PROCEEDINGS OF THE 7TH INTERNATIONAL CONFERENCE ON CONTROL, DYNAMIC SYSTEMS, AND ROBOTICS (CDSR'20)

November 9, 2020 - November 11, 2020 | ~~Niagara Falls, Canada~~ | Virtual Conference

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WELCOME MESSAGE FROM THE CONFERENCE CHAIR

On behalf of the International Academy of Science, Engineering and Technology (International ASET Inc.), the organizing committee would like to welcome you to the 7th International Conference of Control, Dynamic Systems, and Robotics (CDSR'20).

CDSR'20 is aimed to become one of the leading international annual conferences in fields related to traditional and modern control and dynamic systems. This conference will provide excellent opportunities to the scientists, researchers, industrial engineers, and university students to present their research achievements and to develop new collaborations and partnerships with experts in the field.

CDSR'20 is a series of international conferences which are held yearly. These conferences focus on all aspects of traditional and modern control and dynamic systems. After the success of the fifth conference in Niagara falls, Canada, CDSR will remain in Canada and will host the sixth international conference.

In the sixth meeting of this conference, three keynote speakers will share their expertise with the aim of exposing participants to a wide spectrum of applications, and to foster crosspollination of ideas and develop new research interests. In addition, approximately 25 papers will be presented from professors, students, and researchers across the world.

We thank you for your participation and contribution to the 7th International Conference of Control, Dynamic Systems, and Robotics (CDSR'20). We wish you a very successful and enjoyable experience.

Dr. Aparicio Carranza
Conference Chair
CDSR'20

Dr. Yang Shi
Conference Co-Chair
CDSR'20

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ABOUT CDSR'20

The 7th International Conference on Control, Dynamic Systems, and Robotics (CDSR'20) aims to become the leading annual conference in fields related to traditional and modern control and dynamic systems. The goal of CDSR'20 is to gather scholars from all over the world to present advances in the fields of control and dynamic systems and to foster an environment conducive to exchanging ideas and information. This conference will also provide an ideal environment to develop new collaborations and meet experts on the fundamentals, applications, and products of the mentioned fields.

CDSR is a series of international conferences held yearly. These conferences focus on all aspects of control and dynamic systems. After successfully holding CDSR'14 to CDSR'19 in Canada, CDSR'20 is hosted in Canada as well this year.

CDSR is an acronym for **C**ontrol, **D**ynamic, **S**ystems, and **R**obotics.

- The proceedings is published in Ottawa, Canada.
- All papers were peer-reviewed
- The congress proceedings is published under an ISSN and ISBN number
- Each paper is assigned a unique DOI number by Crossref
- The conference proceedings is indexed by Scopus and Google Scholar
- The proceedings is permanently archived in Portico (one of the largest community-supported digital archives in the world)

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SCIENTIFIC COMMITTEE

We would like to thank the following for accepting to act as a member of the Scientific Committee for the CDSR'20 Conference:

Scientific Committee Chairs

Dr. Aparicio Carranza

New York City College of Technology, USA
Conference Chair

Dr. Yang Shi

University of Victoria, Canada
Conference Co-Chair

Scientific Committee Members

- **Dr. Gary M. Bone,** McMaster University, Canada
- **Dr. Lahouari Cheded,** King Fahd University of Petroleum and Minerals, Saudi Arabia
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- **Dr. Meysar Zeinali-Ghayeshghorshagh,** Laurentian University, Canada
- **Dr. Chris Zhang,** University of Saskatchewan, Canada
- **Dr. Dan Zhang,** York University, Canada

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KEYNOTE SPEAKERS

The keynote information for the 7th International Conference of Control, Dynamic Systems, and Robotics (CDSR'20) is as follows:

Dr. Perry Y. Li
University of Minnesota, USA

Dr. Gary M. Bone
McMaster University, Canada

Dr. Medhat Moussa
University of Guelph, Canada

Dr. Murti Salapaka
University of Minnesota, USA

Dr. Robert Langlois
Carleton University, Canada

Dr. Aditya Mahajan
McGill University, Canada

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KEYNOTE SPEAKER

Titles: Combining Hydraulic and Electric Actuations To Improve Efficiency and Control Effectiveness for Off-Road Mobile Machines

Dr. Perry Y. Li, University of Minnesota, USA

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Perry Li is Professor of Mechanical Engineering at the University of Minnesota. His research interests are in design, control and sensing of mechatronics and fluid power systems. Current applications include improving power-train efficiency of on-road and off-road vehicles, compressed air energy storage for renewable energy, human interactive robots and underwater vehicles. Between 2006-2013, he was the founding deputy director for the NSF Engineering Research Center for Compact and Efficient Fluid Power (CCEFP). He was the recipient of the 2002 Japan/USA Symposium on Flexible Automation. Prior to joining the University of Minnesota in 1997, he was on the research staff of Xerox Corporate Research. Dr. Li received his PhD in Mechanical Engineering from the University of California, Berkeley; his MS in Biomedical Engineering from Boston University; and MA in Electrical and Information Sciences from Cambridge University, England.

KEYNOTE SPEAKER

Titles: Advanced Robot Design and Control Strategies for Human-Robot Cooperation

Dr. Gary M. Bone, McMaster University, Canada

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Gary M. Bone received the B.Sc. (Ap.Sc.) degree in mechanical engineering from Queen's University, Canada, and the M.Eng. and Ph.D. degrees in mechanical engineering from McMaster University, Canada, in 1986, 1988, and 1993, respectively.

He joined the Faculty of Engineering, McMaster University, in 1994, where he is currently a Professor with the Department of Mechanical Engineering. His current research interests include robot design and control; collaborative robots (Cobots); 3D machine vision for robots; robot learning from demonstration; soft pneumatic actuators; hybrid pneumatic-electric actuators; and advanced control algorithms for pneumatic and hybrid actuators.

KEYNOTE SPEAKER

Titles: Learning To Grasp For Robotics Applications In Uncertain Environments

Dr. Medhat Moussa,University of Guelph, Canada

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Professor Medhat Moussa received his PhD in Systems design Engineering from the University of Waterloo, MASc in from the Université de Moncton, and BSc. from American University in Cairo in 1996, 1992, and 1987 respectively. In 2000, he joined the University of Guelph's School of Engineering, where he is now a full professor. Professor Moussa's research is focused on developing robots that sense, learn, and act in non-structured, uncertain, and cluttered environments. He has an extensive publication record in robotics grasping, machine learning, machine vision, and Human-Robot Interaction. He holds several US and international patents in machine learning. He maintains strong collaborative relationships with various industry partners.

KEYNOTE SPEAKER

Titles: Reconstruction of Interconnectedness in Networks of Dynamical Systems Based on Passive Observations

Dr. Murti Salapaka, University of Minnesota, USAInstitute, USA

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Professor Salapaka is in the area of Control and Dynamical Systems. He obtained his Bachelors degree in Mechanical Engineering from Indian Institute of Technology, Madras in 1991. He obtained his Masters and PhD. degrees from University of California, Santa Barbara in the years 1993 and 1997 respectively. He was at Electrical Engineering department at Iowa State University from1997-2007. He is currently a faculty in the Electrical and Computer Engineering Department at University of Minnesota at Minneapolis where he holds the Vincentes-Hermes Luh Chair. He is the recipient of the NSF CAREER Award for the year 1998 and is a IEEE Fellow. His research interests span, controls and systems theory and its applications to nanotechnology, single molecule physics and power systems.

KEYNOTE SPEAKER

Titles: Mitigating the Impact of High-Speed Craft Oil Spill Management

Dr. Robert Langlois, Carleton University, Canada

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Rob Langlois is a Professor in the Department of Mechanical and Aerospace Engineering and the Associate Dean, Student Success in the Faculty of Engineering and Design at Carleton University, Ottawa, Canada. He received his Engineering Diploma from St. Francis Xavier University, Antigonish, Nova Scotia, Canada in 1987; and BASc, MASc, and PhD degrees from Queen's University, Kingston, Canada in 1990, 1991, and 1996, respectively. Upon graduation, he gained industrial experience as the Senior Dynamicist and subsequently Manager of Dynamic Analysis at Indal Technologies Inc. (now Curtiss-Wright Indal Technologies), a leader in shipboard aircraft handling systems. Upon joining Carleton University in 2001 he founded the Applied Dynamics Laboratory. Since that time, his research has involved theoretical, computational, and experimental components focused on practical safety-related problems related to shipboard aircraft operation, human performance at sea, neonatal patient transport, vehicle dynamics, cost-accessible flight simulation, and high-speed craft suspension seats. Dr. Langlois has an extensive publication record and is the recipient of four best-paper awards.

KEYNOTE SPEAKER

Titles: Approximate Planning And Learning For Partially Observed Systems

Dr. Aditya Mahajan, McGill University, Canada

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Aditya Mahajan is Associate Professor of Electrical and Computer Engineering at McGill University, Montreal, Canada. He received the B.Tech degree in Electrical Engineering from the Indian Institute of Technology, Kanpur, India in 2003 and the MS and PhD degrees in Electrical Engineering and Computer Science from the University of Michigan, Ann Arbor, USA in 2006 and 2008. From 2008 to 2010, he was postdoctoral researcher in the department of Electrical Engineering at Yale University, New Haven, CT, USA. From 2016 to 2017, he was a visiting scholar at the University of California, Berkeley.

He is the recipient of the 2015 George Axelby Outstanding Paper Award, the 2016 NSERC Discovery Accelerator Award, the 2014 CDC Best Student Paper Award (as supervisor), and the 2016 NecSys Best Student Paper Award (as supervisor). His principal research interests include decentralized stochastic control, team theory, reinforcement learning, multi-armed bandits and information theory.

LIST OF PAPERS

The following papers were presented at the 7th International Conference on Control, Dynamic Systems, and Robotics (CDSR'20).

Estimation and Identification

Title: Real-time Collision Detection for Position-Controlled Humanoid Robots

Authors: Alejandro Ramirez-Serrano, Shadi Moghaddasi

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Title: A Comparison of Three Stator Resistance Estimation Methods for a Permanent Magnet Motor

Authors: Alia R. Strandt, Andrew P. Strandt, Susan C. Schneider, Edwin E. Yaz

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Title: Accelerated Detection Method for Sensor and Actuator Intrusions in Cyber-Physical Systems Using Multiple Model Estimation Algorithm

Authors: Jiayi Su, Yuqin Weng, Susan Schneider, Edwin Yaz

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Control in Healthcare

Title: Adaptive Force-field Control of a 2-DOF Upper-extremity Rehabilitation Robot

Authors: Parya Khoshroo, Behzad Danaei, John McPhee, Jennifer Boger

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Title: Control-Oriented Muscle Torque (COMT) Model for EMG-Based Control of Assistive Robots

Authors: Ali Nasr and John McPhee

View Paper

Title: Injury Risk and Comfort Assessment Applied to Ambulance Transportation

Authors: Daniel G. Kyrollos, Terrin Stachiw, James R. Green, Robert G. Langlois

View Paper

Title: Activation Torque Estimation of Muscles by Forward Neural Networks (Forward-MuscleNET) for sEMG-Based Control of Assistive Robots

Authors: Ali Nasr, Jiayuan He, Ning Jiang, John McPhee

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Control in System

Title: Nanjing University of Aeronautics and Astronautics
Authors: Liyan Wen

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Title: Sensor Fusion INS/GNSS based on Fuzzy Logic Weighted Kalman Filter
Authors: Cunto, G. G., Sasiadek, J. Z.

View Paper

Title: Trajectory Planning for a Human-Robot Interaction Rehabilitation System using Direct-Collocation Optimization
Authors: Arash Hashemi, John McPhee

View Paper

Title: Wireless Sensor Network Security for Smart Home IoT Systems
Authors: Aparicio Carranza, Xiaolin Chen, Heesang Kim, Casimer DeCusatis, Harrison Carranza

View Paper

Title: Roundabout Situational Awareness for Automated Vehicles with Hybrid Machine Learning Approach
Authors: Mehran Zamani Abnili, Nasser L. Azad

View Paper

Title: Covert Communication Using MODBUS Protocol in IoT Devices
Authors: Sashaa Nagrikar, Saeed Alshahrani, Daryl Johnson

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LIST OF PAPERS

Robotics and Mechatronics

Title: Position Control and Force Allocation Algorithms for Hybrid Pneumatic-Electric Linear Actuators

Authors: Behrad Rouzbeh, Gary M. Bone

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Title: Non-linear Parameter Identification for Humanoid Robot Components

Authors: Parastoo Dastangoo, Alex Ramirez-Serrano

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Title: Moving Object Detection for Humanoid Navigation in Cluttered Dynamic Indoor Environments

Authors: Prabin Kumar Rath, Alejandro Ramirez-Serrano, Dilip Kumar Pratihar

View Paper

Title: Human-Robot Collaboration Systems: Components and Applications

Authors: Pablo Segura Parra, Odette Lobato Calleros, Alejandro Ramirez-SerranoCarranza

View Paper

Title: Explore on Voice Parameters of Social Robots Applied in Education Industry

Authors: Yue Yuan, Chih-Fu Wu, Kai-Chieh Lin, Xiao Dou

View Paper

Title: Design and Modelling of a Pick and Place Robotic Manipulator

Authors: Bin Wei

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Title: Research on SLAM and Path Planning Based on ROS Robot

Authors: Linchen Li, Xuehan Li, Zhiguo Shi, Genjing Chang

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SPONSORS

International ASET Inc. would like to thank the following sponsors for their support of CDSR'20:

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JOURNAL SPECIAL ISSUES

Selected articles from the coference will be published in one of the following journals after a secondary review process:

JMIDS - Journal of Machine Intelligence and Data Science
JBEB - Journal of Biomedical Engineering and Biosciences

The publication fee will be waived for papers that win the best paper award. Other attendees will receive a 25% discount towards the publication fee of the journal.

These journals have adopted to the open-access model, meaning all free access to the journal's articles and content with no need for subscription. This ensures larger audience and therefore higher citations.

Users are allowed to read, download, copy, distribute, print, search, or link to the full texts of the articles in this journal without asking prior permission from the publisher or the author. This is in accordance with the BOAI defi nition of open access.

All published papers of JMIDS and JBEB will be submitted to Google Scholar, Microsoft Academic Search, Open J-Gate, Mendeley, Index Copernicus International, Academic Index, Mendeley, Primo Central, and Genomics JournalSeek for possible indexing. Additionally, they will be permanently archived in Portico (one of the largest community-supported digital archives in the world) and will be assigned unique DOIs.

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CDSR’21

The 8th International Conference of Control, Dynamic Systems, and Robotics (CDSR'21) will be held on May 23 - 25, 2021 in Niagara Falls, Canada.

For inquiries and to obtain further information on the congress, please visit the website or call us at:

+1-613-834-9999

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ETHICS & MALPRACTICE

Publication Ethics and Publication Malpractice Statement

The following statement is mainly based on the Code of Conduct and Best-Practice Guidelines for Journal Editors (Committee on Publication Ethics, 2011).

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Scientific Committee
Scientific committees consisting of experts in the fields are established. The committees oversee the peer-review and publication process. To see the scientific committee members, please follow the link below.
Scientific Committee

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One or more reviewer, scientific committee member, or chair, (internal or external), are responsible for evaluating the relevance of the submitted manuscripts to the proceedings, technical and scientific merit, originally, and impact. These evaluations are to be carried out regardless of ethnicity, religion, gender, sexual orientation, political beliefs, and institutions. Successive to peer-review, the Chair has full authority and is solely responsible for the published content and the process thereof.

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ETHICS & MALPRACTICE

Reviewers

Contribution to Decisions

In order for final decisions to be made regarding acceptance or rejection of papers, we rely on peer-review. Peer-review is the process of experts in the field reading, understanding, and objectively commenting on submitted papers. Through peer-review, scholars give back to the academic and scientific community by helping the chair(s) make decisions regarding manuscripts.

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Reviewers should promptly notify the chair(s) if they are unable or unqualified to carry out their reviewing duties. Reviewers should do their best to provide the reviews to the chair(s) as promptly as possible, and within the designated time-frame.

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Invited reviewers should immediately inform the chair(s) in case of a conflict of interest based on competitive, collaborative, personal, family, and other relationships with the authors or people involved in the work.

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ETHICS & MALPRACTICE

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Authorship

Only persons who have significantly contributed to the work and the manuscript can be named authors on a paper. These contributions include the idea/concept, design, experiments, evaluation, analysis, drafting or revision of the manuscript, and others. Authors must all have agreed to be named as such and for the manuscript to be submitted. Anyone who has contributed based on the above, but the level of contribution is not significant, may appear in the acknowledgement section of the manuscript.

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Authors must notify the chair(s) at the time of submission, if any factor outside the scope of the research has influenced any step of the work and manuscript writing. Examples of such factors include but are not limited to funding, grants, advisory and consultancy, stock ownership, current or past employment, and memberships, among others. All funding sources should be disclosed in the manuscript.

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Works involving human and/or animal subjects must ensure that the work has abided by institutional guidelines, and pre-approved by required bodies. Moreover, consent must be acquired from participants, and privacy of subjects must be ensured. All of the above must be specified with clear statements in the manuscript.

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Unethical/plagiarism issues mostly result in a retraction, while unintended mistakes will mostly result in the publication of an erratum.

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ETHICS & MALPRACTICE

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Errata and Retractions

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Schedule

This conference proceeding accompanies the conference, meaning a new proceedings will be published every year for the corresponding annual conference of this series.

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