



# ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

The ESD Newsletter is a monthly newsletter involving ALL members of ESD. Members are encouraged to forward materials, authored papers on Environmental and Environmental Systems topics, and comments on newsletter topics or current events to the Editor. Your participation is greatly appreciated.

The ESD newsletter features **Five** Sections:  
(Please use the **blue** links below to navigate within the newsletter)

## 1. ESD DIVISION NEWS

- [ASME ESD IMECE 2022 TRACK - Postponed until 2023](#)
- [ASME/A&WMA WASTE INFORMATION EXCHANGE](#)
- [ICEM 2023 Call for Abstracts and Session Chairs](#)
- [ASME TEC Sector Assembly of Divisions & Research Committees meeting](#)

## 2. ENVIRONMENTAL TECHNOLOGIES

- [Researchers Make the Case for Synthetic Alternatives to Palm Oil Potential for future reductions of global GHG and air pollutants from circular waste management systems](#)

## 3. ENVIRONMENTAL REGULATIONS

- [Officials in New Jersey and New York Act to Protect Pollinators by Restricting Neonic Pesticides](#)
- [EPA Affirms its Intention to Hold Property Management Companies Responsible for Lead-Based Paint Safety Requirements for Renovations](#)

## 4. EDITORIAL BOARD SELECTIONS

- [Solar's Bright Future Faces A Cloudy Reality: What About All The Waste?](#)
- [A natural gem is being destroyed by plastic](#)
- [Space hummus: Israeli researchers to grow chickpeas on space station](#)
- [Eco-friendly micro-supercapacitors using fallen leaves?](#)

## 5. READER COMMENTS TO THE EDITOR

- [None received this month](#)

# 1. ESD DIVISION NEWS

## ASME ESD IMECE 2022 TRACK Postponed until 2023

The ASME Environmental Systems Division has decided to hold off on the new Track until IMECE 2023. More information will follow early in 2022.

If you want to volunteer to be Chair or Co-Chair or have ideas for specific sessions, please



## **ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER**

ENVIRONMENTAL  
SYSTEMS DIVISION

**01 FEBRUARY 2022**

contact Arnie Feldman ([jjdsenv@att.net](mailto:jjdsenv@att.net)).

**[Back to Newsletter's Page 1](#)**

### **ASME/A&WMA WASTE INFORMATION EXCHANGE**

ESD, the Research Committee on Energy, Environment and Waste (RCEEW) and the Materials Energy Recovery Division (MER), in conjunction with the Air and Waste Management Association (A&WMA) are planning a Waste information Exchange (WIE) in 2022 in the DC Metropolitan Area. The WIE is being modeled after the [Air] Information Exchange, which has been held annually since 1975 in Research Triangle Park (RTP), NC, in which USEPA (QAQPS and ORD) are key participants. The WIE will not require a written paper and any graphics used will be made available to attendees at the discretion of the speaker. The purpose of the Information Exchange is to make participation as a speaker as easy and simple as possible. The idea is to invite experts to come talk about research or regulations on which they are working without having to spend a lot of time in preparation. The WIE will cover policy updates, regulatory changes, and research on the latest waste topics.

ESD, RCEEW and MER are looking for individuals who want to participate in the planning including Track Chairs, Session Chairs, and Panel Chairs. In addition, ESD is looking for a Technical Chair to represent them on the planning Committee.

If you are interested in volunteering or want further information, please contact Arnold Feldman at [jjdsenv@att.net](mailto:jjdsenv@att.net).

Look for more information on the WIE in future ESD Newsletter's and on the web in Linked-In and Facebook.

**[Back to Newsletter's Page 1](#)**

### **ICEM 2023 Call for Abstracts and Session Chairs**

ASME, the Nuclear Engineering and the Environmental Systems Divisions, are pleased to announce the Call for Abstracts for the International Conference on Radioactive Waste Management and Environmental Remediation (ICEM). The Conference is set for Oct. 3 - 6, 2023 in Stuttgart, Germany. ICEM promotes a broad global exchange of information on technologies, operations, management approaches, economics, and public policies in the critical areas of environmental remediation and radioactive waste management. The conference provides a unique opportunity to foster cooperation among specialists from countries with mature environmental management programs and those from countries with emerging programs.

The program Tracks and Topics are shown in the attached or can be seen on the ICEM website (<https://event.asme.org/ICEM/Program>).



## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

Abstracts for articles, papers and presentations are due Jan 29, 2023. Abstracts should be submitted on-line via the website at <https://icem.secure-platform.com/a/organizations/main/home>.

The ICEM Program Chairs, Martin Edelson and Jovica Riznic, request your help as Session Chairs or Co-Chairs. You can either volunteer for a specific Session/Topic or just in general. A “Roles of the Session Chairs” is being prepared and will be available shortly.

For additional information on volunteering or to volunteer (e.g., Session Chair) at ICEM please contact either Program Chair Martin Edelson ([mcedelson@gmail.com](mailto:mcedelson@gmail.com)) or Jovica Riznic ([Jovica.Riznic@cnsccsn.gc.ca](mailto:Jovica.Riznic@cnsccsn.gc.ca)).

For additional information on submitting Abstracts please send an email to ASME at [toolboxhelp@asme.org](mailto:toolboxhelp@asme.org).

### **ASME TEC Sector Assembly of Divisions & Research Committees meeting**

The ASME TEC Sector Assembly of Divisions & Research Committees meeting was held on January 28, 2022. The link details and nomination deadlines for the various TEC Sector Awards were shared. Particulars about TEC development fund related project proposals were updated. Further, the committees (TCPC and IMECE) related information was detailed. The list of approved Editor-in-chiefs for various journals was listed and the nomination details for the remaining journals was shared. The draft topics for the TEC NExT were enumerated. The upcoming webinar for the TEC Talks was announced. The next meeting is scheduled on February 25, 2022. [Back to Newsletter's Page 1](#)

## **2. ENVIRONMENTAL TECHNOLOGIES**

### **Researchers Make the Case for Synthetic Alternatives to Palm Oil**

The world's cheapest and most widely used vegetable oil, palm oil production is a primary driver of deforestation and biodiversity loss in the tropics. These and other problems with the palm oil industry, such as exploitative labor practices, have for years driven interest in more sustainable options. But good alternatives have proven difficult to come by: Other vegetable oils have similar drawbacks to palm oil, and sustainable forestry practices are not always effective in the face of rising demand. Today, the world consumes nearly 7.7 million tons (7.0 million metric tons) of palm oil each year, used in everything from toothpaste and oat milk to biodiesel and laundry detergent. Demand is expected to more than double by 2050. But with advances in bioengineering and increasing concerns about sustainability, a number of companies like Xylome have developed microbial oils they say could offer an alternative to palm oil while avoiding its most destructive impacts. They join numerous other synthetic biology companies — from ventures hawking new biofuels and fertilizer to lab-grown meat —



## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

that aspire to solve environmental problems but share similar challenges scaling up production and demonstrating their approach is in fact more sustainable than the problem they're trying to solve.

Last year, a startup called C16 Biosciences opened a gleaming new lab in Manhattan to develop a microbial palm oil alternative, backed by \$20 million from Bill Gates' climate solutions investment fund. Breakthrough Energy Ventures. A California-based startup called Kiverdi is also working to manufacture yeast oil using carbon captured from the atmosphere, and a team of bioengineers at the University of Bath is at work scaling up its own strain of oily yeast. Xylome recently sent the first batches of its palm oil alternative — called Yoil — to a number of large palm oil suppliers and the FDA for testing. Even with improved strains, there are limits to how far the microbes can be pushed. In a “limits-of-science” model, the group envisioned a way microbial oils might reach price parity with palm oil in the future. They found that even in an ideal scenario, microbial oils would still be more expensive than cultivated palm oil, and that a more likely best-case scenario is microbial oils around four times more expensive. However, if more valuable co-products such as amino acids or proteins could be manufactured along with the oil, microbial oils could plausibly compete with traditional palm oil. Price might also matter less if environmentally conscious consumers are willing to accept higher prices for palm oil-free products. To be viable, microbial alternatives would also need to be joined by regulatory policies phasing out unsustainably produced palm oil and helping producing countries to diversify their economies. Subsidies or carbon taxes could also improve prospects for yeast oils, since the carbon footprint of microbial oils is likely to be lower than palm oil cultivated on deforested land. However, the full life-cycle emissions of yeast oils has not been studied in detail. (Ref. 1)

[Back to Newsletter's Page 1](#)

### **Potential for future reductions of global GHG and air pollutants from circular waste management systems**

The rapidly rising generation of municipal solid waste jeopardizes the environment and contributes to climate heating. Based on the Shared Socioeconomic Pathways, a group of researchers develop a global systematic approach for evaluating the potentials to reduce emissions of greenhouse gases and air pollutants from the implementation of circular municipal waste management systems. The researchers contrast two sets of global scenarios until 2050, namely baseline and mitigation scenarios, and show that mitigation strategies in the sustainability-oriented scenario yields earlier, and major, co-benefits compared to scenarios in which inequalities are reduced but that are focused solely on technical solutions. The sustainability-oriented scenario leaves 386 Tg CO<sub>2</sub>eq/yr of GHG (CH<sub>4</sub> and CO<sub>2</sub>) to be released while air pollutants from open burning can be eliminated, indicating that this source of ambient air pollution can be entirely eradicated before 2050. CH<sub>4</sub> emission factors are based on the IPCC Guidelines 2006<sup>24</sup>, thereby carry out the uncertainties there described. Emissions factors for air pollutants and particulate matter depend on the composition of waste and burning conditions. Although they adopted the most recognized emission factors in the



## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

scientific arena, they acknowledge that large uncertainties are related to the values as those are estimated for total MSW and not specified by MSW fraction. Concerning uncertainty in projections, this is by some means assessed by adopting alternative activity scenarios which allow the comparison of the different estimates and reflect the sensitivities of the proposed measures to input assumptions. Furthermore, the emission saving from energy recovery is not considered at this stage. The reason for this is that the fuel mix and the corresponding emission factors are important when assessing emission savings from energy recovery. This would mean that they need to explore the fuel mix and emission factors for every scenario and region/country to be able to carry out a consistent analysis and provide robust results. In general, there is a global need to improve information on MSW generation rates, treatment, and level of policy implementation. Regardless of the uncertainties, they demonstrate the importance of improving global estimates of GHGs and air pollutant emissions from MSW and highlight the considerable role of this sector when assessing the respective mitigation potentials. (Ref. 2) [Back to Newsletter's Page 1](#)

### 3. ENVIRONMENTAL REGULATIONS

#### Officials in New Jersey and New York Act to Protect Pollinators by Restricting Neonic Pesticides

Officials in New Jersey and New York are taking action to protect their states' declining pollinator populations by restricting outdoor uses of neonicotinoid (neonic) insecticides. In New York, the state Department of Environmental Conservation announced it would make these pesticides "restricted use," and only available to state certified applicators. In New Jersey, A2070/S1016, was signed by Governor last week after years of advocacy from national, state, and local pollinator and environmental groups. "The law relies on the most up-to-date science to ban the largest uses of neonics in the state,". "This is great news for not just pollinators that are poisoned by neonics, but for all the farmers who depend on insect pollination and for all New Jerseyans that value thriving ecosystems." A2070/S1016 provides for a targeted phase-out of outdoor uses of bee-toxic neonicotinoids, chemicals implicated not only in the decline of pollinators, but also the collapse of entire ecosystems. Beginning 12 months after passage, the bill requires state agencies classify neonicotinoids as "restricted use." Under this designation, only certified pesticide applicators would be allowed to apply these products, effectively eliminating consumer uses. Then, in late 2023, the bill prohibits all outdoor non-agricultural neonicotinoid uses. Exemptions are limited to vet care, wood preservation, outdoor applications within one foot of a building, and invasive species. The state agriculture commissioner may also grant a time-limited exemption for use only if an applicator can show that a "valid environmental emergency exists" and that no other less harmful pesticide is available for the given emergency.(Ref. 3) [Back to Newsletter's Page 1](#)





## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

### **EPA Affirms its Intention to Hold Property Management Companies Responsible for Lead-Based Paint Safety Requirements for Renovations**

Property management companies (PMC) need to pay attention to a recent change in the U.S. Environmental Protection Agency's (EPA) enforcement discretion concerning liability from renovations that could encounter lead-based paint. EPA has announced a change to its enforcement priorities for the Lead Renovation Repair and Paintings (RRP) Rule, which applies to renovations, repairs, or painting that could disturb lead-based paint in certain buildings constructed before 1978. Following the change, PMCs themselves, in addition to contractors hired, will be required to be trained by EPA-approved training providers and certify that they follow lead-safe work practices when conducting regulated renovations.

Some background on EPA's RRP Rule: Lead paint has been in the regulatory crosshairs for some time due to its potential to affect the health of young children. Under old RRP Rule guidance, PMCs could protect themselves from RRP Rule liability by (a) hiring a federally certified firm and (b) not allowing their own employees to do any of the renovation work. However, EPA will withdraw its guidance to that effect on March 21, 2022, and intends to hold PMCs themselves responsible for following the RRP Rule. EPA says this change is motivated by its new focus on environmental justice issues. EPA stated that the enforcement of this rule is "especially important to underserved and overburdened communities, which often include a high proportion of rental housing managed by PMCs, and the military community, where family housing is also often managed by PMCs." Details on the regulatory change: The change involves EPA's withdrawal of two Frequently Asked Questions (FAQ) related to the RRP Rule. The first withdrawn FAQ (23002-13650) states that a PMC does not need to obtain EPA certification under the RRP Rule if no PMC employee is doing renovation work. The second FAQ (23002-18348) explains that the federally certified firm hired by the PMC, and not the PMC itself, is responsible for meeting all requirements of the RRP Rule. EPA's Federal Register Notice related to the withdrawal explicitly states that EPA intends to review PMCs' actions related to the RRP Rule as it would any other entity and that the PMC, along with any firm it hires, will be required to get EPA certification and ensure that the renovations comply with all of the RRP Rule requirements. Failure to do so may motivate EPA to bring an enforcement action against both the PMC as well as any firm performing the renovation work. (Ref. 4) [Back to Newsletter's Page 1](#)

## **4. EDITORIAL BOARD SELECTIONS**

### **Solar's Bright Future Faces A Cloudy Reality: What About All The Waste?**

With the pressures of climate change and the urgency to incorporate alternative energy resources like wind and solar, the fixation on the purported benefits of energy transition technologies overshadows the glaring reality—an absence of strategy around identifying and quantifying other life cycle externalities, such as waste disposal or environmental impacts. The energy industry, governments, and society have yet to fully understand the incoming waste



## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

quantities and the long-term impacts associated with end-of-life solar PVs. If a sustainable and circular future is the preferred way forward, controlled management of end-of-life panels in permitted recycling, treatment, and disposal facilities is necessary. Cumulative solar waste projections worldwide are anticipated to reach around 78 million tonnes by 2050. However, many of these forecasts assume full lifespan of 25-30 years of panels and do not account for early replacement, rapid obsolescence, and widespread premature decommissioning driven by solar tax credits, compensation rates, installation price, severe weather events, and China's role that could ultimately push those numbers even higher. Aside from attractive tax subsidies that have resulted in massive and unprecedented solar growth, the conversion efficiency of panels has improved year after year, thanks to manufacturing innovations in China, which dominates and controls the solar market. In the U.S., solar has been showcased as a critical solution to combat climate change, an attractive investment for companies and investors that aligns with their environmental social, and governance goals, and a job creator. Although the solar recycling industry faces challenges of insufficient inputs, high operating costs, and low profitability due to small concentrations of valuable materials, there is potential for a strong solar recycling market if infrastructure and supply chain collaborations existed to collect, process, and sell the various components. However, none of those arrangements are currently in place. New circular business models should be developed and secondary markets established based on recycled, reused, and recovered silicon, metals, and materials for second life panels and other applications that formalize reuse, repair, and remanufacturing value chains in the solar PV industry. Recycling—or the proper disposal of hazardous materials if recycling is not possible—is indeed an essential component of a circular economy. However, first and foremost, we need enabling regulations that incentivize collection and proper end-of-life management of solar waste. This can help build solar recycling capacity while industry and secondary markets scale as part of a comprehensive end-of-life infrastructure. Investment incentives should also be considered in the suite of solutions to encourage the development of the solar recycling industry.

In the rush to decarbonize and electrify our society, waste management is oftentimes overlooked. Opportunities exist for developing properly scoped methodologies that account for the life cycle impacts across entire supply chains of commonly ignored factors of solar installations such as land use, biodiversity loss, environmental justice, water management, and global transportation. Additionally, technologies such as blockchain can provide great impetus for transparent, accountable management of end-of-life panels. It is vital that we plan, prepare, and design energy systems for reuse, recovery, remanufacturing and recycling in the present, or we risk creating new environmental, social and economic burdens in the future. (Ref. 5)

**[Back to Newsletter's Page 1](#)**

### **A natural gem is being destroyed by plastic**

Mausund and the Froan Nature Reserve in Trøndelag have had notable problems with plastic litter for many years. Professional clean-up work began a few years ago with the removal of marine litter in the archipelago's islands and islets. But no one knew how big the task would turn out to be. "The clean-up work began in 2017. The crew couldn't have imagined how bad



## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

it was,". It turns out that the outer island coastal areas of Trøndelag are among the most polluted in the country. NTNU is conducting a research project that addresses the plastic pollution of the reserve. The results were published in Science of The Total Environment. Due to the ocean currents around this mid-coast archipelago, Mausund and the Froan Nature Reserve are particularly exposed to marine litter washed ashore here. A branch of the Gulf Stream swings inward, and the islands are located in the middle of the Norwegian coastal current. Much of the trash travels from afar.

In some surveys, around 70 percent of the plastic has been registered as coming from abroad. "But that doesn't mean that the responsibility primarily rests with people in other countries. A lot of the plastic waste here comes from shipping and local industry, like ropes, fishing gear and building materials. It's not just plastic that drifts ashore,".The Eider AS Mausund Field Station company has 16 employees. They have a collaborative agreement with NTNU for research and fieldwork. This is the source of coastal renovators who are more or less out collecting plastic rubbish on the islands on a daily basis. Staff also travel around to schools and talk about the challenges that plastic in the world's oceans brings with it.

"The clean-up crews have collected a total of 5,500 cubic meters, or 5.5 million liters, of marine waste since we started in 2017. Then add to that 14,200 kilos of oil, chemicals and other liquids that were collected,". "they also have great help from volunteers at various times. Since the start, close to 1,500 volunteers have worked with us. This is a big task with a lot of challenges. It helps that everyone involved in the project feels that they are contributing something positive to the environment,". The biggest challenge now is that the project is not financially predictable. The Norwegian Environment Agency supported the clean-up work in the first few years. Starting last year, the clean-up work has been supported by the Norwegian Retailers' Environment Fund, with 50 øre per plastic bag that customers buy at the store going to the fund. The commitment to the project made by the Retailers' Environmental Fund has contributed to far greater activity with more involved employees and the collection of much more trash. The agreement with the Retailers' Environmental Fund is valid for another two years, and the goal is to clean up almost 50 percent of the archipelago in southern Trøndelag. This is good, but the environmental fund alone is not enough. "One- to three-year agreements with the investments they have in materials and equipment aren't good. They have a really motivated staff, but the lack of predictability is a strain for everyone,". "They have gained some experience as a team since we started and realize that if we're to succeed—both in terms of becoming more efficient and getting on the offensive with the pollution." (Ref. 6) **[Back to Newsletter's Page 1](#)**

### **Space hummus: Israeli researchers to grow chickpeas on space station**

Space travel is fraught with numerous major challenges and obstacles that astronauts must overcome. While advancements have been made to allow for comparatively short trips into





## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

orbit, such as a stay in the International Space Station (ISS), any long-term term travel or stay in space is a far more difficult prospect. One of the biggest challenges that need to be overcome is having a sustainable food supply. While NASA has made advancements in this regard in the past with its food, there are still issues with it. A number of Israeli experiments are heading to the ISS where, as part of the Rakia Mission, they will be tested to see if they can be a viable option for bringing a sustainable food source to space. One of these experiments is set to see if a viable option for sustainable food in space could be a classic bit of Israeli cuisine: hummus. This is no small research effort, combining the efforts of researchers from Israel and Stanford University, the Moon2Mars Ventures venture capital fund, the Desert Mars Analog Ramon Station (D-Mars) and even high school students at the Yeruham Science Center, not to mention Eytan Stibbe, who is set to be the first Israeli astronaut to head to space since Ilan Ramon and the second to do so ever. “The challenge is not just how to grow as many chickpeas as possible, but how to control the way they are grown – so that we maximize our limited resources. The more we learn to grow food with fewer resources, the more prepared we will be for the challenges that await us on Earth, as well.”

This field of study is something that has been called synthetic biology, and it is key to growing agricultural crops for food in space and making space travel and colonies a viable option. The chickpea seeds, contained in a “miniature greenhouse,” will be sent to the ISS on February 19, 2022 on Northrop Grumman’s 17th commercial resupply services mission. However, the experiment will not begin until Stibbe arrives for the Rakia Mission, after his March 31 takeoff. Stibbe will only be on the ISS for a brief period but the experiment will continue after he leaves. The cameras in the miniature greenhouse will allow for remote viewing and control of the LED lights used to provide nutrients to the chickpeas so scientists can track its growth and see if they can control it. This will be compared to chickpeas also being grown on Earth, specifically at the D-Mars station in Mitzpe Ramon, which is meant to simulate the conditions of Mars. The data from the two will be analyzed by high school students from Yeruham Science Center.

The experiment’s outcome is highly anticipated, as it could be seen as a major step in solving the astronaut food crisis. A major advantage of this process is that it both saves considerable amounts of resources and requires no harm to animals while still providing all the nutritional and taste benefits of beef. According to a recent life-cycle analysis, cultivated beef can significantly cut down on the overall environmental footprint of beef production, reducing greenhouse gas emissions by 92%, land use by 95%, and water use by 78% compared to intensive livestock farming. Already, the company has seen considerable success in its research, such as growing a quality rib-eye steak entirely from cultivated cells. But its success hasn’t just been limited to Earth. In 2019, in collaboration with Russia-based 3D Bioprinting Solutions, Aleph Farms managed to send cow cells to the ISS and was able to make them form muscle tissue. (Ref. 7)

**[Back to Newsletter’s Page 1](#)**



## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

### **Eco-friendly micro-supercapacitors using fallen leaves?**

The Korea Advanced Institute of Science and Technology (KAIST) research team has developed a graphene-inorganic-hybrid micro-supercapacitor made of leaves using femtosecond direct laser writing lithography. The advancement of wearable electronic devices is synonymous with innovations in flexible energy storage devices. Of the various energy storage devices, micro-supercapacitors have drawn a great deal of interest for their high electrical power density, long lifetimes, and short charging times. However, there has been an increase in waste battery generation with the increases in the consumption and use of electronic equipment as well as the short replacement period that follows advancements in mobile devices. The safety and environmental issues involved in the collection, recycling, and processing of such waste batteries are creating a number of challenges. Forests cover about 30 percent of the Earth's surface, producing a huge amount of fallen leaves. This naturally occurring biomass comes in large quantities and is both biodegradable and reusable, which makes it an attractive, eco-friendly material. However, if the leaves are left neglected instead of being used efficiently, they can contribute to fires or water pollution.

To solve both problems at once, a research team developed a one-step technology that can create porous 3D graphene micro-electrodes with high electrical conductivity without additional treatment in atmospheric conditions by irradiating femtosecond laser pulses on the surface of the leaves without additional materials. Taking this strategy further, the team also suggested a method for producing flexible micro-supercapacitors. They showed that this technique could quickly and easily produce porous graphene-inorganic-hybrid electrodes at a low price, and validated their performance by using the graphene micro-supercapacitors to power an LED and an electronic watch that could function as a thermometer, hygrometer, and timer. These results open up the possibility of the mass production of flexible and green graphene-based electronic devices. "Leaves create forest biomass that comes in unmanageable quantities, so using them for next-generation energy storage devices makes it possible for us to reuse waste resources, thereby establishing a virtuous cycle." This research was published in *Advanced Functional Materials* last month and was sponsored by the Ministry of Agriculture Food and Rural Affairs, the Korea Forest Service, and the Korea Institute of Energy Research. (Ref. 8)

[Back to Newsletter's Page 1](#)

## 5. ESD NEWSLETTER READER COMMENTS

None received this month.

[Back to Newsletter's Page 1](#)

## ESD NEWSLETTER BOARD



## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

Editor: DR. K. J. SREEKANTH – (sreekanthkj@kisar.edu.kw)

Assoc: DR. JAMES ZUCCHETTO – (jimzuc@comcast.net)

### NEWSLETTER ARTICLE REFERENCES

1. <https://undark.org/2022/01/25/researchers-make-the-case-for-synthetic-alternatives-to-palm-oil/>
2. <https://www.nature.com/articles/s41467-021-27624-7>
3. <https://beyondpesticides.org/dailynewsblog/2022/01/new-jersey-lawmakers-act-to-protect-pollinators-by-restricting-neonic-pesticides/>
4. <https://www.natlawreview.com/article/epa-affirms-its-intention-to-hold-property-management-companies-responsible-lead>
5. <https://www.forbes.com/sites/thebakersinstitute/2022/01/18/solars-bright-future-faces-a-cloudy-reality-what-about-all-the-waste/?sh=4f6d6ba3c450>
6. <https://phys.org/news/2022-01-natural-gem-plastic.html>
7. <https://www.jpost.com/business-and-innovation/tech-and-start-ups/article-694974>
8. <https://www.sciencedaily.com/releases/2022/01/220127104214.htm>

### ABOUT NEWSLETTER

ENVIRONMENTAL ENGINEERING features the application of environmental technologies to engineering systems to attain optimal performance according to established standards. The Newsletter of the Environmental Systems Division (ESD) will attempt to highlight a variety of environmental technology applications aimed at enhancing engineering systems performances in accordance with the latest standards by presenting excerpts of and links to selected articles from a variety of websites.

### DISCLAIMER

**Disclaimer:** This newsletter may contain articles that offer differing points of view. Any opinions expressed in this publication do not represent the positions of the ESD Executive Board members of the American Society of Mechanical Engineers (ASME).



ENVIRONMENTAL  
SYSTEMS DIVISION

## ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

01 FEBRUARY 2022

### Upcoming ASME Conferences

 CONFERENCE #ICEM2023  
Oct 3 – 6, 2023

# ICEM<sup>®</sup> 2023

International Conference on Environmental  
Remediation and Radioactive Waste Management<sup>®</sup>

International Conference Centre Stuttgart  
Stuttgart, Germany

**CALL FOR ABSTRACTS**

**SUBMIT BY JANUARY 29, 2023**





# ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

01 FEBRUARY 2022

## ASME ENVIRONMENTAL SYSTEMS DIVISION (ESD) Executive Committee

Ryan Neil, Chair



Karen Vallar, Co-Chair

Scott Walter, Treasurer/Secretary



**Arnold Feldman, Past Chair**  
JJDS Environmental



**Steven Unikewicz, Member at Large**  
Idaho National Lab

Hebab Quazi, Member at Large





# ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL  
SYSTEMS DIVISION

**01 FEBRUARY 2022**



Sreekanth K. J; Newsletter Editor  
Kuwait Institute for Scientific Research



Laura Herrera, Staff Liaison  
ASME