



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

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

CDSR'20

November 10

November 11

**OUR PROGRAM SCHEDULE IS BASED ON EASTERN TIME
(ET - OTTAWA TIME)**

CDSR'20

CDSR'20 Scientific Committee Chair



Dr. Aparicio Carranza

New York City College of Technology, USA
Conference Chair

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Dr. Yang Shi

University of Victoria, Canada
Conference Co - Chair

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NOVEMBER 10

ROOM 1

8:00 AM - 9:00 AM	Registrations
9:00 AM - 9:10 AM	Official Opening
	Dr. Aparicio Carranza, New York City College of Technology, USA
9:10 AM - 10:10 AM	PLENARY LECTURE
	<u>Combining Hydraulic and Electric Actuators To Improve Efficiency and Control Effectiveness for Off-Road Mobile Machines</u> Dr. Perry Y. Li, University of Minnesota, USA
10:10 AM - 10:55 AM	KEYNOTE LECTURE
	<u>Advanced Robot Design and Control Strategies for Human-Robot Cooperation</u> Dr. Gary M. Bone, McMaster University , Canada
10:55 AM - 11:05 AM	Break

NOVEMBER 10

11:05 AM - 11:50 AM KEYNOTE LECTURE

[Approximate Planning and Learning for Partially Observed Systems](#)
Dr. Aditya Mahajan, McGill University, Canada

11:50 AM - 12:35 PM

Session
[Estimation and Identification](#)

12:35 PM - 12:55 PM

Lunch Break

12:55 PM - 02:10 PM

Session
[Control in Healthcare](#)

PLENARY LECTURE

NOVEMBER 10 | 9:10 AM - 10:10 AM | SESSION CHAIR: DR. APARICIO CARRANZA, NEW YORK CITY COLLEGE OF TECHNOLOGY, USA



Titles: Combining Hydraulic and Electric Actuators 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 LECTURE

NOVEMBER 10 | 10:10 AM - 10:55 AM | SESSION CHAIR: DR. APARICIO CARRANZA, NEW YORK CITY COLLEGE OF TECHNOLOGY, USA



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 LECTURE

NOVEMBER 10 | 11:05 AM - 11:45 AM | SESSION CHAIR: DR. APARICIO CARRANZA, NEW YORK CITY COLLEGE OF TECHNOLOGY, USA



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.

SESSION

ESTIMATION AND IDENTIFICATION

NOVEMBER 10 | 11:50 AM - 12:35 PM | SESSION CHAIR: DR. APARICIO CARRANZA, NEW YORK CITY COLLEGE OF TECHNOLOGY, USA

Titles: Real-time Collision Detection Algorithm for Position-Controlled Humanoid Robots

CDSR 125

Time: 11:50 - 12:05

Presenter: Alejandro Ramirez-Serrano, University of Calgary, Canada

Authors: Alejandro Ramirez-Serrano, Shadi Moghaddasi

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

CDSR 139

Time: 12:05 - 12:20

Presenter: Susan Schneider, Marquette University - EECE Department, United States

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

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

CDSR 140

Time: 12:20 - 12:35

Presenter: Susan Schneider, Marquette University - EECE Department, United States

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

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SESSION

CONTROL IN HEALTHCARE

NOVEMBER 10 | 12:55 PM - 2:10 PM | SESSION CHAIR: DR. ADITYA MAHAJAN, MCGILL UNIVERSITY, CANADA

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

CDSR 138

Time: 12:55 - 1:10

Presenter: Parya Khoshroo, University of Waterloo, Canada

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

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

CDSR 144

Time: 1:10 - 1:25

Presenter: Ali Nasr, University of Waterloo, Canada

Authors: Ali Nasr, John McPhee

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Titles: Injury Risk and Comfort Assessment Applied to Ambulance Transportation

CDSR 156

Time: 1:25 - 1:40

Presenter: Daniel G. Kyrollos, Carleton University, Canada

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

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

CDSR 146

Time: 1:40 - 1:55

Presenter: Ali Nasr, University of Waterloo, Canada

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

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SESSION

CONTROL IN HEALTHCARE

NOVEMBER 10 | 12:55 PM - 2:10 PM | SESSION CHAIR: DR. ADITYA MAHAJAN, MCGILL UNIVERSITY, CANADA

Titles: Trajectory Planning for a Human-Robot Interaction Rehabilitation System using Direct-Collocation Optimization

CDSR 134

Time: 1:55 - 2:10

Presenter: Arash Hashemi, University of Waterloo, Canada

Authors: Arash Hashemi, John McPhee

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NOVEMBER 11

9:00 AM - 9:45 AM KEYNOTE LECTURE

[Learning to Grasp for Robotics Applications in Uncertain Environments](#)

Dr. Medhat Moussa, University of Guelph, Canada

9:45 AM - 10:30 AM KEYNOTE LECTURE

[Mitigating the Impact of High-Speed Craft](#)

Dr. Robert Langlois, Carleton University, Canada

10:30 AM - 10:40 AM BREAK

10:40 AM - 11:25 AM KEYNOTE LECTURE

[Reconstruction of Interconnectedness in Networks of Dynamical Systems Based on Passive Observations](#)

Dr. Murti Salapaka, University of Minnesota, USA

11:25 AM - 12:40 PM SESSION

[Control Systems](#)

12:40 PM - 1:00 PM Lunch Break

1:00 PM - 2:30 PM SESSION

[Robotics and Mechatronics](#)

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KEYNOTE LECTURE

NOVEMBER 11 | 9:00 AM - 9:45 AM | SESSION CHAIR: DR. APARICIO CARRANZA, NEW YORK CITY COLLEGE OF TECHNOLOGY, USA



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 LECTURE

NOVEMBER 11 | 9:45 AM - 10:30 AM | SESSION CHAIR: DR. APARICIO CARRANZA, NEW YORK CITY COLLEGE OF TECHNOLOGY, USA



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 LECTURE

NOVEMBER 11 | 10:40 AM - 11:25 AM | SESSION CHAIR: DR. APARICIO CARRANZA, NEW YORK CITY COLLEGE OF TECHNOLOGY, USA



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

[Dr. Murti Salapaka, University of Minnesota, USA](#)
[Institute, 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 from 1997-2007. 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.

SESSION

CONTROL SYSTEMS

NOVEMBER 11 | 11:25 AM - 12:40 PM | SESSION CHAIR: ALI NASR, UNIVERSITY OF WATERLOO, CANADA

Titles: Adaptive State Tracking Control with Actuator Nonlinearities and Failures

CDSR 118

Time: 11:25 - 11:40

Presenter: Liyan Wen, Nanjing University of Aeronautics and Astronautics, CHINA

Authors: Liyan Wen, Gang Tao

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Titles: Sensor Fusion INS/GNSS based on Fuzzy Logic Weighted Kalman Filter

CDSR 129

Time: 11:40 - 11:55

Presenter: Gabriel De Cunto, Carleton University, Canada

Authors: Cunto, G. G., Sasiadek, J. Z.

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Titles: Wireless Sensor Network Security for Smart Home IoT Systems.

CDSR 135

Time: 11:55 - 12:10

Presenter: Aparicio Carranza, New York City College of Technology, USA

Authors: Aparicio Carranza, Xiaolin Chen, Heesang Kim, Casimer DeCusatis, Harrison Carranza

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CONTROL SYSTEMS

NOVEMBER 11 | 11:25 AM - 12:40 PM | SESSION CHAIR: ALI NASR, UNIVERSITY OF WATERLOO, CANADA

Titles: Roundabout Situational Awareness for Automated Vehicles with Hybrid Machine Learning Approach

CDSR 155

Time: 12:10 - 12:25

Presenter: Mehran Zamani Abnili, University of Waterloo, Canada

Authors: Mehran Zamani Abnili, Nasser L. Azad

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Titles: Covert Communication Using MODBUS Protocol in IoT Devices

CDSR 127

Time: 12:25 - 12:40

Presenter: Saeed Mohammed A Alshahrani, Rochester Institute of Technology, United States

Authors: Sashaa Nagrikar, Saeed Alshahrani, Daryl Johnson

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SESSION

ROBOTICS AND MECHATRONIC

NOVEMBER 11 | 1:00 PM - 2:30 PM | SESSION CHAIR: ALI NASR, UNIVERSITY OF WATERLOO, CANADA

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

CDSR 137

Time: 1:00 - 1:15

Presenter: Gary M. Bone, McMaster University, Canada

Authors: Behrad Rouzbeh, Gary M. Bone

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Titles: Non-linear Parameter Identification for Humanoid Robot Components

CDSR 148

Time: 1:15 - 1:30

Presenter: Alejandro Ramirez-Serrano, University of Calgary, Canada

Authors: Parastoo Dastangoo, Alex Ramirez-Serrano

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Titles: Moving Object Detection For Humanoid Navigation In Cluttered Dynamic Indoor Environments

CDSR 149

Time: 1:30 - 1:45

Presenter: Alejandro Ramirez-Serrano, University of Calgary, Canada

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

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Titles: Human-Robot Collaboration Systems: Components and Applications

CDSR 150

Time: 1:45 - 2:00

Presenter: Alejandro Ramirez-Serrano, University of Calgary, Canada

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

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SESSION

ROBOTICS AND MECHATRONIC

NOVEMBER 11 | 1:00 PM - 2:30 PM | SESSION CHAIR: ALI NASR, UNIVERSITY OF WATERLOO, CANADA

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

CDSR 151

Time: 2:00 - 2:15

Presenter: Yue Yuan, The Graduate Institute of Design Science, Tatung University, Taiwan

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

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

CDSR 154

Time: 2:15 - 2:30

Presenter: Bin Wei, Algoma university, Canada

Authors: Bin Wei

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