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Energy Harvesting from Infrastructure and
Ocean Systems (EHIOS)

Proceedings

11-4-2019

Conference Program

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Program

Energy Harvesting from Infrastructure and Ocean Systems (EHIOS)

An ECI Conference

**November 4 - 6, 2019
Bissinger Auditorium of Howe Center
Stevens Institute of Technology
Hoboken, New Jersey, USA**

Conference Chair

Huiming Yin

Columbia University, USA

Conference Co-Chairs

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Frank Pao, Sustainable Product Developments Labs

Louis R. Viana, LRV Puerto Rico, LLC

Monday, November 4, 2019

07:30 – 08:45	Breakfast (Bissinger Room)
08:00 – 08:30	Conference check-in (Bissinger Lobby)
08:30 – 09:00	Welcome and Announcements Welcome and Introduction - Dean Jean Zu
09:00 – 10:40	<u>Session I: Energy harvesting for smart sensing</u> Session Chair: Tejav DeGanyar
09:00 – 9:40	Keynote – Oliver Hans, Innovation Manager, Schüco From Smart City to Smart Facades
9:40 – 10:00	Yanchu Zhang, Qiliang Lin, Chenhui Yang, Arnaud Edmond Van Mieghem, Huiming Yin, Solar Window Blinds with Passive Cooling Coating and Smart Controllers
10:00 – 10:20	J. Alrowaijeh, S. Alnuaimi, M. R. Hajj, Self-Powered Wireless Sensing for Smart Infrastructure

Room locations and notes

- General Sessions and meals on Monday and Tuesday will be held in the Bissinger Room of the Wesley Howe Center.
- General Sessions and meals on Wednesday will be held in the Fielding Room of the Wesley Howe Center.
- The Poster Sessions will be in the Bissinger Room.
- The ECI office is the Calder Room.
- Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.
- Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).
- Speakers – Please leave discussion time as previously directed by your session chair.
- Please do not smoke at any conference functions.
- Turn your mobile telephones to vibrate or off during technical sessions.
- Please write your name on your program so that it can be returned to you if lost or misplaced.
- After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.
- Emergency Contact Information: Because of privacy concerns, ECI does not collect or maintain emergency contact information for conference participants. If you would like to have this information available in case of emergency, please use the reverse side of your name badge.

Monday, November 4, 2019 (continued)

- 10:20 – 10:40 Qiliang Lin, Fangliang Chen, Design and demonstration of a thermoelectric-powered wireless sensor platform in window frames for the smart building envelope
- 10:40 – 11:10 Coffee/tea/refreshments break**
- 11:10 – 12:50 Session II: Thermal energy harvesting**
Session Chair: Fangliang Chen
- 11:10 – 11:50 **Keynote** – Steve Elkin, SolarUS Inc.
Solar Thermal Systems - Past, Present and Future
- 11:50 – 12:10 Michael Brookman, Fire and Ice: Lessons Learned from Superstorm Sandy, and the California Wild Fires
- 11:10 – 12:30 Xiaokong Yu, Materials and Designs for Heat Harvesting and Thermal Management of Asphalt Pavements
- 12:30 – 12:50 Tengxiang Wang and Linfei Zhang, Design of a Geothermal Well Filled with Phase Change Materials for Daily and Seasonal Heat Storage and Supply
- 12:50 – 2:00 Lunch**
- 2:00 – 3:40PM Session III: Energy Harvesting in Buildings**
Session Chair: Frank Pao
- 2:00 – 2:40 **Keynote** - Walter Hartnett, Vice President , Thornton Tomasetti
Climate Mobilization for Facades
- 2:40 – 3:00 Mohammad Heidarinejad, Emerging Technologies In Building Energy Efficiency
- 3:00 – 3:20 Yuan Yang and Nanfang Yu, Porous radiative cooling paint for building thermal management.
- 2:40 – 3:40 Zhenhua Wei, Development of foamed concrete for building-integrated photovoltaics (BIPVT) panels
- 3:40 – 4:10 Coffee/tea/refreshments break**
- 4:10 – 5:50PM Session IV: Energy Storage and Efficiency**
Session Chair: Mohammad Heidarinejad
- 4:10 – 4:50 **Keynote** – Shihab Kuran, Power Edison
Innovative Energy Storage Solutions

Monday, November 4, 2019 (continued)

4:50 – 5:30

Keynote – Alex Kattamis & Zachary Lochner, Exponent
Energy Harvesting for Micromobility Systems

5:30 – 5:50

A.C. (Thanos) Bourtsalas, Recovery of Energy and Fuels from Waste
Materials in a Circular Economy Society

5:50 – 7:00

Poster Session and Reception

Tuesday, November 5, 2019

- 08:00 – 09:00 Breakfast
- 09:00 – 10:40** **Session V: Energy harvesting for emerging applications**
Session Chair: Thanos Bourtsalas, Daniel Deng
- 09:00 – 9:40 **Keynote** – Tommy Zakrzewski, HKS Architects
Kklai·muht CHänj
- 9:40 – 10:00 Stephanie S. Lee, Kai Zong, Kaustubh Asawa, Chang-Hwan Choi, Nicholas Sparta, Abigail Circelli, Engineering Vertical Crystal Arrrays for Efficient Solar Energy Harvesting
- 10:00 – 10:20 Jian Yu, David Ma, Harvesting energy from low-level vibration using alternate contacts between water drop and two dielectric materials
- 10:20 – 10:40 Donglu Shi, Optical thermal insulation via solar-energy harvesting photothermal nano coatings
- 10:40 – 11:10** **Coffee/tea/refreshments break**
- 11:10 – 12:50** **Session VI: Ocean Energy Harvesting (1)**
Session Chair: Lei Zuo
- 11:10 – 11:50 **Keynote** – Bill McShane, Program Manager, US Department of Energy
The Water Power Technologies Office and Powering the Blue Economy
- 11:50 – 12:30 Z. Daniel Deng, An Energy Harvesting Underwater Acoustic Transmitter for Aquatic Animals (**Invited**)
- 12:30 – 12:50 A. Ahmed, J. Mi, R. Datla, L. Zuo, M. R. Hajj, Multi-Fidelity Modeling and Simulation of Wave Energy Converters
- 12:50 – 2:00** **Lunch**
- 2:00 – 3:40PM** **Session VII: Ocean Energy Harvesting (2)**
Session Chair: David Ma
- 2:00 – 2:40 **Keynote** –Charles Nouhan, Representative to the United Nations in New York, Stakeholder Forum for a Sustainable Future
The Global Partnership for Ocean Wave Energy Technology
- 2:40 – 3:20 Lei Zuo, Towards Blue Energy: The Design, Dynamics, and Control of an Innovative Power Take Off for Ocean Wave Energy Harvesting (**Invited**)

Tuesday, November 5, 2019 (continued)

- 3:20 – 3:40 Jason Lou, Design and Simulation of a Novel Submerged Pressure Differential Wave Energy Converter for Optimized Energy Harvesting Efficiency and Performance
- 3:40 – 4:10 Coffee/tea/refreshments break**
- 4:10 – 5:50PM Session VIII: Ocean Energy Harvesting (3)**
Session Chair: Jason Lou
- 4:10 – 4:50 **Keynote** – Bill Staby, Resolute Marine
Wave-Powered Desalination Systems for Developing Countries and Island Nations. Cabo Verde Case Study
- 4:50 – 5:10 Ugur Erturun, Adebayo Eisape, James West, A push-pull transducer for ocean wave energy harvesting
- 5:10 – 5:30 Boxi Jiang, Shuo Chen, Xiaofan Li, Qiuchi Xiong, Raju Datla, Muhammad Hajj, Robert Parker, Lei Zuo, Performance of a hybrid wave-current energy converter and tank test validation
- 5:30 – 5:50 Raju Datla, Michael DeLorme, Muhammad Hajj, Needs and challenges in model testing of wave and tidal energy devices
- 5:50 – 7:00 Tour of Davison Lab and Reception**

Wednesday, November 6, 2019

- 08:00 – 09:00 Breakfast
- 09:00 – 10:40** **Session IX: Energy harvesting in transportation**
Session Chair: Frank Pao, Stefanie Hubert
- 09:00 – 9:40 **Keynote** – Bill James, JPods
From Oil to Ingenuity, digitizing solar-powered mobility
- 9:40 – 10:00 Lei Zuo, Energy Harvesting from Automobiles, Trains, and Roads
- 10:00 – 10:20 Lukai Guo, Hao Wang, Development of a New Piezoelectric-Based
Energy Harvesting Pavement System
- 10:20 – 10:40 Yong Shi, Piezoelectric Nanofibers and Their Applications in Energy
Harvesting
- 10:40 – 11:10** **Coffee/tea/refreshments break**
- 11:10 – 12:50** **Session X: Challenge and vision of energy harvesting**
Session Chair: Robert Karlicek
- 11:10 – 11:50 **Keynote** – Thomas P. Oppel, American Sustainable Business Council
It's Better When You Help
- 11:50 – 12:10 Jia Mi, Qiaofeng Li, Xiaofan Li, Muhammad Hajj, Lei Zuo, Offshore
Renewable Energy and its Impact on Food-Energy-Water (FEW)
Nexus
- 12:10 – 12:30 Jian Yu and David Ma, Ambient Energy Harvesting: An Electrostatic
Approach Based on Droplet Capacitors
- 12:30 – 12:50 Huiming Yin, Renew Infrastructure by Surface Engineering: Toward
Energy Harvesting, Infrastructure Protection, and Smart Systems
- 12:50 – 2:00** **Lunch**

Posters

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Poster Presentations

1. **Energy harvesting, desalination and coastal protection by oscillating surge wave energy converter**
Jia Mi, Virginia Tech, USA
2. **Energy harvesting potential from vehicular traffic crossing road humps in the case of Slovenia**
Sebastian Toplak, University of Maribor, Slovenia
3. **The utilization and performance of Waste-to-Energy residues in asphalt materials**
Yixi Tian, Columbia University, USA
4. **Solar window blinds with passive cooling coating and smart controllers**
Yanchu Zhang, Columbia University, USA
5. **Design and development of a hydronic system for temperature regulation and heat harvesting in a building integrated photovoltaic thermal panel**
Mehdi Zadshir, Columbia University, USA
6. **Inclusion-based boundary element method for design of building envelopes**
Chunlin Wu, Columbia University, USA
7. **Development of a new piezoelectric-based energy harvesting pavement system**
Lukai Guo, Rutgers University, USA
8. **Ocean harvesting buoy using offshore wind turbines**
Adam Bennett, Columbia University, USA
9. **Development of sun flower technology with a passive solar tracker**
Li-Chen Hsueh, Columbia University, USA
10. **Design of a geothermal well filled with phase change materials for daily and seasonal heat storage and supply**
Tengxiang Wang, Columbia University, USA
11. **Thermoelectric-powered wireless sensor platform for smart building envelope system**
Qiliang Lin, Columbia University, USA