

ICFFTS 2020 **ICAERA** 2020

(ICFFTS'20) & (ICAERA'20) PROGRAM

September 9 - 10, 2020 | Virtual Conference

The organizing committees of the two co-located events, ICFFTS'20 and ICAERA'20, have decided to allow registrants of either conference to attend sessions from both events. As a result, we encourage attendees to study the program and attend the sessions which they may find relevant/interesting.

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

**SCIENTIFIC
COMMITTEE CHAIR**

SEPTEMBER 9

SEPTEMBER 10

ICFFTS'20 & ICAERA'20 SCIENTIFIC COMMITTEE CHAIR:



Dr. Boguslaw Kruczek

University of Ottawa, Canada
Conference Chair

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SEPTEMBER 9

8:00 AM - 9:00 AM	Registrations
9:00 AM - 9:10 AM	Official Opening
	Dr. Boguslaw Kruczek, University of Ottawa, Canada
9:10 AM - 10:10 AM	ICAERA PLENARY LECTURE
	<u>Degradation Analysis and Simulation of Li-ion Batteries</u> Dr. Wei Lu, University of Michigan, USA
10:10 AM - 11:00 AM	ICFFTS KEYNOTE LECTURE
	<u>Soft Sensing And Fuzzy Logic Based Control For Industrial Processes</u> Dr. Chamil Abeykoon, The University of Manchester, UK
11:00 AM - 11:10 AM	Break
11:10 AM - 12:00 PM	ICFFTS KEYNOTE LECTURE
	<u>Nanofluids: Applications and Challenges</u> Dr. Mohammad Hojjat, University of Isfahan, Iran

SEPTEMBER 9

12:00 PM - 12:35 PM

SESSION

Experimental Fluid Dynamics And Heat Transfer

12:35 PM - 12:55 PM

Break

12:55 PM - 1:45 PM

ICFFTS KEYNOTE LECTURE

Strain Tuning High Thermal Conductivity in Semiconductors and Polymers

Dr.Jivtesh Garg, University of Oklahoma, USA

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KEYNOTE LECTURE

SEPTEMBER 9 | 9:10 AM - 10:10 AM | SESSION CHAIR: DR. BOGUSLAW KRUCZEK,
UNIVERSITY OF OTTAWA, CANADA



Titles: Degradation Analysis and Simulation of Li-ion Batteries

[Dr. Wei Lu, University of Michigan, USA](#)

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Dr. Wei Lu is Professor at the Mechanical Engineering Department, University of Michigan, Ann Arbor, and Director of research center: Advanced Battery Coalition for Drivetrains. He uses multi-scale and multi-physics approaches to analyze battery degradation. He has over 150 publications in peer-reviewed journals and over 100 presentations and invited talks in international conferences, universities and national labs including Harvard, MIT and Stanford. He also has plenty of publications in conference proceedings, encyclopedias and book chapters. Prof. Lu was the recipient of many awards including the CAREER award by the US National Science Foundation; the Robert J. McGrattan Award by the American Society of Mechanical Engineers; Elected Fellow of the American Society of Mechanical Engineers; Robert M. Caddell Memorial Research Achievement Award; Faculty Recognition Award; Department Achievement Award; Novelis/CoE Distinguished Professor Award; CoE Ted Kennedy Family Faculty Team Excellence Award; CoE George J. Huebner, Jr. Research Excellence Award; and the Gustus L Larson Memorial Award by American Society of Mechanical Engineers. He was invited to the National Academies Keck Futures Initiative Conference multiple times.

KEYNOTE LECTURE

SEPTEMBER 9 | 10:10 AM - 11:00 AM | SESSION CHAIR: DR. BOGUSLAW KRUCZEK,
UNIVERSITY OF OTTAWA, CANADA



Titles: Soft Sensing And Fuzzy Logic Based Control For Industrial Processes

[Dr. Chamil Abeykoon, The University of Manchester, UK](#)

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Chamil Abeykoon received the B.Sc. (Hons.) degree in mechanical engineering from the University of Peradeniya, Sri Lanka, in 2007, with the award of best performance in mechanical engineering, and the Ph.D. degree in mechanical engineering from the Queens University Belfast, U.K., in 2011, with several publications, in which one of his publications received the Young Author Best Paper Award from the IEEE in 2011. After completing the Ph.D. degree, he briefly worked as a Lecturer in Mechanical Engineering with the University of Peradeniya, Sri Lanka, a Research Fellow with the University of Bradford, U.K., and a Lecturer of Engineering with the Glyndwr University, U.K., before joining the UoM. He is currently with the Faculty of Science and Engineering, School of Materials, University of Manchester (UoM).

For more information, please visit: <https://icffts.com/program/>

KEYNOTE LECTURE

SEPTEMBER 9 | 11:10 AM - 12:00 PM | SESSION CHAIR: DR. BOGUSLAW KRUCZEK,
UNIVERSITY OF OTTAWA, CANADA



Titles: Nanofluids: Applications and Challenges

Dr. Mohammad Hojjat, University of Isfahan, Iran

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Mohammad Hojjat is an Assistant professor of chemical engineering department at University of Isfahan (UI-Iran). Dr. Hojjat received his B.Sc. and M.Sc. degrees in chemical Engineering from Sharif University of Technology (Tehran, Iran). He obtained his PhD from Isfahan University of Technology in 2010. Dr. Hojjat has published about 22 refereed journal papers and about 30 conference proceeding papers. Dr. Hojjat's researches focuses on Transport Phenomena in Nanofluids, Adsorption, and Computational Intelligence in Chemical Engineering.

SESSION

EXPERIMENTAL FLUID DYNAMICS AND HEAT TRANSFER

AUGUST 20 | 12:00 PM - 12:35 PM | SESSION CHAIR: DR. BOGUSLAW KRUCZEK, UNIVERSITY OF OTTAWA, CANADA

Titles: Theoretical and Experimental Investigations for the Virtual Mass of a Taylor Bubble

ICFFTS 122

Time: 12:00 PM - 12:15 PM

Presenter: Abdullah Kendoush, Augusta Technical College, USA

Authors: Abdullah Kendoush, Warren Overton

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Titles: Experiments on supercritical flow instability in two vertical parallel channels

ICFFTS 125

Time: 12:15 PM - 12:30 PM

Presenter: Inderjit Singh, University of Manitoba, Canada

Authors: Inderjit Singh, Vijay Chatoorgoon

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Titles: The Impact of the Location of Temperature Sensors on the Accuracy of Transient-State Temperature Distribution Identification

ICFFTS 124

Time: 12:30 PM - 12:35 PM

Presenter: Nikolai Efimov-Soini, Cracow University of Technology, Institute of Thermal and Process Eng., Poland

Authors: Nikolai Efimov-Soini

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KEYNOTE LECTURE

SEPTEMBER 9 | 12:55 PM - 1:45 PM | SESSION CHAIR: DR. BOGUSLAW KRUCZEK,
UNIVERSITY OF OTTAWA, CANADA



Titles: Strain Tuning High Thermal Conductivity in Semiconductors and Polymers

Dr. Jivtesh Garg, University of Oklahoma, USA

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Dr. Jivtesh Garg is an Associate Professor in the School of Aerospace and Mechanical Engineering at University of Oklahoma. His work focuses on design of semiconductor and polymer materials for thermal management and energy conversion applications. He obtained his Ph.D from Massachusetts Institute of Technology (MIT), Cambridge in 2011. Before that he performed research in the field of thermal management at General Electric, Research and Development at Niskayuna, NY. He obtained his Masters from University of Minnesota in 2002. He is the recent recipient of NSF CAREER award.

SEPTEMBER 10

9:00 AM - 9:50 AM

ICFFTS KEYNOTE LECTURE

Generalist Scholarship and Engineering Education

Dr. Thomas Adams, Rose-Hulman Institute of Technology, USA

9:50 AM - 10:40 AM

ICFFTS KEYNOTE LECTURE

Droplet Heating and Evaporation: Simple Models of Complex Processes

Dr. Sergei Sazhin, University of Brighton, UK

10:40 AM - 10:50 AM

Break

10:50 AM - 11:40 AM

ICAERA KEYNOTE LECTURE

A Bilevel Equalizer to Boost the Capacity of Second Life Li Ion Batteries

Dr. Ngalula S. Mubenga, University of Toledo, USA

11:40 AM - 1:00 PM

SESSION

Energy Optimization

1:00 PM - 1:20 PM

Lunch

1:20 PM - 2:05 PM

SESSION

Heat And Mass Transfer

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KEYNOTE LECTURE

SEPTEMBER 10 | 9:00 AM - 9:50 AM | SESSION CHAIR: DR. BOGUSLAW KRUCZEK,
UNIVERSITY OF OTTAWA, CANADA



Titles: Generalist Scholarship and
Engineering Education

Dr. Thomas Adams, Rose-Hulman Institute
of Technology, USA

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Thomas Adams (or “Dr. Thom” as his students call him) received his BS in mechanical engineering from Rose-Hulman Institute of Technology, USA and his MS and PhD in mechanical engineering from Georgia Institute of Technology, USA. Currently the Herman A. Moench Distinguished Professor of Mechanical Engineering at Rose-Hulman Institute of Technology, he has taught over fourteen different courses and is one of a very small number of faculty to receive both the Institute’s Outstanding Teacher and Outstanding Scholar Awards. He has won best paper awards for his work in engineering education and technical research alike. The topic of his dissertation concerned single-phase and two-phase heat transfer in microchannels, representing some of the seminal work in the field. He has since become a leading educator in the field of micro-electro-mechanical systems (MEMS) and has authored a first of its kind textbook on the subject, aimed at an audience of undergraduate technical majors, regardless of their particular field. His current research focuses on what he calls “generalist scholarship,” in which physical systems and processes are purposely modeled using the most fundamental concepts and methods available in order to ascertain physical trends and correlations that often go unnoticed.

KEYNOTE LECTURE

SEPTEMBER 10 | 9:50 AM - 10:40 AM | SESSION CHAIR: DR. THOMAS ADAMS, ROSE-HULMAN INSTITUTE OF TECHNOLOGY, USA



Titles: Droplet Heating and Evaporation:
Simple Models of Complex Processes
[Dr. Sergei Sazhin, University of Brighton, UK](#)

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Professor Sergei Sazhin received his PhD (Physics) from St Petersburg State University (Russia) in 1977. Currently, he is working as Professor of Thermal Physics at the University of Brighton (UK). He has developed and delivered lecture courses in many subjects including Advanced Computational Fluid Dynamics for 4th year engineering students. Since 2000, he has supervised 14 PhD students to successful completion. He is the author of more than 550 publications, including 3 monographs, 9 book chapters and 243 papers in international refereed journals. His current ISI Web of Science (Google Scholar) citation index is 35 (46). He has been a Fellow of the Institute of Physics (UK) since 1994, was Chairman of the scientific committee of the 27th European Conference on Liquid Atomization and Spray Systems (University of Brighton, 2016), a Leadership in Research Excellence Awardee at the University of Brighton (2017), and has been a Member of the Scientific Council of the International Centre for Heat and Mass Transfer (ICHMT) since 2018. His previous research focused on the development of asymptotic models for wave propagation in a hot plasma, and modelling of the processes in thermodynamically non-equilibrium systems (gas lasers). His current research interests focus on the numerical and asymptotic modelling of fluid dynamics, heat/mass transfer, and combustion processes in fuel and water sprays.

KEYNOTE LECTURE

SEPTEMBER 10 | 10:50 AM - 11:40 AM | SESSION CHAIR: DR. THOMAS ADAMS, ROSE-HULMAN INSTITUTE OF TECHNOLOGY, USA



Titles: A Bilevel Equalizer to Boost the Capacity of Second Life Li Ion Batteries
Dr. Ngalula S. Mubenga, University of Toledo, USA

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Dr. Ngalula Sandrine Mubenga, PE is an Assistant Professor at the Engineering Technology Department at the University of Toledo (UT) [1] (www.Drmubenga.com [2]), Ohio, USA where she received her Bachelor's (2005), Master's (2008) and Doctorate (2017) degrees in Electrical Engineering with honors. Her research areas include battery management Systems, electric vehicles, and renewable energy systems. Her battery research won the 2018 IEEE National Aerospace & Electronics Conference Best Poster Award in the USA, while her hybrid electric vehicle research won the 2008 University of Toledo EECS Dept. Most Outstanding Thesis award. Prior to this role, Sandrine was the Manager of Electrical Engineering at UT where she helped manage a \$65 million budget. For more information please visit: <https://icffts.com/program>

SESSION

ENERGY OPTIMIZATION

SEPTEMBER 10 | 11:40 AM - 1:00 PM | SESSION CHAIR: DR. THOMAS ADAMS,
ROSE-HULMAN INSTITUTE OF TECHNOLOGY, USA

Titles: Prediction Of Performance For An Ejector Refrigeration Cycle Working With R245fa Using Artificial Neural Network

ICFFTS 120

Time: 11:40 AM - 11:55 AM

Presenter: Mehdi Bencharif, Phd candidate, Canada

Authors: Mehdi Bencharif, Sergio Croquer, Sebastien Poncet, Said Zid, Hakim

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Titles: Carbon Dioxide – Based Energy Storage System: A Thermodynamic Approach

ICFFTS 126

Time: 11:55 AM - 12:10 PM

Presenter: Sébastien Poncet, Mechanical engineering department, Université de Sherbrooke, Canada

Authors: Sébastien Poncet, Jeanne Lamotte

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Titles: Salt Impregnated Matrices For Water-vapour Adsorption-based Thermal Energy Storage

ICFFTS 127

Time: 12:10 PM - 12:25 PM

Presenter: Curtis Strong, University of Ottawa, Canada

Authors: Curtis Strong, Suboohi Shervani, Ye Carrier, F. Handan Tezel

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SESSION

ENERGY OPTIMIZATION

SEPTEMBER 10 | 11:40 AM - 1:00 PM | SESSION CHAIR: DR. THOMAS ADAMS, ROSE-HULMAN INSTITUTE OF TECHNOLOGY, USA

Titles: Simulation of Water Vapor Adsorption in a Fixed-bed Column with Silica Gel Material for Thermal Energy Storage Applications

ICFFTS 128

Time: 12:25 PM - 12:40 PM

Presenter: Ye Carrier, University of Ottawa, Canada

Authors: Curtis Strong, Ye Carrier, F. Handan Tezel

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Titles: Transient 3D Numerical Simulation of Horizontal Earth Water Heat Exchanger (EWHE)

ICAERA 113

Time: 12:40 PM - 12:45 PM

Presenter: Mohammad Hamdan, American University of Sharjah Sharjah, UAE

Authors: Hanin Atwany, Mohammad O. Hamdan, Bassam A. Abu-Nabah, Mousa Attom, Abdul Hai Alami

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Titles: Is Bacterial biobutanol production a viable solution?

ICAERA 114

Time: 12:45 PM - 1:00 PM

Presenter: Jules Thibault, University of Ottawa, Canada

Authors: Jules Thibault

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SESSION

HEAT AND MASS TRANSFER

SEPTEMBER 10 | 1:20 PM - 2:05 PM | SESSION CHAIR: DR. JULES THIBAUT,
UNIVERSITY OF OTTAWA, CANADA

Titles: 2D Frost Growth and Densification Model in Counterflow Heat Exchanger

ICFFTS 121

Time: 1:20 PM - 1:35 PM

Presenter: Alexandre Coulombe, Université de Sherbrooke, Canada

Authors: Alexandre Coulombe, Hachimi Fellouah, Sebastien Poncet

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Titles: Two Approaches to Mathematical Modelling of
Hating/Evaporation of a Multi-component Liquid Film

ICFFTS 130

Time: 1:35 PM - 1:50 PM

Presenter: Sergei S. Sazhin, University of Brighton, UK

Authors: Ming Jia, Yanzhi Zhang, Oyuna Rybdylova, Sergei S. Sazhin

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Titles: Mini Review on the Effects of Concentration Polarization in
Forward Osmosis and Pressure-retarded Osmosis Processes

ICFFTS 129

Time: 1:50 PM- 2:05 PM

Presenter: Daryoush Emadzadeh, University of Ottawa, Canada

Authors: Boguslaw Kruczek, Daryoush Emadzadeh

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