

## Cover Note

Dear colleagues,

Hope you are enjoying the summer. We are pleased to share with you the new issue of ASME DSCD Newsletter. This is the first issue handled by the new editor team. Our aim is to make the Newsletter a *people-centered* platform to connect and serve all DSCD colleagues and YOU! Through the Newsletter, we want to offer a channel for constructive communication between DSCD and everyone, inform the community of significant news, cheer achievements of our people, introduce new colleagues, and promote sharing of career experiences and opportunities.

In this issue, Prof. Jordan Berg, the outgoing chair of DSCD, shares a retrospective while reflecting on the challenges and opportunities. Prof. Kam Leang as DSCD's secretary reports the personnel changes in the DSCD ExComm, introducing the outgoing and incoming members. Our delight then goes to recent honors and awards earned by our colleagues. Prof. Masayoshi Tomizuka was named to National Academy of Engineering, Profs. Galip Ulsoy and Miroslav Krstic received the Bellman Control Heritage Awards, and Dr. Bryan Maldonado received the 2022 ASME Old Guard Early Career Award. In our New Faces Spotlight column, Drs. Satadru Dey, Tianyi He, Yao Ma, Bryan Maldonado, Xi Yu and Dong Zhang introduce themselves – new blood makes our community thrive. Seven recent NSF CAREER awardees, Drs. Mehmet Kurt, Zhaojian Li, Xinfan Lin, Changliu Liu, Aimy Wissa, Ye Zhao and Minghui Zheng, kindly share their experiences in proposal preparation and career growth. We hope what they share will help more colleagues, especially junior faculty in this season of CAREER proposal submission. The Newsletter further presents messages about *ASME Letters in Dynamic Systems and Control*, upcoming conferences, and openings. Please enjoy your reading, and do not hesitate to contact us if you have messages to share with all.

**Editor:** Huazhen Fang, University of Kansas

**Senior Associate Editor:** Shuxia Tang, Texas Tech University

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## 2021-2022 DSCD Executive Committee Outgoing Chair Retrospective

Jordan Berg

My last act as Chair of the Executive Committee (ExComm) of the ASME Dynamic Systems and Control (DSC) Division was at the recent 2022 American Control Conference (ACC) in Atlanta, where I passed the Chair's gavel to Prof. Xiaobo Tan of Michigan State University. The DSCD Newsletter has kindly given me this opportunity to mark the occasion by reflecting on the challenges and opportunities faced by the ExComm and the DSC Division in the past year. This retrospective is entirely my personal opinions and does not represent either the views of the other ExComm members or the official positions of the DSC Division.

The DSCD ExComm comprises five elected members, plus two appointed members. The elected members cycle through the positions of junior member, senior member, Vice-Chair, Chair, and Past Chair, before finally rotating off. One appointed member serves as Division Secretary, the other as Division Treasurer. In practice the seven members of the ExComm collaborate closely to support the DSC Division, and decisions are made collectively. Over the past few years, the ExComm has increasingly turned to data-gathering tools like Google Forms to take the guesswork out of determining community needs and priorities. I sincerely thank Prof. Kam Leang, the ExComm Secretary, for leading this initiative and, most of all, thanks to the members of the DSC Division for taking the time to respond.

Our Division has amazing assets. Foremost among them are our vibrant Technical Committees, where the creativity

and expertise of our membership is focused on the great engineering challenges of our time. The DSC Division sponsors two established flagship journals, the Journal of Dynamic Systems, Measurement, and Control, and the IEEE/ASME Transactions on Mechatronics. We have recently added the ASME Letters in Dynamic Systems and Control and the Journal of Autonomous Vehicles and Systems, which promise great value to the DSC community. The Division has initiated a monthly podcast series to spotlight and disseminate the accomplishments of our members. Finally, the Division membership supports several prominent conferences and symposia -- the American Control Conference (ACC), the IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), the International Symposium on Flexible Automation (ISFA), and until recently the Dynamic Systems and Control Conference (DSCC).

In my opinion, the most pressing question faced by the Division is the future of our fall conference. DSCC was established by DSC Division members in 2008, to provide a forum for emerging research in dynamics and control for mechanical systems. DSCC was a more intimate and focused setting to complement our traditional spring meeting at the larger ACC. For several years DSCC served that function admirably, but the conference eventually ran afoul of cultural differences. Perhaps because of the diversity and sheer number of dissemination outlets available to dynamics and control researchers, the expectations of active DSCD members when authoring or reviewing papers, or when organizing and editing conference sessions, depart

significantly from the practices of other ASME Divisions. Understandably and unavoidably, the tools and support provided by ASME are standardized for the most common conference model. Over the course of more than five years, despite sincere bilateral efforts by DSC members and ASME staff to address the problem, the resulting dissonance was progressively eroding the positive benefits of DSCC to Division membership. Finally in 2021 the ExComm responded to a mandate from the DSC membership and suspended future DSCCs.

The Modeling, Estimation, and Control Conference (MECC) arose as a grassroots reaction to the cancellation of the 2021 DSCC. While not an official DSC Division conference, MECC is -- like ACC -- co-sponsored by ASME through the American Automatic Control Council (AACC). It's my personal opinion that MECC is a great venue for the DSC community, and I urge all of us to support the conference with our attendance, with the submission of our latest research results, and with positive word-of-mouth to our colleagues and collaborators. Our community now has the rare opportunity to build a new meeting custom-tailored to our needs and expectations, and I hope that we can seize that opportunity. I look forward to being a part of future MECCs.

Moving to longer term challenges, recent use of polling by the ExComm turned up an interesting dichotomy, as well as an opportunity. The Division has a mailing list of about 650 contacts, based on attendance at conferences and meetings. ASME also provides us a much larger list of about 3,200 ASME members who have identified dynamic

systems and control as a primary or secondary interest in their profiles. A recent poll on the value of various Division activities was sent to both groups, and we received 56 responses from the Division list and 33 from the larger ASME membership list. The Division responses reported value in our conferences and publications and looked forward to in-person or hybrid meetings. The ASME membership responses favored virtual events and did not see great value in traditional academic activities. In my experience, the Division has focused its efforts on the first group, with good success, and has been less aware of the needs – or perhaps even the existence – of the second. I think a great challenge for the ExComm and the Division is to reach out to this latter cohort and attract them to be active participants in our community. Even modest rates of involvement would substantially enhance the diversity and capabilities of the Division. Improving our offerings for industrial practitioners is just one clear need that this initiative might address.

Finally, student members are the future of the Division. The ExComm has been very supportive of efforts to engage students in Division events. I hope that the membership will join with the ExComm to encourage these efforts, by proposing creative new student activities and by helping your own students to take part.

It has been a pleasure and an honor to work with my brilliant and dedicated ExComm colleagues on behalf of the DSC Division membership. As I look forward to my final year on the ExComm, I hope that all DSC Division members feel an ownership stake in the Division. Please let the ExComm members know what is going right, and what still needs to be done. And, of course, when you have the chance, please consider joining the ExComm yourself! Our diversity is our strength.

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## DSCD ExComm Updates

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### *Introducing the incoming and outgoing members of DSCD ExComm*

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Kam K. Leang, University of Utah

The ASME Dynamic Systems and Control Division (DSCD) Executive Committee (ExComm) consists of five elected members, two appointed non-voting members: the Secretary and the Treasurer, and an ASME representative. The ExComm serves the members of the DSCD by fostering innovation and education in the art, science, engineering and practice of Dynamic Systems and Control.

Beginning July 1, 2022, the ExComm members are:

- Professor Xiaobo Tan, Michigan State University, Chair of ExComm.
- Professor Jingang Yi, Rutgers University, Vice Chair
- Dr. Jordan Berg, National Science Foundation, Past Chair.
- Professor Marcie O'Malley, Rice University, Senior Member.

- Professor Atul Kelkar, Clemson University, newly elected Junior Member.
- Professor Kam K. Leang, University of Utah, Secretary.
- Professor Rajesh Rajamani, University of Minnesota, Treasurer.
- Ms. Barbara Zlatnik, ASME Representative.

The ExComm also greatly acknowledges Professor Santosh Devasia, University of Washington, for serving on the ExComm between July 2017 to June 2022.

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## Honors and Awards

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### *Prof. Masayoshi Tomizuka Named to National Academy of Engineering*

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Kirsten Mickelwait

The National Academy of Engineering (NAE) announced today that it has added another Berkeley Engineering professor to its ranks, one of the highest professional honors bestowed on engineers in the United States.



Some past and present Bellman Award recipients at the American Control conference. From left to right: Profs. Miroslav Krstic (2021), Masayoshi Tomizuka (2018), John Baras (2017), Roger Brockett (1989), Arthur Krener (2012), Galip Ulsoy (2020), Eduardo Sontag (2022).

Masayoshi Tomizuka, the Cheryl and John Neerhout Jr. Distinguished Professor of Mechanical Engineering, studies optimal and adaptive control, digital control, signal processing, motion control, mechatronics and their applications in robotics, manufacturing, data storage devices, vehicles and human-machine systems. The NAE cited his "leadership in control of mechanical systems through innovations applied globally in industry, and education of coming generations of leaders."

<https://engineering.berkeley.edu/news/2022/02/masayoshi-tomizuka-named-to-national-academy-of-engineering/>

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### *Profs. Galip Ulsoy and Miroslav Krstic Received the Richard E. Bellman Control Heritage Awards*

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Two DSCD members, Profs. Galip Ulsoy and Miroslav Krstic, received back-to-back the 2020 and 2021 Richard E. Bellman Control Heritage Awards. The citations were: "for seminal research contributions with industrial impact in the dynamics and control of mechanical systems especially manufacturing systems and automotive systems" for Prof. Galip Ulsoy, and "for transformational contributions in PDE control, nonlinear delay systems, extremum seeking, adaptive control, stochastic nonlinear stabilization and their industrial applications" for Prof. Miroslav Krstic

The awards were given at the American Control Conference that took place at Atlanta in June 2022. The awards were According to the American Automatic Control Council, "the Bellman Award is given for distinguished career contributions to the theory or application of automatic control. It is the highest recognition of professional achievement for US control systems engineers and scientists."

Earlier recipients from the ASME DSCD community include Professors Masayoshi Tomizuka (2018) and George Leitmann (2009).

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### *Prof. Ulsoy's Acceptance Speech at ACC 2022*

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To receive the Richard E. Bellman Control Heritage Award is truly an honor. I am thankful first to all of you for attending today after two postponements of these ceremonies due to the pandemic. I am grateful to the honors committee for selecting me, and to my nominator and references for their willingness to put forth and support my nomination.

The Bellman Award is given for "distinguished career contributions to the theory or application of automatic control." My career in control started as a junior at Swarthmore College in 1972 when I took a course based on the textbook Dynamics of Physical Systems by Robert Cannon. That course really challenged me, and I found myself putting in a lot of time and energy just to get by. That investment sparked my interest, and so as a master's student at Cornell University I worked with Dick Phelan and learned the practical and experimental side of automatic control in the laboratory using analog computers. In 1975 I decided to pursue control engineering for my Ph.D. work and Prof. Phelan said, in mechanical engineering at that time, there were really only two choices: MIT or UC Berkeley. So I wound up at UC Berkeley where I learned controls from Yasundo Takahashi, Masayoshi Tomizuka (Tomi is also a Bellman Award recipient), and Dave Auslander. I not only learned the latest in control theory from the book Control and Dynamic Systems by Takahashi, Rabins and Auslander, but did my first experiments using digital controllers. My doctoral advisor and professional role model, Dan Mote, is a dynamicist, and my research was on reducing sawdust by controlling vibrations of bandsaw blades during cutting and included theory, computation and experiment.

When I started as an Assistant Professor at the University of Michigan in 1980, I had the great fortune to have two very special mentors. The late Elmer Gilbert (another Bellman Award recipient) came

to my office to welcome me, to offer his help with the new graduate course I was developing, and to invite me to participate in a College of Engineering control seminar – a regular Friday afternoon seminar which I still continue to attend! The other was my longtime friend and collaborator Yoram Koren, together with whom I conducted many joint research projects, and from whom I learned much of what I know about control of manufacturing systems. Yoram and I had the first digital control computer, a PDP-11, at UM in our laboratory. Michigan was, and is, a wonderful place for control engineering. I had the good fortune to work with, not only Elmer and Yoram, but many outstanding collaborators: Joe Whitesell, the late Pierre Kabamba, Panos Papalambros, Dawn Tilbury, Huei Peng, Ilya Kolmanovsky, Harris McClamroch, Jeff Stein, Gabor Orosz, Chinedum Okwudire and many others! I worked on topics such as automotive belt dynamics, adaptive control of milling, reconfigurable manufacturing, vehicle lane-keeping, co-design of an artifact and its controller, time delay systems, and I was always richer for the experience. Throughout my professional career I worked extensively with industry, especially the Ford Motor Company, where I collaborated with and learned from excellent engineers like Davor Hrovat and Siva Shivashankar (automotive control), Charles Wu (control of drilling), and Mahmoud Demeri (stamping control).

I would like to recognize my wife, Sue Glowski, who is here today, for her love and support. She was educated in English and Linguistics but is always willing to patiently listen to my latest idea about control, even if she has to eventually ask: "what the hell is an eigenvalue?"

Finally, and most importantly, I want to recognize and thank my students and postdocs. This award recognizes your great ideas, and your fine work, and I am delighted to be here today to accept it on your behalf. Thank you!

June 7, 2022

ACC 2022, Atlanta, GA USA

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### *Prof. Krstic's Acceptance Speech at ACC 2022*

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Dear Automatic Control colleagues,

I am happy and humbled to receive the Bellman Award.

My profound gratitude goes to the colleagues who supported my nomination. I am thankful and deeply moved by the selection committee and the A2C2, which advanced a candidate in his mid-fifties, an adolescent by Bellman award standards.

The timing of this award, which recognizes the achievement of an American control systems researcher, carries significance for me. The Bellman award came in the year that happened to be the thirtieth anniversary of my coming to the United States as a graduate student.

It is customary on this occasion for the recipient to say a few words about their formative years and professional trajectory.

I was born and grew up in a small city called Pirot, in remote southeastern Serbia. I was fortunate that my provincial city had one of the top science high schools in former Yugoslavia. And my caring parents spared no expense to provide my brother and me with broader cultural opportunities than those that our hometown could offer.

My undergraduate years at the Department of Electrical Engineering of the University of Belgrade provided me with two things. First, the toughest academic competition I've experienced, before or since, was during those five undergraduate years. And, second, I met my future wife in our freshman math class.

Before Petar Kokotovic gave me a PhD opportunity, I had only an inkling that I might have a shot at some success in research. But, within a few weeks of arriving in Santa Barbara, I had the fortune of solving a problem that had a reputation of being unsolvable, though I didn't know that. So things moved quickly with research from that point on,

and I had Petar's unlimited attention. I could fill hours on being mentored by Petar. But let me just say that, during those Santa Barbara years, Petar's enthusiasm and support for my work left me feeling that there was nothing more important happening in the world than what I was doing in research. At the same time, with everything I would produce or say, I had the training benefit of a keener, more unforgiving, and yet more nuanced critique than I would ever subsequently encounter, as a researcher or academic administrator.

Of the areas credited to me, the ones that probably come to mind first are PDE backstepping and extremum seeking. Let me describe how these interests started, soon after I left Santa Barbara.

Petar Kokotovic, Richard Murray, and Art Krener had a large project on controlling flow instabilities in jet engines. We solved those problems using reduced-order nonlinear ODE models of those flows. And it was clear that, for a nonlinear control researcher, there was hardly a more fertile ground than fluids. The only problem was: who would provide an ODE reduction for me for the next control design problem I tackle? If fluids people spend their entire careers refining, for a specific type of flow, the reductions from the Navier-Stokes representation to ODEs, it was obvious I could not count on them for control-oriented reduced models. I had to roll up my sleeves and build control methods directly for PDEs. From scratch. Because Riccati equations—in infinite dimension to boot—are not the way to extend PDE control to the nonlinear case. The answer to the challenge of constructive PDE control came in the form of continuum backstepping transformations, employing Volterra operators and easy-to-solve Goursat-form PDEs for the control gain functions. If you have interest in an example of this line of PDE control research, I recommend the paper with Coron, Bastin, and my student Vazquez, which has enabled stabilization of traffic flows in a congested, stop-and-go regime.

How I got drawn to extremum seeking is

also interesting. In 1997, a combustion colleague at Maryland pointed me to publications from the 1940s and 1950s on what I would describe as an approach to adaptive control for nonlinear systems. Heuristic, but orders of magnitude simpler than what I had written my PhD on. Attempts at sleep were futile, for several days, until I figured out how to prove stability of this algorithm, using a combination of averaging and singular perturbation theorems. If you wanted to sample one control paper from the last quarter century on extremum seeking, I recommend the one on model-free seeking of Nash equilibria with Tamer Basar and my student Paul Frihauf.

To my students and collaborators, I would like to say: this Bellman award is yours. For your papers, books, theorems, and industrial products.

As I mention students, I want to extend gratitude to two companies that have been the environments in which my former students have been able to thrive and leave a legacy. At ASML, control of extreme ultraviolet photolithography has improved the density of microchips by 2-3 orders of magnitude. At General Atomics, control of aircraft arrestment on carriers has enabled one of the most impressive and deployed recent advances in defense technology.

I won't pretend that it is not a delight to see my name in the list of the 44 recipients of the Bellman award. Scholars of incredible depth and engineers of stunning impact. I've studied the list. Amazingly, the numbers of American-born and foreign-born recipients of this US award seem to be the same: 22 each. If you sought an example of how the US is unequalled in extending opportunity to scientific immigrants, like myself, you could hardly find a clearer illustration.

It was also impossible for me to miss in the list that, after India, represented by four Bellman awardees, the second most highly represented foreign country is a certain little country, just a few percent more populous than the city of Atlanta, the country from which Petar Kokotovic, Drago Šiljak, and I came to the US. If I don't mention this, in the hope of

inspiring a few young minds at the Universities of Belgrade, Novi Sad, or Niš, who should?

I couldn't have made it here without role models and without pioneers who charted the pathways along which it was then not that hard for me to walk. Among them are people who have also generously supported me over the years: Tamer Basar, Manfred Morari, Art Krener, Eduardo Sontag, Masayoshi Tomizuka, Galip Ulsoy, Jason Speyer, Graham Goodwin, Jean-Michel Coron, Petros Ioannou—to limit myself to ten. I hope that, in the remainder of my research career, I more fully deserve their support, as well as by other friends I don't mention here but who are aware of the extent of my gratitude and respect.

Let me close and thank you with a quote from my former department chair who astutely observed: "To you guys, in control systems, every other field is a special case of control theory."

What if that's true?

June 7, 2022,

ACC 2022, Atlanta, GA USA

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***Dr. Bryan Maldonado Received the 2022 ASME Old Guard Early Career Award***

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Dr. Bryan Maldonado received the 2022 ASME Old Guard Early Career Award "for leadership in bridging ASME's Internal Combustion Engine and Dynamic Systems & Control divisions, mentoring STEM students, and improving science communication and outreach."

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## New Faces Spotlight

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***New professionals of the DSCD community***

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### Satadru Dey



Satadru Dey is an assistant professor of Mechanical Engineering at The Pennsylvania State University, and he directs the Smart City Laboratory at Penn State. Prior to that, he was an assistant professor of Electrical Engineering at University of Colorado Denver from 2017 to August 2020. He received his Ph.D. in Automotive Engineering from Clemson University in 2015. He was a postdoctoral researcher at University of California, Berkeley from 2015 through 2017. During the period of 2010-'12, he worked for General Electric Company as a control engineer. In the Smart City Laboratory, Dey and his PhD students Sara Sattarzadeh, Tanushree Roy, Shanthan Kumar Padisala, and Shashank Dhananjay Vyas are focusing on research and education related to safety and security of dynamical systems by fusing control theory, data-driven techniques, and physics-based modeling. Applications of interest are energy and transportation systems, for example, batteries, electric vehicles, and connected and autonomous vehicles. Recent research highlights include battery electrochemical and thermal fault diagnostics combining physics-based models and machine learning algorithms, and cyber-attack detection in connected vehicles leveraging the socio-technical nature of intelligent transportation.

### Tianyi He



Tianyi He is currently an Assistant Professor at the Department of Mechanical and Aerospace Engineering, Utah State University. His research interest is robust

control, learning-based control, and applications on electric VTOL aircraft, UAVs, autonomous vehicles. In the past years, He has participated in the NASA ARMD Convergent Aeronautics Solution project to develop new-concept adaptive-mission aircrafts, nonlinear aeroelasticity modeling and control of flexible wings, system-level performance analysis and design of electric VTOL aircraft.

Prior to joining USU, He worked in AP-TIV Inc. for developing control algorithms of autonomous vehicles. The product has been tested and implemented in commercial vehicles. He received the B.S. degree from the Beihang University, Beijing, China in 2013 and M. Phil. degree from the Hong Kong University of Science and Technology, Hong Kong, China in 2015, respectively; and the Ph.D. degree from Michigan State University, MI, USA in 2019. His hobbies are reading history and playing soccer.

### Yao Ma



Yao Ma joined the Department of Mechanical Engineering at Texas Tech University as an assistant professor in August 2019. Before that, he received a Ph.D. degree in mechanical engineering from the University of Texas at Austin in 2019, an M.S. degree in electrical and computer engineering from North Carolina State University in 2013, and a B.S. degree in control science and engineering from the Harbin Institute of Technology in 2012.

Together with his students, his lab works on the control, modeling, and optimization of connected and automated vehicles (CAVs) in mixed traffic when interacting with diverse human participants. Through a combined theoretical treatment and driver-in-the-loop experimental study, we aim to develop a framework to guide the control design of CAVs to achieve better efficiency, safety, and social compatibility.

Outside of work, he is an amateur guitar player and a frenzy cat lover.

### Bryan Maldonado



Dr. Bryan Maldonado is an associate research staff member in Oak Ridge National Laboratory's Buildings and Transportation Science Division. He received his BS degrees in mathematics and mechanical engineering from Universidad San Francisco de Quito, Ecuador, in 2014, and his PhD degree in mechanical engineering, with an emphasis on powertrain control, from the University of Michigan, Ann Arbor, Michigan, USA, in 2019.

In 2014, Dr. Maldonado worked as a research assistant at the European Organization for Nuclear Research (CERN) in Geneva, Switzerland. In 2018, he worked as a graduate student research aide at Argonne National Laboratory. He joined the Army Research Laboratory as a journeyman fellow in 2019, and in 2020, he joined Oak Ridge National Laboratory. Dr. Maldonado has coauthored more than 25 publications in powertrain control, including a chapter in Artificial Intelligence and Data Driven Optimization of Internal Combustion Engines (Elsevier, 2022). His research interests include model-based optimal control, statistical signal processing, stochastic dynamic systems, propulsion systems, and integrated energy systems.

Dr. Maldonado is a member of SAE International, IEEE, and ASME; co-host of the ASME Dynamic Systems & Control Division podcast series; and the recipient of the 2022 ASME Old Guard Early Career Award, the 2018 Tau Beta Pi Michigan Gamma Scholarship, and the 2016 Rackham Summer Award at the University of Michigan.

In his free time, Dr. Maldonado likes to hike around the Great Smoky Mountains and bike in the greenways of Knoxville.

### Xi Yu

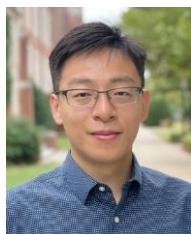


Xi Yu is an assistant professor in the Department of Mechanical and Aerospace Engineering at West Virginia University. Xi joined WVU in 2021. Before her current appointment, she was a postdoctoral associate at the GRASP Lab at the University of Pennsylvania. She received a B.S. and a Dipl.-Ing. in mechanical engineering from Karlsruhe Institute of Technology (KIT) in 2010 and 2011, respectively. She then worked as a research intern at the Institute of Product Engineering at KIT. She received a Ph.D. in mechanical engineering from Boston University in 2018.

Xi's main research interests include exploring challenging environments (i.e. large-scale environments with intrinsic dynamics, uncertainties, or adversaries) with teams of imperfect robots (i.e. robots that are minimally actuated, or with limited sensing or communication capabilities), and to forward the understanding of the time-varying, stochastic networks synthesized by the robot teams.

Xi has been a Harry Potter fan for a little bit more than 20 years. Her favorite House in Hogwarts is Hufflepuff. Her team enjoys playing a "Blimps Quid-ditch" with the autonomous blimps that are designed and built in her lab and should be used for exploring dynamic environments.

### Dong Zhang



Dong Zhang joined the University of Oklahoma as an Assistant Professor in the Aerospace and Mechanical Engineering

in September 2021. He previously received the B.S. degree in Civil and Environmental Engineering from the University of Michigan in 2015, and the B.S. degree in Electrical and Computer Engineering from Shanghai Jiao Tong University in 2015. He also earned the M.S. and Ph.D. degrees in Systems Engineering from the University of California, Berkeley in 2016 and 2020, respectively. He is directing the Energy Systems and Controls Lab which primarily focuses on the intersection of control theory and energy systems to maximize efficiency and improve safety of interconnected energy systems which requires strong fundamental science for modeling, estimation, and control. His group is currently recruiting graduate students to work on several exciting problems related to next-generation energy storage systems, advanced battery management systems, and electric vehicle energy management.

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## Interview with Recent NSF CAREER Awardees

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### *Recent CAREER awardees share their experience*

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In this issue, we interviewed six recent NSF CAREER awardees to discuss their research, CAREER proposal preparation experience, and career suggestions for junior faculty. We celebrate their achievements, as well as achievements of many other awardees, and appreciate their generosity of sharing.

### Mehmet Kurt

University of Washington, Seattle  
CAREER: Nonlinear Resonances of Highly Damped, Soft Materials



*Q: Congratulations on your recently awarded CAREER project! Can you please introduce it to our readers?*

Thank you so much! My project aims to develop nonlinear modal analysis methods to understand the dynamics of soft and biological materials such as the human brain tissue, which could lead to better understanding of injury mechanisms and improved diagnostic, prevention and treatment strategies for brain pathologies like traumatic brain injury (TBI). One particular challenge arising in this field is the application of traditional modal analysis to highly damped and soft materials. The problem is that the dynamic deformations of soft materials are typically large and nonlinear due to the combined effect of geometrical nonlinearities and nonlinear elasticity/dissipation. In the presence of high damping in soft materials, these deformations activate energy transfers between fundamental modes. As a result, traditional modal analysis based on normal mode theory leads to inaccurate estimates of the largest deformations in these systems. Our proposed research aims to fill this research gap by developing a novel modal-like methodology to study the dynamics of these systems.

My long-term educational goal is to expand the participation of underrepresented minorities (URM), with a specific focus on the LGBTQ+ community. LGBTQ+ students and professionals face barriers to representation and visibility in science, technology, engineering, and math (STEM) fields. The grant will create a mentorship network for LGBTQ+ students in STEM, which will end with a virtual science symposium. The kickoff event will involve bringing people together to learn about the brain as well as about LGBTQ+ brain scientists' contributions to the field. I am extremely excited to contribute to the increased visibility of LGBTQ+ individuals in STEM through this CAREER proposal!

*Q: What are your suggestions on how to prepare a successful CAREER proposal?*

I think submitting a proposal that you are genuinely excited about and motivated by is the key to a successful CAREER proposal. Therefore, I found pre-

paring a CAREER proposal as a good exercise opportunity to think about my long-term research and educational goals. My CAREER proposal was awarded on my third try, which was the one that I believe I was able to project my enthusiasm most clearly.

*Q: What are the most exciting research challenges and opportunities in your research fields?*

I think this intersection of nonlinear dynamics and analysis with brain biomechanics is really exciting! Currently, one of the most important scientific challenges in brain biomechanics during head impacts is understanding the exact physical mechanism that leads to the injury. We hypothesize that energy localization in the brain due to nonlinear phenomena could be one of the factors that lead to the injury. However, studying this nonlinear phenomena requires the development of new computational and experimental (e.g., imaging) tools, and I believe this to be an important and exciting challenge in brain injury mechanics.

*Q: Can you please describe your career up to date?*

I completed my Ph.D. with Professor Alexander Vakakis at UIUC in 2014 and a postdoctoral fellowship with Professor David Camarillo at Stanford University in 2017. I am currently an assistant professor of Mechanical Engineering at the University of Washington since January 2022. Before joining UW, I was an assistant professor in the Mechanical Engineering Department at Stevens Institute of Technology. I have a somewhat unusual educational background, with a foundation in nonlinear dynamics established through my PhD studies at UIUC, which were complemented with biomechanics and medical imaging during my postdoctoral training at Stanford.

*Q: It could be challenging to start as a new faculty member. What are your suggestions about how to grow an academic career for new faculty colleagues of our community?*

One concrete example that I can give which helped me is networking and getting involved in their respective scientific organizations. I think having a "support"

group of colleagues, friends, and mentors helps a new faculty member, both logistically and mentally.

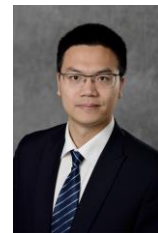
*Q. Thank you for your sharing!*

It was my pleasure, thank you for having me on!

**Li, Zhaojian**

Michigan State University

CAREER: Privacy-Aware Collaborative Sensing and Control for Cloud-Enabled Automotive Vehicles



*Q: Congratulations on your recently awarded CAREER project! Can you please introduce it to our readers?*

Hello everyone, my name is Zhaojian Li and I am an Assistant Professor in the Department of Mechanical Engineering at Michigan State University.

*Q: What are your suggestions how to prepare a successful CAREER proposal?*

First, start early and ask senior colleagues to read and critique your proposal. I found their feedback very valuable. Second, think hard about your unique advantages and make them shining points in the proposal. Third, write a good education and research integration plan with novel/interesting activities that utilize your or your institution's advantages.

*Q: What are the most exciting research challenges and opportunities in your research fields?*

There are two major research directions in my group. The first one is collaborative sensing and control for privacy-sensitive systems with real-time constraints, where we develop efficient and privacy-preserving schemes for close collaborations of real-time systems such as robots and connected and automated vehicles. The second research direction my group is exploring is robotic tree fruit harvesting, where we develop practical



viable robotic systems for automated tree fruit harvesting. The main challenges include precise outdoor perception and planning/control in a clustered environment.

*Q: Can you please describe your career up to date?*

I have been enjoying my career so far. Despite a lot of frustration in the first two years of my academic career, I have been fully enjoying research, teaching, and mentoring students.

*Q: It could be challenging to start as a new faculty member. What are your suggestions about how to grow an academic career for new faculty colleagues of our community?*

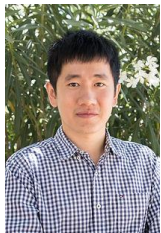
Stay passionate about the job and write a lot of proposals :).

*Q. Thank you for your sharing!*

### Xinfan Lin

University of California, Davis

CAREER: Active Learning of Second-Life Battery Systems by Combining Reinforcement Learning Principle and Device Physics



*Q: Congratulations on your recently awarded CAREER project! Can you please introduce it to our readers?*

When electric vehicle (EV) batteries are “retired”, they still have roughly 80% of their original capacity left. Instead of being thrown away, many batteries can be given a “second life” in lower-power systems to store solar and wind energy. While this practice of the so-called battery repurposing is a popular and proven solution, EV batteries need to be evaluated beforehand, as a key challenge facing repurposing is the risk of unsafe/unhealthy battery operation due to the damage and degradation suffered from the first use. Current repurposing practice requires tedious and costly manual

testing and grading of each retired battery module. Still, one-time testing can only guarantee safety and performance at the beginning but not during subsequent operation. A key enabler for battery repurposing at a much larger scale is the advanced technique for accurate, fast, automatic, and continuous monitoring of critical battery internal states and parameters. My proposed project aims at developing an active learning framework, where the input excitation current is regulated to optimize the information content and quality of the response battery voltage data, by combining reinforcement learning and battery physics. The goal is to significantly improve the speed and accuracy of battery testing and diagnostics.

*Q: What are your suggestions on how to prepare a successful CAREER proposal?*

There are two unique aspects of the CAREER proposal that distinguish it from a regular NSF proposal. First, it is important to have a vision for one’s long-term career, and emphasize how the proposed research activities could help achieve the career goal. A CAREER award goes beyond the purpose of solving specific research problems, but more importantly, aims at enabling the PI to establish him/herself as a future leader in their field. It is hence desired to show how your research portfolio will evolve in 5-10 year and what the key role of the CAREER project plays in it. Second, the CAREER proposal requires the integration of the research activities with education, as the latter is an equally important aspect of a faculty career as the former. It is hence desired to organize the proposed education activities around a certain theme, which either represents the notion/long-term goal of your education efforts, or a high-level common concern for education that needs to be addressed in your field. It is also important to show how the research results/activities of the project could directly benefit the education endeavor.

*Q: What are the most exciting research challenges and opportunities in your research fields?*

It has been envisioned by many that our society in future will be built upon re-

newable energy generation and transportation electrification. Batteries are becoming the ubiquitous energy storage device, as needed for storing the intermittent renewable energy, such as wind and solar, and for powering the electrified transportation modes in air, land, and sea with zero-emission potential. A major challenge is how to fully utilize the value and reduce carbon footprint over the battery life cycle. A circular battery economy is rising on the horizon, where multiple secondary usage pathways are being created to extend the usage of battery after the primary use. These pathways include direct repurposing for stationary energy storage, rejuvenating/repair for renewed first or second use, and recycling the materials for making new units. Control will be playing an important role in enabling such a battery ecosystem. For example, estimation and diagnostics of battery states and health are needed to inform the decision making on choosing the optimal usage pathways at different stages of battery life; and health-aware optimal control and management is needed to maximize battery lifetime and ensure safe and efficient operation along all usage pathways.

*Q: Can you please describe your career up to date?*

After obtaining my PhD in Mechanical Engineering in 2014, I first worked as a research engineer at the Ford Motor Company for 2.5 years. My stint in industry saw the start of the surge of electric vehicles, and I had the opportunities to participate in many exciting projects, including the development of EV DC fast charging system and hybrid electric performance/racing vehicle. My industry experience has been a valuable asset of my career, as it gave me the chance to feel for the saying that “there are more solutions than problems in academia while it is the opposite in industry.” I learned how to identify meaningful research problems, which is as critical as, if not more important than, finding the solutions. I then joined the Department of Mechanical and Aerospace Engineering of UC Davis as an Assistant Professor in 2017. As a mechanical engineer by training, I started out by continuing my research on electric vehicles and energy

(storage) systems. Over the years, thanks to the dual focuses and collaborative environment in my department, I had the opportunities to delve into many exciting areas in aerospace engineering, including Unmanned Aerial Vehicles (UAV) and spacecraft systems through collaboration and sponsorship from ONR and NASA. The flexibility to explore new frontiers has always been one of the most appealing aspects of the faculty career to me.

*Q: It could be challenging to start as a new faculty member. What are your suggestions about how to grow an academic career for new faculty colleagues of our community?*

From my personal experience, time management is very important especially at the beginning. The faculty career starts with a steep learning curve and many new adventures, including developing research ideas, writing grant proposals, publishing papers, recruiting/mentoring students, teaching, and setting up research lab among others. I managed to survive with a balanced schedule allocating time on different tasks on a regular basis to push forward different fronts with a steady pace, which I found to be much more efficient than sticking with one task until finish before starting another. It is also important to develop connection and establish collaboration early on. Capability to collaborate is almost as important as doing independent research in today's academia, where research is becoming increasingly multi-disciplinary. Collaboration is also a good way to initiate the exploration of new areas, where one's own research expertise and credentials remain to be established.

*Q. Thank you for your sharing!*

### Changliu Liu

Carnegie Mellon University

CAREER: Toward Lifelong Safety of Autonomous Systems in Uncertain and Interactive Environments



*Q: Congratulations on your recently awarded CAREER project! Can you please introduce it to our readers?*

The research objective of this CAREER project is to study the design principles to achieve optimal lifelong safety of autonomous robotic systems in uncertain and interactive environments (UIEs). For example, this capability will enable industrial collaborative robots to safely and optimally work with unfamiliar human workers in novel tasks throughout the robots' lifetime. UIEs are the most challenging environments for autonomous systems because they contain other intelligent entities who will react to the ego robot in unknown manners. The safety requirements are represented as constraints on the choices of the autonomous systems to achieve their tasks. Our goal is to optimally augment existing systems (existing hardware platforms with task-oriented controllers) with advanced cross-task safe guardians that will monitor and modify the nominal task-oriented actions. The optimality refers to 1) optimal task performance when safety is assured; 2) optimal actions before inevitable failures, i.e., detect these inevitable failures as early as possible and inform users; and 3) optimal actions after any failure, i.e., never make the same mistake again.

This research will increase trustworthiness of autonomous systems and minimize human efforts in deployment and maintenance. Moreover, the guardians can potentially compensate for human errors, a big source of safety hazards. These are critical steps toward granting full autonomy to intelligent robots in UIEs, which will lead to disruptive impacts in different application domains, e.g., industrial collaborative robots, autonomous driving, etc.

*Q: What are your suggestions on how to prepare a successful CAREER proposal?*

I mainly have two suggestions, which I found was the most important factors that contributed to the success of my CAREER proposal. First, start early and work several iterations on the proposal. It would be difficult to get things right in the first few rounds. Do not worry. Keep polishing, then you will have a better understanding on what is important to say and what is less important to your proposal. Second, try to collect feedbacks from as many people as you can. I received many precious suggestions from many colleagues that greatly re-shaped my CAREER proposal.

*Q: What are the most exciting research challenges and opportunities in your research fields?*

I would say: how to ensure robots work safely and efficiently with humans so that they can better serve, assist, and collaborate with humans in their daily lives across work, home, and leisure. The analysis and controller synthesis become much more complicated when humans are in the loop. How to ensure safety and maximize efficiency in different human-robot systems is a challenging research question. Meanwhile, to deal with this research challenge, there are many research opportunities, which requires rethinking system modeling, control, and analysis, as well as integrating ideas from other disciplines such as machine learning, ergonomics, social science, psychology, etc.

*Q: Can you please describe your career up to date?*

I received my PhD degree from UC Berkeley in 2017. After a short postdoc appointment at Berkeley, I moved to Stanford as a CARS postdoctoral fellow in 2018. I joined the Robotics Institute at Carnegie Mellon University as an assistant professor in January 2019.

*Q: It could be challenging to start as a new faculty member. What are your suggestions about how to grow an academic career for new faculty colleagues of our community?*

There can be a lot to say; and as a junior faculty myself, I am still exploring different strategies to grow. Here I just want to share one important suggestion

which I received before I started my faculty job and that I find very helpful: try to stay focused and keep generating important results (e.g., publishing high-quality papers). There are so many things to worry about when starting as a new faculty member: teaching, student recruiting, mentoring students, fund raising, etc, all of which can be time sinks. It is important to set aside enough time for yourself to stay focused on your core research and generate impacts by getting important results.

*Q. Thank you for your sharing!*

### Aimy Wissa

Princeton University

CAREER: Dynamics of Extreme Locomotion in Biological and Bioinspired Systems: The Effect of Elasticity on Mobility and Mechanical Power Flow



*Q: Congratulations on your recently awarded CAREER project! Can you please introduce it to our readers?*

Small animals such as arthropods like trap-jaw ants, click beetles, and mantis shrimps can achieve accelerations that are six orders of magnitudes more than a cheetah. This Faculty Early Career Development (CAREER) grant aims to develop analytical and experimental tools to evaluate the dynamics of organisms capable of extreme accelerations and apply these principles to design a jumping micro-scale robot, using click beetles as a case study organism. Click beetles belong to a group of organisms that use latches and springs to amplify their muscle power output and circumvent the same actuation limitations that currently cripple micro-robots. The current state of the art in modeling such organisms lacks several dynamic considerations that allow engineers to implement the appropriate principles to engineered systems. In the planned modeling approach, click beetles or micro-robots are

represented as a global structure composed of substructures on elastic and rigid substrates to model various environments. Expressions for power transmission and dissipation through each substructure and at the junctions will be studied through mechanical mobility functions, which can be derived analytically or measured directly in experiments. The techniques developed in this project are beneficial to both biology and engineering. It creates a framework to analyze a diverse group of organisms that use springs and latches to move extremely fast and enables a design framework for micro-robots to direct power towards the robot's components for locomotion and dissipate energy elsewhere to prevent mechanical failure.

*Q: What are your suggestions how to prepare a successful CAREER proposal?*

One of the most helpful things for me while preparing for my CAREER was getting feedback from others. I shared my CAREER draft with mentors and senior people in my field. I also shared the draft with faculty outside my area to get their feedback on the motivation, perceived impact, and merit. Before drafting the proposal, I also reached out to the program officer and shared the summary page, and then I scheduled a meeting to discuss the proposed research plan with him. Each round of feedback made the proposal stronger and more direct. Finally, I received my CAREER on the third attempt, and I want to share this here because it can be very discouraging to keep getting rejected, but I also learned a lot from the rejections. The first rejection taught me that I was looking at the wrong program for my work and the second rejection confirmed that choice for the topic and program but highlighted some of the weaknesses in the research plan.

*Q: What are the most exciting research challenges and opportunities in your research fields?*

My field is bioinspired locomotion and design. The research challenges in my field vary significantly depending on the particular scale and mode of locomotion. For example, for small-scale robotics, there are technical challenges related to energetics, actuation, and

onboard power management. In avian-inspired flow control, there are exciting challenges associated with understanding the flow control strategies employed by birds and translating those into lightweight, effective, and adaptive control devices for engineered vehicles.

*Q: Can you please describe your career up to date?*

After my postdoctoral fellowship at Stanford, I joined the University of Illinois as an assistant professor in 2015. At the University of Illinois, I established my research group, the Bioinspired Adaptive Morphology (BAM) lab. The BAM lab focuses on bioinspired locomotion. More specifically, we focus on modeling and experimental evaluation of dynamic and adaptive bioinspired systems, especially those moving in the presence of a fluid. Our project involves bird-inspired flow control devices, insect-inspired jumping and gliding, and multimodal locomotion systems such as flying fish and grasshoppers. Given the broad range of interests, I was intentional about creating a research group with individuals from diverse technical backgrounds. During the early years of the lab, I also worked on building collaborations, which have been extremely instrumental in growing my career. In 2022, The BAM lab and I moved to Princeton University. We will continue our work on bioinspired locomotion and expand our work to include new organisms and new locomotion strategies. I have been the recipient of numerous awards in addition to the CAREER award, including the Air Force Research Laboratory Summer Faculty Fellowship and the Air Force Office of Scientific Research Young Investigator Program award.

*Q: It could be challenging to start as a new faculty member. What are your suggestions about how to grow an academic career for new faculty colleagues of our community?*

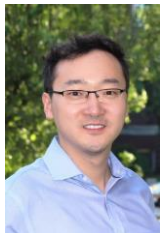
I think the thing that helped and still helps my career the most is PEOPLE. Choosing several mentors from inside and outside my field has helped me navigate a lot at the beginning of my career. I reached out to different people when I needed help drafting early proposals, re-

cruiting students, or even making decisions about equipment. I also had a community of peers where we shared common experiences and created new and exciting collaborations, some of which have lasted until today. In the past two years, COVID has hurt our ability to attend technical meetings that were also critical for my career. Now that things are improving, I highly suggest to new faculty to engage in networking through technical conferences and to take the chance to attend new conferences and expand their network to include colleagues from different disciplines.

### Ye Zhao

Georgia Institute of Technology

CAREER: Interactive Decision-making and Resilient Planning for Safe Legged Locomotion and Navigation



*Q: Congratulations on your recently awarded CAREER project! Can you please introduce it to our readers?*

A: This CAREER project aims for an integrated research and education program in safe and autonomous locomotion, with an initial research focus on a scalable, robust, generalizable task and motion planning framework, dubbed as “interactive decision-making and resilient planning”, for safe robot locomotion and navigation in complex, human-crowded environments. In particular, it retains and augments the strengths of full-body-dynamics-aware trajectory optimization with the complementary capabilities of symbolic planning and adversarial machine learning for environment abstraction, formal task specification design, and contact robustness reasoning. This project has a large focus on experimental evaluations of locomotion over rough terrain and navigation in real-world environments.

*Q: What are your suggestions how to prepare a successful CAREER proposal?*

I think it very helpful to reserve at least a few weeks polishing and criticizing your proposal from different angles, and deep thinking about an integrated research and education program, in particular, how the education program can reciprocally promote the research counterpart. Another thing I would like to share during my preparation is to invite your colleagues, especially those not in your technical area and/or even your friends who are not in STEM disciplines, to review your proposal and share their feedback. Since CAREER proposals are often reviewed by panel experts from many different fields, it would be important for your core research ideas to be understandable and appreciated by a broader panel of reviewers.

*Q: What are the most exciting research challenges and opportunities in your research fields?*

One of the main challenges in my research field stems from the computational hurdles that prohibit complex legged systems from operating in unstructured environments reliably, collaborating with other robot teammates efficiently, and interacting with humans safely. In particular, robustness to contact terrain uncertainty, locomotion task generalization, navigation safety coupled with complex locomotion dynamics, and proactive interaction with pedestrians to avoid collisions are yet long-standing challenges. Similar problems have been existing in the fields of autonomous driving and aerial robotics and extensively studied through task planning and decision-making methodologies. Nevertheless, these methodologies are historically under-explored for locomotion systems due to their highly non-linear, hybrid, and under-actuated dynamics.

*Q: Can you please describe your career up to date?*

I did my Ph.D. degree at UT Austin, and then moved to Harvard for my postdoc. Since 2019, I have been leading the Laboratory for Intelligent Decision and Autonomous Robots (LIDAR) in the School of Mechanical Engineering at Georgia Tech. I am fortunate to work with a group of highly motivated and talented graduate and undergraduate students

from ME, ECE, and Robotics programs. My group is generally interested in planning, control, decision-making, and machine learning algorithms of highly agile and human-cooperative robots maneuvering in dynamically-changing, unstructured, and adversarial environments. Over the past few years, I have enjoyed very much my experience in working with colleagues exploring machine learning, multi-agent safety control, and soft robotics. I look forward to collaborating with people from physical human-robot interaction, cognitive neuroscience, and contact mechanics areas.

*Q: It could be challenging to start as a new faculty member. What are your suggestions about how to grow an academic career for new faculty colleagues of our community?*

I am still growing and learning. As a junior faculty member, my experience tells me that reaching out to people outside your specific research areas as much as you can create completely new ideas that you may never expect initially. Staying hungry for unexplored ideas enables highly interdisciplinary research directions. This would be helpful for junior faculties to establish your independent research program sooner than later.

*Q. Thank you for your sharing!*

### Minghui Zheng

University at Buffalo

CAREER: Facilitating Autonomy of Robots Through Learning-Based Control



*Q: Congratulations on your recently awarded CAREER project! Can you please introduce it to our readers?*

Thank you. This project aims to equip drones with a capability to learn from the experience of other drones, despite their different dynamics and platforms, via a learning-based feedforward control framework. This approach to the design

of planning and control of drones is expected to reduce the design, test, evaluation, and certification of drones that are uniquely and efficiently customized for applications in their operating environment.

*Q: What are your suggestions how to prepare a successful CAREER proposal?*

I have several tips which I found very helpful to my own proposal development: think and start early with a clear research idea and some preliminary studies, attend the CAREER workshops to learn what is expected for the CAREER proposal, talk with program directors for advice, and share the proposal draft with your mentors and peers for comments and feedback.

*Q: What are the most exciting research challenges and opportunities in your research fields?*

Robotics techniques have achieved significant progress in the past decades and are playing essential roles in many applications. One challenge is how to rapidly and massively bring heterogeneous robots by many different manufacturers to real-world applications without too much human tuning and testing. If we may build a fundamental understanding of how one robot could efficiently learn from the experiences gathered by other robots even with different dynamics and built on various platforms, this process may be facilitated. I see learning among heterogeneous robots as a challenge as well as an opportunity in this field.

*Q: Can you please describe your career up to date?*

I joined the University at Buffalo in 2017 after graduating from UC Berkeley. Since then, I have been working on various robotic systems with different applications. For example, as I briefly mentioned, I worked on drone systems focusing on learning among various quadrotors, with applications to structural health monitoring and disaster resilience. Another main focus of my research is the planning and control of collaborative robots, with applications to disassembly, recycling, and remanufacturing of end-of-use consumer electronics.

*Q: It could be challenging to start as a new faculty member. What are your suggestions about how to grow an academic career for new faculty colleagues of our community?*

Growing into an independent faculty member is exciting yet challenging. I have been very fortunate to have obtained very helpful suggestions from my Ph.D. advisor and my academic brothers and sisters. The important one to me is to broaden out from my doctoral research and independently develop new directions. It might be challenging at the very beginning, but I believe new faculty will benefit a lot.

*Q. Thank you for your sharing!*

My pleasure. Hope this is helpful. And thank you for the interview!

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## Journal Launched Recently

**ASME Letters in Dynamic Systems and Control** offers rapid dissemination of novel, high-quality, cutting-edge original findings on theoretical or applied topics from the dynamics and control community. Please see the attached flyer for more.

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## Upcoming Conferences

**The 2nd Modeling, Estimation and Control Conference**

Jersey City, NJ, October 2-5, 2022

<https://mecc2022.a2c2.org>

**The 2023 American Control Conference**

San Diego, CA, May 31 - June 2, 2023

<https://acc2023.a2c2.org>

**The 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronic**

Seattle, WA, June 28-30, 2023

<http://www.aim2023.org>

**The 7th IEEE Conference on Control**

## Technology and Applications

Bridgetown, Barbados, August 16-18, 2023

The flyers are attached.

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## Openings

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### PhD positions at the University of Oklahoma

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The [Energy Systems and Controls Lab](#) at the University of Oklahoma is searching for a motivated Ph.D. student candidate in Energy Systems and Control. Our technical interests include control systems, optimization, energy systems, vehicle electrification, batteries, smart grids, energy/material experiments. Desirable backgrounds of students include mechanical engineering, electrical engineering, mathematics, systems engineering, materials engineering, and physics. Specific areas of interests include:

- Modeling and Optimization
- Energy Storage and Battery Management Systems
- State Estimation, System Identification, and Optimal Control

This position is fully supported by the Energy Systems and Controls Lab at the University of Oklahoma directed by Prof. Dong Zhang. More info can be found at <https://www.escl-ou.com>. If interested, please email (1) your CV, (2) copies of academic transcripts from all post-secondary institutions, and (3) a statement identifying qualification, to [dzhang@ou.edu](mailto:dzhang@ou.edu).

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### Faculty position at New York Institute of Technology

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The Department of Mechanical Engineering at New York Institute of Technology has a new tenure-track faculty position, starting as early as Fall 2022. The preferred areas are mechatronics,

robotics, dynamic systems, and controls.

Link: <https://careers-nyit.icims.com/jobs/2860/assistant-associate-professor%2c-mechanical-engineering/job>

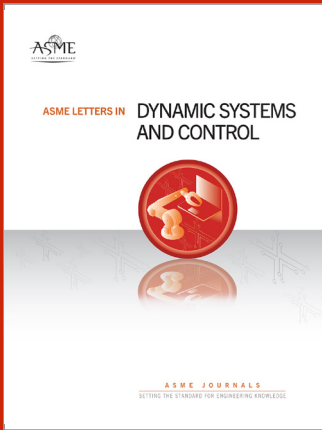
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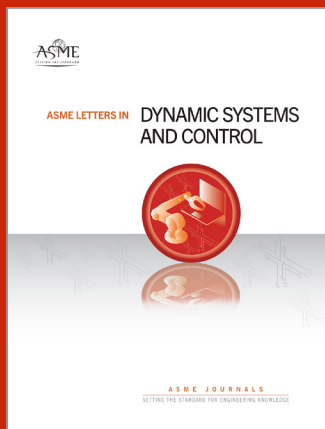
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## Call for papers: 2022 Modeling, Estimation and Control Conference (MECC 2022)

October 1-5, 2022 (Saturday – Wednesday), at Westin Hotel in Jersey City, NJ, United States.

The second Modeling, Estimation and Control Conference (MECC 2022), sponsored by the American Automatic Control Council (AACC) and co-sponsored by the International Federation of Automatic Control (IFAC), will be held October 1-5, Saturday – Wednesday, 2022, at Westin Hotel in Jersey City, NJ, United States. On behalf of the MECC 2022 Organizing Committee, AACC, and IFAC, we cordially invite you to participate in the conference and enjoy a unique opportunity to network with colleagues.

MECC 2022 aims to serve the scientific and engineering communities with interests in modeling, estimation, and control of cross-disciplinary mechanical systems; to provide a platform for dissemination and discussion of the state of the art in relevant research areas; and to create opportunities for networking with colleagues. The conference features conference awards, contributed sessions, invited sessions, workshops, special sessions, plenary talks, keynote speeches, student programs, as well as committee meetings, industry programs, and social functions.

MECC 2022 invites (1) manuscripts that report original research on all aspects of modeling, estimation, and control; and (2) proposals for invited, special, and tutorial sessions, and workshops on emerging topics. Exhibits from both industries and research labs are welcome. All manuscripts and proposals will be peer-reviewed through PaperCept (<https://ifac.papercept.net>), and all accepted papers must be presented at the conference by an author of the paper. MECC 2022 conference proceedings will be published via the IFAC-PapersOnLine which is open access and indexed in EI, Scopus, Web of Science, and INSPEC.

All [IFAC Affiliates](#) will be offered a discount on the registration rate. In addition, registration discounts will be offered to those who belong to any one of AACC's 9 member societies: AIAA, AIChE, ASCE, ASME, APS, IEEE, ISA, SCA, and SIAM.

Accepted papers will be published in the proceedings of the event using the open-access IFAC-PapersOnLine series hosted on ScienceDirect (<https://sciencedirect.com/>). To this end, the author(s) must grant exclusive publishing rights to IFAC under a Creative Commons license when submitting the final version of the paper. The copyright belongs to the authors, who have the right to share the paper in the same terms allowed by the end user license, and retain all patent, trademark and other intellectual property rights (including research data). Substantially extended versions of the conference paper can be submitted to journals of the above AACC member societies, with IFAC and non-IFAC journals. To read more, please visit IFAC publications guidelines for conferences at <https://www.ifac-control.org/publications/Editors%20Guide>.



More detailed information will be provided at the conference website: <https://mecc2022.a2c2.org>.

#### MECC 2022 Tentative Key Dates

Submission of Special & Invited Session Proposals:	April 04, 2022
Submission of Tutorial & Workshop Proposals:	April 04, 2022
Submission of Contributed & Invited Papers:	April 08, 2022
Notification of Paper Acceptance:	June 27, 2022
Final Paper Submission:	July 25, 2022



# 2023 American Control Conference: Call for Papers

May 31- June 2 2023, Hilton San Diego Bayfront, San Diego, CA, USA (<http://acc2023.a2c2.org/>)



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The 2023 American Control Conference (ACC) will be held Wednesday through Friday, May 31- June 2 2023 in San Diego, California, USA at the Hilton San Diego Bayfront Hotel. Known as California's beach city, San Diego enjoys near perfect weather year-round, many miles of spectacular coastline and a thriving downtown with a sophisticated art, nightlife and dining scene. The hotel is conveniently located adjacent to the San Diego Convention Center, across the Harbor Drive Pedestrian Bridge from the Padres' Petco Park and Downtown Gaslamp Quarter.

ACC is the annual conference of the American Automatic Control Council ([AACC](#)), the U.S. national member organization of the International Federation for Automatic Control ([IFAC](#)). National and international society co-sponsors of ACC include the American Institute of Aeronautics and Astronautics ([AIAA](#)), American Institute of Chemical Engineers ([AIChE](#)), American Society of Civil Engineers ([ASCE](#)), American Society of Mechanical Engineers ([ASME](#)), IEEE Control Systems Society ([IEEE-CSS](#)), Institute for Operations Research and the Management Sciences ([INFORMS](#)), International Society of Automation ([ISA](#)), Society for Modeling & Simulation International ([SCS](#)), and Society for Industrial & Applied Mathematics ([SIAM](#)).

The 2023 ACC technical program will comprise several types of presentations in regular and invited sessions, tutorial sessions, and special sessions along with workshops and exhibits. For contributed and invited papers, authors will have the option to present to a larger audience in a rapid-interactive (RI) format. Submissions are encouraged in all areas of the theory and practice of automatic control.

**Contributed Papers:** ACC Papers are invited in the form of regular manuscripts (allotted 6 proceedings pages and up to 8 pages with additional page charge). Submissions to L-CSS have the option for presentation at ACC (note: L-CSS papers have a strict 6 page limit). Papers must conform to the submission policies, detailed on the conference and journal web pages. All manuscripts should be written in English, be in 2-column format, and meet strict page limits.

**Invited Sessions:** Invited sessions consist of 6 papers (up to 8 pages with additional page charge) presenting a unifying theme from a diversity of viewpoints. Proposals must clearly describe the motivation and relevance of the session. Proposals must be accompanied by full versions of each paper, which will be individually reviewed together with the proposal itself.

**Tutorial Sessions:** Tutorial sessions are a special category of invited sessions organized to provide an introduction to a topic of interest. The format is structured around a main tutorial paper (up to 18 pages) and talk (60 minutes) to bring the participants up to speed, followed by three presentations (with or without papers of up to 6 pages each) to give a picture of the state of the art. Tutorial sessions involving strong industry and academic collaboration are highly encouraged.

**Special Sessions:** Special sessions offer a venue for creating awareness of, and providing exposure to emerging research areas, research and funding opportunities, and other topics of broad interest to attendees. History and industry-sponsored sessions also fall into this category.

**Workshops:** Workshops to be held prior to the conference are solicited on all related topics. Proposals for workshops addressing novel control methodologies and nonstandard control applications, as well as workshops with strong tutorial value are encouraged.

**Exhibits:** Exhibitors are invited to showcase, demonstrate and market control-related publications, software tools, educational products, services, and jobs. Exhibits are open throughout the conference to all attendees of the ACC.

All papers and session and workshop proposals must be submitted through the conference submission website. Submissions must conform to the policy found at the conference website: <http://acc2023.a2c2.org/>

## IMPORTANT DATES

L-CSS option Submission	ACC Manuscript Submission	Acceptance/Rejection Notice:	Final Manuscript Submission:
September 9, 2022	September 23, 2022	January 22, 2023	March 13, 2023





# 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics

June 28th- 30th, 2023 | Seattle, WA, USA

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## Call for Papers

The 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM2023) will be held on **June 28-30, 2023 in Seattle, WA, USA** (<https://aim2023.org/>). As the flagship conference on mechatronics and intelligent systems, AIM 2023 will bring together the international mechatronics community to discuss cutting-edge research results, expert perspectives on future developments, and innovative applications in mechatronics, robotics, automation, industrial electronics, and related areas.

The sponsors and organizers of AIM 2023 invite submissions describing original work, including but not limited to the following topics: Actuators, Automotive Systems, Bioengineering, Data Storage Systems, Electronic Packaging, Fault Diagnosis, Human-Machine interfaces, Human-Robot Interaction and Collaboration, Human Factors in Mechatronics Systems, Industry Applications, Information Technology, Intelligent Systems, Machine Vision, Manufacturing, Micro Electro-Mechanical Systems, Micro/Nano Technology, Modeling and Design, System Identification and Adaptive Control, Motion Control, Vibration and Noise Control, Neural and Fuzzy Control, Opto-Electronic Systems, Optomechanics, Prototyping, Real-Time and Hardware-in-the-Loop Simulation, Robotics, Sensors, System Integration, Transportation Systems, Smart Materials and Structures, Energy Harvesting, and other frontier fields.

We invite high-quality submissions in the categories below. All submissions must be uploaded to the submission website: <http://ras.papercept.net/conferences/scripts/start.pl> following the schedule below.

**Contributed:** All papers go through a rigorous peer-review review process. All accepted manuscripts must be presented by the authors at the conference, will be published in the conference proceedings, and will be submitted for inclusion in IEEEExplore, subject to formatting and copyright requirements.

**Invited:** Invited sessions consist of 4 to 6 thematically related invited papers that will be presented together at the conference. Invited session proposals must include a brief statement of purpose and extended abstracts of the included invited papers. Invited papers are submitted and reviewed following the same process as contributed papers, and are included in the proceedings

**Workshops:** Half-day or full-day workshops will be in one of two categories: (1) *Tutorial Workshops* focused on educating attendees about an emerging topic and (2) *Research Workshops* focused on bringing together experts to discuss an emerging field. Tutorial and workshop proposals must include a statement of objectives, a description of the intended audience, and a list of speakers with an outline of their planned presentations. Unless specifically requested, individual tutorial and workshop presentations are not peer reviewed, and do not appear in the proceedings.

**Special Sessions:** Special sessions will be organized to give exhibitors, organizations, and attendees a venue to discuss specialized, new, and not strictly technical topics (such as products) that would not be appropriate for the other submission categories. Special Session proposals must include an abstract of the special session.

**Late Breaking Results:** Poster presentations on late-breaking mechatronics research results will be presented during the conference. Note that the deadline for posters is much later than the deadline for papers, allowing presenters to share their most recent results. Posters will be peer-reviewed.

**TMECH/AIM Focused Section and TMECH Presentation-Only:** TMECH authors have two opportunities to share your work at AIM2023. (1) *Presentation Only:* All authors of TMECH papers accepted between Feb. 16, 2022 and Feb. 15, 2023 have the option to present their work during the conference. (2) *Focused Section:* Submissions to the 4<sup>th</sup> Edition of the Focused Section on TMECH/AIM Emerging Topics will go through the TMECH review process and, if accepted, are presented at AIM2023 and published as part of the focused section published in the August 2023 issue of TMECH. Inclusion in the focused section requires paid registration and presentation. Papers rejected for publication in TMECH will automatically be considered by the Program Committee of AIM 2023 for inclusion in AIM2023 as a contributed paper. Details are available on a supplemental call for papers available on the conference website: <https://aim2023.org/> and the TMECH website <http://www.ieee-asme-mechatronics.info/>.

## Important Dates

TMECH/AIM Focused Section Submissions:	January 6, 2023
Invited/Workshop/Special Session Proposals:	January 27, 2023
Contributed and Invited Papers and TMECH Presentation Only:	February 1, 2023
TMECH/AIM First Decision:	March 1, 2023
TMECH/AIM Revisions:	March 25, 2023
Notification of AIM and TMECH/AIM Paper Status:	April 25, 2023
Final Paper Submissions:	May 10, 2023
Late-Breaking Submissions:	May 16, 2023

## Call for Papers

### The Fourth Edition of Focused Section on TMECH/AIM Emerging Topics

Submissions are called for the Fourth Edition of Focused Section (FS) on TMECH/AIM Emerging Topics. This Focused Section is intended to expedite publication of novel and significant research results, technology and/or conceptual breakthrough of emerging topics within the scopes of TMECH ([www.ieee-asme-mechatronics.org](http://www.ieee-asme-mechatronics.org)). It also provides the rapid access to the state-of-the-art of TMECH publications within the mechatronics community.

The submitted paper must not exceed 8 TMECH published manuscript pages, excluding photos and bios of authors, and will be subject to a peer review process in the standard of TMECH. All final accepted papers from submissions to the Focused Section will be published in August Issue of TMECH in 2023 and will be presented in the 2023 IEEE/ASME International Conference on AIM (AIM 2023, [aim2023.org](http://aim2023.org)). The rejected papers from submissions will be transferred to the Program Committee of AIM 2023 for further review and consideration as contributed conference papers.

The review process for submissions to this Focused Section will be conducted in up to two rounds with one Major/Minor Revision allowed, and the final decision falls into one of the following two categories:

1. Accept for publication in Focused Section. In this case, the paper will be accepted by AIM 2023 concurrently for presentation only with full information of the paper to be included in the preprinted proceeding of AIM 2023. The final publication in TMECH, however, will be subject to the completion of presentation in AIM 2023 with paid full registration fee.
2. Reject for publication in Focused Section (after the first or second round). In this case, the paper, as well as all review comments, will be forwarded to the Program Committee of AIM 2023 for further consideration. A final Accept/Reject decision will then be made by the Committee as a contributed conference paper for AIM 2023.

#### Manuscript preparation

Papers must contain original contributions and be prepared in accordance with the journal standards. Instructions for authors are available online on the TMECH website.

#### Manuscript submission

Manuscripts should be submitted to TMECH online at: [mc.manuscriptcentral.com/tmech-ieee](http://mc.manuscriptcentral.com/tmech-ieee), selecting the track 'TMECH/AIM Emerging Topics'. The cover letter should include the following statement: This paper is submitted to the Fourth Edition of Focused Section on TMECH/AIM Emerging Topics. The full information of the paper should be uploaded concurrently to AIM 2023 online at: [ras.papercept.net/conferences/scripts/start.pl](http://ras.papercept.net/conferences/scripts/start.pl), noted with the given TMECH manuscript number in the designated area.

#### Submission/Review/Decision Timeline (tentative):

Opening Date of TMECH/AIM FS Submission Site (first submission):	November 1, 2022
Closing Date of TMECH/AIM FS Submission Site (first submission):	January 6, 2023
Full Information of TMECH/AIM FS Paper Submitted to AIM Site:	January 6, 2023
First Decision for TMECH/AIM FS Submission:	March 1, 2023
Revised TMECH/AIM FS Submission Due by:	March 25, 2023
Final Decision for TMECH/AIM FS Submission:	April 25, 2023
Final Version of TMECH/AIM FS Submission Due by:	May 10, 2023
Publication of Focused Section in TMECH:	August 2023

**Contacts:** For any questions related to this Call for Paper, please contact:

**Garrett Clayton, [garrett.clayton@villanova.edu](mailto:garrett.clayton@villanova.edu), Program Chair of AIM 2023.**



## 7<sup>th</sup> IEEE Conference on Control Technology and Applications (CCTA) 2023 August 16-18, 2023 – Bridgetown, Barbados

CCTA 2023, the 7<sup>th</sup> IEEE Conference on Control Technology and Applications, will be held Wednesday through Friday, August 16-18, in Bridgetown, Barbados. CCTA 2023 will be an in person conference. CCTA 2023 is one of the main conferences sponsored by the IEEE Control Systems Society. The technical program will feature the presentation of contributed and invited papers, as well as tutorial sessions and workshops, focusing on technological advances and applications of control engineering. CCTA 2023 will spearhead a new initiative that emphasizes career networking and special sessions focused on industry relevant control problems. It will also provide an avenue for enhanced interactions between industry, government and academic researchers. With easy accessibility, including from Europe and the Americas, and industry sponsored sessions, significant participation from industry is anticipated. The conference includes all aspects of control engineering for practical control systems, from analysis and design, through simulation and hardware. CCTA 2023 will feature applications of control technology for robotic, mechatronic, automotive, biomechanical, aerospace, power and energy systems, control of networks, AI/ML developments in control, and many others. Plenary lectures will be delivered on each of the three days as part of the conference program. A series of tutorial workshops will be presented on Tuesday preceding the conference. Authors of selected articles presented at CCTA 2023 will be invited to prepare an extended version of their work to be considered for publication in a Special Issue of IEEE Transactions on Control Systems Technology (TCST). Participants will have the opportunity to present their papers that were published in IEEE TCST in 2022-2023.

**Call for Contributed Papers:** Papers are invited in the form of regular manuscripts. Papers must conform to the submission policy, which will be provided on the website, requiring that all manuscripts be in 2-column format and meet strict page limits.

**Call for Invited Sessions:** Invited sessions consist of 5-6 papers, which should present a unifying theme from a diversity of viewpoints. Proposals must describe the motivation and relevance of the session. Proposals must be accompanied by full versions of each paper, which will be individually reviewed along with the proposal itself.

**Call for Tutorial Sessions:** Tutorial sessions and panel discussions addressing state-of-the-art control methods and advanced industrial applications are solicited.

**Call for Workshops:** Workshops to be held prior to the conference are solicited on all related topics. Proposals addressing novel control methodologies and applications are strongly encouraged. For information regarding proposal submissions contact Jakob Stoustrup <jakob@es.aau.dk>.

**Call for Industrial Abstracts:** As an application and industry-oriented conference, CCTA offers the possibility to submit industrial abstracts that are included in the conference preprints but not in the proceedings. The corresponding author must be affiliated with industry. Industrial abstracts must conform to the submission policy, described below, requiring that all manuscripts be in 2-column format and meet the strict page limits of 2-4 pages. They are subject to peer-review similar to regular contributed papers. Industrial abstracts might be submitted in terms of an invited or special session.



The conference will take place at the Hilton Barbados in Bridgetown. Located on the 17<sup>th</sup>-century ruins of Charles Fort, a UNESCO World Heritage Site, the Hilton Barbados Resort offers access to many amenities. Located 15 minutes from Bridgetown and the Mount Gay Rum Tour, and 40 minutes from Shark Hole Beach, there are many things to explore and enjoy.

### Organizing Committee

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Kira Barton (University of Michigan), Program Chair

Dennice Gayme (Johns Hopkins), Finance Chair

Stefano Di Cairano (MERL), CCTA Editorial Board Chair

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Elisa Franco (Univ. of California, LA), Michaëlle Mayalu (Stanford), Student/Diversity & Inclusion Co-Chairs

### Important Dates

Paper Submission Opens:  
November 4th, 2022

Paper Submission Due:  
February 10th, 2023

Decision Notification:  
April 21st, 2023

Registration Opens:  
Middle of May 2023

Final Submission:  
Middle of June 2023