

FINAL PROGRAM

WiSEE **2019**

**7th IEEE International Conference on
Wireless for Space and Extreme Environments**

Oct 16-18, 2019 - Ottawa, ON, CANADA

Organizing Committee

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Detailed Program and Proceedings Access

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Prakash Patnaik, NRC Aerospace Research Ctr

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Reza Zekavat, Worcester Poly. Institute



Welcome Message from Prime Minister of Canada



PRIME MINISTER • PREMIER MINISTRE

October 16–18, 2019

Dear Friends:

I am pleased to extend my warmest greetings to everyone attending the 2019 IEEE International Conference on Wireless for Space and Extreme Environments.



This conference brings together engineers, scientists, government officials and industry leaders to share information on the latest advancements in wireless sensing and communication technology. I am certain that delegates will benefit from the educational sessions and the networking opportunities available, and will leave ready to take on new challenges.

I would like to thank the Institute of Electrical and Electronic Engineers for putting together an informative and stimulating program for everyone in attendance.

On behalf of the Government of Canada, I offer my best wishes for an enjoyable and productive meeting in Ottawa.

Sincerely,

The Rt. Hon. Justin P. J. Trudeau, P.C., M.P.
Prime Minister of Canada

Disclaimer: The message is one of greetings and good wishes for significant achievements by an individual or a group celebrating a milestone. It should not be construed as an endorsement by the Government of Canada or its employees of the views or activities of the event organizers or of its members.

General Chair's Welcome Message



On behalf of the Organizing Committee of the 2019 IEEE International Conference on Wireless for Space and Extreme Environments (WiSEE), I want to welcome all of you to our lovely city of Ottawa, the capital of Canada. This is the seventh WiSEE. It has grown, matured and became a successful conference. It is on its way to become one of IEEE's major conferences thanks to the dedication of a small group of volunteers.

Most of the Organizing Committee (OC) members are my colleagues from the University of Ottawa and Carleton University. I thank them all for accepting my invitation to be part of the OC. We also have several OC members from the USA and Europe. I thank them all as well for their excellent work. As the conference moves to a new venue each year, the local organizers change but the Steering Committee (SC) stays the same and acts as the memory of the conference. I thank the SC members for making this conference possible.

Keynote speeches are important in every conference. We thank all of our keynote speakers for accepting our invitations and for their excellent speeches. Each workshop requires immense amount of work to organize. We thank all our workshop organizers for their valuable contributions and for making this conference a success. Technical Program Committee (TPC) members and in particular TPC Co-chairs invested a great amount of their time in reviewing the papers to ensure a high quality program is delivered to all attendees. I am thankful for their efforts and dedication. I also would like to thank the National Research Council of Canada for organizing two technical tours of their research facilities. Most importantly, I would also like to thank all of you who contributed to this event: all authors, participants, sponsors and patrons. I hope you will remember this event for its wonderful program and presentations and that you will experience some Canadian hospitality in Ottawa. Enjoy the conference.

IEEE WiSEE 2019 General Chair

Dr. Abbas Yongacoglu (University of Ottawa)

Technical Program Co-chairs' Message



On behalf of the Technical Program Committee, we would like to extend our warmest welcome to all of the attendees of the 7th IEEE International Conference on Wireless for Space and Extreme Environments (IEEE WiSEE). We are very pleased to host you at this beautiful and relaxing city, Ottawa. While you enjoy the rich program we prepared for you, we hope you will have some opportunity to explore the beauties of this city and observe the wonderful fall colors of October. IEEE WiSEE 2019, has four technical sessions in the areas of RF, Propagation and Antenna Design, Sensors: Design, Fabrication, and Systems, Machine Learning for Wireless Systems and Sensing Platforms and Wireless Systems: Theory and Applications, in addition to a poster session. The technical program is complemented by six world-class keynotes as well as four workshops focusing on cutting-edge topics. We hope you will enjoy and share the knowledge from all the presented papers.

We received a total of 58 paper submissions, out of which 14 papers have been accepted for oral presentation, yielding an acceptance rate of 24%. Each paper has been reviewed rigorously and received at least three peer reviews. We also have six extended abstracts accepted to the poster session. In addition to the main track, we are confident that Passive Wireless Sensor Technology, Space Solar Power, Integrated Ground-Air-Space Borne Communications and Sensor Technologies for Applications in Aerospace Extreme Environment workshops will attract your interest immensely with their excellent programs including excellent invited presentations.

We would like to take the opportunity to thank all the authors for submitting their high-quality work to IEEE WiSEE 2019. Your hard work sets the bar high for the next year's edition. Next, we'd like to thank greatly to our Technical Committee Members, Workshop Chairs and Reviewers who have put countless hours to prepare an outstanding program for you. Finally, the conference wouldn't be possible without the efforts of each and every Organizing Committee and Steering Committee Member. We sincerely hope you will enjoy IEEE WiSEE 2019 and have a wonderful experience in this beautiful city at this wonderful time of the year. We look forward to seeing you in Ottawa.

IEEE WiSEE 2019 Technical Program Chairs

Dr. Melike Erol-Kantarci (University of Ottawa)

Dr. Abolfazl Razi (Northern Arizona University)

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Concordia University, University of Maine, Carleton University, University of Ottawa

Keynote Speakers

Wed Oct 16, 2019

Thu Oct 17, 2019

Fri Oct 18, 2019

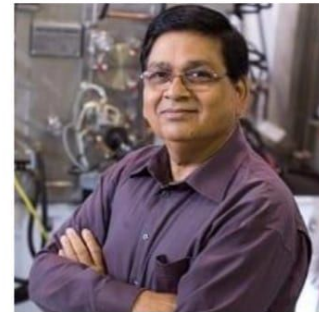
AM



Prof. Roshdy Hafez
Carleton University
Topic: 5G Powerful Engine for the Connected Society



Prof. Mason Peck
Cornell University
Topic: Autonomous Gram-Scale Spacecraft: Flight Experiments and Future Architectures



Dr. Prakash Patnaik
NRC Aerospace, Ottawa
Topic: Sensors in Aerospace Extreme Environment

PM



Dr. Marco Mezzavilla
NYU Polytech
Topic: Public Safety Communications above 6 GHz: Challenges and Opportunities



Dr. Richard Schwerdtfeger
NSF, SBIR/STTR
Topic: The National Science Foundation's Seedfund – Non-dilutive funding for deep tech start-ups and small businesses



Thursday Banquet Speaker
Mr. Giorgio Magistrati
ESA ESTEC
Topic: Wireless in Space as seen by ESA and WiSEE 2020 Invitation

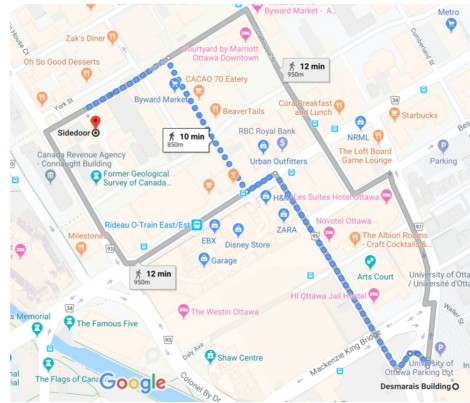
WiSEE 2019 Program Overview						
Wednesday, October 16, 2019						
	7:00	8:30	Breakfast and Registration			
	8:30	9:10	Keynote: Roshdy Hafez, Carleton (Room A)			
	9:10	9:30	Break			
			Room A	Room B	Room C	Room D
S1	9:30	11:30	PWST-A	PWST-B	WiSEE	SSP
	11:30	12:30	Lunch			
	12:30	13:10	Keynote: Marco Mezavilla, NYU (Room A)			
	13:10	13:30	Break			
S2	13:30	15:30	PWST-A	PWST-B	WiSEE	SSP
	15:30	16:00	Break			
S3	16:00	17:30	PWST-A	PWST-B	WiSEE	SSP
	18:00	20:00	Reception: Sidedoor Restaurant, 18b York St, Ottawa, ON			
Thursday, October 17, 2019						
	7:00	8:00	Breakfast and Registration			
	8:00	8:40	Keynote: Mason Peck, Cornell (Room A)			
	8:40	9:00	Break			
S4	9:00	11:30	PWST-A	PWST-B	WiSEE	SSP
	11:30	12:30	Lunch			
	12:30	13:10	Keynote: Richard Schwerdtfeger, NSF (Room A)			
	13:10	13:30	Break			
S5	13:30	15:30	PWST-A	PWST-B	IGASC	SSP
	15:30	16:00	Break			
S6	16:00	17:30	PWST-A	PWST-B	IGASC	SSP
	18:30	20:30	Banquet Keynote: Giorgio Magistrati, ESA			
Friday, October 18, 2019						
	7:00	8:00	Breakfast and Registration			
	8:00	8:40	Keynote: Prakash Patnaik (Room A)			
	8:40	9:00	Break			
S7	9:00	10:30	PWST-A	PWST-B	STA	SSP Tutorials
	10:30	10:45	Break			
S8	10:45	12:00	PWST-A 1-on-1	PWST-B 1-on-1	STA	SSP Tutorials
	12:00	12:45	Box Lunch/ Boarding Tour bus			
S9	13:00	14:40	PWST-A Panel #1	PWST-A Panel #2	Canadian National Research Council (NRC) Tours - Sold Out	
	14:40	15:00	Break			
S10	15:00	16:30	PWST-A Panel #3	PWST-A Panel #4		

Reception - Wed Oct 16 at 6pm

Sidedoor Restaurant

18b York St, Ottawa, ON K1N 5T5

10 min walk from Desmarais Building

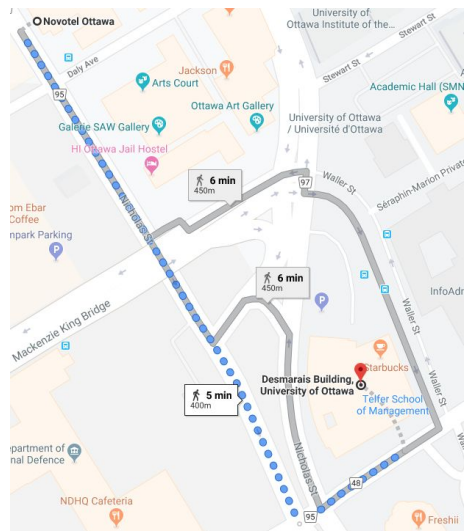


Banquet - Thu Oct 17 at 6:30pm

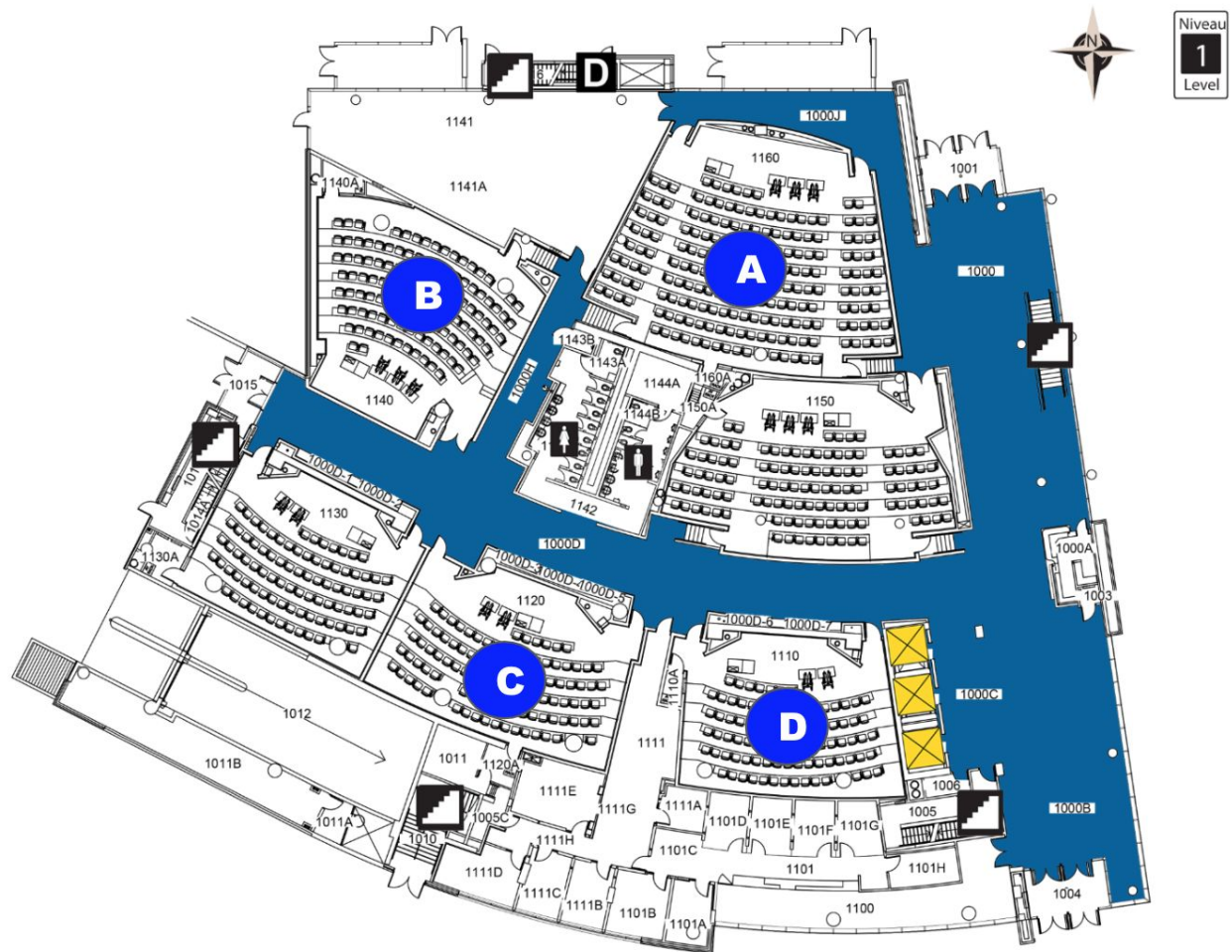
Desmarais Building, U. of Ottawa

55 Laurier Ave E, Ottawa

4 min walk from Novotel Hotel



Floor Plan (Desmarais Building, U. of Ottawa)



Room A = DMS1160 (PWST Sessions A and WiSEE keynotes)

Room B = DMS1140 (PWST Sessions B)

Room C = DMS1120 (WiSEE Wed/Thu, IGASC Thu, STA Fri)

Room D = DMS1110 (SSP Workshop)

Banquet is on the 12th floor of the same building.

Detailed Program

Wednesday, October 16

Wednesday, October 16

8:00 - 5:30

WiSEE Posters: Poster Session

Chair: Melike Erol-Kantarci (University of Ottawa, Canada)

Experimental Study of Neighbour Node Discovery in Wireless Sensor Networks

[Ameer Al-Shammaa](#) and [Alan Stocker](#) (University of Leicester, United Kingdom (Great Britain))

Electric Beam-Steering Leaky-Wave Antenna for Space Communications

[Nima Javanbakht](#) and [Barry Syrett](#) (Carleton University, Canada); [Jafar Shaker](#) (Communications Research Centre Canada, Canada); [Rony E. Amaya](#) (Carleton University, Canada)

Fault Tolerant Auto-Correlation Based on PVTAR Affected D-Flip Flops

[Kris Niederkleine](#) and [Steffen Paul](#) (University of Bremen, Germany)

Poster Abstract: A Convolutional Neural Network Based Solution for Pipeline Leak Detection

[Olakunle Fola Ibitoye](#), [Omair Shafiq](#) and [Ashraf Matrawy](#) (Carleton University, Canada)

Error Rate Performance of Dual-hop Relay Systems for Generalized Fading Channels and Energy Harvesting Nodes

[Imtiaz Ahmed](#) (Marshall University, USA); [Imran Ahmed](#) (University of British Columbia, USA); [Md. Jahangir Hossain](#) (University of British Columbia, Okanagan, Canada); [Sonia Sadeque](#) (Medimpact Corporation, USA)

Optimal Antenna Size for Rain Degraded Digital DTH Links in Tropical Location

[Obiseye Obiyemi](#) (Department of Electrical and Electronic Engineering, Osun State University, Nigeria); [Tunji Ibiyemi](#) (University of Ilorin, Nigeria)

Wednesday, October 16

8:30 - 9:10

Keynote1A: 5G Powerful Engine for the Connected Society

Prof. Roshdy Hafez, Carleton University

Room A

Chair: Abbas Yongacoglu (University of Ottawa, Canada)

Wednesday, October 16

9:30 - 10:00

PWST S0-A: PWST Workshop Overview

Room A

Chair: Omar Torres (NASA LaRC, USA)

9:30 PWS Workshop Overview and SBIR Solicitation

[George Studor](#) (NASA Engineering and Safety Center, USA); [Omar Torres](#) (NASA LaRC, USA); [Donald Malocha](#) (Pegasense, LLC & University of Central Florida, USA)

Wednesday, October 16

9:30 - 11:30

WiSEE S1: RF, Propagation and Antenna Design

Room C

Chair: Jan Budroweit (German Aerospace Center (DLR), Germany)

9:30 *In-Situ TID Testing and Characterization of a Highly Integrated RF Agile Transceiver for Multi-Band Radio Applications in a Radiation Environment*

[Jan Budroweit](#) (German Aerospace Center (DLR), Germany); [Mattis Jaksch](#) (German Aerospace Center, Germany)

10:00 *Low Power Antenna Design for Free Space Optical Communications Inside the Ariane 5 VEB*

[Christian Sanchez](#) and [Steffen Paul](#) (University of Bremen, Germany); [Johannes Sebald](#) (Ariane Group, Germany)

10:30 *Scattering of EM Waves from a Rotating Dispersive Very Good Conducting Cylinder*

[Esmail M M Abuhdima](#), [Gurcan Comert](#), [Ahmed Elqaouaq](#), [Ashleigh Reeves](#) and [Williams Kellen](#) (Benedict College, USA)

11:00 *Use of a Switched Beam Antenna in a Star Wireless Sensor Network for Data Collection: Neighbor Discovery Problem*

[Guéréguin Der Sylvestre Sidibé](#) (Université de Clermont Auvergne, France); [Aurelien Surier](#) (Universite Clermont-Auvergne / LIMOS CNRS, France); [Raphaël Bidaud](#) (Université de Clermont Auvergne, France); [Gilles Delisle](#) (LRTCS-UQAT, Canada); [Nadir Hakem](#) (Université du Québec en Abitibi Témiscamingue & LRTCS Research Laboratory Télébec in Underground Communications, Canada); [Marie Françoise Servajean](#) (LIMOS, France); [Badr Rmili](#) (CNES, France); [Gerard Chalhoub](#) (University Clermont Auvergne, France); [Michel Misson](#) (Université de Clermont Auvergne, France)

SSP S1: An Introduction to SSP

Darel Preble, Space Solar Power Institute

Room D

Chair: Darel Preble (Space Solar Power Institute, USA)

Wednesday, October 16

10:00 - 11:30

PWST S1-A: Propulsion & Flight Test

Room A

10:00 *Inflight Parachute Measurement Challenge*

[Jared Daum](#) (NASA, USA)

10:30 *AFRC Wireless Development Plan and Needs for Flight Test Instrumentation*

[Richard Hang](#) (NASA AFRC, USA)

11:00 *Instrumentation Challenges and Wireless Sensor Opportunities at the NRC Flight Test Laboratory*

[Kenneth Hui](#) (National Research Council Canada, Canada)

PWST S1-B: Optical and EM Backscatter

Room B

10:00 *Extension of Interrogation Zone of Backscatter Sensors with Multiple Interrogators*

Jin Mitsugi (Keio University, Japan)

10:30 *Large Area Multi-Wavelength with Detection Range from FIR to UV - Application for FSO Measurement*

Rainer Martini (Stevens Institute of Technology, USA)

11:00 *UHF RFID-based Additively Manufactured Passive Wireless Sensor for Detecting Micrometeoroid and Orbital Debris Impacts*

Eduardo Rojas (Embry-Riddle Aeronautical University, USA)

Wednesday, October 16

12:30 - 1:10

Keynote1P: Public Safety Communications above 6 GHz: Challenges and Opportunities

Dr. Marco Mezzavilla, NYU

Room A

Chair: Ali Abedi (University of Maine, USA)

Wednesday, October 16

1:30 - 3:30

PWST S2-A: Industry & IOT - Needs and Applications

Room A

1:30 *Oak Ridge National Labs Research and Development - What's New for PWS*

Timothy McIntyre (ORNL, USA)

2:00 *Wireless Concrete Sensors for IOT Solutions for the Construction Industry*

Mustafa Salehi (Giatec, Canada)

2:30 *From Passive to Active Sensing: Relay-Assisted Wireless Energy Transfer*

Sonia Naderi, Somayeh Khosroazad and [Ali Abedi](#) (University of Maine, USA)

3:00 *Hybrid Direct-Write 3D Printing of 3D Volumetric Electrical Circuits*

Raymond C Rumpf (University of Texas at El Paso, USA)

PWST S2-B: Flexible Sensors and Antennas - Technology

Room B

1:30 *Damage Characterization Using Nanocomposite Sensors and Tomographic Methods*

Hanjoo Lee and [Kenneth J Loh](#) (University of California, San Diego, USA)

2:00 *Textile Antennas for the Space Environment*

Ami Yang (NASA, USA)

2:30 *NASA In-Space Manufacturing Flexible Sensing Development*

Curtis Hill (United States & NASA, USA)

3:00 *Passive Sensors and Antennas Using Stretchable Conductors*

Jacob Adams (North Carolina State University, USA)

WiSEE S2: Sensors: Design, Fabrication, and Systems

Room C

Chair: Praveen Shankar (California State University Long Beach, USA)

1:30 **Gain Margin of a First Order System with Two Delayed Sensors**

[Praveen Shankar](#) (California State University Long Beach, USA); [Lonnie Labonte](#) (University of Maine Orono, USA); [Ali Abedi](#) (University of Maine, USA)

2:00 **Maximizing Throughput in Deterministic and Low Latency Intra-Spacecraft UWB Sensor Networks**

[Andre Lübken](#) and [Martin Drobczyk](#) (German Aerospace Center (DLR), Germany)

2:30 **UHF RFID-based Additively Manufactured Passive Wireless Sensor for Detecting Micrometeoroid and Orbital Debris Impacts**

[Carlos Roberto Mejias-Morillo](#), [Audrey Gbaguidi](#) and [Dae Won Kim](#) (Embry-Riddle Aeronautical University, USA); [Sirish Namilae](#) (Embry-Riddle Aeronautical University, USA); [Eduardo Rojas](#) (Embry-Riddle Aeronautical University, USA)

SSP S2: Antenna Technologies for Space

Room D

Chair: Reza Zekavat (WPI, USA)

1:30 **Spacenna Flatness and Error Correction**

[Abigail Kragt Finnell](#) (IUPUI, USA); [Sawyer Powell](#) (Purdue University, USA); [Penghui Heng](#) (IUPUI, USA); [Peter J Schubert](#) (Indiana University-Purdue University Indianapolis & Green Fortress Engineering, USA)

2:00 **Antenna Arrangement Verification for Low Sidelobe Levels**

[Abigail Kragt Finnell](#) (IUPUI, USA); [Peter J Schubert](#) (Indiana University-Purdue University Indianapolis & Green Fortress Engineering, USA)

Wednesday, October 16 4:00 - 5:30

PWST S3-A: Aircraft & Helicopter - Needs and Applications

Room A

4:00 **What We Want to Sense: Manufacturing and In-Service Aircraft Structure**

[Gary Georgeson](#) (Boeing NDE and Measurement, USA)

4:30 **Passive Wireless SAW Sensors, Microsystems and Applications**

[Marco Aimi](#) (GE Research, USA)

5:00 **Remaining Passive is Not an Option: Inspiring Youth Through the Canadian Aero/Space Skills Network**

[Christopher Kitzan](#) (Canada Aviation and Space Museum, Canada)

PWST S3-B: EVA & Surface Systems - Needs and Applications

Room B

4:00 **Opportunities for Wireless Accessories on the Lunar Exploration Spacesuit**

[Chris Gerty](#) (NASA, USA)

4:30 **Lunar Lighthouse (Using PWS)**

[Michael E Evans](#) (NASA & Texas A&M University, USA)

WiSEE S3: Machine Learning for Wireless Systems and Sensing Platforms

Room C

Chair: Amir Aghdam (Concordia University, Canada)

4:00 *Classifying Poisoning Attacks in Software Defined Networking*

Thomas A. V. Sattolo, Saumil Macwan, Michael Vezina and [Ashraf Matrawy](#) (Carleton University, Canada)

4:22 *Design of a Semi-Supervised Learning Strategy Based on Convolutional Neural Network for Vehicle Maneuver Classification*

[Abdelhamid Mammeri](#) (National Research Council Canada, Canada); [Yiheng Zhao](#), [Azzedine Boukerche](#) and [Abdul Jabbar Siddiqui](#) (University of Ottawa, Canada); [Barry Pekilis](#) (National Research Council Canada, Canada)

4:45 *A Machine Learning Approach to the Estimation of Near-Optimal Electrostatic Force in Micro Energy-Harvesters*

[Masoud Roudneshin](#) (Concordia University, Canada); [Kamran Sayrafian](#) (NIST, USA); [Amir Aghdam](#) (Concordia University, Canada)

5:07 *Effective Learning Algorithms for Search and Rescue Missions in Unknown Environments*

[Masoud Roudneshin](#) (Concordia University, Canada); [Amir Mohammad Moradi Sizkouhi](#) (Amirkabir University of Technology, Iran); [Amir Aghdam](#) (Concordia University, Canada)

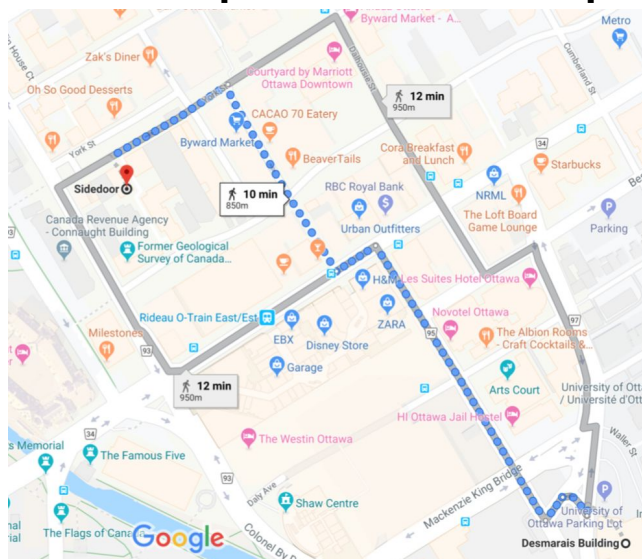
SSP S3: SSP Keynote: Satellite Development and Launching, a Hands on Experiment

Greg Durgin, Georgia Tech

Room D

Chair: Darel Preble (Space Solar Power Institute, USA)

WiSEE Reception - Wed Oct 16 at 6pm



Sidedoor Restaurant: 18b York St, Ottawa, ON K1N 5T5

Thursday, October 17

Thursday, October 17 8:00 - 8:40

Keynote2A: Autonomous Gram-Scale Spacecraft: Flight Experiments and Future Architectures

Prof. Mason Peck, Cornell

Room A

Chair: Fatemeh Afghah (Northern Arizona University, USA)

Thursday, October 17 9:00 - 11:30

PWST S4-A: Unmanned Vehicles - Needs and Applications

Room A

9:00 **Requirements for Autonomous Unmanned Aerial Passive Wireless Multi-Modal Sensing Systems for Energy Applications**

[Aaron Wilson](#) (University of Tennessee & Oak Ridge National Laboratory, USA)

9:30 **Autonomous Drones**

[Ian Glenn](#) (ING Robotic, Canada)

10:00 **Break**

10:30 **Seeker 1.0 Prototype Free Flying Inspection Robot Mission Results and Next Steps**

[Brian Banker](#) (NASA, USA)

11:00 **AI, Machine Perception and Advanced Sensing in Autonomous Robotic Systems Used in Industrial Asset Inspection**

[Saul Aaron Singer](#) (Automodality, Inc., USA)

PWST S4-B: SAW, BAW, MEMS - Technology

Room B

9:00 **Wireless High-Temperature Surface Acoustic Waves Sensors: Material Challenges**

[Thierry Aubert](#) (CentraleSupélec, France)

9:30 **Integrated Circuits for Extreme Environments Using Gallium Nitride Transistors**

[Jean-Paul Noël](#) and [Alireza Loghmany](#) (National Research Council Canada, Canada)

10:00 **Break**

10:30 **Passive Wireless Sensors for Power Distribution Grid Monitoring**

[Jacqueline Hines](#) (Applied Sensor R&D Corporation, USA)

11:00 **Miniature Langasite-based BAW/SAW Resonant Sensors in Harsh Environments**

[Haifeng Zheng](#) (Univ of North Texas, USA)

WiSEE S4: Wireless Systems: Theory and Applications

Room C

Chair: Abdelhamid Mammeri (National Research Council Canada, Canada)

9:00 *IR-UWB Study for Intra-Satellite Wireless Communication*

[Johta Awano](#) (Japan Aerospace Exploration Agency, Japan); [Astushi Tomiki](#) (Japan Aerospace Exploration Agency & Institute of Space and Astronomical Science, Japan); [Hisashi Nishikawa](#) (GIT-Japan Inc., Japan)

9:30 *Millimeter Wave Power Transfer to A Multi-rotor Helicopter*

[Koichi Mori](#) (Nagoya University, Japan)

10:00 *Real-Time Separation of Collided Signals in Multiple Zones Backscatter Communication System*

[Jin Mitsugi](#) and [Hiromu Kamei](#) (Keio University, Japan); [Yuusuke Kawakita](#) (Kanagawa Institute of Technology, Japan); [Haruhisa Ichikawa](#) (The University of Electro-Communications, Japan)

SSP S4: Microwave Power Transfer

Room D

Chair: Darel Preble (Space Solar Power Institute, USA)

9:00 *The Interdependence of Space Solar Power Satellite Aperture Design and Orbital Mechanics*

[Erik Centeno](#) (Georgia Institute of Technology & The Propagation Group, USA); [Evan Shi](#) and [Cheng Qi](#) (Georgia Institute of Technology, USA); [Gregory Durgin](#) (Georgia Tech, USA)

9:30 *Design of a Circular-Patch Reflectarray for Microwave Power Transfer and Communications in Space*

[Emily M. Backer](#) (Viasat, USA); [Mohammad Alhassoun](#) (Georgia Institute of Technology, USA); [Gregory Durgin](#) (Georgia Tech, USA)

10:00 *The Interdependence of Space Solar Power Satellite Aperture Design and Orbital Mechanics*

[Gregory Durgin](#) (Georgia Tech, USA)

10:30 *All-Electric Aircraft Localization Performance Study via Space Solar Power Satellite Constellation*

[Shu Ting Goh](#) (National University of Singapore, Singapore); [Reza Zekavat](#) (WPI, USA)

Thursday, October 17

12:30 - 1:10

Keynote2P: Non-dilutive Funding Opportunities for Deep Technology Companies from the National Science Foundation

Dr. Rick Schwerdtfeger, NSF

Room A

Chair: George Studor (Analytical Mechanics Associates, USA)

Thursday, October 17

1:30 - 3:30

PWST S5-A: WAIC Systems (4.2 - 4.4 GHz) - Technology and Users

Room A

1:30 WAIC SAW SDR System and New Technology

[Donald Malocha](#) (Pegasense, LLC & University of Central Florida, USA)

2:00 Development of a Wireless Avionics Intra-Communication Test Bed for Electromagnetic Radiation Measurements

[Eduardo Rojas](#) (Embry-Riddle Aeronautical University, USA)

2:30 Extreme (-150C to +1800C) Passive Wireless Resonant Sensors: Ground Test to Commercial Flight Instrumentation

[Reamonn Soto](#) (Sensatek Propulsion Technology, Inc, USA)

3:00 Status of Standards and Requirements for Wireless Avionic Intra-aircraft Communication(WAIC) Systems for Commercial Aircraft

[Dave Redman](#) (AVSI/ Texas A&M, USA)

PWST S5-B: Thru-Structure Sensing - Technology

Room B

1:30 Through-metal Communications and Power Transfer

[Juan Romero-Arguello](#) (University of California Davis, USA); [Anh-Vu Pham](#) (University of California at Davis, USA)

2:00 Applications for COTS Magneto-Inductive Systems: 'Rockphone', 'Diver Comm', 'Terra Comm'

[Pierre Poulain](#) (Ultraelectronics-Maritime Systems, USA)

2:30 Frequency Selective Surface-Based Sensing for Concurrent Temperature and Strain Measurement: Benefits, Challenges, and Applications

[Kristen M Donnell](#) (Missouri University of Science and Technology, USA); [Mahboobeh Mahmoodi](#) (Missouri University of Science and Technology & Applied Microwave Nondestructive Testing Laboratory, USA); [Doyle Motes](#) and [Russell Austin](#) (Texas Research Institute, USA)

3:00 Wireless Passive Microstrip Patch Antenna Temperature Sensor in High-Temperature Applications

[Cheryl Xu](#) (NCSU, USA); [Fuh-Gwo Yuan](#) (North Carolina State University, USA)

IGASC S5: IGASC Keynote and Panel Session

Keynote: Prof. Halim Yanikomeroglu, Carleton University, Panelists: Dr. Mohammad Mozaffari, Ericsson USA, Dr. Arashmid Akhawain, Huawei Canada, Prof. Gunes Karabulut-Kurt, Visiting Professor at Carleton University, Istanbul Technical University, Dr. Jean-Daniel Medjo Me Biomo, Carleton University

Room C

Chair: Irem Bor-Yaliniz (Carleton University, Canada)

SSP S5: Special Topics on Commerce and Economy

Darel Preble and Gail Tverberg, Space Solar Power Institute

Room D

Chair: Reza Zekavat (WPI, USA)

Thursday, October 17

4:00 - 5:30

PWST S6-A: Spaceflight Sensors - Needs and Applications

Room A

4:00 Technology Development in the High Operating Temperature Technology (HOTTech) Project

Gary W. Hunter (NASA Glenn Research Center, USA)

4:30 Instrumentation Needs of Inflatable Space Structures

Douglas A Litteken (NASA & Johnson Space Center, USA); Thomas Jones (NASA Langley Research Center, USA)

5:00 Overview of the Large-Scale Test Capabilities of NASA Glenn Research Center at Plum Brook Station

Richard Evans (NASA GRC, USA)

PWST S6-B: Medical & Flight Crew - Technology

Room B

4:00 Distributed Sensing for Mechanical and Biomedical Systems

Haiying Huang (University of Texas at Arlington, USA)

4:30 The Future of near Patient Testing Using Passive Wireless BAW Sensors

Bryan Bothwell (Qorvo Biotechnologies)

5:00 Biometric Wireless Sensor Systems: Current Implementations and Future Needs

Michel Lortie (MDA Corp, USA)

IGASC S6: IGASC Workshop Presentations

Room C

Chair: Irem Bor-Yaliniz (Carleton University, Canada)

4:00 Flying Ad Hoc Networks: Evaluation of a Delay-Reducing Routing Protocol for Multi-Beam Directional Antennas

Jean-Daniel Medjo Me Biomo, Thomas Kunz and Marc St-Hilaire (Carleton University, Canada)

4:30 Case Study of Radio Coverage in Complex Indoor Environments for 5G Communications

Kedjar Khaled (Université du Québec en Outaouais, Canada); Larbi Talbi (University of Quebec - Outaouais, Canada)

5:00 UAV Assisted Ground User Localization

Saliha Büyükçorak and Gunes Karabulut Kurt (Istanbul Technical University, Turkey); Abbas Yongacoglu (University of Ottawa, Canada)

5:30 Diversity Based Coverage Improvement for Air-to-Ground Wireless Channels

Nirmani Hewa Ranchagoda and Sithampanathan Kandeepan (RMIT University, Australia); Ming Ding (Data 61, Australia); Akram Al-Hourani and Karina Mabell Gomez (RMIT University, Australia)

SSP S6: Photovoltaic Technologies

Henry Brandhorst, Carbon-Free Energy LLC

Room D

Chair: Darel Preble (Space Solar Power Institute, USA)

Thursday, October 17

6:30 - 8:30

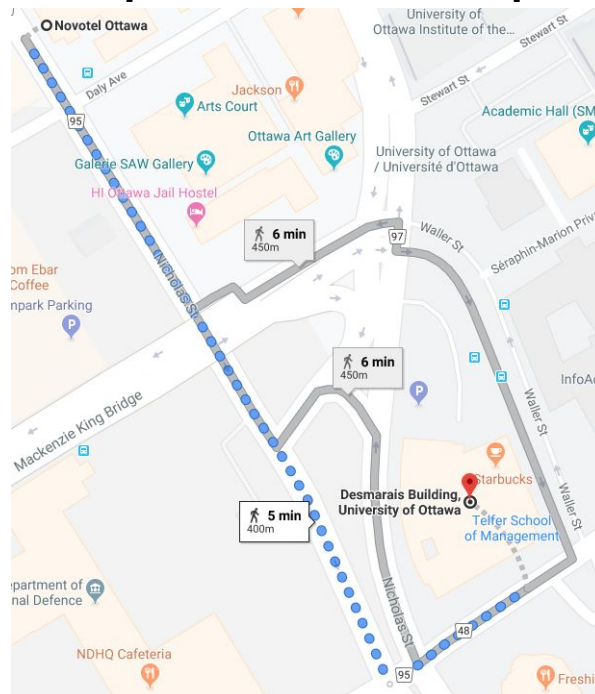
KNBQT: Wireless in Space as seen by ESA and WiSEE 2020 Invitation

Giorgio Magistrati, ESA

Room A

Chair: Ali Abedi (University of Maine, USA)

Banquet - Thu Oct 17 at 6:30pm



12th floor, Desmarais Building, U. of Ottawa: 55 Laurier Ave E, Ottawa

Friday, October 18

Friday, October 18 8:00 - 8:40

Keynote3A: Sensors in Aerospace Extreme Environment

Dr. Prakash Patnaik, NRC Aerospace

Room A

Chair: Abbas Yongacoglu (University of Ottawa, Canada)

Friday, October 18 9:00 - 10:30

PWST S7-A: Misc PWS Technology

Room A

9:00 **Chipless RFID: Design Advances and Measurement Challenges in Identification and Sensing Applications**

[Katelyn Brinker](#) (Missouri University of Science and Technology, USA); [Reza Zoughi](#) (Missouri University of Science and Technology, USA)

9:30 **Passive Micro-wave Energy Harvesting for Space Applications**

[Gregory Durgin](#) (Georgia Tech, USA)

10:00 **REVEALS Activities in Exploration, Graphene-based Antistatic Coatings Real-time 2D Meta-material Radiation Detectors**

[Zach Seibers](#) (Georgia Institute of Technology, USA)

PWST S7-B: Industry - Technology

Room B

9:00 **Hybrid Wireless Ultrasonic Sensor Networks with Temperature Compensated Thickness Measurement**

[Shani Lu](#) (Inductosense, United Kingdom (Great Britain))

9:30 **Building the Bridge Between Engineering and Business**

[Christopher Cook](#) (ECM Space, Canada)

STA S7: STA Workshop Session I

Room C

Chair: Prakash Patnaik (NRC, Canada)

9:00 **Ultrasonic Wireless Sensor Network for Human Habitation in Deep Space Mission**

[Hendra Kesuma](#) (AES Aircraft Elektro/ Elektronik-System GmbH & Bremen Dynamics and University of Bremen, Germany); [Sallar Ahmadi-Pour](#) (University of Bremen, Germany); [Amber Joseph](#) (New Zealand Student's Space Association, New Zealand); [Hans-Juergen Zimmerman](#) (Airbus Defence and Space, Germany); [Patrick Weis](#) (Ariane Group, Germany)

SSP S7: Tutorial: Localization Technologies for Space - Part I

Reza Zekavat

Room D

Chair: Reza Zekavat (WPI, USA)

Friday, October 18 10:45 - 12:00

PWST S8-A: One-on-One Session

Room A

PWST S8-B: One-on-One Session

Room B

STA S8: STA Workshop Session II

Room C

Chair: Prakash Patnaik (NRC, Canada)

10:45 Quantum Sensing Technologies for Applications in Aerospace Extreme Environments

[Bhashyam Balaji](#) (DRDC-Ottawa, Canada)

11:30 Extreme (-150C to +1800C) Passive Wireless Resonant Sensors: Ground Test to Commercial Flight Instrumentation

[Reamonn Soto](#) (Sensatek Propulsion Technology, Inc, USA)

SSP S8: Tutorial: Localization Technologies for Space - Part II

Reza Zekavat

Room D

Chair: Reza Zekavat (WPI, USA)



IEEE.ORG/WISEE

Attendee

Matrawy, Prof. Ashraf
 Zekavat, Prof. Seyed (Reza)
 Kunz, Prof. Thomas
 Karabulut Kurt, Dr. Gunes
 Erol-Kantarci, Dr. Melike
 Hafez, Mr. Roshdy
 Sayrafian, Dr. Kamran
 Balaji, Dr. Bhashyam
 Durgin, Prof. Gregory
 Bouida, Mr. Zied
 Mitsugi, Dr. Jin
 Donnell, Dr. Kristen
 Zhao, Dr. Yanxiao
 Mezzavilla, Dr. Marco
 Abuhdima, Dr. Esmail
 Hines, Dr. Jacqueline
 McIntyre, Mr. Timothy
 Mozaffari, Mr. Mohammad
 Masmoudi Ghodhbane, Dr. Raouia
 Pham, Prof. Anh-Vu
 Malocha, Prof. Donald
 Mammeri, Dr. Abdelhamid
 Simate, Mr. Zilole
 Shankar, Dr. Praveen
 Ranjan, Dr. Alok
 Tverberg, Ms. Gail
 Bor-Yaliniz, Mrs. Irem
 Aubert, Mr. Thierry
 Rumpf, Prof. Raymond
 Adams, Prof. Jacob
 Hewa Ranchagoda, Mrs. Nirmani
 Afghah, Dr. Fatemeh
 Drobczyk, Mr. Martin
 Budroweit, Mr. Jan
 Brinker, Ms. Katelyn
 Huang, Prof. Haiying
 Centeno, Mr. Erik
 Rojas, Dr. Eduardo
 Raza, Mr. Mudassir
 Sajadul Islam, Mr. Chowdhury
 Boyd, Mr. Darren
 Wilson, Mr. Aaron
 Sanchez, Mr. Christian
 Lübken, Mr. Andre
 Rasool, Dr. Jamal
 Hang, Mr. Richard
 Guettache, Mr. Farid
 Malocha, Dr. Svetlana
 Torres, Mr. Omar
 Romero-Arguello, Mr. Juan
 Hill, Mr. Curtis
 Javanbakht, Mr. Nima

Affiliation

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 Missouri University of Science and Technology
 South Dakota School of Mines and Technology
 NYU Tandon School of Engineering
 Benedict College
 Applied Sensor R&D Corporation
 ORNL
 Ericsson Research, Santa Clara, CA, USA.
 Safran Tech, Safran Sensing Systems
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 Virginia Commonwealth University
 Space Solar Power Institute
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 University of Texas at El Paso
 North Carolina State University
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Soto, Mr. Reamonn	Sensatek Propulsion Technology, Inc
Sidibé, Mr. Guéréguin Der Sylvestre	Université de Clermont Auvergne
Misson, Mr. Michel	Université de Clermont Auvergne
Awano, Dr. Johta	Japan Aerospace Exploration Agency
Elwazziki, Mr. Hamza	Dnipro University of Technology
Ibitoye, Mr. Olakunle	Carleton University
Sholanke, Mr. Joseph Idowu	Doklantech Engineering Company
Singh, Mr. Gurdeep	Thapar Institute of Engineering & Technology
Egbanubi, Mr. Oluwafemi	University of Ilorin
Lu, Dr. Shani	Inductosense
Niederkleine, Mr. Kris	University of Bremen
Kesuma, Dr. Hendra	AES Aircraft Elektro/ Elektronik-System GmbH
Mejias-Morillo, Mr. Carlos	Embry-Riddle Aeronautical University
Khaled, Mr. Kedjar	Université du Québec en Outaouais
Schubert, Prof. Peter	Indiana University-Purdue University Indianapolis
Kragt Finnell, Mrs. Abigail	IUPUI
Ahmed, Dr. Imtiaz	Marshall University
Githenya, Mr. Alex	Gihts Tech
Noël, Dr. Jean-Paul	National Research Council Canada
Kalonji, Mr. Erick	Vaal University of Technology
Litteken, Mr. Douglas	NASA
Evans, Dr. Michael	NASA
Roudneshin, Mr. Masoud	Concordia University
Patnaik, Dr. Prakash	NRC
Daum, Mr. Jared	NASA
Seibers, Zack	Georgia Institute of Technology
Bothwell, Bryan	Qorvo
Yang, Ms. Ami	NASA
Loghmany, Dr. Alireza	National Research Council Canada
Singer, Mr. Saul	Automodality, Inc.
Yuan, Dr. Fuh-Gwo	North Carolina State University
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Akhavain, Mr. Arashmid	Huawei Technologies Canada Co., Ltd.
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Poulain, Dr. Pierre	Ultraelectronics-Maritime Systems
Zheng, Dr. Haifeng	Univ of North Texas
Aimi, Dr. Marco	GE Research
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LaPlante, Mr. Daniel	Benedictine College
Backer, Ms. Emily	Viasat
Lee, Mr. Hanjoo	University of California, San Diego
Hui, Mr. Kenneth	National Research Council Canada



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Topics of interest

- Artificial intelligence and deep learning in space
- Wireless sensors, systems, and networks
- Delay and disruption tolerant networks
- Network architectures, middleware integration, and data management
- Big data processing and data fusion techniques
- Wireless privacy, security and routing techniques
- Localization, detection, classification & tracking
- Antenna design and processing
- Integrated vehicle systems and robotics
- RFID devices and systems
- Propagation modeling and channel description
- Optical communication systems
- Availability, certification, and spaceflight qualification for wireless devices and systems
- Multi-carrier systems, spread spectrum techniques, cognitive radio networks, emerging technologies
- High speed, low latency, multi-stream data techniques (full-duplex, LTE, MIMO)
- Space cyber security

Submission formats

- Full papers (6 pages 2-col IEEE Style)
- Posters (1 page 1-col IEEE Style)
- Presentations (1 page Workshop Specific)

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Important Deadlines:
Submission: July 1, 2020
Acceptance: Aug 15, 2020
Final papers: Sept 15, 2020
Early registration ends: Sept 15, 2020

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