

# NSERC Energy Storage Technology Network

## Technical Conference

June 19–20, 2018

Alumni Lounge  
Mattamy Athletic Centre

 #NESTNet

### Welcome

It is with great excitement that we welcome you to Toronto for the third annual NSERC Energy Storage Technology Network (NESTNet) Technical Conference. We would like to offer our sincere thanks to you for joining us today and gratefully acknowledge the support from our partners, without whom this event would not have been possible.

As we move towards cleaner energy systems, demand for innovative energy storage solutions is rising. NESTNet brings together leaders from the academic community, industry, utilities and government. Over the next two days, we are happy to be providing them with a stage to discuss the progress made so far and to share their outlooks for the future.

[ryerson.ca/nestnet](http://ryerson.ca/nestnet)

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8:30 am ET	<b>Breakfast and registration</b>
9:00	<b>Welcome and opening remarks</b> Bala Venkatesh, Ryerson University
9:15	<b>Presentation by the Chair of the Commercialization and Outreach Committee</b> Jennifer MacInnis, Ryerson University
9:30	<b>Theme 1 overview: Energy storage technologies</b> F. Handan Tezel, University of Ottawa
10:00	<b>Project 1.1: Hybrid multi-level grid-scale battery thermal management system</b> Claire McCague on behalf of Majid Bahrami, Simon Fraser University
10:15	<b>Project 1.2: Fabrication, mathematical modelling, design and testing of flywheels for grid-scale energy storage</b> Marc Secanell, University of Alberta
10:30	<b>Break and networking</b>
10:45	<b>Project 1.3: Design and testing of an innovative energy accumulator for underwater CAES</b> Mehdi Ebrahimi on behalf of Rupp Carriveau, University of Windsor
11:00	<b>Project 1.4: Thermal energy storage in adsorbent beds for space heating and cooling applications</b> Ye Hua on behalf of F. Handan Tezel, University of Ottawa
11:15	<b>Project 1.5: Hybrid energy storage system designs</b> Amr Adel on behalf of Bala Venkatesh, Ryerson University
11:30	<b>Lunch (served on West Concourse)</b>
12:30 pm	<b>Theme 2 overview: Power electronics converters</b> Liuchen Chang, University of New Brunswick
1:00	<b>Project 2.1: Modular architecture and functionality of energy storage power converters</b> Liuchen Chang, University of New Brunswick
1:15	<b>Project 2.2: Digital control systems of power converters for energy storage</b> Vijay Sood, University of Ontario Institute of Technology
1:30	<b>Project 2.3: Coordinated operation of multiple storage units and technologies</b> Reza Iravani, University of Toronto
1:45	<b>Project 2.4: SCADA interface for energy storage systems</b> Tariq Iqbal, Memorial University
2:00	<b>Project 2.5: Control systems for second-life batteries for grid-scale energy storage</b> Lukas Swan, Dalhousie University
2:15	<b>Break and networking</b>
2:30	<b>Theme 3 overview: Power systems integration</b> Claudio Cañizares, University of Waterloo
3:00	<b>Projects 3.1 and 4.2: Optimal planning for energy storage facilities in transmission systems and modelling electricity market prices considering large-scale energy storage penetration</b> Hamid Zareipour, University of Calgary
3:15	<b>Project 3.3: Energy storage device protection</b> Xavier St. Onge on behalf of Saleh Saleh, University of New Brunswick
3:30	<b>Project 3.4: Integration of energy storage for improving power quality of smart distribution systems</b> Mahmoud Othman on behalf of Magdy Salama, University of Waterloo
3:45	<b>Break and networking</b>
4:00	<b>Project 3.5: Operation and control of power systems with energy storage systems</b> Claudio Cañizares, University of Waterloo

## Agenda - Day 1

Tuesday, June 19, 2018

4:15	<b>Project 3.6: Reliability modeling and assessment of power systems with energy storage systems</b> Prasanna Piya on behalf of Rajesh Karki, University of Saskatchewan
4:30	<b>Project 3.7: Capacity markets for energy storage - design and implementation</b> Bhanu Opathella on behalf of Bala Venkatesh, Ryerson University
4:45	<b>Group photos</b>
5:00	<b>Reception (West Concourse) and poster session</b>
6:30–8:30	<b>Dinner and awards</b> Winners of the energy storage design challenge and award for best poster announced

## Agenda - Day 2

Wednesday, June 20, 2018

8:30 am ET	<b>Breakfast and registration</b>
9:00	<b>Welcome and opening remarks</b> Bala Venkatesh, Ryerson University
9:15	<b>Theme 4 overview: Economics and policy</b> Bala Venkatesh on behalf of Miguel Anjos, École Polytechnique de Montréal
9:45	<b>Project 4.1: Development of life cycle net energy ratio of energy storage technologies</b> Abayomi Oni on behalf of Amit Kumar, University of Alberta
10:00	<b>Project 4.3: Provision of ancillary services by energy storage systems</b> Kankar Bhattacharya, University of Waterloo
10:15	<b>Project 4.4: Optimal brokerage models for the grid integration of energy storage</b> Mathieu Besançon on behalf of Miguel Anjos, École Polytechnique de Montréal
10:30	<b>Break and networking</b>
10:45	<b>Project 4.5: Towards federal and provincial energy storage policy frameworks for Canada</b> Mark Winfield, York University
11:00	<b>Project 4.6: Social acceptance of energy storage systems</b> Ian Rowlands, University of Waterloo
11:15	<b>Presentation: NESTNet's international strategy</b> Ian Rowlands, Internationalization Lead
11:30	<b>Presentation: Investigating public attitudes of energy storage technologies in the UK and Canada</b> Christopher Jones, Senior Lecturer in Social and Environmental Psychology, University of Surrey
11:45	<b>Presentation: Energy storage research in the UK</b> Jacqueline Edge, Energy Storage Research Manager, Energy Futures Lab, Imperial College
12:00	<b>Closing remarks</b> Bala Venkatesh, Ryerson University
12:15–1:15	<b>Lunch (served on West Concourse)</b>
2:00–2:30	<b>Research Steering Committee meeting (Blue and Gold Room)</b>
3:00–5:00	<b>Board of Directors meeting (Blue and Gold Room)</b>

### **Theme 1: Energy storage technologies**

**Theme leader: Dr. F. Handan Tezel, University of Ottawa**

**In this theme, research is focused on batteries (thermal management systems and innovative housing designs), flywheels (designs and modeling), compressed air energy storage (CAES; enhanced underwater designs and operation), thermal storage (materials and system designs), and hybrid energy storage models.**

### **Theme 2: Power electronics converters**

**Theme leader: Dr. Liuchen Chang, University of New Brunswick**

**Research in this theme focuses on power electronic converters, including modular converters, digital controllers, supervisory controllers, supervisory control and data acquisition (SCADA) systems, and power electronics for repurposed electric vehicle batteries.**

### **Theme 3: Power systems integration**

**Theme leader: Dr. Claudio Cañizares, University of Waterloo**

**Research in this theme will enable the seamless integration of energy storage into power systems by developing planning tools, operational tools, protection systems, power quality mitigation solutions, and reliability benchmarks.**

### **Theme 4: Economics and policy**

**Theme leader: Dr. Miguel Anjos, École Polytechnique de Montréal**

**This theme investigates and provides solutions for techno-economic challenges in the successful integration of energy storage into power systems. In addition, it examines policy, regulatory and social challenges faced by storage solutions to enable successful uptake by utilities and societies.**



#### **Wi-Fi**

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