



ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

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SYSTEMS DIVISION

JUNE 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:
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1. ESD DIVISION NEWS

DIVISION NEWS

ESD is proud to name its new leadership team for the next 3 years. They are Steve Unikewicz as Chair, Bin He as CoChair and Arnold Feldman as Secretary Treasurer. The Executive



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Committee and the Division would like to thank Ryan Neil, Karen Vallar and Scott Walthour for their service for the past three years.

The Executive Committee is happy to announce that its Fiscal Year 2023 Budget/Plan includes, with no changes, the funding of the following programs: Education Support Program, Dixy Lee Ray Award, and the ACES Conference sponsorship. It also includes a doubling of the ESD Student/Early Career Competition awards and co-sponsorship of a new conference the Waste Information Exchange. The Plan likewise has funding for attend 2 ESD members to attend non-ESD ASME conferences and ESD conferences along with funding to sponsor ESD members to be presenters and panelists at ASME events. For more details on the above please feel free to contact ESD at <https://www.asme.org/get-involved/technical-divisions/technical-divisions-community-pages/environmental-systems-division> **[Back to Newsletter's Page 1](#)**

ASME IMECE 2023 ESD TRACK

If you want to volunteer to be Chair or Co-Chair or have ideas for specific sessions, please contact Arnie Feldman (jjdsenv@att.net). **[Back to Newsletter's Page 1](#)**

ESD's Waste Information Exchange (WIE) 2022 Call for Technical Chairs

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 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.

Look for more information on WIE in future ESD Newsletters. **[Back to Newsletter's Page 1](#)**



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ICEM 2023 Call for Abstracts and Session Chairs

Nuclear Engineering and ESD, are pleased to announce Call for Abstracts. ICEM promotes a broad global exchange of information on technologies, operations, management, economics, and public policies in environmental remediation and radioactive waste management. This is a unique opportunity to foster cooperation among specialists from mature environmental management programs and those with emerging programs. The program Tracks and Topics are on the ICEM website (<https://event.asme.org/ICEM/Program>).

Abstracts for articles, papers and presentations are due Jan 29, 2023. Abstracts should be submitted on-line at <https://icem.secure-platform.com/a/organizations/main/home>. For additional information on submitting Abstracts please send an email to ASME at toolboxhelp@asme.org.

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. "Roles of the Session Chairs" is available to review duties.

The graphic features a dark blue background with a stylized industrial cityscape and a large gear. In the top left, there is a circular logo depicting a factory. Text is arranged in a clean, modern font. A yellow banner at the bottom contains the submission deadline. The ASME logo is in the bottom right corner.

CONFERENCE
Oct 3 – 6, 2023
#ICEM2023

ICEM[®] 2023

International Conference on Environmental
Remediation and Radioactive Waste Management[®]

International Conference Centre Stuttgart
Stuttgart, Germany

CALL FOR ABSTRACTS

SUBMIT BY JANUARY 29, 2023

ASME
SETTING THE STANDARD

For additional information please contact either Martin Edelson (mcedelson@gmail.com) or Jovica Riznic (Jovica.Riznic@cnsccsn.gc.ca). **[Back to Newsletter's Page 1](#)**

2. ENVIRONMENTAL TECHNOLOGIES

Edible kelp packaging and plastic-free insulation: 9 innovations designed to help end plastic pollution

Plastic is an issue that is easy for the public to understand. Consumers hold plastic products in their own hands every day, and footage of marine animals ensnared by plastic waste provokes a strong, emotive reaction. But weaning our society off plastic is much easier said than done. Plastic materials have useful properties that are difficult to replicate. And plastic is even more embedded in society than many realise. The public often equates plastic with packaging, and it is true that single-use packaging accounts for 40% of annual plastic production. But plastics are also used in a host of other applications such as textiles, construction, and agriculture.

Here are nine of the most exciting innovations that are helping to reduce our global plastic footprint.

Edible, kelp-based packaging

Using low-emission manufacturing processes and renewably sourced biomaterials, Norwegian material science company B'ZEOS is working with global corporations to replace single-use plastic packaging with seaweed-based alternatives. The company's first product was an edible drinking straw, but its line of alternative packaging has since expanded thanks to partnerships with Nestle and Spanish plastic manufacturer Aitiip. Seaweed does not require any fertilisation, pesticides, or freshwater – which is what makes it such an attractive alternative to other, land-grown, crop-based biomaterials. B'ZEOS's production processes do not use any toxic chemicals, and the formula for each packaging product is tailored to its final use.

A new kind of compostable plastic

San Francisco-based startup Intropic Materials is developing a bioplastic that can be composted at home. According to a study published in Nature, this new material breaks down within days or weeks depending on the type of plastic and the conditions of the compost – such as its temperature. Normally, microbes use enzymes to slowly 'eat' biodegradable plastic. In the case of the new material, however, the enzymes are built into the plastic itself. When the plastic is thrown away, and the humidity and temperature are right, the enzymes are activated.

Compostable packaging made from agricultural waste

Using agricultural waste materials, German startup Traceless has created three new types of packaging. All three are designed specifically as a replacement for high-volume, single-use plastics. The new materials are fully compostable, even at home, and are completely safe to



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use on food. The polymers used in the company's products—a film, a sprayable coating, and a hard plastic alternative—are natural and without any chemical alteration, meaning that they decompose quickly. The hard plastic option can be used in 3D printers, dyed, moulded, and printed. Similarly, the film can also be dyed and printed, as well as heat-sealed.

Children's toys made from recycled rice crop waste

According to The World Counts, 90% of toys on the market are made of plastic. And the toy industry uses 40 tonnes of plastic for every \$1 million in revenue. This makes it the most plastic-intensive industry in the world. Rice husks constitute about one-fifth of the total weight of rice, and the enormous volume of the waste material produced each year causes problems for farmers around the world. Using rice husks to make toys, therefore, has further benefits, as it prevents the waste from being burned – an approach with a considerable emissions footprint.

Water-repellant building insulation made from popcorn

A team from Germany's University of Göttingen has developed an exterior building insulation material using granulated popcorn. The new insulation is efficient, water repellent, and provides good protection from fire. Used as part of the exterior shell of a building, the popcorn-based insulation is of a quality equivalent to that of commonly used plastic insulation materials. As the sustainable material made from plants, not only does the popcorn insulation help reduce thermal waste, it also reduces carbon emissions.

An alternative to plastic seed coatings

Now, the University of Cambridge spin-out Xampla has partnered with multinational company Croda to develop a natural replacement for microplastic seed coatings. The new coating is made from natural materials, leaves no residue in the environment, and will disappear without a trace once it has done its job of protecting the seed. An initial trial of the coating is expected to take one year to complete.

A more circular model for takeaway lunches

In the UK alone, it is estimated that consumers generate 11 billion items of food packaging waste per year – and that's just from takeaway lunches. Swiss startup reCircle wants to eliminate this mountain of takeaway waste by changing people's habits. The company has developed a circular system that allows customers to purchase their takeaway food in reusable containers.

Enzyme technology to break down plastics

Australian startup Samsara Eco has developed an innovative solution that can break down single-use plastics into harmless organic molecules that can be easily recycled or composted. Enzymes—organic substances that catalyse bio-reactions—are the key to the technology. The



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enzymes break plastic polymer molecules down into their constituent parts – known as monomers.

Building blocks made from plastic waste

American startup ByFusion has developed technology that compresses discarded plastic waste into blocks that can be used in construction. The eco-friendly process—called ‘Blocker’—uses steam and compression, and does not rely on chemicals. One of the key benefits of the technology is that, unlike many forms of plastic recycling, the feedstock does not need to be washed or pre-sorted. All types of plastic can be fed into the system, where they are shredded and fused into the blocks – which are known as ‘ByBlocks’. (Ref. 1)

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H₂-Industries to produce clean hydrogen while cleaning ocean plastic waste

H₂-Industries has teamed up with naval architecture company TECHNOLOG Services for the development of 3D ship designs that would collect ocean plastic waste to make clean hydrogen. The collected plastics will be used for producing H₂ that will power the ship and other applications. The designs the companies will create are intended to result in a ship that will be able to collect plastic waste out of the ocean. Marine plastic waste is a considerable environmental and health problem that is rapidly worsening worldwide. The ship will collect the plastics and convert them into clean hydrogen for powering the ship itself. The surplus H₂ produced by the ship will be stored and brought back to the shore for use in other applications. Ocean plastic pollution is expected to have more than doubled by 2030, according to data from a UN Environment Programme (UNEP) assessment. Waste plastics are the largest form of ocean litter, comprising up to 80 percent of all marine debris found in both surface waters and in deep-sea sediments. The 150-meter-long ship will work with two smaller vessels for plastic collection and clean hydrogen production. The size will be finalized depending on optimal storage capacity for the H₂ it produces. The intention is to have the ship travel at four knots with plastic that two smaller vessels have collected while towing a two-mile net that collects plastic waste from the surface down as far as ten meters (33 feet). The ship’s open bow design will make it possible for collected plastic waste to be sent onto conveyers that will transport it into the ship’s storage hold. From the hold, the plastic waste will undergo a thermolysis process used by H₂-Industries plants on shore. That will convert it into a clean hydrogen. The company expects to be able to produce 100 kilograms of H₂ for every 600 kilograms of plastic waste it collects. (Ref. 2)

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3. ENVIRONMENTAL REGULATIONS

Two new bills aim to reduce plastic pollution in New York state

As New York state grapples with a plastic pollution crisis, legislators are taking aim at the problem with a new spate of policy proposals. Two bills introduced in the New York state assembly this month would place far-reaching requirements on plastic manufacturers, mandating that they pay for waste management and dramatically increase recycling rates, among other things.

One of the bills, branded by proponents as “the strongest packaging reduction bill in the nation,” would require plastic manufacturers to reduce their single-use packaging by at least 50 percent within 10 years, while also mandating that big polluters pay for the cost of plastic disposal and recycling. The other proposal would expand New York’s “Bottle Bill,” which allows consumers to get a few cents back if they return used bottles to a retailer or redemption center. This comprehensive legislation is commensurate with the severity of the plastic pollution problem. The single-use bill, Assembly Bill A10185, invokes a concept known as “extended producer responsibility,” or EPR. Many policies fall within the category of EPR, but the approach generally seeks to place the economic burden of waste management onto the companies that make plastic and use it in their products. Companies therefore should pay for all of the cleanup, disposal, recycling, and other handling costs associated with the stuff they produce after consumers throw it away. The second proposal, Assembly Bill A10184, would expand New York state’s bottle bill to include containers for non-carbonated beverages such as wine, juice, and tea, and double the current 5-cent deposit, allowing consumers to get 10 cents back for every bottle they return. The bill is based on the idea that consumers pay a deposit whenever they buy an eligible drink, and can then reclaim their deposit if they return the empty bottle. (Ref. 3)

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Reshaping global policies for circular economy

Circular economy may not always be effective or even desirable owing to the spatiotemporal dimensions of environmental risk of materials, and variability of global policies. Circular flows involving toxic materials may impose a high risk on the environment and public health such that overemphasis on anthropogenic circularity is not desirable. Moreover, waste flows at a global scale might result in an uneven distribution of risks and costs associated with a circular economy. Challenges remain in implementing and enforcing international policies across national boundaries. The United Nations Basel Convention on the Transboundary Movement of Hazardous Waste and their disposal is used here as an example to illustrate the challenges and to propose a way forward for anthropogenic circularity. A paper describing the results appeared in the journal *Circular Economy* on 19 May 2022. (DOI 10.1016/j.cec.2022.100003)



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Circular economy remains the following challenges and opportunities in implementing and enforcing international policies across national boundaries. Controlling toxic releases across material lifecycles. Despite attempts to use policies and economic incentives to avoid toxic releases and exposures during the lifecycle of such products, fugitive emissions occur and vulnerable populations and environment are impacted adversely. Insufficient investments in environmental protection in low- and middle-income countries have resulted in a high burden of toxic pollution-related mortality rates. Therefore, it may be more desirable to eliminate some toxic materials from the circular economy of products to avoid the disincentive of diminishing returns on investments in collection and recycling. Another vital aspect of circular economy is the issue of mixing materials in recycling which can compromise the quality of the products. Although spatiotemporal, geographic, and international dimensions pose major challenges to the effectiveness of circular economy, there are opportunities to transition from a linear model of material and energy flows, including innovations in technology and policy capacities. Despite many economic, environmental, and social challenges, the harmonization and compatibility of regulations and policies among the countries, regions, and even provinces are needed in the circular economy policy support framework so that the updating and revising of circular economy implementation in the US, the EU, Japan, and China can be achieved without delay. (Ref. 4) [Back to Newsletter's Page 1](#)

4. EDITORIAL BOARD SELECTIONS

Is Organic Produce Healthier Than the Conventional Kind?

In spite of growing awareness over rising grocery costs, Americans continue to shell out for fresh organic produce. U.S. shoppers collectively spent more than \$9 billion on organic fruits and vegetables in 2021, according to a January 2022 report from the Organic Produce Network. That's more than was spent on conventional produce, even though organic items have a significant markup, the report found. Clearly, people are willing to pay a premium for organic fruits and vegetables. When researchers from University of Wisconsin in Parkside surveyed 770 consumers in the Midwest about their reasons for doing so, they found a range of motivations. The responses, which were published in September 2021 in the journal PLoS One, included wanting to avoid pesticides, concerns about environmental stewardship, and the perceived increased nutritional value and improved taste of organic compared with conventional produce.

Researchers estimate that over one billion pounds of pesticides are used in the United States each year. Growers of conventional produce are required to meet federal standards for using them, according to the U.S. Environmental Protection Agency (EPA). According to the agency, types and levels in and on fruit and vegetables must have a "reasonable certainty of no harm." The USDA tests levels annually through its Pesticide Data Program, and since 1996 the EPA



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has canceled or restricted the use of over 270 pesticides on food crops. The good news is, you may not have to pay a premium to reduce your pesticide exposure. Since many pesticides are applied topically, washing fresh produce under running water can remove pesticide residue, according to the National Pesticide Information Center (NPIC). The EWG website, however, does make a point to note that the samples the Dirty Dozen and Clean Fifteen lists are based on are tested for pesticides after they have been prepared to be eaten. "This means the produce has been thoroughly washed and, when applicable, peeled," the site states. (Ref. 5)
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Effects of physical parameters on fish migration between a reservoir and its tributaries

Reservoirs interrupt natural riverine continuity, reduce the overall diversity of the environment, and enhance the spread of non-native fish species through suitable environments. Under favourable conditions, invasive species migrate to tributaries to benefit from local resource supplies. However, the changes in physical conditions in reservoirs that motivate fish species to migrate remain poorly understood. The researchers analysed migration between a reservoir and its tributary in three non-native (asp *Leuciscus aspius*, ide *Leuciscus idus*, and bream *Abramis brama*) and two native (chub *Squalius cephalus* and pike *Esox lucius*) species equipped with radio tags. This 5-year study revealed that an increasing day length was the most general predictor of migration into the tributary in all observed species except *E. lucius*. Only *L. aspius* responded to the substantially increasing water level in the reservoir, while the migration of *L. idus* and *S. cephalus* was attenuated. *Abramis brama* and *S. cephalus* occurred more frequently in tributaries with an increase in temperature in the reservoir and vice versa, but if the difference in temperature between the reservoir and its tributary was small, then *A. brama* did not migrate. Their results showed that migration from the reservoir mainly followed the alterations of daylight, while responses to other parameters were species specific. The interindividual heterogeneity within the species was significant and was not caused by differences in length or sex. Their results contribute to the knowledge of how reservoirs can affect the spread of non-native species that adapt to rapid human-induced environmental changes.

In conclusion, the migration of both, native and non-native species between the reservoir and its tributary was influenced mainly by the photoperiod. Their study, however, revealed an alteration in the migration scenario for non-natives in response to temperature and water level changes in the reservoir, suggesting the potential for water management measures to avoid invasive species spread into a new environment, hence supporting the protection of native assemblages in the tributaries. The manipulation of the water level in the reservoir and/or the installation of suitable lateral obstacles at the tributaries should be considered to



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avoid the upstream migration of invaders from the reservoir into the upstream stretches of the tributaries. (Ref. 6) [Back to Newsletter's Page 1](#)

Rice flash Joule heating process recycles plastic from end-of-life F-150 trucks into high-value graphene for new vehicles

Rice University chemists working with researchers at the Ford Motor Company are turning plastic parts from end-of-life vehicles into graphene via the university's flash Joule heating process (earlier post). The Rice lab of chemist James Tour introduced flash Joule heating in 2020 to convert coal, petroleum coke and trash into graphene. The lab has since adapted the process to convert plastic waste into graphene and to extract precious metals from electronic waste. The average SUV contains up to 350 kilograms (771 pounds) of plastic that could sit in a landfill for centuries but for the recycling process reported in an open-access paper in the debut issue of a new Nature journal, Communications Engineering.

The goal of the project led by Tour and graduate student and lead author Kevin Wyss was to reuse that graphene to make enhanced polyurethane foam for new vehicles. Tests showed the graphene-infused foam had a 34% increase in tensile strength and a 25% increase in low-frequency noise absorption. That's with only 0.1% by weight or less of graphene. Flash Joule heating to make graphene packs mixed ground plastic and a coke additive (for conductivity) between electrodes in a tube and blasts it with high voltage. The sudden, intense heat—up to nearly 5,000 degrees Fahrenheit—vaporizes other elements and leaves behind easy-to-solubilize, turbostratic graphene. Flash heating offers significant environmental benefits, as the process does not require solvents and uses a minimum of energy to produce graphene. To test whether end-of-life, mixed plastic could be transformed, the Rice lab ground the shredder fluff made of plastic bumpers, gaskets, carpets, mats, seating and door casings from end-of-life F-150 pickup trucks to a fine powder without washing or pre-sorting the components. Ford has been using up to 60 pounds of polyurethane foam in its vehicles, with about 2 pounds of that being graphene-reinforced since 2018, according to co-author Alper Kiziltas, a technical expert at Ford research who focuses on sustainability and emerging materials. (Ref. 7) [Back to Newsletter's Page 1](#)

Laser ablation: becoming an option for nuclear decontamination

High power laser ablation systems designed for industrial decontamination applications are proving effective at nuclear sites around the world. Disaster sites Chernobyl and Fukushima have successfully evaluated this technology to improve worker safety and eliminate radiation efficiently. Commonly used processes for removing low-level contamination include grit



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blasting, water blasting, CO2 pellet blasting, chemical cleaning and power tool grinding. While these methods can be effective, they typically produce a significant volume of mixed hazardous waste which is difficult and time consuming to collect, with high cost of disposal. Operator safety is another significant concern with traditional methods. Concerns are excessive dose rates, repetitive stress, risk of serious injuries, excessive noise and the inhalation of hazardous airborne contaminants. Laser ablation is a non-abrasive cleaning method that uses no consumable media, chemicals or gases. It may be used in close proximity to other activities, near sensitive controls and on or near operating equipment.

Typical systems consist of a portable laser source with a fibre optic beam delivery to a hand-held or robot-mounted laser end-effector. Ablated materials are collected at the target surface by a laser fume extractor, with multi-stage filtering, thereby preventing release. Adapt Laser has worked with partners including CleanLASER to develop its laser systems. The portable cleanDECONT CL1000 and CL2000 laser ablation systems use an Nd:YAG, high power laser source. During operation, the laser source is protected by placing it in a clean location outside the radiologically controlled area. In the process, a hand-held, or robot mounted laser optic, is used to move an intense, focused and pulsed laser beam across the target surface. The end effector and fiber optic umbilical, up to 100m away, are wrapped to remain clean and avoid contamination. The laser vaporises organic coatings, rust or oxides and hydrocarbons – which normally contain fixed, non-smearable, radiological contaminants. Vaporised residues are collected immediately after ablation by a strong point-source vacuum system that captures process residues. They pass through multi-stage filtering to be scrubbed free of particles and vapours, preventing hazardous airborne contaminants and minimising clean-up. Laser surface preparation by mobile robot delivery is another option. Laser ablation decontamination will become more capable in future through automation, robotics and AI. (Ref. 8)

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What foods will 9.3 billion people be eating in 2050?

Over the next few decades, the fate of the world's food supply will largely be shaped by a number: 9.3 billion. That's the projected global population for 2050. By then, the Food and Agriculture Organization (FAO) estimates that the world needs to have boosted food production by 60% to meet demand. Where will those extra calories come from? The answer will likely require new approaches to food production. Agriculture currently uses about 40% of the world's land and is responsible for 25% of greenhouse gas emissions. It's possible to clear vast swaths of tropical forests and other areas to make new agricultural land, as nations did at an unprecedented rate throughout the 20th century. Feeding a growing population sustainably will require both improving the efficiency of conventional agriculture and inventing new ways to make food.



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On the conventional agricultural side, many commercial farmers are already employing methods to increase yield while minimizing environmental destruction, such as using efficient irrigation systems, tailoring fertilizer blends to certain crops and soils, utilizing computers to better apply pesticides and herbicides, and feeding cattle food supplements to lower their methane output. Grown in a lab, cell-cultured meat isn't a plant-based meat alternative — it's real meat.

The process works by extracting a healthy culture of cells from an animal, and then placing those cells into a bioreactor where they can grow and multiply into tissue. After a couple of weeks, the lab-grown meat can be shaped into familiar products, like burgers or chicken nuggets. Companies like Beyond Meat and Impossible Foods have sent the plant-based meat alternatives booming over the past decade. One reason these companies have shot to prominence is that they appeal to both vegetarians and carnivores alike by mimicking the taste, look, and texture of real meat products. Legumes — whose edible seeds are called pulses — are responsible for all of the world's beans, lentils, and peas. Pulses are cheap and packed with protein and B vitamins.

But one of the reasons these plants are likely to play an increasingly important role in the global food supply is their sustainability. Legumes can grow in a wide variety of climates and, unlike most modern crops, they don't require nitrogen fertilizers. In fact, most legumes (famously, peanuts) actually improve soil quality. Jellyfish have been eaten as part of Asian cuisine for centuries. But the invertebrates, of which there are more than 20 edible species, could soon start showing up on Western menus, likely in the form of dried chips or as a cold, pickled product. Kelp, which is a macroalgae, is not only rich in antioxidants and elements like iodine but also one of the most sustainable crops. After all, seaweeds like kelp require no feed and, because they grow through photosynthesis, they capture carbon that enters the oceans from greenhouse gasses in the atmosphere. Feed the world's growing population in a sustainable way is a mammoth task, but it wouldn't be the first time society has radically transformed its approach to food production. (Ref. 9) [**Back to Newsletter's Page 1**](#)



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5. ESD NEWSLETTER READER COMMENTS

None received this month.

NB: Readers may request for “name withheld from printing” while submitting their comments/suggestions.

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NEWSLETTER ARTICLE REFERENCES

- 1 <https://www.edie.net/edible-kelp-packaging-and-plastic-free-insulation-9-innovations-designed-to-help-end-plastic-pollution/>
2. <https://www.hydrogenfuelnews.com/clean-hydrogen-h2-industries/8552819/>
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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).



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Upcoming Webinars (Live or Recorded Access) / [Conferences](#)

[Summer Heat Transfer Conference Co-Located with 16th International Conference on Energy Sustainability](#)

Philadelphia, Pennsylvania USA from July 11 – 13, 2022

[29th International Conference on Nuclear Engineering](#)

Shenzhen, China and Virtual from August 8 – August 12, 2022

[International Design Engineering Technical Conferences & Computers and Information in Engineering Conference](#)

St. Louis Union Station Hotel, St. Louis, Missouri USA from August 14 – 17, 2022

[International Pipeline Conference](#)

Hyatt Regency - Telus Convention Centre, Calgary, Alberta, Canada from September 26–30, 2022

[International Additive Manufacturing Conference](#)

Lisbon, Portugal from October 19 – 20, 2022

[International Mechanical Engineering Congress & Exposition®](#)

Greater Columbus Convention Center, Columbus, Ohio USA from October 30 – November 3, 2022