Co-Chair
T3-1	Ioannis	Raptis	University of Massachusets Lowell	Session Co-Chair
W3-3	Edmond	Richer	Southern Methodist University	Session Chair
W3-1	Roberto	Rocchetta	National Institute of Aerospace, NIA	Session Chair
T2-6	Biswanath	Samanta	Georgia Southern University	Session Co-Chair
T3-6	Biswanath	Samanta	Georgia Southern University	Session Co-Chair
W3-3	Vivek	Sangwan	Indian Institute of Technology Bombay	Session Co-Chair
W2-1	Marco P.	Schoen	Idaho State University	Session Co-Chair
W2-6	Mahdi	Shahbakhti	Michigan Technological University	Session Co-Chair
W2-6	Jason	Siegel	University of Michigan	Session Co-Chair
W3-6	Jason	Siegel	University of Michigan	Session Co-Chair
T2-1	Jonathon	Slightam	Marquette University	Session Co-Chair
W2-6	Stephanie	Stockar	Penn State University	Session Chair
T3-2	Jun	Ueda	Georgia Institute of Technology	Session Chair
W2-6	Christopher	Vermillion	North Carolina State University	Session Co-Chair
W2-2	Qian	Wang	Penn State University	Session Chair
T3-3	Baitao	Xiao	Ford Motor Company	Session Co-Chair
W2-1	Chengzhi	Yuan	University of Rhode Island	Session Chair
T2-6	Wenlong	Zhang	Arizona State University	Session Co-Chair
T3-6	Wenlong	Zhang	Arizona State University	Session Co-Chair
T3-5	Chen	Zhang	University of Minnesota	Session Co-Chair
W2-4	Junfeng	Zhao	General Motor	Session Co-Chair
W2-5	Minghui	Zheng	University at Buffalo	Session Co-Chair
W3-5	Minghui	Zheng	University at Buffalo	Session Co-Chair
T3-1	Qingze	Zou	Rutgers University	Session Chair

Authors Index

Author First Name	Author Last Name	Presentation Day	Session Time	Session Number	Paper Number
Leontine	Aarnoudse	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9192
Nicole	Abaid	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9091
Nicole	Abaid	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9274
Nicole	Abaid	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9222
Nicole	Abaid	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9190
Jake J.	Abbott	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9029
Zahra	Afkhami	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9192
Qadeer	Ahmed	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9056
Yong Han	Ahn	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9129
Syed N.	Ahsan	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9187
Mohammad	Al Janaideh	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9184
Ehab I.	Al Khatib	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9211
Mohammad	Al Saaideh	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9184
Oreoluwa	Alabi	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9094
Abdullah	Algethami	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9081
Amer	Allafi	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-8921
Amer	Allafi	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-9072
Marc	Allain	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9247
Brendon C.	Allen	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9078
Andrew	Alleyne	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9175
Andrew	Alleyne	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9089
Ghazwan	Alwan	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Younes	Alwan	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Mohammad Reza	Amini	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-8969
Aws	Anaz	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Charles W.	Anderson	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9181
Sean B.	Andersson	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9201
Sean B.	Andersson	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9163
Oyuna	Angatkina	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9175
Ghassane	Aniba	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9106
King	Ankobea-Ansah	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9226
Sardar	Ansari	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9221
Hamza	Anwar	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9056
Mukilan	Arasu	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9056
Chad	Archer	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Rickard	Arvidsson	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-8964
Hashem	Ashrafiuon	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8954
Matteo	Aureli	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9277
Matteo	Aureli	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9278
Matteo	Aureli	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9187
Mostafa	Bagheri	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8915
Mostafa	Bagheri	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-8951
Yash	Bagla	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9254
Yash	Bagla	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9237

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Soovadeep	Bakshi	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-8970
Xuefeng	Bao	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9191
Roni	Barak Ventura	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9041
Shraddha	Barawkar	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9252
Shraddha	Barawkar	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9131
Oumar	Barry	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9094
Oumar	Barry	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9118
Oumar	Barry	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9000
Eric	Barth	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9009
Kira	Barton	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9192
Kira	Barton	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9198
Saeid	Bashash	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9166
Randal W.	Beard	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9037
Julio S.	Beatriz	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9059
David	Bell	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038
Michael	Benson	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9275
Michael	Benson	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9276
Michael	Benson	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9201
Pinhas	Ben-Tzvi	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-8999
Pinhas	Ben-Tzvi	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8998
Pinhas	Ben-Tzvi	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-8996
Alexander	Bertino	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-8951
David	Bevly	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9135
Priyanka	Bhovad	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9016
Trevor J.	Bird	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9236
Kai-Uwe	Bletzinger	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-9074
Kai-Uwe	Bletzinger	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8909
Almuatazbellah	Boker	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8990
Alain	Boldini	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9060
John	Borek	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9196
John	Borek	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9071
Joseph R.	Bourne	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-8946
Joseph R.	Bourne	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9027
Joseph R.	Bourne	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9099
Aidan	Bradley	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9190
Sean N.	Brennan	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9167
Sean N.	Brennan	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9110
Sean N.	Brennan	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9114
Sean N.	Brennan	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9120
Douglas	Bristow	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9217
John E.	Britt	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9082
Florian	Browne	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9210
Hanna	Bryngelsson	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9151
Julia	Buckland	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038

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Jake	Buzhardt	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9015
Jake	Buzhardt	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9194
Andres	Caesar	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9084
Yingjie	Cai	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9221
Massimo	Cancian	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9105
Marcello	Canova	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9146
Mingcong	Cao	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9006
Gerard-Andre	Capolino	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8942
Antonio	Cardenas	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9066
Gabe	Carryon	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9045
Dumitru	Caruntu	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9059
Dumitru	Caruntu	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9171
Dumitru	Caruntu	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9172
Maria	Castano	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9134
Maria	Castano	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9028
Dylan	Caverly	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8945
Ryan J.	Caverly	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9259
Ryan J.	Caverly	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8945
Angel	Cerda Lugo	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9066
Youngsu	Cha	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9060
Animesh	Chakravarthy	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9228
Chuan	Chang	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9005
Yuhe	Chang	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9163
Sheryl	Chau	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-8912
Sheryl	Chau	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-8929
Raghuraj	Chauhan	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-8996
Bo	Chen	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Dongmei	Chen	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9103
Dongmei	Chen	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-8970
Kaian	Chen	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9092
Pingen	Chen	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9231
Xia	Chen	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9233
Xiaotian	Chen	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-8920
Xiaotian	Chen	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9255
Xu	Chen	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-8976
Xu	Chen	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9263
Xu	Chen	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9264
Xu	Chen	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9022
Yan	Chen	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9005
Yan	Chen	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-8997
Yan	Chen	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9159
Yan	Chen	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9003
Yi	Chen	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9143
Yi	Chen	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9143
Yi	Chen	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9177

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Yuanyan	Chen	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9104
Zheng	Chen	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9228
Zheng	Chen	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9156
Zheng	Chen	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8988
Zheng	Chen	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9155
Zhu	Chen	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9186
Haoshu	Cheng	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-8987
Haoshu	Cheng	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9260
Thiagarajan	Chidambareswaran	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9005
Shubhankar	Chintamani Shindgikar	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9040
George	Chiu	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9210
George	Chiu	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9242
George	Chiu	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9233
Yong K.	Cho	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9129
Jongeun	Choi	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9189
Jongeun	Choi	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9036
Jongeun	Choi	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9170
Tina	Chow	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9068
Mobin Uddin	Chowdhury	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9007
Matthew	Chu Cheong	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9103
Chien-Hsin	Chung	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9004
Garrett	Clayton	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9258
Garrett	Clayton	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9275
Garrett	Clayton	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9276
Garrett	Clayton	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9201
Jack	Cole	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9068
Demetris	Coleman	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9134
Demetris	Coleman	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9028
Ryan	Coulter	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9271
Christian	Cousin	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9078
Luis	Crespo	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-8949
Michael	Crimmins	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9276
Donald M.	Cropek	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9099
Mary	Crowe	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9266
Austin	Curtis	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9083
Eric	Curtis	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9039
Rob	Daily	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9135
Matilde	D'Arpino	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9105
Tuhin	Das	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9084
Mohammadreza	Davoodi	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8992
Mohammadreza	Davoodi	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9176
Joseph	Deese	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9168
Luigi	del Re	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8963
Patrick	Delafontaine	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229

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Lyubomyr	Demkiv	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8994
Junpeng	Deng	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8963
Santosh	Devasia	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9200
Santosh	Devasia	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9262
Paul	Dice	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Warren	Dixon	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9078
Xiaonan	Dong	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-8920
Nehal	Doshi	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9223
Corey	Dotson	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9044
Zachary	Dougherty	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8941
Joseph	Drallmeier	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9206
Pengwei	Du	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9103
Xinyu	Du	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-8997
David	Dunlop	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9241
Laurel	Dunn	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9068
Saravanan	Duraiarasan	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9247
Gerald	Eaglin	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9162
Christian	Earnhardt	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9196
Christian	Earnhardt	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9071
Craig	Emter	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Osama	Ennasr	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9134
Osama	Ennasr	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9028
Elena	Escuder Milian	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9226
Azim	Eskandarian	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9121
Navid	Fallahinia	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-8955
Saba	Faryadi	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8992
Saba	Faryadi	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9176
Vitaliy	Fedonyuk	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9016
Robert	Felmlee	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9266
Tianheng	Feng	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-8970
Karl	Fetzer	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8954
Dimitar	Filev	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9092
James Richard	Forbes	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8945
Matthew	Franchek	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9098
Zachary	Frank	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9100
Deepak	Gala	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9024
Matt E.	Galla	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9211
Chandravamsi	Gandra	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9018
Nicholas	Gans	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9063
Yuan	Gao	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-9117
Joseph	Garbini	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9200
Mayank	Garg	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9151
C. Fletcher	Garrison IV	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9173
Michelle	Gegel	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9217
Amirhossein	Ghasemi	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9040

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Amirhossein	Ghasemi	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9267
Amirhossein	Ghasemi	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9268
Amirhossein	Ghasemi	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9269
Amirhossein	Ghasemi	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9042
Jasprit Singh	Gill	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9097
Anouck	Girard	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-8950
Rita	Gitik	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9261
Chris	Glugla	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Yoshua	Gombo	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9200
Alejandro	Gonzalez	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9066
Karolos	Grigoriadis	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9098
Ben	Groelke	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9196
Ben	Groelke	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9071
David	Grow	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9148
Yan	Gu	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-9117
Yan	Gu	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9115
Sijing	Guo	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9064
Xuexun	Guo	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9064
Sunit K.	Gupta	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9094
Saikrishna	Gurumoorthy	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9159
Kimberly	Gustafson	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9175
Aleksandar	Haber	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9007
Annika-verena	Haecker	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9045
Hossein	Haeri	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-8979
Carrie M.	Hall	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9226
Chang Soo	Han	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9129
Jihun	Han	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9178
Pingang	Han	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-8987
Pingang	Han	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9260
Drew	Hanover	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9223
Elizabeth C.	Hardin	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9150
Amanda	Hashimoto	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9222
Azad	Hassan	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Ben	Haydon	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9068
Xiang	He	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9025
Xiang	He	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9027
Xiang	He	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9099
Shahin	Hedayati Kia	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8942
Bobo	Helian	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8988
Sadra	Hemmati	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9223
Humberto	Henao	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8942
Tucker	Hermans	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9173
Eduardo	Hernandez	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9253
Mehrdad	Heydarzadeh	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8942

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Rebecca	Histed	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9277
Rebecca	Histed	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9278
David	Hoelzle	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9192
Guy	Hoffman	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-8985
Patrick	Holmes	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9214
Baisravan	HomChaudhuri	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9065
Baisravan	HomChaudhuri	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9040
Baisravan	HomChaudhuri	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9160
Roberto	Horowitz	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-8983
Bashir	Hosseini Jafari	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9063
James	Hoy	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9084
Chuan	Hu	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9006
Guangzhou	Hu	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-9207
Jiayi	Huang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9256
Yiwen	Huang	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9005
Garlan	Huberts	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Yildirim	Hurmuzlu	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9211
Omar A.	Hussain	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9029
Omar A.	Hussain	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9277
Taeseon	Hwang	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9100
Eunjeong	Hyeon	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9046
Keisuke	Ikeda	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9026
Uduak	Inyang-Udoh	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9273
Amir	Iqbal	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9115
Vahid	Izadi	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9267
Vahid	Izadi	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9268
Vahid	Izadi	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9042
Neera	Jain	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9210
Neera	Jain	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9212
Neera	Jain	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9236
Sidharth	Jangra	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9004
Mrdjan	Jankovic	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038
Soo	Jeon	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9170
Woongsun	Jeon	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9096
Jinho	Jeong	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9170
Kshitij	Jerath	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-8979
Yunyi	Jia	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9143
Yunyi	Jia	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9177
Yunyi	Jia	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9049
Jiaoying	Jiang	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-9207
Tianyu	Jiang	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-8976
Chi	Jin	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9069
Chi	Jin	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9067
Victoria	Joshi	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9082
Ezequiel	Juarez	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9171

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Yoshihiro	Kai	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9026
Paul-camille	Kakou	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9094
Tsubasa	Kaneda	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9026
Dominik	Karbowski	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9178
Pouria	Karimi Shahri	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9040
Pouria	Karimi Shahri	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9268
Pouria	Karimi Shahri	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9269
Mansour	Karkoub	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9077
Tyler	Kelly	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038
Sean	Kenny	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-8949
Alicia	Keow	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9156
Alicia	Keow	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9155
Deniz	Kerimoglu	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9077
Patrick	Keyantuo	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9068
Gholamreza	Khademi	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9180
Gholamreza	Khademi	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9150
Mohamed	Khalil	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-9074
Mohamed	Khalil	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8909
Amir	Khameneian	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Zurwa	Khan	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9195
Marc D.	Killpack	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9037
Heeseong	Kim	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9239
Hongjip	Kim	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9000
Kwang	Kim	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9100
Namdoo	Kim	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9178
Won-jong	Kim	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9081
Youngki	Kim	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9046
Sviatoslav	Klos	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8994
Sangjin	Ko	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9053
Ilya	Kolmanovsky	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-8950
Ilya	Kolmanovsky	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-8969
Revanth	Konda	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9169
Ioannis	Kouroudis	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8909
Shreyas	Kousik	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9214
Melissa	Krieger	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9101
Venkat N.	Krovi	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9153
Venkat N.	Krovi	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9097
Miroslav	Krstic	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8915
Miroslav	Krstic	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-8951
Paul	Krueger	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9219
Manish	Kumar	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9252
Manish	Kumar	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9131
Nikunj	Kumbhani	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9166
Andrew J.	Kurdila	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9118

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Qingzhi	Lai	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9004
Cary	Laird	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9089
Manuel	Lanchares	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-8950
Robert	Landers	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9217
Reza	Langari	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9053
Jacob	Leachman	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-8979
Kam K.	Leang	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9029
Kam K.	Leang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9270
Kam K.	Leang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9277
Kam K.	Leang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9278
Kam K.	Leang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9258
Kam K.	Leang	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-8946
Kam K.	Leang	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9025
Kam K.	Leang	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9027
Kam K.	Leang	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9099
Kam K.	Leang	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9173
Emily	Leary	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Robert	Leary	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9167
Robert	Leary	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9114
Robert	Leary	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9120
Chia-Ning	Lee	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9200
Kok-Meng	Lee	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-9207
Kooktae	Lee	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9047
Kooktae	Lee	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9044
Yu-Hsiu	Lee	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-8926
Niklas	Legnedahl	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9151
Christopher	Leroy	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9155
Jessica	Leu	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9208
Ao	Li	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-8997
Ao	Li	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9003
Min	Li	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9021
Rui	Li	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9177
Ruixue	Li	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9147
Suyi	Li	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9016
Tianwei	Li	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9218
Zhaojian	Li	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9092
Xiao	Liang	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9186
Yiliang	Liao	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9277
Yiliang	Liao	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9278
Michael	LiBretto	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9129
Markus	Lienkamp	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-9188
Qinghua	Lin	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9231
Wen-Chiao	Lin	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-8997
Xinfan	Lin	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9004
Letian	Lin	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9104

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Letian	Lin	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9108
Chunsheng	Liu	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9257
Chunsheng	Liu	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8924
Jianhua	Liu	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9049
Hao	Liu	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-8987
Hao	Liu	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9260
Yen-Chen	Liu	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9141
Yujiong	Liu	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-8999
Jonathan	Lock	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-8964
Chenliu	Lu	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038
Naijing	Lv	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9049
Geronimo	Macias	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9044
Siddharth	Mahesh	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9247
Anson	Maitland	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9069
Anson	Maitland	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9067
Giorgos	Mamakoukas	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9134
Noah	Manring	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Zhu	Mao	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9115
Steven E.	Markham	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9173
Jason	Martz	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9039
Stephen	Mascaro	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-8961
Stephen	Mascaro	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-8955
Stephen	Mascaro	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9245
Lance	McCAnn	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9200
Jonathan	McConnell	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9084
Tomas	McKelvey	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-8964
John	McPhee	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9069
John	McPhee	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9067
Yifan	Men	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9039
Panagiotis	Michaleris	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-8995
Milos	Milanovic	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9258
Mark	Minor	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9241
Sandipan	Mishra	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9273
Samuel	Misko	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8994
Aleksandra	Mitrovic	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9258
Varun R.	Mittal	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9132
Mohamed	Mohamed	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9195
Alireza	Mohammadi	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8942
Hanieh	Mohammadi	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9150
Javad	Mohammadpour Velni	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8992
Javad	Mohammadpour Velni	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9176
Vahidreza	Molazadeh	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9191
Hever	Moncayo	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8957
Jason Z.	Moore	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9114

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Jason Z.	Moore	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9120
Lee	Moradi	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8994
Chris	Morgan	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9223
Scott	Moura	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9068
Ranjan	Mukherjee	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-8912
Ranjan	Mukherjee	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-8921
Ranjan	Mukherjee	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-9072
Ranjan	Mukherjee	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-8929
Christopher	Mullen	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9271
Todd	Murphey	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9134
James	Mynderse	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9083
Jeffrey	Naber	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Matthieu	Nadini	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9256
Matthieu	Nadini	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9054
William S.	Nagel	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9270
William S.	Nagel	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9277
Mark	Nagurka	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9009
Kayvan	Najarian	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9221
Peiman	Naseradinmousavi	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8915
Peiman	Naseradinmousavi	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-8951
Austin	Nash	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9212
Sergey	Nersesov	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8954
Justin	Ngo	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9277
Justin	Ngo	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9278
Helene	Nguewou-Hyousse	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9220
Zhenyu	Niu	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-8987
Zhenyu	Niu	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9260
Mehrdad	Nourani	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8942
Keyvan	Noury	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9240
Keyvan	Noury	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9126
Oded	Nov	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9041
Shahin	Nudehi	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-8906
Kenn	Oldham	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9221
Olusola	Olojed	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9272
Zakai	Olsen	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9100
Marcia K.	O'Malley	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9082
Anuj	Pal	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-8984
Derek	Paley	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9220
Jeremy	Palme	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9276
Christopher	Pannier	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9192
Seri	Park	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9276
Ben	Pawlowski	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9181
Seth	Payne	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9173
Francesco	Pecora	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9007
Victoria	Pellerito	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9203

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Evan	Pelletier	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9167
Evan	Pelletier	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9110
Stephen	Peluso	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9101
Huei	Peng	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9179
Jih-Sien	Peng	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9141
Yansong	Peng	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9159
Adam	Pettinger	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9062
Lan N.	Pham	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9029
John	Pierce	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9135
Davide	Piovesan	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9066
Davide	Piovesan	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9266
Davide	Piovesan	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9013
Pierluigi	Pisu	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9097
Subhadipto	Poddar	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9076
Philipp	Polterauer	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8963
Maurizio	Porfiri	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9060
Maurizio	Porfiri	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9256
Maurizio	Porfiri	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9041
Maurizio	Porfiri	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9054
Ashkan	Pourkand	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9148
Niket	Prakash	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9046
Shat	Pratoomratana	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9157
Michael	Prucka	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9146
Mitch	Pryor	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9062
Mitch	Pryor	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9123
Jorge	Pulpeiro Gonzalez	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9226
Haochen	Qi	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8959
Jingyuan	Qi	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8998
Feng	Qian	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9091
Yingxin	Qiu	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9243
Qiuping	Qu	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Verica	Radisavljevic-Gajic	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9258
Christopher D.	Rahn	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9151
Rajesh	Rajamani	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9096
Micky	Rakotondrabe	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9184
Vikram	Ramanathan	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9123
Praveen	Ramaprabhu	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9168
Ioannis	Raptis	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9138
Hailin	Ren	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8998
Yong	Ren	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-8995
Christopher	Reyes	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9172
Edmond	Richer	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9219
Edmond	Richer	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9211
Samuel	Richmond	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9256

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Alessandro	Rizzo	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9256
Denise	Rizzo	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-8950
Denise	Rizzo	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9054
Giorgio	Rizzoni	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9056
Rush D.	Robinett III	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9106
Roberto	Rocchetta	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-8949
Julie	Rocho-Levine	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9198
Renato	Rodriguez Nunez	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9154
John	Rollinger	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038
Chad	Rose	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9082
Maxwell H.	Rosen	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9060
Cristian	Rostiti	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9146
Courtney A.	Rouse	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9078
Aymeric	Rousseau	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9178
Brandon	Rudolph	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9019
Rasoul	Salehi	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9247
Ali	Salim	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9229
Biswanath	Samanta	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9272
Vivek	Sangwan	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9132
Yousef	Sardahi	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8990
Tohid	Sardarmehni	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9248
Tohid	Sardarmehni	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9216
Soumik	Sarkar	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9076
Harish	Sathishchandra	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9201
Thomas	Sattel	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9045
Matthias J.	Schmid	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9153
Matthias J.	Schmid	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9097
Marco P.	Schoen	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9157
Sebastian	Schuck	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-9188
Nathan	Schutte	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9017
William	Scott	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9220
Robert	Seney	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9194
Joohwan	Seo	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9036
Prateek	Shah	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-8983
Umer Hameed	Shah	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9077
Mahdi	Shahbakhti	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9106
Mahdi	Shahbakhti	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9223
Mahdi	Shahbakhti	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Yunli	Shao	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9075
Anuj	Sharma	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9076
Nitin	Sharma	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9191
Ping-Yen	Shen	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9259
Taehyun	Shim	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9239
Masoud Jahromi	Shirazi	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9274
Masoud Jahromi	Shirazi	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9190

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K. Alex	Shorter	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9198
Ritika	Sibal	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9198
Ayaz	Siddiqui	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9168
Jason	Siegel	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9206
Dan	Simon	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9180
Dan	Simon	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9150
Jonathon	Slightam	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9009
Ronald A.	Smaldone	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9063
Arthur	Smith	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9000
Patrick	Smith	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9135
Jordan	Smith	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9266
Virginia	Smith	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9276
David Y.	Son	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9219
Xingyong	Song	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9248
Xingyong	Song	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9216
Ziyou	Song	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-8969
Seyedeh Mahsa	Sotoudeh	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9065
Damoon	Soudbakhsh	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9154
Srivatsan	Srinivasan	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9153
Vaibhav	Srivastava	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9254
Vaibhav	Srivastava	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9237
Dylan	Stecklair	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9101
Anna	Stefanopoulou	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9206
Anna	Stefanopoulou	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9046
Anna	Stefanopoulou	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9247
Paolo	Stegagno	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-8920
Paolo	Stegagno	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9255
Paolo	Stegagno	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8923
Paolo	Stegagno	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8913
Scott	Steinbrink	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9266
Scott	Steinbrink	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9013
Jake A.	Steiner	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9029
Jake A.	Steiner	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9027
Jake A.	Steiner	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9099
Stephanie	Stockar	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9101
Stephanie	Stockar	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9146
Timothy	Stolzenfeld	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038
Kenichi	Sugawara	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9026
Melvin	Summerville	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9007
Jing	Sun	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-8969
Liang	Sun	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-9024
Zongxuan	Sun	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9075
Byungjun	Sung	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9239
Reza	Tafreshi	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9195

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Dénes	Takács	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-8960
Phanindra	Tallapragada	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9016
Phanindra	Tallapragada	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9018
Phanindra	Tallapragada	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9015
Phanindra	Tallapragada	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9194
Kai Liang	Tan	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9076
Xiaobo	Tan	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9134
Xiaobo	Tan	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9028
James	Tangorra	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9045
Tanvir	Tanim	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9151
Shahin	Tasoujian	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9098
Clark	Taylor	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9138
Jonathan S.	Terry	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9037
James	Tigue	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-8961
Anuj	Tiwari	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9262
Masayoshi	Tomizuka	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9026
Masayoshi	Tomizuka	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9208
Luke T.	Torres	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9155
Mohamed	Toub	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9106
Mark V.	Trevorrow	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9257
Mark V.	Trevorrow	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8924
Thulani	Tsabedze	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9271
Tsu-Chin	Tsao	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-8926
Jun	Ueda	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9129
Jun	Ueda	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9243
A. Galip	Ulsoy	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9261
Kamal	Upadhyay	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8959
Vladimir	Vantsevich	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-8994
Krishna	Varadarajan	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9167
Balázs	Várszegi	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-8960
Ramanarayan	Vasudevan	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9214
Vighnesh	Vatsal	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-8985
Joshua	Vaughan	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9162
Prithvi Gopinath	Veeravalli	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9084
Hamid	Vejdani	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-9203
Hamid	Vejdani	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9083
Luke	Venstrom	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-8906
Johannes	Verberne	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8957
Christopher	Vermillion	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9196
Christopher	Vermillion	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9068
Christopher	Vermillion	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9071
Christopher	Vermillion	Wednesday, October 9	3:30PM–5:30PM	W3-6	DSCC2019-9168
Sujith	Vijayan	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9118
Illés	Vörös	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-8960
Scott	Wade	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9271

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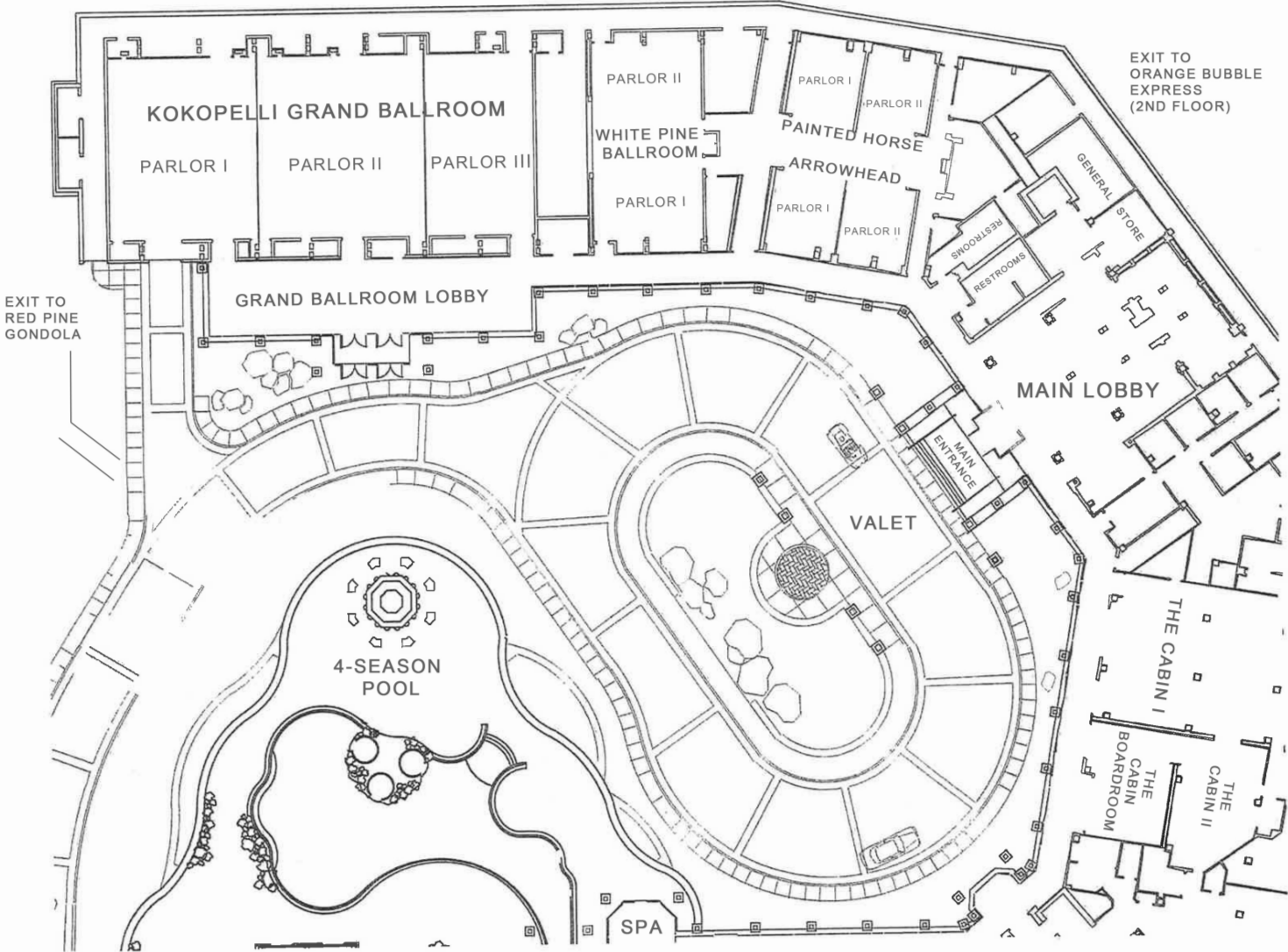| Author First Name	Author Last Name	Presentation Day	Session Time	Session Number	Paper Number
Mohamed	Wahba	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9167
Nolan	Walker	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9063
Dan	Wang	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-8976
Dan	Wang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9263
Dan	Wang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9264
Fengchen	Wang	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9159
Fengchen	Wang	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9003
Hao	Wang	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-8969
Hong-Du	Wang	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9077
Jiamin	Wang	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9118
Jie	Wang	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9233
Jing	Wang	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9092
Junmin	Wang	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9006
Junmin	Wang	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9055
Junmin	Wang	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9021
Lu	Wang	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9221
Qian	Wang	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9111
Qian	Wang	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-8995
Weitian	Wang	Wednesday, October 9	1:15PM–3:15PM	W2-2	DSCC2019-9143
Weitian	Wang	Wednesday, October 9	3:30PM–5:30PM	W3-2	DSCC2019-9177
Xin	Wang	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9073
Xinpeng	Wang	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9179
Yan	Wang	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9092
Yan	Wang	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-8984
Yingxu	Wang	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-8962
Zhenpo	Wang	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9055
Kevin R.	Ward	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9221
Jacob	Ward	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9135
Catherine	Weaver	Wednesday, October 9	1:15PM–3:15PM	W2-6	DSCC2019-9236
Justin	Whitaker	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9037
Chris	White	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9148
Ryder	Winck	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8941
Ryder	Winck	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-9019
Aimy	Wissa	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9175
Kelilah L.	Wolkowicz	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9114
Kelilah L.	Wolkowicz	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9120
Jianyang	Wu	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9055
Juan	Wu	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9051
Kai	Wu	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9092
Xihui	Wu	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9121
Yumeng	Wu	Thursday, October 10	1:15PM–3:15PM	T2-2	DSCC2019-9242
Roland	Wüchner	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-9074
Roland	Wüchner	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8909
Huanxiong	Xia	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9049

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Baitao	Xiao	Thursday, October 10	1:15PM–3:15PM	T2-5	DSCC2019-9038
Hui	Xiao	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9022
Mutian	Xin	Thursday, October 10	1:15PM–3:15PM	T2-4	DSCC2019-9159
Defeng	Xu	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-8927
Lin	Xu	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9064
Peidong	Xu	Thursday, October 10	3:30PM–5:30PM	T3-5	DSCC2019-9003
Xiaotian	Xu	Thursday, October 10	1:15PM–3:15PM	T2-3	DSCC2019-8990
Michael	Yagiela	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9013
Zeyu	Yan	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-8970
Bingen (Ben)	Yang	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9240
Bingen (Ben)	Yang	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9126
Can	Yang	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8988
Bin	Yao	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8988
Jalal	Yazji	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9155
Arjun	Yeravdekar	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9042
Xiongfeng	Yi	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9228
Kyubaek	Yoon	Thursday, October 10	1:15PM–3:15PM	T2-6	DSCC2019-9189
Saad	Yousaf	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9082
Kaiyan	Yu	Thursday, October 10	1:15PM–3:15PM	T2-1	DSCC2019-9051
Xiao	Yu	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9021
Rui	Yu	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8959
Chengzhi	Yuan	Wednesday, October 9	1:15PM–3:15PM	W2-1	DSCC2019-8920
Chengzhi	Yuan	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9255
Chengzhi	Yuan	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8923
Chengzhi	Yuan	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8913
Hamza	Zaidi	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9155
Naghmeh	Zamani	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9148
Amir Hosein	Zamanian	Wednesday, October 9	3:30PM–5:30PM	W3-3	DSCC2019-9219
Thomas	Zehelein	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-9188
Andy	Zelenak	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9123
Ali	Zemouche	Wednesday, October 9	1:15PM–3:15PM	W2-4	DSCC2019-9096
Jingqiang	Zha	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9021
Ding	Zhang	Wednesday, October 9	3:30PM–5:30PM	W3-1	DSCC2019-9198
Haopeng	Zhang	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9017
Jianwu	Zhang	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-8927
Jingting	Zhang	Thursday, October 10	9:30AM–11:30AM	T1-2	DSCC2019-8923
Jingting	Zhang	Thursday, October 10	3:30PM–5:30PM	T3-2	DSCC2019-8913
Jiucai	Zhang	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9086
Jun	Zhang	Wednesday, October 9	9:30AM–11:30AM	W1-1	DSCC2019-9169
Jun	Zhang	Wednesday, October 9	6:30PM–7:15PM	W4-1	DSCC2019-9271
Qiang	Zhang	Thursday, October 10	3:30PM–5:30PM	T3-6	DSCC2019-9191
Xiaoli	Zhang	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9086
Xin	Zhang	Wednesday, October 9	3:30PM–5:30PM	W3-4	DSCC2019-9021
Jianguo	Zhao	Thursday, October 10	3:30PM–5:30PM	T3-4	DSCC2019-9181
Ding	Zhao	Wednesday, October 9	9:30AM–11:30AM	W1-2	DSCC2019-9179

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Minghui	Zheng	Friday, October 11	9:30AM–11:30AM	F1-2	DSCC2019-9186
Xu	Zhou	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9086
Hua	Zhou	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-8959
Guoming	Zhu	Wednesday, October 9	1:15PM–3:15PM	W2-3	DSCC2019-8962
Guoming	Zhu	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9147
Guoming	Zhu	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-8984
Guoming	Zhu	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-9039
J. Jim	Zhu	Thursday, October 10	9:30AM–11:30AM	T1-1	DSCC2019-9104
J. Jim	Zhu	Friday, October 11	9:30AM–11:30AM	F1-1	DSCC2019-9108
Ling	Zhu	Thursday, October 10	3:30PM–5:30PM	T3-3	DSCC2019-8984
Junyi	Zou	Wednesday, October 9	1:15PM–3:15PM	W2-5	DSCC2019-9064
Qingze	Zou	Thursday, October 10	3:30PM–5:30PM	T3-1	DSCC2019-9218
Lei	Zuo	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9000
Lei	Zuo	Wednesday, October 9	3:30PM–5:30PM	W3-5	DSCC2019-9091

Hotel Floor Plan

KOKOPELLI GRAND BALLROOM
PARLOR I
PARLOR II
PARLOR III

PARLOR II
WHITE PINE BALLROOM
PARLOR I

PARLOR I
PARLOR II
PAINTED HORSE
ARROWHEAD
PARLOR I
PARLOR II

EXIT TO
ORANGE BUBBLE
EXPRESS
(2ND FLOOR)

GENERAL STORE
RESTROOMS
RESTROOMS

GRAND BALLROOM LOBBY

EXIT TO
RED PINE
GONDOLA

MAIN LOBBY

MAIN ENTRANCE

VALET

4-SEASON POOL

THE CABIN I
THE CABIN BOARDROOM
THE CABIN II

SPA

Hotel Floor Plan

| storage | storage | storage | storage |

BOBCAT BALLROOM ← →

PARLOR 1

operatable partition

PARLOR 2

operatable partition

PARLOR 3

pantry

kitchen

stairs

← To Lobby

corridor

elevator

elevator lobby

elevator

elevator equipment

storage

SILVERADO
LODGE

Notes and Comments

Notes and Comments

2020 ASME Dynamic Systems and Control Conference
Pittsburgh, Pennsylvania, USA
October 4-7, 2020

Call for Papers

The 2020 Annual Dynamic Systems and Control (DSC) Conference, sponsored by the Dynamic Systems and Control Division (DSCD) of ASME, will be held Sunday through Wednesday, October 4-7, 2020, in downtown Pittsburgh, Pennsylvania, USA. The conference venue will be Pittsburgh Marriott City Center. On behalf of the DSCD, we cordially invite you to attend the conference, present the latest findings, and enjoy the engagement with colleagues working in related areas.

The DSC Conference is the showcase technical forum of the ASME Dynamic Systems and Control Division. It provides a focused and intimate setting for dissemination and discussion of the state of the art in dynamic systems and control research, with a mechanical engineering focus. The 2020 DSC Conference Technical Program will consist of sessions in all of the usual areas of interest to the Division that include but are not limited to: automotive and transportation systems, bio-systems and health care, energy systems, mechatronics, modeling, identification, intelligent systems, robotics, vibrations, and smart structures, etc. The conference features contributed sessions, invited sessions, workshops and special sessions, plenary talks, student programs including best student paper competition and networking, as well as committee meetings and social functions.

All accepted papers must be presented on-site at the conference by an author of the paper. Online access to conference papers will be given to all registered attendees at the start of the conference. Following the event, the official proceedings of the conference are published in the ASME Digital Collection, and will be submitted to all major indexers including EI Complex, Scopus, and the ISI Conference Proceedings Citation Index.

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