
WELCOME TO THE ACC 2020

THE AMERICAN AUTOMATIC CONTROL COUNCIL

The American Control Conference is organized under the auspices of the American Automatic Control Council (AACC), which is an association of nine professional societies:

- 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)
- Institute of Electrical and Electronics Engineers (IEEE)
- Institute for Operations Research and the Management Sciences Applied Probability Society (INFORMS APS)
- International Society of Automation (ISA)
- Society for Industrial and Applied Mathematics (SIAM)
- Society for Modeling and Simulation International (SCS)

AACC represents the United States to the global control community and supports the mission of the individual member societies in enhancing the role and contributions of automation for the benefit of humankind. AACC is also the US National Member Organization (NMO) of the International Federation of Automatic Control (IFAC), a multinational federation of NMOs, each representing the engineering and scientific societies concerned with automatic control in its country. AACC helps arrange for IFAC events in the U.S. and provides delegates for IFAC committees and leadership.

Organizing the annual, 3-day, cross-disciplinary ACC is the principal technical activity of AACC. The conference typically attracts about 1,300 participants and features about 1,000 refereed papers. The ACC is an internationally recognized control conference with substantial participation from outside the US. Academia, industry, and government are all well-represented. Additionally, AACC offers several annual awards to recognize and honor individuals who have made substantial contributions to control theory and practice. These awards are presented during the annual AACC Awards Ceremony, held at the ACC. AACC also supports control education from K-12 through post-graduate studies. AACC provides opportunities for personal and professional development and recognition to its large cast of volunteers, on whom it is crucially dependent for its operations and success.

The activities of the AACC are governed by a Board of Directors. Each AACC member society appoints a director. Operational responsibilities for the AACC rest with five officers, who report to the Board. Operating committees for ACCs, awards committees, etc., report to the officers. All directors, officers, and committee members are volunteers.

To learn more about AACC please visit www.a2c2.org.

GREETINGS FROM THE AACC PRESIDENT

On behalf of the American Automatic Control Council (AACC), I am pleased to welcome you to the 2020 American Control Conference (ACC) in Denver. ACC attracts participants from academia, industry, and government; from around the world; and, from a wide range of disciplines including all the engineering and control-relevant branches of applied mathematics.

AACC is a federation of nine professional societies: 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), Institute of Electrical and Electronics Engineers (IEEE), the International Society for Automation (ISA), the Society for Modeling & Simulation International (SCS), the Society for Industrial and Applied Mathematics (SIAM), and Applied Probability Society as a subdivision of the Institute for Operations Research and the Management Sciences (INFORMS APS). The mission of the AACC is to promote cooperation among the various segments of the automatic control profession within the U.S. and to represent the U.S. in international activities. To this end, AACC manages the ACCs, supports control-related workshops and symposia, represents the U.S. in the International Federation of Automatic Control (IFAC), provides volunteers for IFAC activities, and undertakes other initiatives that promote and coordinate developments in the automatic control field.

AACC was founded more than sixty years ago in 1957 and had its first organizational meeting that year in Chicago. Among the various AACC activities, the largest single activity is ACC organization, which begins about five years in advance. The American Control Conference has had two name changes in its history. The first conference – the National Automatic Control Conference – was held in 1959 in Dallas. The very next year the conference was renamed the Joint Automatic Control Conference, which ran until 1981. AACC decided to change the conference name to the American Control Conference during an operational change in which the conference went from being organized each year by one of its member societies (which would rotate among the societies) to being organized by an operating committee whose members are drawn from multiple societies. Each operating committee is led by a General Chair and a Program Chair. These positions as well as the operating committee members change each year.

AACC is an organization led and run by volunteers. The governing body of the AACC is its Board of Directors. Each member society appoints one Board member. The Board provides overall governance of AACC and elects the Chairs of various committees, the ACC General and Program Chairs, and the Officers who are responsible for operations and recommendations to the Board.

Each ACC is both a presentation of the latest research results in and a celebration of automatic control. In addition to the peer-reviewed papers in the conference proceedings, each ACC features workshops, special sessions, exhibits, and social events which include a banquet, opening and closing receptions, and the annual AACC Awards Ceremony.

Please join me in thanking the General Chair Santosh Devasia, the operating and program committees, the AACC Board and Officers, and many others for their volunteer contributions.

I extend my best wishes to all conference participants for an enjoyable, stimulating, and productive ACC.

Jay A. Farrell

AACC President, 2019-2020

GREETINGS AND THANKS FROM THE GENERAL CHAIR

On behalf of the Operating Committee, it is my great pleasure to welcome you to the 2020 American Control Conference in Denver, Colorado. The success of any conference depends first and foremost on its participants, and thus we thank you sincerely for choosing ACC as a forum for disseminating your work. As part of a vital community of colleagues and friends, we are also extremely grateful for your companionship in Denver.

The 2020 ACC Operating Committee (OpComm) has brought together their diverse collective experience to develop new innovations for the conference. These include: (i) the Rapid Interactive (RI) sessions that enable participants to present to a large portion of the attendees and for attendees to get a sampling of the many research results in an area, which has been popular at other conferences, e.g., in the Robotics Community; (ii) the fifty or so late-breaking poster presentations (without the need to submit a full paper) that is becoming an increasingly preferred way to communicate emerging ideas in conferences; and (iii) incorporating Federal funding from NSF (through the efforts of our Vice-Chair for Student Affairs, Kira Barton) to increase the diversity of students participating in ACC. We welcome your remarks and comments on the effectiveness of these and potential ways to improve further.

ACC is our conference, managed by volunteers from our societies. Hence, I am very thankful to the large community of dedicated volunteers that support ACC activities, including but not limited to the conference OpComm (each of whom played a key role to 2020 ACC's success), the review team (including the Program Chair Martha Grover, the reviewers, the program committee, the Associate Editors, and the Conference Editorial Board) for maintaining the high quality of the ACC program, the American Automatic Control Council (its officers as well as the Steering Committee) for sharing their collective wisdom on the mechanics of putting together a conference, and the current and past OpComms for being generous in sharing their ideas, time, and knowledge. Finally, thanks to Bob Judd, to whom I am indebted to for helping with the hotel and site selection process and the many contracts, and in this special year for renegotiating with the hotel as we transitioned to a fully online conference.

It was heartwarming to find the strong interest in the conference from our community, in spite of the Covid-19 situation. Most of the authors of the more than 800+ papers felt sufficient value to submit their final papers to ACC and registering, while paying the full conference fees. Due to the volunteer spirit in our community, we were able to lower the overall registration rates, and refund a substantial portion of the fees back to the registrants. I am very grateful to the support and guidance from the OpComm members and the AACC board and officers all through this transition process.

We are anticipating strong participation in ACC 2020 from our community, and we hope to try and hold most of the typical events. You should expect your attendance to be both informative and enjoyable. I hope to see you online in July.

Santosh Devasia

General Chair, 2020 American Control Conference

TECHNICAL PROGRAM OVERVIEW

Welcome to the 2020 American Control Conference. We are excited to bring together control researchers from a range of disciplines to discuss theoretical developments of common interest and diverse applications in engineering and science. This year we are proud to feature a new presentation format in the morning Rapid Interactive (RI) sessions. On each of the three mornings of the conference, there will be two parallel RI sessions. The intent of the RI sessions is to increase the visibility of your work and to promote more in-depth discussions and interactions between authors and conference attendees. Specifically, each presenter in an RI session will be presenting to a large audience of half the conference. Each of the six sessions will begin with a keynote presentation, selected from the highly rated contributed papers. Next, 21 papers will be presented back-to-back in a rapid three-minute format. In the subsequent interactive portion of the session, authors will further share their ideas and results through a digital poster session, with large monitors provided for each presenter to promote discussion and engagement with the audience. The six RI sessions are entitled Optimization and Optimal Control, Control of Energy and Automotive Systems, Predictive Control, Control of Robotic Systems, Learning, and Control of Biological and Aerospace Systems.

The conference will also feature five plenary seminars: three morning plenaries, as well as two evening plenaries on Tuesday and Wednesday, with diverse topics on control in science and engineering. The plenary programs commence with a plenary lecture on **Control Challenges for the Laser Interferometer Gravitational-wave Observatory (LIGO)**, by **Dennis Coyne**, and wraps up with the **Friday morning plenary by Eckman Award winner Na Li on Distributed Decision Making in Network Systems**.

The 2020 ACC received 1239 paper submissions, 46 invited session proposals, 5 tutorial session proposals, and 11 pre-conference workshop proposals. After a tremendous and conscientious effort by the Society Review Chairs, the Associate Editors, and the Program Committee, together with the eleven auditors and all of the reviewers, 835 papers were selected for presentation at the conference, for an acceptance rate of 67%. In addition, 27 papers were nominated for the Student Best Paper Competition. This year the papers were reviewed in a double-blind process to reduce bias in evaluation. We encourage you to attend the Student Best Paper Session on Wednesday from 4-6 pm to hear the presentations of the five outstanding finalists for the award. Also, we encourage you to engage with the poster presenters in our Late-Breaking Results poster session, during the breaks throughout the conference.

The program was assembled in Atlanta in January, thanks to the dedication of Amir Aghdam, Santosh Devasia, Kam Leang, Ardalan Vahidi, George Chiu, Kristi Morgansen, Bonnie Ferri and Fumin Zhang, as well as the sacrifice of a large number of Post-Its. Amir's attention to detail is remarkable, and when he finally approved the program schedule, we all were confident that it was time to celebrate. The Operating Committee for the ACC has been dedicated and effective, and I appreciate their contributions to assemble all the critical pieces into the complex conference system. You can find their names in the final program and on the conference website. Please do thank them for their service when you see them online. I also gratefully acknowledge our General Chair Santosh Devasia for his leadership and vision, as well as his cheerfulness at all times.

Many thanks for your dedication to the 2020 American Control Conference, and enjoy the conference!

Martha Grover

GREETINGS FROM THE IFAC PRESIDENT

It is my great pleasure as president of the International Federation of Automatic Control (IFAC) to “welcome” you to the American Control Conference organized by the American Automatic Control Council (AACC) and co-sponsored by IFAC.

By now, it seems already standard that a welcome is independent of the location of the person “being welcomed” and the location of the person “welcoming” -- and it applies to a virtual meeting room, a virtual lecture or – you guessed it – a virtual conference. This welcome reaches you probably in an electronic version and you are not holding the usual ACC booklet in your hands. Most likely, this is one of the smaller changes that you witness when comparing this year’s ACC to your past ACC experiences. The spread of the SARS-CoV-2 virus and the associated disease COVID-19 has turned many things upside down and radically changed how we participate in conferences - at least for the rest of the year and most probably way beyond. This statement is not based on my predictions on the future of the SARS-CoV-2 virus (I would not dare...), but based on my opinion that this pandemic brings lasting changes, some of which might even be for the better.

It is clear that seeing the current pandemic purely as a chance would not do justice to the many tragic losses and the restrictions we have to accept for our daily lives. No question, the spread of the SARS-CoV-2 virus is the worst disaster of worldwide impact that mankind has seen since many decades, and my greatest wish with all my heart is that you, your families and friends stay healthy. Let us try anyways to not only minimize the horrible consequences of this pandemic, but also to think beyond the crisis, actively shaping this change by envisioning a better and possibly more sustainable future.

Within IFAC, we certainly try to adapt this mindset and we are constantly thinking about change for the better of the community – especially in this difficult situation. Already the IFAC constitution states that IFAC’s primary objective is to serve all those concerned with the theory and application of automatic control and systems engineering, wherever they are situated. A recent project in this respect is for example the initiative of the ‘Corona Control Community Project (C3P) Website’, a joint effort with IEEE CSS that you’ve probably already heard about (<https://covid.ifac-control.org>). Serving the community, of course, also includes our ‘daily business’: organizing and sponsoring more than 50 technical meetings every year, the publication of eight prestigious archival journals, recognizing great achievements and talent through IFAC Awards, promoting the benefits of automatic control among the public at large and many more initiatives that are carried out thanks to all the IFAC boards, committees and volunteers.

Finally, and most importantly, I want to thank the organizers of the American Control Conference, who have done a tremendous job in adapting to the difficult COVID-19 imposed circumstances in such a professional way. Even though, or maybe even because of the changes the spread of the SARS-CoV-2 virus forces on us, this ACC will be a new and exciting experience. Next to the technical program of high scientific level, it will certainly be a fruitful conference that inspires new ideas and sparks new collaborations, despite the difficult time the conference takes place in.

Last but not least, I wish us all interesting sessions, presentations and discussions, and I hope to meet many of you, at least virtually, in one or the other session over the next couple of days.

Frank Allgöwer

President of the International Federation of Automatic Control