

# ST2020 Technical Program

Version Feb 25, 2020

We take this opportunity to thank and welcome everyone to Sustaining Tomorrow 2020. Your efforts and contributions have made this conference a success. We hope that you will have a wonderful time in the Southernmost city of Canada, and we look forward to welcoming you back for a similar conference next year.

Sincerely,  
ST2020 Committee

## Website

Please refer to <https://st2020.ca> for updates and details.

The banquet will be on Thursday June 18. Please advise us of any dietary restriction, special needs, etc. by emailing to [TELab@uwindsor.ca](mailto:TELab@uwindsor.ca)

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## Notes:

This conference is **restricted to paid delegates**. If you have not registered, please do so using your credit card at

<https://webapps.uwindsor.ca/conferences/TandE/index.php>

Remember to save the receipt as you checkout, and email a copy to [TELab@uwindsor.ca](mailto:TELab@uwindsor.ca).

Please limit your presentation to 15 minutes, leaving 3 minutes for discussion, and 2 minutes for changeover. In case of a no-show, the next presentation(s) will be advanced accordingly.

Selected papers will be considered for a Refereed Conference Proceedings, a Reviewed Book Chapter, and/or a Special Journal Issue. Some of our past successes include:

Complementary Resources for Tomorrow – Proceedings of Energy & Resources for Tomorrow 2019, Editors: A. Vasel & D.S-K. Ting, Springer, 2020, <https://www.springer.com/gp/book/9783030388034>.

Environmental Management of Air, Water, Agriculture, and Energy, Editors: A. Vasel & D.S-K. Ting, Taylor & Francis / CRC, 2020.

Sustaining Resources for Tomorrow, Editors: J. A. Stagner & D.S-K. Ting, Springer, 2020, <https://link.springer.com/book/10.1007/978-3-030-27676-8>.

Energy Generation and Efficiency Technologies for Green Residential Buildings, Editors: D.S-K. Ting & R. Carriveau, The Institute of Engineering and Technology, London, UK, 2019.





<https://www.sciencedirect.com/journal/sustainable-energy-technologies-and-assessments/special-issue/1017RPQ0S0W>

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## Notation

\* presenting author

## Paper/presentation Status

-  presentation / abstract only
-  full-length paper under review, in addition to confirmed presentation
-  full-length paper, pending finalized version from the author(s), in addition to confirmed presentation
-  pending visa approval and/or registration confirmation

<b>Thursday, June 18</b>	
08:00–08:30	<b>Centre of Engineering Innovation (CEI) Atrium</b> Breakfast & Registration Package Pickup
08:30–08:40	<b>Welcome and Opening Remarks (Room 1101 CEI)</b> Rupp Carriveau, President, VP Academic, VP Research, Dean of Engineering
08:40–09:20	<b>Plenary Lecture #1 (Room 1101 CEI)</b> Sustaining Tomorrow: Predictions, Prophecies & Precautions – Graham T. Reader
	<b>Solar, Room 1101. Co-Chairs: Lindsay Corneal &amp; Paul Henshaw</b>
09:20–09:40	Solar-1. Novel optical cavities for enhanced thermophotovoltaic systems Nima Talebzadeh*, Paul O’Brien Advanced Materials for Sustainable Energy Technology Lab, Department of Mechanical Engineering York University, Toronto, Ontario, Canada
09:40–10:00	Solar-2. Experimental set-up for evaluating the efficacy of self-cleaning coatings Chris Pung*, Heidi Jiao, Lindsay M. Corneal Engineering, Grand Valley State University Grand Rapids, Michigan, USA
10:00–10:20	<a href="#"><u>Coffee Break</u></a>
	<b>Climate?, Room 1101. Co-Chairs: Paul O’Brien &amp; Andreas Poulikkas</b>
10:20–10:40	
10:40–11:00	
11:00–11:20	
11:20–11:40	
11:40–12:00	
12:00–13:00	Lunch

<b>Thursday, June 18</b>	
	<b>Sustainable Living, Room 1101. Co-Chairs: Jacqueline Stagner &amp; Quade Digweed</b>
13:00–13:20	Living-1. Tiny house design tool for safety, efficiency, and cost-effectiveness Michael J. Stratton II, Lindsay M. Corneal* Engineering, Grand Valley State University Grand Rapids, Michigan, USA
13:20–13:40	
13:40–14:00	
14:00–14:20	<a href="#"><u>Coffee Break</u></a>
	<b>Sustainable System, Room 1101. Co-Chairs: &amp; Ahmad Reza Vasel-Be-Hagh</b>
14:20–14:40	System-1. Non-dimensional characterization of power-generating Archimedes screws Murray Lyons*, William Lubitz School of Engineering, University of Guelph Guelph, Ontario, Canada
14:40–15:00	System-2. Comparison of upward and inverse conventional circulating liquid-solids fluidized beds using CFD approach Zeneng Sun*, Chao Zhang, Jesse Zhu Department of Chemical & Biochemical Engineering / Department of Mechanical & Materials Engineering Western University, London, Ontario, Canada
15:00–15:20	System-3. Investigation of polyoxymethylene dimethyl ether fuels on a high efficiency diesel engine S. Leblanc*, Clean Combustion Engine Laboratory, University of Windsor Windsor, Ontario, Canada
15:20–15:40	<a href="#"><u>Coffee Break</u></a>
	<b>Sustainable System, Room 1101, Co-Chair: Mohammad Abutayeh &amp; Rupp Carriveau</b>
15:40–16:00	System-4. Numerical investigation of the thermo-hydraulic behaviors in the 64-element Canadian supercritical water-cooled reactor fuel bundle Huirui Han*, Chao Zhang Department of Mechanical & Materials Engineering Western University, London, Ontario, Canada
16:00–16:20	System-5. Characterization of the volume flow rate of water entering an Archimedes screw Arash Yoosefdoost*, William Lubitz School of Engineering, University of Guelph Guelph, Ontario, Canada
16:20–16:40	System-6. Evaluation of smart booster fans and dampers for advanced HVAC systems Behdad Rezanejad Zanjani*, Paul G. O'Brien Advanced Materials for Sustainable Energy Technology Lab, Department of Mechanical Engineering York University, Toronto, Ontario, Canada
16:40–17:00	
17:00	Bus leaves CEI, University of Windsor (@ 5:00 pm) for Banquet
18:00–20:00	Banquet at Cooper's Hawk Vineyards and The Vines Restaurant
20:00	Bus returns from banquet (Cooper's Hawk Vineyards @ ~8:00 pm) to CEI, & then, hotels, as needed

<b>Friday, June 19</b>	
08:00–08:30	<b>Centre of Engineering Innovation (CEI) Atrium</b> Breakfast & Registration Package Pickup
08:30–08:40	<b>Gift Draw (Room 1101 CEI)</b> Rupp Carriveau, VP Research, Dean of Engineering
08:40–09:20	<b>Plenary Lecture #2 (Room 1101 CEI)</b> Energy Transition Towards 2050 – Andreas Poullikkas
	<b>Wind, Room 1101. Co-Chairs: &amp; Rupp Carriveau</b>
09:20–09:40	Wind-1. Wind farm optimization Ahmad Vasel-Be-Hagh* Mechanical Engineering, Tennessee Tech University Tennessee, USA
09:40–10:00	
10:00–10:20	<u>Coffee Break</u>
	<b>Solar, Room 1101. Co-Chairs: William Lubitz &amp; Graham Reader</b>
10:20–10:40	Solar-3. Attenuation of optical losses in parabolic trough collector solar fields Mohammad Abutayeh* Mechanical Engineering Department, Arkansas State University Arkansas, USA
10:40–11:00	Solar-4. Transparent 1d-photonic crystal het mirrors with high contrast refractive indices for solar thermal applications Atousa Pirvaram*, Nima Talbzadeh, Siu Ning Leung, Paul G. O'Brien Advanced Materials for Sustainable Energy Technology Lab, Department of Mechanical Engineering York University, Toronto, Ontario, Canada
11:00–11:20	Solar-5. Multi-objective optimization for exergoeconomic performance of a thermoelectric generator through mutation-PSO algorithm Xi Wang*, David S-K. Ting, Paul Henshaw, Turbulence & Energy Lab, University of Windsor Windsor, Ontario, Canada
11:20–11:40	Solar-6. Attenuation of optical losses in parabolic trough collector solar fields Mohammad Abutayeh* Mechanical Engineering Department, Arkansas State University Arkansas, USA
11:40–12:00	
12:00–13:00	<b>Lunch &amp; <u>Poster Display (Co-chairs: William Lubitz &amp; Lindsay Miller)</u></b>
	Post-1. Structural response of a wind turbine tower as a function of yaw misalignment Yogesh Nagaraja*, Rupp Carriveau, David S-K. Ting Turbulence & Energy Lab, University of Windsor Windsor, Ontario, Canada
	Post-2. Marrying solar PV with TEG Xi Wang*, Paul Henshaw, David S-K. Ting Turbulence & Energy Lab, University of Windsor Windsor, Ontario, Canada

**Friday, June 19**

**Greenhouse & Storage, Room 1101. Co-Chairs: Lindsay Miller & Lucas Semple**

13:00–13:20	Green-Storage-1. Energy budget analysis to support energy storage analysis of solar-heated greenhouses William Lubitz* School of Engineering, University of Guelph Guelph, Ontario, Canada
13:20–13:40	Green-Storage-2. Evaluation of a fan-assisted trombe wall equipped with a thermal energy storage medium Harmeet Singh*, Abdallah Alshantaf, Paul G. O'Brien Advanced Materials for Sustainable Energy Technology Lab, Department of Mechanical Engineering York University, Toronto, Ontario, Canada
13:40–14:00	Green-Storage-3. Review and analysis of covered agriculture design, energy usage and production in varying climates Lucas Semple* Under Sun Acres, Staples, Ontario, Canada
14:00–14:20	Green-Storage-4. Modular vertical farming system for plant production in northern and remote communities Quade Digweed* Harrow Research and Development Centre, Agriculture and Agri-Food Canada Harrow, Ontario, Canada
14:20–14:40	<u>Coffee Break</u> Poster Re-display (Co-chairs: William Lubitz & Paul O'Brien)

**Water, Energy, Food, Room 1101. Co-Chairs: & David Ting**

14:40–15:00	WEF-1. The evolution of the water-energy-food nexus as a decision support tool for sustainable development in South Africa Stanley Mbofho Liphadzi, Sylvester Mpandeli*, Dhesigen Naidoo, Aidan Senzanje, , Luxon Nhamo, Tafadzwanashe Mabhaudhi Water Research Commission, Pretoria, South Africa Centre for Transformative Agricultural and Food Systems, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg, South Africa International Water Management Institute, Pretoria, South Africa School of Environmental Sciences, University of Venda, Thohoyandou, South Africa
15:00–15:20	
15:20–15:40	
15:40–16:00	WEF-4. Integrated agricultural water management solutions through the water-energy-food (WEF) nexus Luxon Nhamo, Sylvester Mpandeli, Stanley Mbofho Liphadzi, Vimbayi G.P. Chimonyo, Aidan Senzanje*, Dhesigen Naidoo, Albert T. Modi, Tafadzwanashe Mabhaudhi Water Research Commission, Pretoria, South Africa Centre for Transformative Agricultural and Food Systems, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg, South Africa International Water Management Institute, Pretoria, South Africa School of Environmental Sciences, University of Venda, Thohoyandou, South Africa

Poster Final Display

Thank you for your contribution.  
We look forward to seeing you at Mitigating Climate Change 2021, see <https://mcc2021.ca>.