



European Council of Applied Sciences, Technologies, and Engineering  
US National Academy of Engineering

### 2022 EU-US Frontiers of Engineering Symposium

Hotel Park, Bled, Slovenia

October 19-22, 2022

<https://www.naefrontiers.org/202304/2022-EUUS-Frontiers-of-Engineering-Symposium#tabs>

<https://www.ias.si/home>

### PROGRAM

Symposium co-chairs: Marko Topič, University of Ljubljana, and Vahid Tarokh, Duke University

#### Wednesday, October 19

7:30-9:00 pm      Registration/Welcome Reception      *Hotel Restaurant*

#### Thursday, October 20

From 7:00 am      Breakfast      *Hotel Restaurant*

8:30      Welcome      *PREŠEREN HALL*

Patrick Maestro, Secretary-General, Euro-CASE  
John Anderson, President, National Academy of Engineering  
Mark Pleško, President, Slovenian Academy of Engineering  
Janez Fajfar, Mayor of Bled

#### Opening Remarks

Marko Topič, Symposium co-chair (EU)  
Vahid Tarokh, Symposium co-chair (US)

9:00      **PROSTHETICS AND AI**      *PREŠEREN HALL*

Session co-chairs: and Amy Orsborn, University of Washington, and  
Stanisa Raspopovic, ETH Zurich

*Ultra-flexible Electrodes for Long-lasting, Large-scale, Bi-directional Neural Interface*  
Lan Luan, Rice University

*We would like to express our gratitude to The Grainger Foundation, the US National Science Foundation, ELES, Plinovodi, Kemijski inštitut, Cinkarna Celje, Yaskawa, Fotona, Pipenbaher inženirji, NEK, Krka, Riko, Salonit Anhovo, Jožef Stefan Institute, and the Ministry of Education, Science and Sport of Slovenia for their support of the 2022 EU-US Frontiers of Engineering Symposium.*

*Machine Learning Algorithms for Neural Decoding*  
Chethan Pandarinath, Georgia Institute of Technology

10:30	Break	
11:15	<i>Soft Bionic Limbs: From Research to Real World</i> Cristina Piazza, Technical University Munich	
12:00 noon	Lunch	<i>Hotel Restaurant</i>
1:00	Flash Poster Presentations	<i>PREŠEREN HALL</i>
2:00	Poster Session I (odd numbers)	<i>KOSOVEL HALL</i>
2:45	Poster Session II (even numbers)	
3:30	Break	
4:00	<b>SUPPLY CHAIN/LOGISTICS</b> Session co-chairs: Cristiana Lara, Amazon, and Lisa Melander, Chalmers University of Technology	<i>PREŠEREN HALL</i>
	<i>Resilient Supply Chains: Lessons from the Covid-19 Pandemic</i> Tina Comes, Delft University of Technology	
	<i>Managing Sustainable Supply Networks</i> Veronica Villena, Arizona State University	
5:30	Break	
7:00	Dinner	<i>Hotel Restaurant</i>

**Friday, October 21**

From 7:00 am	Breakfast	<i>Hotel Restaurant</i>
8:30	<b>SUPPLY CHAIN/LOGISTICS (cont.)</b>  <i>A Systematic Approach to Electrification of the Transport System in Gothenburg Municipality: The Case of Heavy-duty Vehicles</i> Spyros Ntemiris, Business Region Göteborg	<i>PREŠEREN HALL</i>
	<i>AI Robotics for Real World Logistics</i> Carlos Florensa, Covariant.AI	
10:00	Break	

10:30	<p><b>POST LITHIUM-ION BATTERIES</b>  Session co-chairs: Neil Dasgupta, University of Michigan, and Robert Dominko, National Institute of Chemistry, Ljubljana</p> <p><i>Solid-state Batteries for Electromobility</i>  Matthew McDowell, Georgia Institute of Technology</p> <p><i>Multivalent Metal (Mg, Ca, Al) Anode Batteries as a Future High-energy Alternative to Li-ion</i>  Jan Bitenc, National Institute of Chemistry, Slovenia</p>	PREŠEREN HALL
12:00 noon	Lunch	Hotel Restaurant
1:00	<p><i>Unlocking the Potential of Aqueous and Aprotic Metal-air Batteries</i>  Nagore Ortiz-Vitoriano, CIC Energigune, Spain</p> <p><i>“There’s Plenty of Room in the Middle”: A Mechanistic Perspective for Beyond Lithium-ion Batteries</i>  Partha Mukherjee, Purdue University</p>	
2:30	Break	
3:00	Tour to Ljubljana, visiting the National Institute of Chemistry Short and guided visit of old part of City of Ljubljana Reception at Rectors Building of University of Ljubljana	
8:00	Dinner	Hotel Restaurant
<b><u>Saturday, October 22</u></b>		
From 7:00 am	Breakfast	Hotel Restaurant
8:30	<p><b>ZERO-CARBON BUILDINGS</b>  Session co-chairs: Francesco Goia, Norwegian University of Science and Technology, and Nora Wang Eram, American Council for an Energy-Efficient Economy</p> <p><i>Equitable Building Decarbonization through Electrification</i>  Karma Sawyer, Pacific Northwest National Laboratory</p> <p><i>Smart Buildings and Neighborhoods Enabling a Sustainable Energy Future</i>  Roderick Jackson, National Renewable Energy Laboratory</p> <p><i>Integrated Simulation Workflows for Sustainable Building Design</i>  Jakob Strømmand-Andersen, Henning Larsen</p>	PREŠEREN HALL
10:15	Break	
10:45	<p><i>Digital Innovation for a Circular Built Environment</i>  Catherine De Wolf, ETH Zurich</p>	

12:00 noon      Panel  
Closing remarks  
Lunch

*Hotel Restaurant*

**2022 EU-US Frontiers of Engineering  
Poster List**

Number	LastName	FirstName	Poster Title
1	Bitenc	Jan	Multivalent metal (Mg, Ca, Al) anode batteries as sustainable high-energy alternative to Li-ion
2	Blenner	Mark	Rapid plastic degradation by the microbial communities and isolates of the yellow mealworm
3	Brozovsky	Johannes	Built Environment and Digitalization
4	Cabrera	Laura	Examining Societal, Ethical, and Cultural Implications of Advances in Neuroscience and Neurotechnologies
5	Cao	Yue	Power Electronics Enabled Systems of Systems: Co-design of efficiency, power density, and reliability
6	Capsi Morales	Patricia	Neural Synergistic Information Shows Potential for Myoelectric Control of Dexterous Hand Prostheses
7	Chandan	Amrit	Eliminating Battery Waste Through Circular Technology
8	Dasgupta	Neil	Dasgupta Research Laboratory
9	Dominko	Robert	Integrated sensor printed on the separator enabling the detection of dissolved manganese ions in battery cell
10	Downey	Austin	Online Structural State-Estimation in Extreme Dynamic Environments
11	Eggleston	Michael	Bridging the Physical and Digital
12	Engholm	Albin	Quantitative analyses for navigating deep uncertainty in the transformation to autonomous and electric road freight transport systems
13	Faenza	Nicholas	Multifaceted Approach to Battery System Safety
14	Florensa	Carlos	AI Robotics for Real World Logistics
15	Furst	Ariel	Furst Lab
16	Genorio	Bostjan	Functionalization of Materials (Energy storage and conversion applications)
17	Humar	Janez	PENTLJA concept
18	Jackson	Roderick	Smart Buildings and Neighborhoods Enabling a Sustainable Energy Future
19	Jain	Neera	Feedback Control Co-Design for Transient Thermal Management
20	Jost	Marko	Perovskite-based solar cells powering the future
21	Katic	Natalija	Does unwanted triggering of sensory interference mechanisms limits neurotechnology for sensory restoration?
22	Kazyak	Eric	Understanding the electro-chemo-mechanics of Li plating in anode-free solid-state batteries

Number	LastName	FirstName	Poster Title
23	Khanie	Mandana	Low Carbon Human Centric Daylit Spaces
24	Kim	Haegyum	Advanced Materials Development for Green Energy Storage
25	Lara	Cristiana	Algorithmic Tools for Supply-chain Network Design, Planning and Strategy
26	Luan	Lan	Development and Application of Multimodal Neural Interface
27	Marbella	Lauren	Understanding and Controlling Materials for Li- and Beyond Li-ion Batteries
28	McCurry	Daniel	Safe Water Reuse Through Chemistry
29	McDowell	Matthew	Understanding and controlling materials evolution in energy storage devices
30	Melander	Lisa	Horizontal collaborations for environmental sustainable solutions
31	Miller	Sabbie	Driving decarbonization and carbon sequestration in novel materials development
32	Mukherjee	Partha	Multiscale Modeling and Analytics in Energy Storage
33	Ochoa	Maria Paz	Using Math Programming to Support Strategic and Tactical Decisions at the Dow Chemical Company
34	Ortiz Vitoriano	Nagore	Unlocking the Potential of Aqueous and Aprotic Metal-Air Batteries
35	Piazza	Cristina	Exploring Advanced Grasping Capability in Soft Multi-Synergistic Prosthetic Hands
36	Sauder	Jonathan	Inventing "Smart" Mechanisms and Creating New Space Architectures
37	Sawyer	Karma	Delivering Grid Modernization Value by Design
38	Sharma	Nitin	Direct Muscle State Visualization via Ultrasound Imaging for Closed-Loop Neurorehabilitation
39	Torok	Adam	Torok Workgroup
40	Torres-Machi	Cristina	Innovation for Resilient Infrastructure
41	Villena	Veronica	A more sustainable supply network
42	Wang	Sihong	Laboratory for Biomimetic Polymer Electronics
43	Wang	Chieh (Ross)	Generating Realistic Driving and Traffic Scenarios for Assessing Emerging Mobility Solutions
44	Yang	Yu	Fishing out reactive organic carbon for climate change and water reuse: Redox and complexation
45	Zhang	Qi	Green ammonia and its role as a versatile energy carrier