



*I am clearly excited about the upcoming 2020 Transportation, Energy, Economics, and the Environment ([TE3](#)) next week. The two webinars on Thu and Friday are promising to be very informative in light of the recently announced electric vehicle goals from California and Governor Whitmer's two executive orders on climate action that will put Michigan on a path to become fully carbon neutral by 2050.*

*This will be the first TE3 without Dr. John DeCicco on the helm because John has just retired. John joined the Energy Institute as a research professor in 2011 and made tremendous contributions with his scholarship and public engagement through Congressional testimonies and media interviews. The Regents already saluted his contributions in Transportation, Energy, and the Environment in their Sept 17, 2020 meeting.*

*Join me in congratulating John with a promise to have a gathering with some of his favorite Italian beverages at hand as soon as we can.*

*~ Anna*

## CONGRATULATIONS:



[Tony Reames](#), an assistant professor at the University of Michigan School for Environment and Sustainability, has been elected to the board of GreenHome Institute ([GHI](#)), a non-profit organization based in Grand Rapids, Michigan that helps people make green building and renovation choices in their homes.

According to an [article](#) in the Grand Rapids Business Journal, Reames is one of four new GHI appointments.



[Nicholas Kotov](#), Professor of Chemical Engineering, has been awarded a collegiate professorship. He has been named the Irving Langmuir Distinguished University Professor of Chemical Sciences and Engineering.

## UPCOMING EVENTS

### **NERS Colloquial, October 2, 4-5 pm**

Nuclear Engineering and Radiological Sciences will feature a talk by [Jared DeWese](#), Senior Communications Advisor for Third Way. Communicating, titled "Changing Public Policy, and Social Justice Aspects of Nuclear Energy". <https://umich.zoom.us/j/94373529373>

Meeting ID: 943 7352 9373, Passcode: 089296. Learn more about the series [here](#).

### **TE3 webinars, Oct 8-9, 2020**

This year UMEI will host its Transportation, Energy, Economics and the Environment (TE3) conference online as a two-part webinar on Thursday and Friday, **11:00 am - 1 pm**

**October 8th and 9th, 2020.** The Thursday panel will address behavioral factors in the vehicle market, featuring Dana Jackman of the U.S. Environmental Protection Agency and U-M Erb Institute director Tom Lyon. Friday's discussion of grid integration for electric vehicles will feature Michael Kintner-Meyer of Pacific Northwest National Laboratory and U-M SEAS professor Michael Craig. See the [TE3 website](#) for further details. Registration closes October 2.

### **Fastest Path to Zero Virtual Series Conclusion, October 6, noon–2pm**

Find out what the 2020 campaign tells us about the future of climate action. This event is hosted by Third Way and U-M's Department of Nuclear Engineering and Radiological Sciences (NERS). Register here.

### **Finland/Michigan Energy Circle Webinars, October 27-29, 8:00 am**

Join us for these webinars on **Oct 26-29 and Nov 9-11 at 8am ET** to learn about some of the energy research activities in Finland universities and businesses on batteries and fuel cells. The State of Michigan and the Ministry of Economic Affairs and Employment of Finland recently expressed their official interest to collaborate on clean technologies. Topics so far cover battery degradation and recycling, flow batteries, and fuel cells. The webinars are open to the public. Details coming soon.

### **Clean Energy Conversations**

The new Clean Energy Conversations virtual workshop series aims to tie together the many threads across the campus by providing regular, organized opportunities for collaboration among and between the U-M community and external partners. Please add yourself to the mailing list if you are interested in keeping apprised and potentially taking part in these conversations. (the first conversation could happen on Oct 27th)

### **New Energy: Conversations with Early-Career Energy Researchers, November 18, 2020**

Tony Reames, an assistant professor in the School for Environment and Sustainability at the University of Michigan will be presenting, "[An Incandescent Truth: Spatial, Racial, and Socioeconomic Disparities in Residential Energy Efficiency](#)", on **November 18** as part of Energy Week at Duke University. Click [here](#) for more information.

## **IN THE NEWS**

## **Low-Income Households Face Higher Energy Burdens**

The American Council for an Energy-Efficient Economy (ACEEE) stated in a new [report](#) that low-income households spent as much as 45% more of their monthly income on energy bills than their more affluent counterparts. [Tony Reames](#), an assistant professor at the University of Michigan's School for Environment and Sustainability, is one of the lead researchers in Detroit Communities Reducing Energy and Water, a local pilot program that educates families on energy consumption and identifies ways to improve efficiency in their households, according to an article by [US News and World Report](#).

## **Mobility electrification group explores paths to lower emissions**

A research group led by U-M professor, [Anna Stefanopoulou](#), Director of the Energy Institute, is exploring the use of electric buses as part of the University's energy emissions reduction program. According to an article in the [University Record](#), the potential emissions abatement from full electrification of the U-M bus fleet could be equivalent to eliminating the annual greenhouse gas emissions from 200 houses. Preston VanAlstine, an LSA senior noted that "workplace charging, which, if offered, can be an added incentive to make the shift" to electric vehicles.

## **Tesla's Battery May Reveal A Major Push Towards Solid State Technology**

Before Tesla's Elon Musk battery day, [Richard M. Laine](#), a professor at of Materials Science and Engineering at the University of Michigan and battery researcher, stated in a recent [CNN Business article](#) that Musk may be optimistic in his timeline, but says solid state technology is the "holy grail of batteries".

## **Flying Cars Face Challenges**

SkyDrive started as a volunteer group called Cartivator to develop a flying car and recently completed the first test flight of its electrical vertical takeoff and landing (eVTOL) vehicle. Now Boeing and automakers like Toyota and Hyundai have developed similar technology, according to an article in [StarTribune](#). Safety and design are two of the greatest challenges. However, energy efficiency and practicality are other considerations. [Ella Atkins](#), professor of aerospace engineering at the University of Michigan, said that while the eVTOL is more fuel-

efficient than a helicopter, it is not as efficient as an electric car due to the fact that it must lift itself. SkyDrive plans to have an eVTOL version available for sale to the public in 2023.

### **A New Rechargeable Zinc Battery**

Nicholas Kotov, professor of engineering at the University of Michigan, and his research team have created a rechargeable battery, a sort of fat layer on robots. The battery is environmentally friendly and provides up to 72 times more power than their lithium counterparts, according to an [Yahoo Finance article](#).

### **Using Photons in an Air-Bridge Thermophotovoltaic Cell to Transform Heat into Electricity**

According to an article in [University of Michigan News](#), heat-harnessing “solar” cells, an energy storage application known informally as a “sun in a box,” stores extra wind and solar power generation in a heat bank, and could help bring down the price of storing renewable energy as heat. “This approach to grid-scale energy storage is receiving widespread interest because it is estimated to be tenfold cheaper than using batteries,” said [Andrej Lenert](#), an assistant professor of chemical engineering.

### **Cobalt-Free Battery May Replace Lithium**

Cobalt is a mineral used in the lithium-ion batteries that power electric cars. Most of it comes from the Democratic Republic of the Congo, where mining has been linked to child labor and deaths. Researchers from the University of Texas have developed a cobalt-free battery that operates at higher voltages and at charge rates similar to their lithium counterparts, as reported in a recent [Wired](#) article. According to [Greg Less](#), the technical director at the University of Michigan’s Battery Lab, the cathode material “shows great promise.”

## **UPCOMING FUNDING OPPORTUNITIES**

### **University of Texas Energy Infrastructure of the Future Project**

The University of Texas at Austin Energy Institute has launched an Energy Infrastructure of the Future Project (and Energy Futures Dashboard. A multi-year,

interdisciplinary study, and interactive tool to better understand the costs and impacts associated with investment in the nation's aging energy infrastructure.

### **Department of Energy, DE-FOA-0002196**

Buildings Energy Efficiency Frontiers & Innovation Technologies (BENEFIT) – 2020. Department of Energy, National Energy Technology Laboratory. The objective of this Funding Opportunity Announcement (FOA) is to research and develop next-generation building technologies that have the potential for significant energy savings and improved demand flexibility, affordability, and occupant comfort. An additional goal is to advance building construction, remodeling, and retrofit practices, and associated workforces. To be eligible for consideration, a concept paper must be submitted no later than **November 5, 2020, by 5:00 p.m. ET.**

### **Recent Publications by UMEI Faculty Affiliates (in no particular order)**

Heller, Martin C, Michael H Mazor, Gregory A Keoleian, 2020, "Plastics in the US: toward a material flow characterization of production, markets and end of life", Environ. Res. Lett. 15 094034, <https://doi.org/10.1088/1748-9326/ab9e1e>

Cai, Ting, Mohtat, Peyman, Stefanopoulou, Anna G., Siegel, Jason B., "Li-ion Battery Fault Detection in Large Packs Using Force and Gas Sensors", IFAC World Congress 2020, September 30, 2020

Temeche, Eleni, Sylvio Indris, and Richard M. Laine, "LiAlO<sub>2</sub>/LiAl<sub>5</sub>O<sub>8</sub> membranes derived from flame synthesized nanopowders (NPs) as a potential electrolyte and coating material for all solid-state batteries (ASSBs)", ACS Applied Materials & Interfaces, accepted for publication September 2020, <https://doi.org/10.1021/acsami.0c13021>

Ravikumar, Dwarakanath, Gregory Keoleian, Shelie Miller, 2020, "The environmental opportunity cost of using renewable energy for carbon capture and utilization for methanol production", Applied Energy, 279, 115770, <https://doi.org/10.1016/j.apenergy.2020.115770>

Chen, Jixin, Alireza Goshtasbi, Amir Peyman Soleymani Mark Ricketts, James Waldecker, Chunchuan Xua, Jun Yang, Tulga Ersal, Jasna Jankovic, 2020, “Effects of cycle duration and test hardware in relative humidity cycling of a polymer electrolyte membrane”, Journal of Power Sources, 476, 228576, <https://doi.org/10.1016/j.jpowsour.2020.228576>

Geng, Sijia, Maria Vrakopoulou, Ian A.Hiskens, 2020, “Chance-constrained optimal capacity design for a renewable-only islanded microgrid”, Electric Power Systems Research, 189, 106564, <https://doi.org/10.1016/j.epsr.2020.106564>

Nazir, Md Salman, Ian Hiskens, 2020, “Analysis of synchronization in load ensembles”, Electric Power Systems Research, 190, 106779, <https://doi.org/10.1016/j.epsr.2020.106779>

## **MISCELLANEOUS OPPORTUNITIES**

### **Assistant Professor - Andlinger Center for Energy and the Environment, Princeton University**

The Andlinger Center for Energy and the Environment at Princeton is receiving applications for the assistant professor position in broad energy storage systems. Topic areas of interest include CO<sub>2</sub> valorization, artificial photosynthesis, carbon capture, and storage. More information here.

### **Undergraduate Global CO<sub>2</sub> Initiative, Winter 2021**

Are you an undergraduate student looking to get involved in the carbon sequestration and utilization community? Join Kianna Marquez today in planning for the launch of the Global CO<sub>2</sub> Initiative Undergraduate Association next semester using this [Google Form](#). Be a part of the network of students that will take on the challenge of our generation: implementing a global climate solution!

### **JUMP into STEM building energy efficiency challenges**

The JUMP into STEM competition, hosted by Oak Ridge National Laboratory (ORNL) and the National Renewable Energy Laboratory (NREL), is accepting submissions from students currently enrolled in U.S. colleges and universities until November 13, 2020, for three new challenges: [Advanced Building Construction](#)

[Methods](#), [Grid-interactive Efficient Buildings \(GEB\)](#), and [Building Energy Audit for Residential or Commercial Buildings](#). Click [here](#) for more information.