2023 ICAMechS

International Conference on Advanced Mechatronic Systems

Melbourne, Australia

Sept. 4 -7, 2023

PROGRAM

Organizers:

IEEE Systems, Man, and Cybernetics Society
Swinburne University of Technology
International Journal of Human Factors Modelling and Simulation
International Journal of Advanced Mechatronic Systems

Sponsors:

International Journal of Modelling, Identification and Control
The Institute of Complex Medical Engineering

Cooperation with:

The Society of Instrument and Control Engineers

The Institute of Systems, Control and Information Engineers

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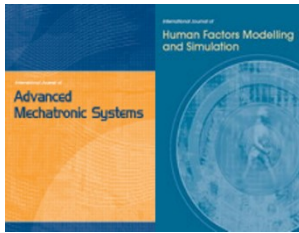
2023 International Conference on Advanced Mechatronic Systems

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GREETINGS
FROM THE GENERAL CHAIRS AND PROGRAM CHAIRS

On behalf of the members of the Organizing Committee, it is our great pleasure and honor to warmly welcome you to the 2023 International Conference on Advanced Mechatronic Systems, ICAMechS 2023, Melbourne in Victoria, Australia. ICAMechS 2023 is held at Swinburne University of Technology, Melbourne, Australia, Sept. 4 -7, 2023. We hope that ICAMechS 2023 brings together both researchers and scientists from the areas of advanced mechatronic systems, industrial electronics, artificial intelligence and applications to present their latest research results and develop new research collaboration and networks.

As in the last few years, this conference has been successfully sponsored by International Journal of Advanced Mechatronic Systems (IJAMechS), Swinburne University of Technology, IEEE Systems, Man, and Cybernetics Society, International Journal of Human Factors Modelling and Simulation, The Institute of Complex Medical Engineering, and cooperated with The Society of Instrument and Control Engineers, and The Institute of Systems, Control and Information Engineers.

ICAMechS 2023 is a privileged forum and the conference program consists a set of high quality technical papers and includes ten sessions on *Robotics systems; Artificial intelligence; Sensors and actuators; Signal and image processing; Control system designs; Computer vision; Mechatronic systems; Advanced methodologies; Machine learning; Technologies and applications.* In reviewing all of the submitted papers trough a rigorous two-step and blind review process, we have selected more than 40 high quality and innovative research results to be presented in these sessions, aiming at stimulating you to develop new ideas and further innovative research results in these research fields

Also, we have invited two distinguished speakers, Prof. Qinglong Han (Swinburne University of Technology, Australia) and Prof. Xinghuo Yu (RMIT University (Royal Melbourne Institute of Technology), Australia), to give the keynotes and present their recent research results in this conference. In special, we sincerely thank to both Prof Qinglong Han and Prof. Xinghuo Yu.

We would like to express our sincere gratitude to all the people, including the authors, reviewers, participants, the members of Advisory Committee, Program Committee and Organizing Committee, for their great support.

We trusty that you all enjoy the conference events and wish you all a pleasant and enjoyable stay in beautiful Melbourne, the most livable city of the world.

Best regards,

General Chairs: Zhihong Man and Mingcong Deng
Program Chairs: Jinchuan Zheng, Takao Sato, Shengjun Wen and Jiong Jin

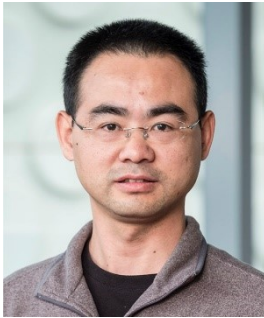**General Chairs**

Zhihong Man

Mingcong Deng

Program Chairs

Jinchuan Zheng

Takao Sato

Shengjun Wen

Jiong Jin

CONFERENCE HIGHLIGHTS

All of submitted papers have been rigorously reviewed by at least two experienced researchers in the corresponding fields. A total of 40 high quality papers from more than 10 different countries and areas in the world have been accepted and included in the final program of ICAMechS 2023. Two distinguished keynote speakers in mechatronics have been invited. According to the research topics of the accepted papers, 10 regular sessions have been scheduled.

For the online presentations, Zoom Test will be conducted between 16:00 and17:00, on Monday, Sept. 4, 2023.

The conference is held at Swinburne University of Technology and the timetable is scheduled based on Australian Eastern Standard Time (GMT +10) as follows.

- The registration is held at No. 612 (staffroom) EN building, Swinburne University of Technology, between 16:00 and 20:00, on Monday, Sept. 4, 2023.

- Keynotes and regular sessions are conducted between 09:10-16:20, on Tuesday, Sept. 5, 2023.

- Keynotes and regular sessions are conducted between 09:30-16:20, on Wednesday, Sept. 6, 2023.

- Panel discussions and technical tour are conducted between 09:10 and 16:30, on Thursday, Sept.7, 2023.

CONFERENCE REGISTRATION

The full registration includes Welcome party, Banquet and closing ceremony, USB data, Conference Proceedings.

SOCIAL EVENTS

- **Welcome party** is held at No. 612 (staffroom) EN building, Swinburne University of Technology, between 16:00 and 20:00, on Monday, Sept. 4, 2023.

- **Banquet** is scheduled between 18:30 and 20:30, on Tuesday, Sept. 5, 2023.

CONFERENCE LOCATION

- Conference site: Swinburne University of Technology, Melbourne, Australia

- Address: Swinburne University of Technology, Hawthorn Campus, John St, Hawthorn VIC 3122

Melbourne, Australia's unrivalled and diverse capital of sport, culture entertainment and style, is one of the world's most livable cities. It's time for you to explore more and start planning your trip to Melbourne. As the capital city of Victoria as well as Australia's second-largest city, Melbourne is the home to one of the world's most harmonious and culturally diverse communities. Its population is made up of five million people from all over the world. Around 140 cultures are represented, from Victoria's original Indigenous inhabitants to more recent migrants from countries in Europe, Asia and Africa. Around Melbourne, from cafes to bars, you can definitely get a tasty snapshot of Melbourne's dining and drinking. Also, you may like to explore Royal Botanic Gardens Victoria,

a treasured part of Melbourne's cultural life for more than 165 years – much loved by both generations of Victorians and overseas visitors. The foodie, cultural and sports-loving capital city of Melbourne has enough to keep you entertained for two days. But better yet, Victoria's most enticing experiences are all within a short drive from the city. From mountain vistas to cool-climate wines and little penguins, whichever direction you turn, Victoria will serve up something unforgettable. The spectacular Great Ocean Road hugs the seaside cliffs that snake along the wild and windswept Southern Ocean. The striking vistas along the iconic road evoke awe with craggy cliffs, empty beaches and soaring bluffs flanked by brilliant green countryside. Add epic surf, native wildlife, unforgettable hiking and biking trails and you will find plenty of things to see and do around every curve.
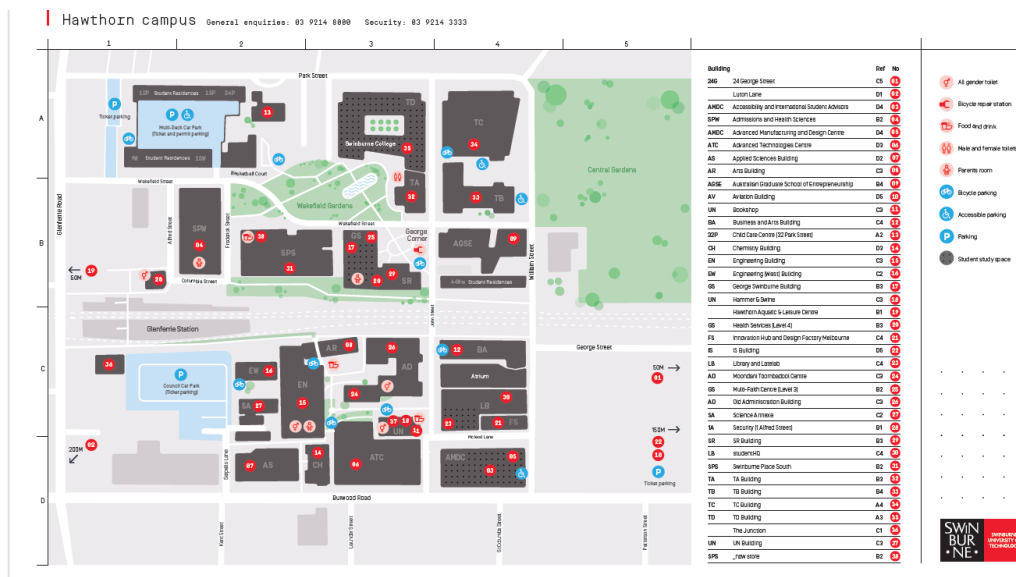
Swinburne University Hawthorn Campus Map

■ Route from Melbourne Airport
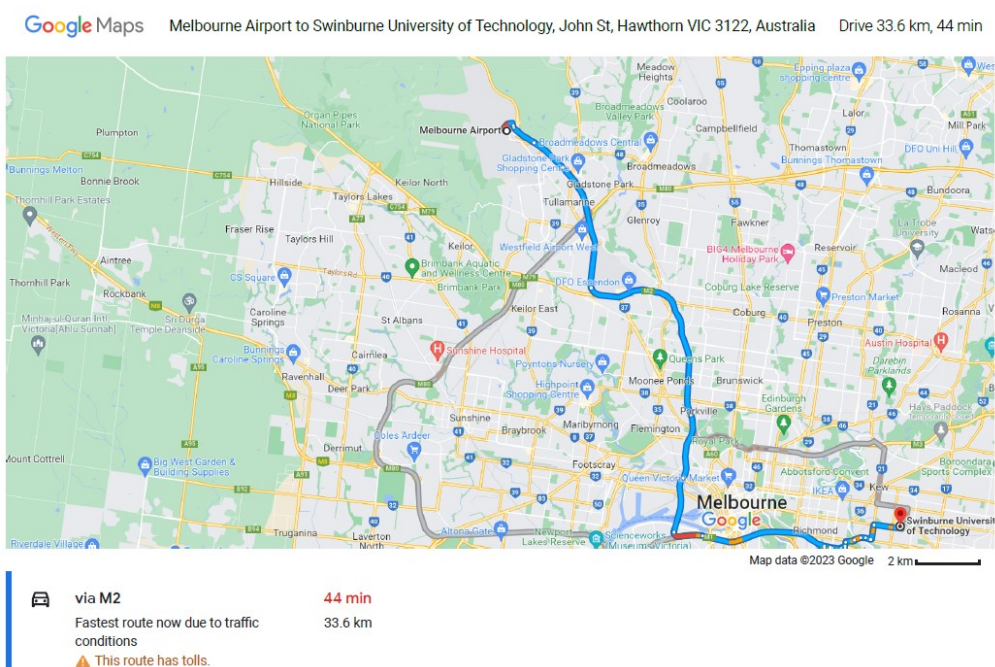
- **Train**

Hawthorn has three railway stations – Hawthorn, Glenferrie and Auburn. From Glenferrie railway station, you can easily step straight onto Hawthorn campus of Swinburne University.

- **Tram**

Six tram routes (16, 48, 70, 72, 75 and 109) provide a quick and easy way to get to and from Hawthorn campus.

- **Taxis**

You can use Cabstop to book a taxi via SMS. The Cabstop service allows you to wait for a taxi in a safe area and gives the driver an exact location for pick-up.

PLENARY SPEAKERS

Prof. Qinglong Han, Swinburne University of Technology, Australia

Professor Han is Pro Vice-Chancellor (Research Quality) and a Distinguished Professor at Swinburne University of Technology, Melbourne, Australia. He held various academic and management positions at Griffith University and Central Queensland University, Australia. Professor Han was awarded The 2021 Norbert Wiener Award (the Highest Award in systems science and engineering, and cybernetics), The 2021 M. A. Sargent Medal (the Highest Award of the Electrical College Board of Engineers Australia), The IEEE Systems, Man, and Cybernetics Society Andrew P. Sage Best Transactions Paper Award in 2022, 2020, and 2019, respectively, The IEEE/CAA Journal of Automatica Sinica Norbert Wiener Review Award in 2021, and The IEEE Transactions on Industrial Informatics Outstanding Paper Award in 2020.

Professor Han is a Member of the Academia Europaea (The Academy of Europe). He is a Fellow of The Institute of Electrical and Electronics Engineers (FIEEE), a Fellow of The International Federation of Automatic Control (FIFAC), a Fellow of The Institution of Engineers Australia (FIEAust), and a Fellow of The Chinese Association of Automation (FCAA). He is a Highly Cited Researcher in both Engineering and Computer Science (Clarivate). He has served as an AdCom Member of IEEE Industrial Electronics Society (IES), a Member of IEEE IES Fellows Committee, a Member of IEEE IES Publications Committee, and the Chair of IEEE IES Technical Committee on Networked Control Systems. He is currently the Editor-in-Chief of IEEE/CAA Journal of Automatica Sinica, the Co-Editor-in-Chief of IEEE Transactions on Industrial Informatics, and the Co-Editor of Australian Journal of Electrical and Electronic Engineering.

Title of the keynote:

Dynamic Event-Triggered Distributed Coordination Control

Abstract:

Distributed coordination control is the current trend in networked systems and finds prosperous applications across a variety of fields, such as smart grids and intelligent transportation systems. One fundamental issue in coordinating and controlling a large group of distributed and networked agents is the influence of intermittent inter-agent interactions caused by constrained communication resources. Event-triggered communication scheduling stands out as a promising enabler to strike a balance between the desired control performance and the satisfactory resource efficiency. What distinguishes dynamic event-triggered scheduling from traditional static event-triggered scheduling is that the triggering mechanism can be dynamically adjusted over time in accordance with both available system information and additional dynamic variables. This talk provides an up-to-date overview of dynamic event-triggered distributed coordination control. The motivation of dynamic event-triggered scheduling is first introduced in the context of distributed coordination control. Then some techniques of dynamic event-triggered distributed coordination control are discussed in detail. Implementation and design issues are well addressed. Furthermore, this talk exemplifies two applications of dynamic event-triggered distributed coordination control in the fields of microgrids and automated vehicles. Several challenges are suggested to direct the future research.

Professor Xinghuo Yu, FAA, FIEEE, HonFIEAust, RMIT University, Melbourne, Australia

Xinghuo Yu is an Associate Deputy Vice-Chancellor and a Distinguished Professor at RMIT University (Royal Melbourne Institute of Technology), Melbourne, Australia. His main research areas include control systems engineering, intelligent and complex systems, and power and energy systems. He received many awards and honours for his contributions, including 2018 MA Sargent Medal from Engineers Australia and 2013 Dr.-Ing. Eugene Mittelmann Achievement Award from IEEE Industrial Electronics Society. He is a Fellow of Australian Academy of Science, an Honorary Fellow of Engineers Australia, and a Fellow of the IEEE, Australian Computer Society and Australian Institute of Company Directors. He has been a Clarivate's Highly Cited Researcher in Engineering since 2015. He was the President of IEEE Industrial Electronics Society.

Title of the keynote:

Terminal Sliding Mode Control in Mechatronic Systems

Abstract:

Sliding mode control (SMC) has been studied and used extensively due to its robustness and simplicity. Central to SMC is the sliding motion which is induced by a disruptive (discontinuous) control forcing the state of the controlled system into a prescribed sub-dynamics with desirable control characteristics. Finite-time reachability of the switching manifolds is required to induce the system state into the sliding motion, though, asymptotical convergence is embedded in the conventional switching manifolds. Terminal SMC (TSMC) has been developed in recent years that enables finite-time reachability of the system equilibrium. The advantage of such a control strategy is the enhanced robustness, higher steady state precision, and simplicity in implementation.

In this talk, we will first introduce the basics of TSMC, and then present an overview of its recent developments in theory and applications, as well as its challenges and opportunities. In particular, we will demonstrate how to use TSMC in sensing, actuation, motion control, and optimization in mechanical systems and beyond.

INSTRUCTIONS FOR ZOOM MEETINGS

➢ **Download and Install Zoom**

Go to https://zoom.us/ download.

URL: ①https://zoom.us/ ②https://zoom.com.cn/download (Author in China)

Opening this link on an iOS or Android device will open the app store to download the Zoom mobile application.

➢ **Join the meeting**

1. Joining via the link

     Room 1 (Main Hall): https://us06web.zoom.us/j/3040814250?pwd=WlFia3dtbUU4aTdKdFg0Y2RCVWd2Zz09

     Room 2: https://us05web.zoom.us/j/5093345016?pwd=4t50LJFD08xbxaSfsLEfJGjf6ltM1Z.1
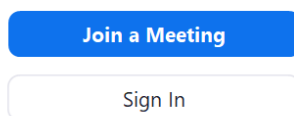
2. Joining via a web browser (https://zoom.us/)

     Type the meeting ID or personal link name and click Join.
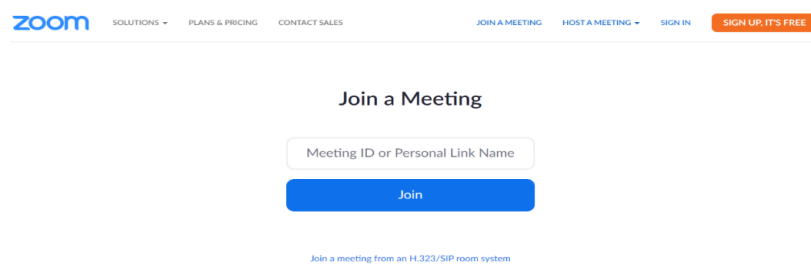
3. Joining the meeting via Zoom client

Type the meeting ID or personal link name, your name, and click Join.

Note: Zoom instructions for joining a meeting can be found here:

https://support.zoom.us/hc/en-us/articles/206618765-Zoom-Video-Tutorials.

➢ **Functionality of Zoom in the Meeting**

The Zoom Menu Bar appears at the bottom of the Zoom window once the meeting begins. If you can't see the menu bar, move your mouse slightly and the bar will appear. (The bar disappears after a few seconds when in full-screen mode.)

With the Zoom Menu Bar, you are able to:

1. Mute/Unmute your audio. You can also select your audio input here by clicking the up arrow next to the microphone icon.

2. Start/Stop your video. You can also select your video input here by clicking the up arrow next to the video camera icon.

3. Invite more people to join by email, IM, or meeting ID.

4. Open/Close a window of a list of participants and related details. The participants list allows you to "raise your hand" to let everyone know you wish to speak and see who else has their hand raised. You can also easily mute/unmute yourself on the participants list.

5. Share your screen or select a specific application to share (e.g., Microsoft)

6. Send a message to one person (using private chat) or to all participants.

7. Record the meeting (if you have been granted permission).

8. Leave or end the video meeting.