



January-March 2022 Happenings

Events

We welcomed MSc student **Adriana Vasquez Aldana** to our FES theme. Adriana received her bachelor degree in Civil Engineering from Universidad Surcolombiana - Neiva, Huila, Colombia. As part of FES she is studying under the supervision of Dr **Mohamed Gamal El-Din** and will be conducting research on wetland approaches to oil sands process water treatment using mesocosms, focusing on the development and application of hydrochars.

PhD student **Stephanie Ibsen** provided a talk on their FES research entitled Dishing The Dirt On Soil Invertebrates And Sustainability as part of the University of Alberta Sustainability Council webinar series, 16 February 2022.

Theme researchers, Drs **Amalesh Dhar** and **Scott Chang**, were invited panelists for the Energy Systems Signature Area webinar on Energy Systems and the Environment: Leaks, Losses, and Lessons Learned, 17 February 2022. The session examined the environmental impacts that conventional energy systems continue to have, as well as the cumulative impacts of developing and deploying renewable energy systems. Dr Chang presented on research conducted with Dr **Christopher Nzediegwu**.

Dr **Muhammad Arslan** presented on his PhD research, Using Floating Wetlands To Treat Large-Scale Waste Water Sources, as part of Energy Talks, hosted by Future Energy Systems and the Edmonton Public Libraries, 23 February 2022.

PhD student **Jerico Fiestas Flores** presented his FES research at the Circumpolar Student Association Northern Research Day, 22 March 2022. His talk was titled A Dynamic Economic Analysis Of Oil Sands Process-Affected Water (OSPW) Treatment Alternatives In Alberta.

Achievements

In March **Yihan Zhao** successfully completed her PhD program in which she investigated humic substances as soil amendments in coal mine reclamation. Yihan has now joined Dr **M Anne Naeth**'s research team as a post doctoral fellow and her research will focus on the use of plants and nano humus for water treatment at the mesocosm scale.

Dr **Mohamed Gamal El-Din** and his team's (Dr **Soliu Ganiyu** and PhD students **Lingjun Meng** and **Monsuru Suara**) research on oil sands process water remediation using solar power was showcased in the Future Energy Systems feature article, Sun, Water, And Chemistry. www.futureenergysystems.ca/news/post/sun-water-and-chemistry

PhD student **Stephanie Ibsen**'s research on invertebrates as reclamation success indicators was featured in a Folio article, How Bugs And Worms Could Help Restore Land After Industrial Use. www.futureenergysystems.ca/news/post/a-whole-world-under-our-feet-how-bugs-and-worms-could-help-restore-land-after-industrial-use

Eleven peer reviewed papers were published this quarter - a great way to end the year!

Demir-Duz, H, LA Perez-Estrada, MG Álvarez, **M Gamal El-Din** and S Contreras. 2022. Synergetic effect of O₃/H₂O₂ and UV-C light irradiation for the treatment of oil sands process water. Science of the Total Environment 832:154804 DOI: [10.1016/j.scitotenv.2022.154804](https://doi.org/10.1016/j.scitotenv.2022.154804).



RESILIENT RECLAIMED LAND AND WATER SYSTEMS

Ganiyu, SO, M Arslan and M Gamal El-Din. 2022. Combined solar activated sulfate radical-based advanced oxidation processes (SR-AOPs) and biofiltration for the remediation of dissolved organics in oil sands produced water. *Chemical Engineering Journal* 433:134579 DOI: [10.1016/j.cej.2022.134579](https://doi.org/10.1016/j.cej.2022.134579).

Ganiyu, SO, S Sable and M Gamal El-Din. 2022. Advanced oxidation processes for the degradation of dissolved organics in produced water: a review or process performance, degradation kinetics and pathway. *Chemical Engineering Journal* 429:132492 DOI: [10.1016/j.cej.2021.132492](https://doi.org/10.1016/j.cej.2021.132492).

Lu, Q, Q Xu, J Meng, ZT How, P Chelme-Ayala, X Wang, M Gamal El-Din and X Zhang. 2022. Surface microlenses for much more efficient photodegradation in water treatment. *ACS ES&T Water* 2:644-657 DOI: [10.1021/acsestwater.2c00008](https://doi.org/10.1021/acsestwater.2c00008).

Luo, Z, L Meng, ZT How, P Chelme-Ayala, L Yang, C Benally and M Gamal El-Din. 2022. Treatment of oil sands process water by the ferric citrate under visible light irradiation. *Chemical Engineering Journal* 429:132419 DOI: [10.1016/j.cej.2021.132419](https://doi.org/10.1016/j.cej.2021.132419).

Nzediegwu, C, MA Naeth and SX Chang. 2022. Monovalent-divalent element quotient drives lead (II) removal in aqueous solutions by nitric acid-modified biochar. *Soil Science Research Network* DOI: [10.2139/ssrn.4037952](https://doi.org/10.2139/ssrn.4037952).

Song, J, ZT How, Z Huang and M Gamal El-Din. 2022. Biochar/ion oxide composite as an efficient peroxymonosulfate catalyst for the degradation of model naphthenic acids compounds. *Chemical Engineering Journal* 429:132220 DOI: [10.1016/j.cej.2021.132220](https://doi.org/10.1016/j.cej.2021.132220).

Soulodre, EMJ, **A Dhar and MA Naeth.** 2022. Plant community development trends on mixed grass prairie well sites 5 years after reclamation. *Ecological Engineering* 179:106635 DOI: [10.1016/j.ecoleng.2022.106635](https://doi.org/10.1016/j.ecoleng.2022.106635).

Suara, MA, SO Ganiyu, S Paul, JL Stafford, and M Gamal El-Din. 2022. Solar-activated zinc oxide photocatalytic treatment of real oil sands process water: Effect of treatment parameters on naphthenic acids, polyaromatic hydrocarbons and acute toxicity removal. *Science of the Total Environment* 819:153029 DOI: [10.1016/j.scitotenv.2022.153029](https://doi.org/10.1016/j.scitotenv.2022.153029).

Zhao, Y and MA Naeth. 2022. Soil amendment with a humic substance and arbuscular mycorrhizal fungi enhance coal mine reclamation. *Science of The Total Environment* 823: 153696 DOI: [10.1016/j.scitotenv.2022.153696](https://doi.org/10.1016/j.scitotenv.2022.153696).

Zhao, Y and MA Naeth. 2022. Lignite derived humic products and cattle manure biochar are effective soil amendments in cadmium contaminated and uncontaminated soils. *Environmental Advances* 8:100186 DOI: [10.1016/j.envadv.2022.100186](https://doi.org/10.1016/j.envadv.2022.100186).

Notices And Reminders

Procurement And Travel

As of April 1 2022, there are considerable changes to the University of Alberta, and therefore FES, purchasing and travel policies. Key changes include mandatory use of Preferred Suppliers and the Travel Management Program, use of SupplyNet as the primary payment option, with use of P-Cards for some eligible expenses, and elimination of expense claims for personal methods of payment i.e. cash or personal credit cards. Contact the theme coordinators to discuss options.