ICASSE 2019

International Conference on Aerospace System Science and Engineering
Toronto, Ontario, CANADA • July 30–August 1

WELCOME TO THE INTERNATIONAL CONFERENCE ON AEROSPACE SYSTEM SCIENCE AND ENGINEERING.

Dear ICASSE 2019 participants:

On behalf of the Organizing and Program Committees, I would like to welcome you to Toronto, Ontario, and Canada. We hope that you enjoy the conference and find the program that has been selected to be interesting and stimulating. The conference would not be possible without your participation.

Chris Damaren
Director, University of Toronto Institute for Aerospace Studies
ICASSE 2019 Organizing and Program Committees Chair

WIFI ACCESS

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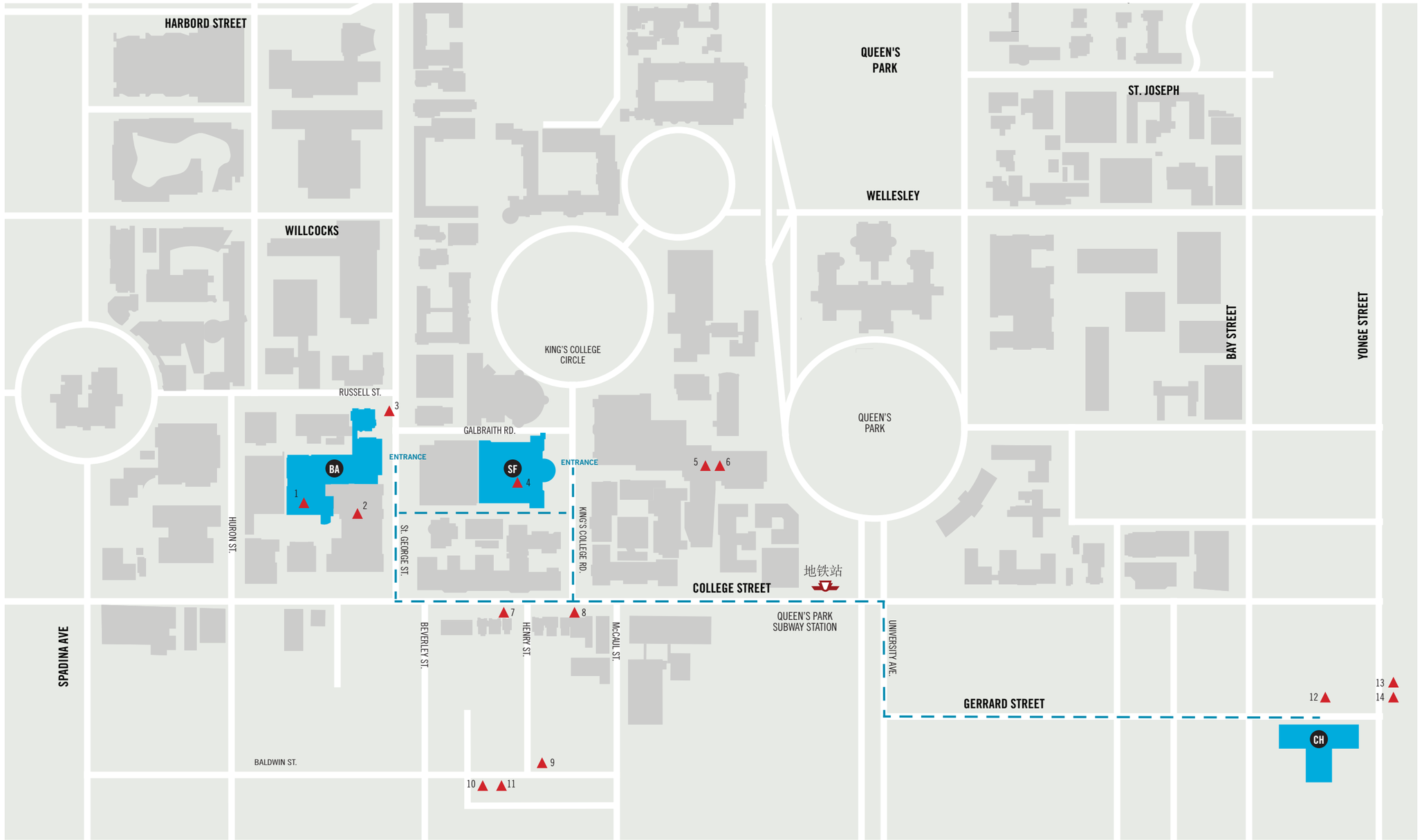
Russia

PLENARY SPEAKERS

Hugh H.T. Liu
Dmitry Strelets
Xingqun Zhan

LOCAL MAP



BA **Bahen Centre**

40 St George St, Toronto, ON M5S 2E4

SF **Sandford Fleming Building**

10 King's College Rd, Toronto, ON M5S 3G4

CH **Chelsea Hotel**

33 Gerrard St W, Toronto, ON M5G 1Z4

Food & Beverage ▲

1 The Cube, *sandwiches, salads, snacks, drinks*

2 Second Cup, *sandwiches, snacks, coffee, tea*

3 Food trucks, *burgers, fries, fast food* (中快餐)

4 Sandford Fleming pit, basement level, *sandwiches, salads, snacks, Indian fast food, drinks*

5 Medical Science Building cateferia, *various vendors*

6 Starbucks

7 Subway, *sandwiches*

8 Spicy Mafia, *Chinese soups* (麻辣烫)

9 Cafe La Gaffe, *sit-down restaurant* (西餐)

10 Kinton Ramen, *Japanese noodles*(日式拉面)

11 Hana Korea, *Korean sit-down restaurant*

12 Scaddabush, *Italian sit-down restaurant* (西餐)

13 Boston Pizza

14 Banh Mi Boys, *Vietnamese-style sandwiches* (越式三明治)

DAY 1
Tuesday
July 30

8:15–9:00 Registration
9:00 Introduction
9:10 Welcome
9:20 Plenary Speaker
Hugh H.T. Liu
9:50 Session 1
10:30 Coffee Break
11:00 Session 2
12:00 Lunch
13:30 Session 3
14:50 Coffee Break
15:20 Session 4
17:00 Break
18:30 Welcome Dinner
20:00 End of Day 1/3

Locations

Bahen, Room 1180
9:00–12:00
Bahen, Room 1170
13:30–17:00
Chelsea Hotel
18:00–20:00

VISION PROCESSING

Session 1
Chair: Chris Damaren

9:50
[71] **Fusion Object Detection with Convolutional Neural Network**

Ying Ya, Han Pan, Zhongliang Jing, Xuanguang Ren, Lingfeng Qiao

10:10
[77] **Unsupervised Satellite Image Classification Based on Partial Transfer Learning**

Jian Hu, Hongya Tuo, Chao Wang, Haowen Zhong, Han Pan, Zhongliang Jing

10:30 Coffee Break

ATTITUDE CONTROL

Session 2
Chair: Jianzhe Huang

11:00
[27] **Control Strategy Design for Forced Fly-Around of Spacecraft Against the Tumbling Target Based on Differential Geometric Principle**

Yuanhe Liu, Yangang Liang, Jianyong Zhou, Jiutian Li

11:20
[36] **Spacecraft Attitude Maneuver Using Fast Terminal Sliding Mode Control Based on Variable Exponential Reaching Law**

Yuedong Wu, Shufan Wu, Deren Gong, Zeyu Kang, Xiaoliang Wang

11:40
[116] **Fault Isolation of Reaction Wheels Onboard 3-Axis Controlled In-Orbit Satellite Using Ensemble Machine Learning Techniques**

Afshin Rahimi, Atilla Saadat

12:00 Lunch

NAVIGATION 1

Session 3
Chair: Xiaoliang Wang

13:30
[9] **An Integrated Fault Detection and Exclusion Scheme to Support Aviation Navigation**

Yawei Zhai, Xingqun Zhan, Jin Chang

13:50
[52] **Unscented Kalman Filter Based Method for Spacecraft Navigation Using Resident Space Objects**

Matthew Driedger, Michael Rososhansky, Philip Ferguson

14:10
[24] **Ultra-Rapid Direct Satellite-Selection Algorithm for Multi-GNSS**

Cheng Chi, Xingqun Zhan, Tong Wu, Xin Zhang

14:30
[10] **On Ground Test of an IMU/GNSS Receiver for Atmospheric Re-Entry Vehicle Applications**

Xiaoliang Wang, Shufan Wu, Deren Gong, Zhe Su

14:50 Coffee Break

TURBOMACHINERY

Session 4
Chair: Xiaohua Liu

15:20
[39] **Stall Margin Enhancement of Aeroengine Compressor with a Novel Type of Alternately Swept Blades**

Chao Fang, Yizhi Zhang, Yidan Li, Xiaohua Liu

15:40
[56] **Aerothermal Characteristics of Transonic Over-Tip Leakage Flow for Different Tip Geometries with Cooling Injection**

Mingxing Tang, Shaopeng Lu, Yunkai Liu, Jinfang Teng

16:00
[40] **A Theoretical Model to Predict the Stall Inception of an Aeroengine Compressor with Micro Tip Injection**

Xiaohua Liu, Jinfang Teng, Jun Yang, Chao Fang

16:20
[106-1] **Improving the cooling air supply system for the HPT blades of high-temperature GTE**

Andrey Minchenko, Valeriy Nesterenko, Ivan Malinovsky, Revanth Reddy A.

16:40
[111] **Investigation into the Wear Process of Laser Cladding from TiC Multilayer Coating for GTE Shrouded Blade Platforms**

Pavel Kleimenov, Leonid Lesnevskiy, Maxim Lyakhovetsky, Alexey Ionov

DAY 2
Wednesday
July 31

Poster display all day

9:00 Plenary Speaker

Dmitry Strelets

9:30 Session 5

10:30 Coffee Break

11:00 Session 6

12:00 Lunch

13:30 Session 7

14:50 Coffee Break

15:20 Session 8

17:00 End of Day 2/3

Location

Bahen, Room 1180
9:00–17:00

ACOUSTICS

Session 5
Chair: Wei Ma

9:30
[6] **Comparison of Deconvolution Algorithms of Phased Microphone Array for Sound Source Localization in an Airframe Noise Test**

Jiayu Wang, Wei Ma

9:50
[16] **Analytical Solutions to a Rijke Tube System with Periodic Excitations Through a Semi-Analytical Approach Disturbance**

Jianzhe Huang

10:10
[25] **Arrangement Optimization of Phased Microphone Arrays Based on Deconvolution Algorithm**

Xuyang Wang, Wei Ma

10:30 Coffee Break

NAVIGATION 2

Session 6
Chair: Yawei Zhai

11:00
[74] **Real-Time Integrity Monitoring for Civil Aviation with Improved Navigation Performance**

Jin Chang, Xingqun Zhan, Yawei Zhai

11:20
[26] **Analysis on GNSS MBOC Pilot and Data Signal Joint Tracking**

Xue Wang, Zhenghong Zhu, Yao Guo, Xiaochun Lu

11:40
[106] **Space Vehicle Orbital Determination Performance Analysis Considering GNSS Side Lobe Signals**

Xiaoya Liu, Xingqun Zhan, Jihong Huang, Cheng Chi

12:00 Lunch

CONTROL SYSTEMS

Session 7
Chair: Zhongliang Jing

13:30
[14] **Vibration Suppression of Large Deployable Space Structures Based on Viscous Damping**

Min Luo, Zhenghong Zhu, Qinghua Xu, Yaobin Wang, Wenbo Luo

13:50
[91] **Dynamics and stabilization of flexible spacecraft structures with magnetic coil-pair actuators**

Bryan Pawlina, Christopher J. Damaren

14:10
[44] **Leader-Follower Formation Control and Obstacle/Collision Avoidance with Dynamic Constraints**

Shaoyang Mu, Pingfang Zhou

14:30
[54] **Detumbling a Non-Cooperative Target with Unknown Inertial Parameters using a Space Robot Under Control Input Magnitude Constraint**

Rabindra Gangapersaud, Guangjun Liu, Anton H.J. de Ruiter

14:50 Coffee Break

STRUCTURES

Session 8
Chair: Craig Steeves

15:20
[13] **New Model and Analytical Review of Approaches to Buckling Problem Investigation of Structurally-Anisotropic Aircraft Panels Made from Composite Materials**

L M Gavva

15:40
[4] **Control Parameters Design of Spacecraft Formation Flying via Modified Biogeography-Based Optimization**

Tianfu Chen, Dexin Zhang, Xiaowei Shao

16:00
[46] **The Numerical Simulation of Fatigue Crack Propagation in Inconel 718 Alloy at Different Temperatures**

Chi Duan, Xiuhua Chen

16:20
[76] **Acoustic Fatigue Research for Honeycomb Sandwich Structure with Impact Damage Based on Vibro-Acoustic Coupling Analysis**

Ruowei Li, Haitao Zhao, Mingqing Yuan, Ji'an Chen

16:40
[115] **Practical Considerations for Filtering in SIMP Topology Optimization**

Daniel Pepler, Craig Steeves

DAY 3
Thursday
August 1

8:40 Plenary Speaker

Xingqun Zhan

9:10 Session 9

10:10 Coffee Break

10:40 Session 10

12:00 Lunch

13:30 Session 11

14:50 Coffee Break

15:20 Session 12

16:40 Awards Ceremony

16:50 Closing Remarks

17:00 End of Day 3/3

Location

Sandford Fleming
Room 1105
9:00–17:00

TRAJECTORY GENERATION

Session 9
Chair: Hugh Liu

9:10
[17] **Comparison of the Legendre-Gauss Pseudospectral and the Hermite-Legendre-Gauss-Lobatto Methods for Low Thrust Spacecraft Trajectory Optimization**

Sanjeev Narayanaswamy, Christopher J. Damaren

9:30
[80] **Real-Time Trajectory Generation for a Swarm of Quad-rotor UAVs Using Custom Solver**

Min Prasad Adhikari, Anton H. J. de Ruiter

9:50
[107] **Real-Time Trajectory Generation Trading-Off Control Effort and Flight Time for Hovering Vehicles**

Weihong Yuan, Luis Rodrigues

10:10 Coffee Break

SYSTEMS ENGINEERING

Session 10
Chair: Maksim Shkurin

10:40
[57] **Combining Autoencoder with Similarity Measurement for Aircraft Engine Remaining Useful Life Estimation**

Mengni Wang, Yuanxiang Li, Honghua Zhao, Yuxuan Zhang

11:00
[49] **Deorbiter CubeSat Mission Design**

Houman Hakima, M. Reza Emami

11:20
[102] **Understanding and Representing Requirements for Aerospace Systems Engineering**

Yong Chen, Qingyun Chen, Yi Wang, Haoming Li, Busheng Wu

11:40
[61] **Modelling and Simulation of the Power Subsystem of a LEO satellite**

Varsha Parthasarathy, Philip Ferguson

12:00 Lunch

FLUID MECHANICS

Session 11
Chair: Fang Chen

13:30
[32] **The Evolution of Wingtip Vortex Wandering – A Stability Analysis Based on Stereo PIV Experiment**

Siyi Qiu, Yang Xiang, Hong Liu

13:50
[37] **Recent Research Progress on Fluid-Thermal-Structural Coupling Analysis in Hypersonic Flows**

Yingxuan Qin, Fang Chen, Hong Li

14:10
[58] **Effect of Nucleation and Icing Evolution on Run-Back Freezing of Supercooled Water Droplet**

Mingming Sun, Weiliang Kong, Fuxin Wang, Hong Liu

14:30
[90] **Development of Ryerson's First Hyperloop Pod for Systems Using a Modular Approach**

Mohammed M. Khan

14:50 Coffee Break

STRUCTURAL DYNAMICS AND NOVEL CONCEPTS

Session 12
Chair: Bing Zhao

15:20
[95] **Experimental Study on Structural Behaviors of Envelope Structure Model of Flexible Airship**

Bing Zhao, Yi Li, Wujun Chen, Jianwen Chen, Zhongliang Jing

15:40
[43] **A General Method for Dynamics Modeling of Flexible Aircraft**

Yishu Liu, Qifu Li, Bei Lu

16:00
[33] **Revisited: Machine Intelligence in Heterogeneous Multi Agent Systems**

Kaustav Jyoti Borah, Rajashree Talukdar

16:20
[87] **Dynamic Behavior of Partial Space Elevator with Parallel Tethers and Multiple Climbers**

Gangqiang Li, Zhenghong Zhu

POSTERS

On display July 31 in the Bahen Centre atrium

[1] **Design and Stress Analysis for Aircraft Structure Repair Beyond Specification**

Chen Chen, Li Kang

[18] **Concepts for Morphing Airfoil Using Novel Auxetic Lattices**

Zeyao Chen, Xian Wu, Zhe Wang, Jianwang Shao

[19] **An Improved Deep Convolutional Neural Network to Predict Airfoil Lift Coefficient**

Boping Yu, Liang Xie, Fuxin Wang

[20] **Transceiver Pseudolite Carrier Frequency Self-Alignment Closed-Loop System**

Tong Wu, Xingqun Zhan, Xin Zhang

[22] **Remote Sensing Image Change Detection and Location Based on Dynamic Level Set Model**

Yunkai Liu, Yuanxiang Li, Yongshuai Liu, Jiawei Liu

[28] **Virtual Simulation Experiment System for Spacecraft Orbital Principle and Its Teaching Application**

Jiutian Li, Yangang Liang, Zheng Qin, Jianyong Zhou

[31] **Optimization of the Supersonic Engine Inlet**

Koval Svetlana

[38] **Verification of GPS III and QZSS L1C Signal Joint Positioning Performance with Software Defined Receiver**

Xiang Huo, Xue Wang, Sen Wang, Xiaofei Chen, Jing Ke

[50] **Study on Impact Behavior of Composite Sandwich Structure with Different Interlayer Angles**

Yuyang Peng, Xiuhua Chen

[68] **Influence of Non-Uniform Inlet Velocity and Non-Uniform Temperature Distribution on Turbine Blade**

Xiuhe Zhang, Fang Chen

[70] **Analysis of Elevation-Dependent Pseudo-Range Variation Characteristics for GPS III New Signal In-Orbit Testing Phase Based on Measurements with a High Gain Antenna**

Huihui Shi, Xiaochun Lu, Xue Wang, Yongnan Rao, Meng Wang

[78] **Positioning and Timing Campaign Based on Chinese Area Positioning System (CAPS)**

Yang Zhang, Yu Su, Wenfang Jing, Xiaochun Lu

[81] **Data Augmented Design of Turbulence Modeling**

Yizhi Zhang, Weipeng Li

[85] **Robust Orbital Boost Maneuver of Spacecraft by Electrodynamic Tethers**

Jinyu Liu, Gangqiang Li, Zhenghong Zhu, Xingqun Zhan

[88] **Spacecraft Anomaly Detection via Transformer Reconstruction Error**

Hengyu Meng, Yuxuan Zhang, Yuanxiang Li, Honghua Zhao

[99] **Altitude Ignition by Reducing IDT at Low Pressure with Additive**

Zhijia Chen, Xiaobin Huang, Hong Liu

[108] **The Selection of Wall Cooling Channel Geometry for Selective Laser Melting Production**

Pavel Starikov, Alexey Ionov, Igor Borovik

NOTES

HOSTED BY:

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