

MECHATRONICS 2018

Reinventing Mechatronics

16th Mechatronics Forum International Conference

University of Strathclyde, Glasgow, UK

19th – 21st September 2018



The 16th Mechatronics Forum International Conference will be held in Glasgow, UK on 19th – 21st September 2018. The conference is sponsored by the **IET Robotics & Mechatronics TPN** and the **IMechE**, and is organized by the **University of Strathclyde**.

Mechatronics is a vital element of modern engineering systems and requires multidisciplinary expertise across a range of disciplines, such as: mechanical engineering, electronics, information technology, and control systems science. Recent rapid developments in areas such as the Internet of Things, Cyber Physical Systems, robotics and autonomous systems, augmented reality, smart cities and driverless cars to name but a few, have created uncertainties as to mechatronics' future development and role. The goal of the conference is to debate, discuss and hence to **reinvent** mechatronics by bringing together international experts to provide an overview of the state-of-the-art of mechatronics, to position mechatronics within the context of current technical and other developments, to present recent research results and to share ideas for the future of this multidisciplinary field.

Building on its long established history of conferences dating back to 1989, the conference will provide an international forum for professionals, academics, and researchers to look back at the role of mechatronics and its technological development since its inception, to consider the latest developments from a wide range of interdisciplinary theoretical studies, to review applications of mechatronic systems, including in particular current developments such as space robotics and Cyber Physical systems along with other emerging fields.

In particular, we welcome the presentation and discussion of emerging research topics derived from mechatronics and its applications, its design methodologies and techniques which bridge theoretical studies and applications across mechatronic systems, as well as developing the links between existing mechatronics concepts and future mechatronic, and other, systems. Novel quantitative engineering and science studies may also be considered.

Papers are therefore invited on all aspects of mechatronic research and application, including but not limited to:

- **Mechatronic design - Reinventing Mechatronics:** the role of mechatronics, developments including smart environments such as smart homes & smart cities, integration with the Internet of Things & Cyber Physical Systems, impact of legislation (i.e. privacy related), future standards;
- **Mechatronic applications:** agriculture, extreme environments such as nuclear, off-shore and space. actuators and sensors, robotics and machine vision, vibration and noise control, smart structures, motion control, MEMS, automotive systems, system identification and control of mechatronics systems and mechatronics education, robotics, control, automation, fault diagnosis, human-machine interfaces, medical applications, industrial applications, intelligent systems, real-time simulation, hardware-in-the-loop simulation, systems integration, transportation systems and other mechatronics application areas;
- **Mechatronics design methodology & theory:** design representations, modelling and simulation, verification and validation methods, standards, case studies, model based mechatronic design, system modelling, mechatronic design beyond traditional mechatronics, connected systems, embedded intelligence, miniaturised complex systems, mechatronic design of large complex systems, mechatronic design of mixed reality environments;
- **Mechatronics in extreme environments:** scenario identification and representations, unique solutions for environment specific scenarios;

- **Space mechatronics and robotics:** mechatronics for space robotics; standard robotic joint interfaces; modular robotics in space exploration; space robotics operating systems; sensing data capture, sensory data fusion for situation awareness in space;
- **Drives and actuators:** employing electrical, hydraulic, pneumatic, or other principles, novel and very advanced solutions, their modelling, simulation and control and application;
- **Mechatronic perceptions and task planning in robotics:** sensing and image processing, path planning and gait control; artificial intelligence in robotics; experimental realization and very advanced industrial applications;
- **Mechatronic applications in manufacturing:** modelling and simulation, control, energy efficient manipulations; novel mechatronic component machining and shaping;
- **Sensors, measurement systems and signal processing:** pattern recognition: novel sensor principles, sensors and actuators in micro-systems, sensing of small quantities, sensor systems, wireless sensing, sensor fusion, data validation & verification;
- **Control of mechatronic systems:** new and advanced control algorithms, learning control, control in an information rich world, control of complex processes, uncertainty management in highly complex systems;
- **Human aspects and mechatronics:** collaborative robotics, mechatronic solutions to support an ageing population, interdisciplinary collaboration in mechatronic design, operator roles in complex mechatronic systems, mechatronics in healthcare and surgery;
- **Industrial wireless communications in mechatronics:** wireless sensor and actuator networks, wireless networked control systems, wireless robotics;
- **Mechatronics for environmental sustainability:** Smart pollution sensing and modelling, in-situ real time sensing of environments, connected systems, and big data processing;
- **Mechatronic education:** teaching of mechatronic aspects, mechatronic curricula, challenges, unconventional courses.

Special Sessions, Panel Sessions & Workshops

In addition to papers in the above areas, proposals are invited for special sessions, panel sessions and workshops to be included in the conference programme. Examples include Reinventing mechatronics theme, education, design standards, system integration with IoT & CPS, energy & sustainability. It is expected short (5 min) papers to initiate discussion or a more open forum and could be held in the evenings after the main conference. The proposer should provide:

1. Their contact details;
2. A statement setting out the nature of the proposal (i.e. special session, panel session or workshop);
3. The topic, and title, for the proposed special session, panel session or workshop and an outline of its structure (i.e. invited papers (subject to review), invited panel, open workshop or other);
4. An indication of their willingness to act as the organiser for such a session.

Proposals should reach the conference organising committee by a revised deadline on 1 March 2018, including combining proposal if necessary, and a formal invitation sent out by 1 March 2018 (to allow for relevant paper submission by 15 March 2018).

The conference organising committee has received several proposals and will organise a Special Session on "**Symbiotic Mechatronics**". The details of the proposal can be found at the conference website. The other proposals are being considered.

Conference Chairs

Professor Xiu T Yan, Director of Space Mechatronic Systems Technology Laboratory (SMeSTech)

Professor Phillip Moore, Chairman of Mechatronics Forum, University of Skovde

International Advisory Committee Members

Abbas Dehghani, UK	David Russell, US	Job van Amerongen, NL	Michael R Jackson, UK
Alessandro Gasparetto, IT	Emilio Gonzalez, MX	Jonathan Corney, UK	Nabil Hassan Mostafa, EG
Alison Mackay, UK	Eric Rogers, UK	Jong Hyeon Park, KR	Necip Sahinkaya, UK
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Samuel Gomes, FR
Sanjay Sharma, UK

Sebastian Bartsch, DE
Sven Rönnbäck, SE

Wojciech Szykiewicz, PL
Xuping Zhang, DK

Xiu-Tian Yan, UK

Conference Local Organising Committee:

Chairman: Professor David Bradley

Dr. Silvio Cocuzza; Dr. Karen Donaldson; Dr. Roberto Palazzetti; Mr. Gwenole Henry; Mr. Scott Brady
Mr. Cong Niu and Mrs. Youhua Li

Conference Details

◆ MECHATRONICS 2018 VENUE

Technology & Innovation Centre at the University of Strathclyde 99 George St., Glasgow, United Kingdom. G1 1RD

◆ REGISTRATION

Full Conference Package

Early Bird Registration (rate per person)	£400
Research Student	£300
Retired Researcher	£300
Standard Registration:	£450
Research Student	£350
Retired Researcher	£350

Full registration fee includes submission of 1 paper; welcome reception, entrance to all sessions, free Wi-Fi, lunches, coffee breaks; social event and conference dinner, book of abstracts and an electronic version of the symposium proceedings.

Day Delegate Rate

Early Bird Registration (rate per person)	£330
Standard Registration	£300

Registration fee includes submission of 1 paper; one day attendance to the conference, lunch, coffee breaks; free Wi-Fi during the conference, the Book of Abstracts and an electronic version of the symposium proceedings.

◆ SUBMISSIONS & PUBLICATIONS

Papers should describe original and unpublished work. All manuscripts will be reviewed by three (3) members of the program committee, and the accepted papers will be published in a conference Proceeding. Selected papers will be published in a Journal special issue to be confirmed.

Instructions for preparation and electronic submission are available on the Mechatronic 2018 website:

<http://mechatronicsforum.co.uk>.

◆ IMPORTANT DATES

Deadline for submission of full paper:	31 May 2018
Notification of acceptance:	25 June, 2018
Final paper submission deadline:	16 July 2018
Provisional Programme publication	23 July 2018
Early bird registration deadline	30 July 2018
Final registration deadline	20 August 2018
Final Programme publication	27 August 2018

◆ CONTACT DETAILS

For any queries please do not hesitate to get in contact with the Conference Local Organising Committee:

<http://mechatronicsforum.co.uk>

E: mechatronicsforum@gmail.com

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