FUTURE ENERGY SYSTEMS

2021 Research Symposium Presentations

20 SEPTEMBER 2021 - 24 SEPTEMBER 2021

WELCOME AND ORIENTATION

Monday, 20 September 2021, 9:30 - 10:00 MT

- Orientation to symposium structure; **all participants are encouraged to attend**
- Welcome and launch by Vice President (Research and Innovation) **Aminah Robinson Fayek**

ALTERNATIVE FUELS

Monday, 20 September 2021, 10:00 - 12:00 MT

- Jayranjan Maurya, *The techno-economic assessment of alternative materials for hydrogen production via photocatalytic water splitting*
- Himanshi Dhawan, *Study of physical mixtures of Ir and metal oxide supports for water splitting applications*
- Orain Brown, *Exploring biomass and heavy oil co-processing enabled by copper catalysis*
- Shibashis Das, *Developing genetic tools for Methylomicrobium album BG8: a versatile microbial platform for conversion of methane to isoprenoids*
- Dagem Haddis, *Steam Explosion and Enzymatic Digestion with Sugar Recovery as Pretreatments for Cellulose Nanocrystals Production*
- José Carlos Velasco Calderón, *Mechanistic investigation into the formation of humins in acid catalyzed liquid phase biomass reactions*
- Shaoqing Liu, *Electronic Delocalization of Bismuth Oxide Induced by Sulfur Doping for Efficient CO2 Electroreduction to Formate*
- Harshitha Rajashekhar, *Engineering product selectivity in CO2 photoreduction using bimetallic plasmonic nanoparticles on oxide supports*
- Danish Dar, *Reactive Distillation for Synthesis of Dimethyl Ether Using Bio-Methanol from a Kraft Pulp Mill*

HYDROCARBONS

Tuesday, 21 September 2021, 10:00 - 12:00 MT

- Osama Younis, *An Integrated Assessment of Deep Decarbonization Pathways for the Canadian Oil Sands*
- Jerico Fiestas Flores, *A Dynamic Economic Analysis of oil sands process-affected water (OSPW) treatment alternatives in Alberta*
- Hannah Tollefson, *Energy Media: The Politics of Solid-Phase Bitumen*
- Menatalla Ahmed, *Effects of low-temperature hydrothermal treatment on the properties and removal of fine solids from nonaqueous extraction bitumen*
- Camila Santander, *Removal of hydrophobic bitumen-coated fine solids from NAE bitumen*
- Katelyn Le, *Separation and Oxidation Strategies for Developing Novel Asphaltene-Derived Feedstocks*

- Xuyang Liu, *Surface-modified magnetite nanoparticles for removal of fine solids from nonaqueous extracted bitumen*
- Mohammad Yousefi, *Bitumen Extraction by Using Non-thermal cyclic solvent process*
- Somayeh Khajepour, *Real-time monitoring of Oil Sand Pipelines by Wireless Communications*
- Young Hoon Lee, *Instability of parallel flow of two immiscible liquids in a pore and application to Steam-Assisted Gravity Drainage*

LANDSCAPES

Tuesday, 21 September 2021, 13:00 - 15:00 MT

- Cedar Hanneson, *Electrical Resistivity at Mount Meager; Southwestern BC: A Volcanic Geothermal Prospect*
- Alireza Rangriz Shokri, *Carbon to Electrons: A CO2 Circulation Feasibility Study for Sustainable Geothermal Power Generation at the Aquistore CO2 Storage Site*
- Yu Wei, *Specific Surface Free Energy of Ice and Clathrate Hydrates*
- Irum Zahara, *Adsorption kinetics and modeling for removal of heavy metals from wastewater by keratin derived sorbents*
- Stephanie Chute-Ibsen, *Composition and Optimal Sampling Time for Soil Invertebrates in Reclaimed Coal Mine Sites In Central Alberta*
- Wenshuai Yang, *Sliver/Tannic acid/Fe3+ functionalized magnetic graphene oxide nanocomposite as ultra-efficient catalyst and disinfectant for wastewater treatment*
- Zixiang Wei, *Combinative chemical analysis by functional surface nanodroplets*
- Maggie Cascadden, *Life Cycle Analysis of Novel Constructed Wetlands Water Reclamation Materials*
- Thomas Patrick, *Water-use implications of low-carbon pathways in the oil sands*
- Andrea Miller, *Building Futures: Indigenous-Owned Renewable Energy in Alberta and a Just Transition*

RENEWABLES

Wednesday, 22 September 2021, 10:00 - 12:00 MT

- Riley Hooper, *Synthetic and structural insights into group 14 materials using solid-state NMR*
- Damini Vrushabendrakumar, *Crystal facet engineering of 1D metal oxide photocatalysts using chemisorption of divalent cations*
- Balaranjan Selvaratnam, *Predicting Noncentrosymmetric Quaternary Tellurides Using Machine Learning*
- Matthias Lottmann, *More Than Hot Air: A 100-Watt Low Temperature Difference Stirling Engine Prototype for Model Validation*
- Sadegh Aghapour Aktij, *High-Performance Thin Film Composite (TFC) membranes for Energy Harvesting using Pressure Retarded Osmosis (PRO)*
- Omex Mohan, *Scale up study on pipeline hydro-transportation of agricultural and forestry residues*
- Rui He, *A semi-supervised GAN method for RUL prediction using failure and suspension histories*
- Meng Rao, *Improving fault diagnosis performance of deep learning models for wind turbines via speed normalization of vibration signals*
- Millawithanachchige Dulika Nayanasiri, *Compare Impact of Maximum Power Point Tracking methods of Wind Farms on Turbine Bearings*

ENERGY STORAGE

Wednesday, 22 September 2021, 13:00 - 15:00 MT

- Matthew Labbe, *Atomic Layer Deposition of Transition Metal Oxide Catalysts for Zinc-Air Batteries*
- Yingjie He, *Hollow Mesoporous Carbon Nanospheres Decorated with Metal Oxide Nanoparticles as Efficient Earth-Abundant Zinc-Air Battery Catalysts*
- Nicholas Kissoon, *Sustainable High Energy Batteries: Electrochemical Grafting and In-Situ Analysis of Organic Cathode Materials*
- Justin Mah, *Reduction of all-solid battery decomposition with protective carbon layer*
- Yiling Nan, *Electrolyte Design in Li-S battery with anti-reductive solvent shell*
- Jasper Woodard, *Optimizing Silicon Surface-Binder Interactions for Long Life Lithium-ion Batteries*
- Soumitra (Sam) Sarkar, *Flywheel Energy Storage Systems for Electric Vehicle Charging Applications*
- Manas Kumar Mandal, *Using pore former in the anode catalyst layer to increase the performance of the proton exchange membrane water electrolyzer*
- Octavio Martinez Perez, *Artificial Photosynthesis with a Ruthenium-Rhenium Assembly for Solar CO2 Reduction*

SYSTEMS AND FUTURES

Thursday, 23 September 2021, 13:00 - 15:00 MT

- Adrian Velazquez Osorio, *Robots; machine learning; and self-run labs. The coming era of scientific discovery*
- Saidur Rahman, *Two-Stage Stochastic Optimization of a Virtual Power Plant*
- Evan Arbuckle, *Modelling Regional Hydropower Development with GCAM-Canada*
- Sara Eghbali, *A Numerical Study on Energy Extraction from Retrofitted Co-axial Wells*
- Yuzhuo Li, *Graph-theory-inspired unified relationships in power converters*
- Fatemeh Bakhtiari Ziabari, *Production of renewable biojet fuels*
- Minza Haider, *Projections of cost of ownership; GHG intensity; and market share of vehicles in the passenger and freight transportation sectors*
- Nilusha Welegedara, *Analyzing the spatiotemporal variation of urban heat islands with land use changes: A case of Edmonton; Canada*
- Sonak Patel, *What determines municipal renewable energy development? Insights from a mixed-methods study of municipalities in Alberta*
- Matthew Davis, *A decarbonization assessment of Canada's electricity generation sector*

POSTER HALL

Marquee Event on Monday, 20 September 2021, 13:00 - 15:00 MT

- Posters available all week, hosted on Twitter
- Find posters using **#FESResearchShowcase** and follow **@uafutureenergy** to see highlights

AWARDS ANNOUNCEMENT

Friday, 24 September 2021

- Recognizing top oral presentations and top posters