EDITORIAL:

Foreword by the Conference Chair

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The sustainability conference at the University of Akureyri (Iceland) at 11. April 2025 is celebrating its 5th anniversary. For the 5th time, we explore and address environmental and sustainability issues of local, national, and global relevance. This year, the conference comes with two exciting novelties. Firstly, the conference is for the first time co-hosted by the Stefansson Arctic Institute. The institute sponsors the first Stefansson Arctic Student award among self-nominated students who graduated at the BA, MA or PhD level at the University of Akureyri. The award is highlighting excellent student research in order to attract more talents to devote their time to research on sustainability and/or to conduct their research in a sustainable manner. Secondly, while in the past year the abstracts were published on the conference website and the recordings of talks were uploaded to social media (YouTube), this year, the abstracts of the conference are published in the peer-reviewed journal *Nordicum-Mediterraneum*. We see these developments together with an increased registration rate as evidence for the conference gaining momentum, not only because environmental issues and especially climate change are reaching the public awareness, but also because the continued efforts of the organisation committee since the first conference in 2020 to increase the quality and reach of the conference have been successful. The conference traditionally has a student session, which every year highlights the interest and/or involvement of students in making academic affairs more sustainable. This student session is also reflecting the tradition of the University of Akureyri within the Green Flag certification, where student involvement in sustainable practices leads to more environmentally friendly research, teaching, and more generally sustainable operations.

The broad orientation of the conference attracted a diverse set of submissions from ~10 nations across 3 continents, showcasing the international, multidisciplinary approaches to

advance sustainability in our reality that is more and more visibly impacted by climate change and with more recent, serious threats on a political level.

This year we are delighted to receive a keynote delivered by Claire Nauwelaers and Richard Harding, who visited the University of Akureyri in the past in their role of compiling a case study on Iceland's adaptation to climate change. In their keynote they provide an analysis across five European territories, with a resulting framework that serves policymakers and stakeholders for more ambitioned climate adaptation.

Well in line with the need for engaging a broad mass into climate adaptation actions, the conference highlights the importance of climate communication, tackled from the NGO perspective by student contributor Eva Karen Guðrúnardóttir and from the psychological perspective by Yvonne Höller. What needs to be said to convince a broad public of the urgency to increased, quick action in view of the emerging climate crisis? The current political landscape makes it clear that so far, we failed to communicate effectively to all.

Indigenous communities are a particular group that needs to be heard because of their important role in sustainability. Jón Haukur Ingimundarson explains the situation in South Greenland where climate adaptation efforts are especially challenging because of the rapidly changing environment in the Arctic. Even more directly, Renata Colwell hits into that direction with her talk about the implications of Gwich'in advocacy in caribou conservation and the endangerment of their efforts under the Trump administration.

Related to contemporary challenges in the political landscape, the sociopolitical dynamics of energy transitions are articulated by Lauren Bothwell and Jenna A. Lamphere, who examine the barriers to adopting offshore wind energy in Texas. Their insights into the intersection of political will and technological innovation offer important lessons for regions facing similar challenges during the urgently needed transition to renewable energy.

Several talks from international contributors will be exploring practical applications of sustainability: Giulia Petrarchi introduces the implications of food (dis)education, Marie Pourghasem Omandani presents an out-of-the box approach of using mycelium materials in public spaces, Vo Thi Tam Minh's study on nitrogen dioxide emissions in Ho Chi Minh City underscores the value of utilizing satellite data for environmental monitoring and

management, and Garðar Kári Garðarsson introduces an innovative way of food valorization by transforming food waste into a valuable source for biofuels. Natalia Ramirez Carrera will introduce a so-far largely ignored topic on the upcoming challenge of managing plant pests that are emerging because of climate change, and proposes approaches how to sustainably manage them.

In terms of measurement, Cihan Çalıkoğlu's comparative analysis of the Sustainable Development Index and Human Development Index in European Union countries serves as a reminder of the integral link between human well-being and sustainable development. The relevance of the reliability and validity of these indices is also emphasized by Eva Maria Ingvadóttir, who proposes the use of the UN Sustainable Development Goals to guide undergraduate student research.

On a more localized scale, Audrey Matthews, Ásta Margrét Ásmundsdóttir, and Johanna Franke reveal the critical challenges Iceland faces regarding marine litter and wastewater management. Their work serves not only as a reflection of national priorities but also as a call to enhance enforcement mechanisms and regulatory frameworks that protect our precious marine ecosystems.

Finally, in a Stefansson Student Sustainability Award will be handed out to Ísold Egla Guðjónsdóttir, who convinced the jury with her thorough BA thesis on redirecting phosphorus from wastewater. In view of the poor situation in Iceland where wastewater is largely untreated and, if at all, only filtered, this thesis has local relevance. However, also on a global scale the thesis convinced the jury with the potential far-reaching impact of fertilizer creation from wastewater – potentially creating a win-win situation for the environment and the economy.

After the conference is before the conference – we invite all interested readers to follow our updates closely and consider submitting or participating in another way in the 6th Sustainability Conference at the University of Akureyri in 2026. Current efforts are likely to put the conference on an even more intenrational base in collaboration with other universities in the Arctic region.

ABSTRACTS:

Transformative Innovation for better Climate Change Adaptation: Enabling Conditions and Future Perspectives

Lessons from empirical studies on five European territories

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invited as an oral presentation (talk) KEYNOTE

There is a growing scientific consensus that Climate Change Adaptation (CCA) – the process of adjustment to climate-induced impacts, underway or expected – is not being implemented at anything like the scale, depth and speed needed to avoid dangerous climate-related risks. Moreover, due to the complex impacts of climate change, their strong interrelatedness and profound societal implications, solutions adopted in the past to address weather-induced disasters are unlikely to work well in the future. The thesis of an analysis on this subject undertaken for the European Commission's Joint Research Centre (JRC), between December 2022 and April 2024, was that transformative – even radical – adaptation solutions are now needed to avoid much worse climate-related damage and

higher costs in the future. The key question investigated was: 'How to harness the potential of the emerging "Transformative Innovation" paradigm to bring about more effective CCA strategies and actions?' The two independent experts who carried out this study developed a conceptual framework, which postulates that eight key features of 'Transformative Innovation' can act as enabling conditions for the design and implementation of CCA strategies of the necessary high transformative ambition. The experts went on to deploy this framework on empirical studies for JRC based on field research in five European territories: the region of Gorenjska, in Slovenia; the whole of Iceland; the Northern Netherlands; the City of Turku, in Southwest Finland; and the region of Provence-Alpes-Côte d'Azur, in France. Their present paper, which is not itself funded by JRC, compares the strengths and weaknesses of these five territories' progress towards fulfilment of the eight enabling conditions. The paper details the considerable variation between these territories' respective performance in this regard, and concludes that none of them can be said to be fully successful. For each enabling condition, the authors then suggest numerous practical ways forward, which could potentially be followed by any territory seeking to move decisively towards genuinely 'Transformative CCA'.

Claire Nauwelaers is an independent Belgian Policy Analyst and Governmental Adviser, specialised in research and innovation policy and regional development. She is working on policy design and evaluation, innovation-led Green Transition, Climate Adaptation Strategies and transformative innovation policies. Previously she worked as Senior policy analyst at OECD in Paris; as Research Director at the University of Maastricht and the United Nations University in the Netherlands; and as researcher and teaching assistant at the University of Louvain in Belgium.

Richard Harding is an independent expert from the UK with predominantly practitioner background. Early in his career, he worked in DG Regio of the European Commission in Brussels, overseeing implementation of EU Cohesion Policy programmes for socio-economic development in industrial regions. He was later Resident Advisor in Romania and Croatia supporting these countries' EU accession of in the field of Cohesion Policy. Since then, he has worked as an independent expert on a wide variety of EU-funded projects – most recently, together with Claire Nauwelaers, on innovation-led industrial and green transition and climate change adaptation.

Climate change adaptation, socio-ecological challenges and agricultural development in Greenland

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In the period 2005 to 2015, when the prospects of mining dominated the Greenlandic media, Kujalleq residents in southernmost Greenland were experiencing significant growth in agriculture, fisheries, and tourism, raising the hopes for sustainable futures without reliance on extractive industries. Thus, the one mining proposal that faced fierce resistance in South Greenland was the proposed Kuannersuit mining project near Narsaq, which is a most significant horticulture and beef-cattle production area and where tourism was steadily growing. In 2021 Greenland's parliament passed legislation that bans uranium mining, and the government integrated several SDGs within its strategy for agriculture emphasizing the need for food security, a decrease in expensive imports and long-distance transportation of food products, and support for local production of domesticated plants and animals while combining climate change adaptation and mitigation measures.
The last twenty years have seen rapid developments such as a major increase in horticulture production, invoking the suggestion that Greenlanders may become self-sufficient concerning various root crops and vegetables; the emergence beef cattle production, which has tripled since 2015 and benefitted from a warming climate; swift increase of the fertility rate in Greenland´s ca. 17,000 sheep; the reintroduction of sheep-rearing in Nuup Kangerlua (Nuuk Fjord) in 2018; and the use of fishmeal to supplement the use of imported barley as fodder. Based on onsite interviews with farmers, agricultural experts and other stakeholders in Greenland, this presentation evaluates these processes, describes adaptive responses to climatic changes and detrimental weather events and economic conditions, and discusses wicked problems associated with stakeholder conflict of interest over land use, subsidy schemes, resource waste and pollution, as well as the significance of most recent resumption of gold mining in Nalunaq and sudden increase of interest in rare earth mineral

extraction in Killavaat Alannguat.

Jón Haukur Ingimundarson is Senior Scientist with the Stefansson Arctic Institute and Associate Professor of anthropology and Arctic studies at the University of Akureyri, Iceland.

His research foci include the political ecology of farming systems, cultural change, and adaptation in medieval to modern Iceland and Greenland; and human development, socio-economic transformations, and adaptive responses to changing environmental, climatic and economic conditions in the circumpolar North.

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The Psychology of Climate Change Communication

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invited as an oral presentation (talk)

Climate change must be communicated in ways that shifts individual decisions and actions towards limiting mean temperature rise. However, today's climate change communication is not sufficiently effective in triggering mitigation actions to reduce carbon footprint. To change this, individual barriers to engagement with climate change must be addressed, including lack of knowledge, uncertainty and scepticism, distrust in information, psychological distancing, externalizing responsibility, poor judgement, psychological bias, faulty mental models, reliance on technology, other priorities, lifestyle, fatalism, helplessness, personal freedom, economic concerns regarding income and costs, among others. This review introduces the barriers to climate action, their nature and impact, approaches to overcome them, as well as socio-demographical factors moderating pro-climate involvement. The role of personal experience of climate change effects will be highlighted in view of the increasing exposure of humans to climate change induced natural disasters and potential positive effects of these often traumatic experiences on pro-climate

engagement. Finally, there is evidence that the effective induction of climate change emotions and that framing messages towards human value orientations are viable approaches to maximize the impact of climate change communication towards energizing pro-climate actions and behavior even in difficult-to reach populations.

Yvonne Höller is a Professor in Psychology at the University of Akureyri, Iceland. In her previous research in Austria she examined neurological diseases with quantitative EEG, but her current research focuses on environmental and seasonal aspects and works on using her accumulated knowledge in neuroscience to advocate for sustainable actions.

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The Effects of Sewage from Akureyri on the Waters of Eyjafjörður Bay in North Iceland

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In accordance with the Water Framework Directive (WFD) as of 2021, Icelandic law mandates secondary wastewater treatment for urban areas with a population equivalent of 10,000 or more. Despite this, Akureyri a town of 20.000 inhabitants has utilized the ‘less sensitive areas’ exception, defined in 1993, to bypass this requirement, resulting in only primary treatment of sewage. This study investigates the impact of this practice on Eyjafjörður Bay, a semi-enclosed fjord currently under review for its ‘less sensitive’ status.
Raw sewage, subjected only to preliminary screening, is discharged into the fjord, raising concerns about pollutant accumulation. In this study, samples were collected at various depths and distances from the wastewater treatment plant (WWTP) outlet to assess effluent

dispersal and water quality. The study also considers the influence of brackish water inflow from rivers, as well as seasonal stratification on pollutant behavior.
Analyses focused on heavy metals, NOx, phosphorus, and dissolved oxygen saturation. The findings aim to provide critical data for the ongoing evaluation of Eyjafjörður Bay's environmental status and inform future wastewater management policies in Iceland.

Ásta Margrét Ásmundsdóttir holds an Adjunct position at the University of Akureyri and is doing research in wastewater impact on Nordic countries and microplastic sediments.

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Audrey Matthews graduated with a Batcholors degree in Chemistry from Huddersfield Polytechnic (UK), and then gained a PhD from Reading University (UK). She is an Assistant Professor in the Faculty of Nursing at the University of Akureyri. Her research interestes include the study of effluents and particulate analysis in urban environments, and solutions to plastics waste and recycling.

Using UN Sustainable Development Goals to Guide Undergraduate Research

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accepted as an oral presentation (talk)

The UN sustainable development goals (SDGs) can inform and help shape meaningful undergraduate research with the aims of addressing current societal challenges across disciplines. This talk will center around how the SDGs can serve as a starting point and guide for undergraduate research, particularly within the field of biotechnology. This talk will briefly discuss how the SDGs pertain to Iceland and present highlights from recent undergraduate honors theses (submitted in partial fulfillment of the requirements for the degree Bachelor of Science in biotechnology at the University of Akureyri (UNAK)) that all

aimed to address different challenges relating to one or more SDGs using applied microbiology.

Eva María Ingvadóttir holds an Adjunct position at the University of Akureyri and is doing research on thermoanaerobacter alcohol and sustainable teaching in higher education.

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Iceland's Commitment to Clean Beaches: Legal and Policy Strategies for Marine Litter Reduction

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accepted as an oral presentation (talk)

Marine litter remains a pressing challenge for environmental governance, requiring coordinated legal and policy responses at national and international levels. Iceland, as an island nation heavily reliant on its fisheries sector, is bound by countless international laws related to marine (plastic) pollution and has taken steps to address this issue through a combination of domestic measures and commitments. The presentation briefly analyzes Iceland's legal obligations in the context of marine litter reduction, examining how its national policies align with international frameworks such as the MARPOL Convention, the London Convention, and regional agreements under the OSPAR framework.
Despite Iceland's efforts, key challenges persist, particularly in enforcement mechanisms, regulatory integration, and comprehensive data collection. Marine litter is recognized as a form of pollution under several legal instruments, yet gaps remain in translating these obligations into concrete and effective reduction measures. While initiatives like beach clean-ups and waste management improvements exist, a stronger regulatory approach—supported by data-driven policy decisions—is needed to enhance compliance and long-term impact in Iceland.

The presentation will look into how Iceland can reinforce its legal and policy framework by strengthening enforcement, improving monitoring mechanisms, and ensuring better alignment with international due diligence obligations. Adopting more targeted reduction measures, particularly right at the source of waste generation, will be critical to fulfilling Iceland's responsibility in marine protection and advancing global efforts against marine litter.

Johanna Franke is a M.A. Polar Law graduate at the University of Akureyri. Her current work and research, including her master's thesis, focuses on beach litter data collection and marine litter policies and reduction strategies in Iceland.

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Sustainable Pest Management

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Invited as an oral talk

Pseudomonas syringae, traditionally recognized as a plant pathogen, has a broader ecological role beyond agriculture. In diverse non-agricultural environments, researchers have isolated the bacterium revealing non-pathogenic behavior and significant roles, often associated with its ice nucleation property.
The primary objective of this project was to achieve the first isolation of P. syringae from lichens. In Paper I, we detail the isolation process from a specific lichen genus, Peltigera, after screening 10 different lichen genera. The analysis extends to studying the P. syringae population within the same sampling points alongside Peltigera, moss, and tracheophytes when feasible. Following the isolation of this potential plant pathogen, the logical progression led to Paper II, where we explored the fitness and pathology of selected P. syringae strains, predominantly from more aggressive phylogroups, across ten different

plant species, primarily crops. The results showed similar pathogenicity in some lichen strains compared with epidemic ones and a similar fitness in 8 out of 10 plant species tested.
The final project phase aimed to understand the exclusive isolation of P. syringae from a single genus. Paper III, adopting a metabolomics approach, analyzed differences in the profiles of Peltigera and non-Peltigera lichen genera that may influence P. syringae presence. Peltigera's overall profile shows a higher chemical investment, focusing on the production of certain compounds. Kinetics and inhibition analyses suggest a slightly increased growth of P. syringae in Peltigera media, though not considered decisive. The study also outlines specific compounds present or absent in Peltigera, including the absence of ubiquinones, recognized for their resistance role against P. syringae in various plant species.
Furthermore, experiments with P. syringae isolated in Iceland gain significance through collaboration with INRAE (Paper IV). Comparisons with a global database reveal that this Icelandic P. syringae population appears to have been isolated for at least 10,000 years.

Natalia Ramirez has spent the past four years on a PhD at the University of Akureyri. She is passionate about science, especially plant pathology, because it is a field that can contribute to improving food security. She discovered that lichens are a habitat of a plant pathogen called Pseudomonas syringae. This new finding will help us to understand their environmental needs and potential sources of crop contamination. Towards the end of the PhD research she shifted focus to exploring natural chemicals that could be used as sustainable biocontrol treatments, either as a preventive measure or to manage crop outbreaks.

Food (Dis)Education: Are Regulatory Standards Encouraging Corporations to Shift the Blame Down the Food Supply Chain?

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Food waste is the term used to describe when food is lost in the final stages of the food supply chain. Since food production and distribution are very intensive for the environment while food security is still not a certainty to all European Union citizens, different governments in Europe tried to introduce standards and initiatives to reduce food waste. Oftentimes, these regulations caution corporations to educate consumers on food waste reduction practices. While well-intentioned, these norms have the backdrop of allowing corporations to shift the blame of food waste down to consumers, the last link of the supply chain.

Initiatives such as “pay one get one free” provide corporations involved in food distribution convenient way to offload surplus stock without providing consumers meaningful value for their spending. In many occurrences this type of initiatives compels consumers to acquire more products than necessary, leading to products ending in the garbage bin at the consumer’s home rather than at the supermarket. While the difference may seem marginal in terms of resource optimization, it reduces accountability for waste among distribution corporations.

This paper conducts a comparative analysis of the implementation of these norms, evaluating their potential to genuinely reduce food waste versus their impact as a means for corporations to shift responsibility. The objective is to explore how legislation can effectively regulate the relationship between distributors and consumers to reduce food waste, ensuring it promotes sustainable food distribution rather than providing corporations with an easy opt-out.

The paper compares two countries with contrasting approaches to food waste reduction: Norway, which encouraged private initiatives, and Austria, which adopted a top-down regulatory approach. This comparison broadens the scope of analysis and provides insight into different perspectives on the issue.

Giulia Petrachi is a legal scholar from Italy specialized in environmental and sustainability. After obtaining a Bachelor’s degree in Comparative International and European Legal Studies she graduated with top grades in Environmental law from the University of Tromsø. She is currently pursuing a PhD in Private law, with a focus on food waste reduction, at the

University of Oslo.

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Multidimensional Assessment of Sustainable Development Index and Human Development Index Using Topsis and Bilinear Ordering

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accepted as an oral presentation (talk)

This study investigates how the Human Development Index (HDI) influences Sustainable Development (SD) in European Union (EU) countries by analyzing the relationship between the United Nations' HDI and a newly constructed Sustainable Development Index (SDI) by the authors. The dataset comprises 18 indicators retrieved from Eurostat for 2021. The study employs the TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) approach to calculate the SDI and utilizes bilinear ordering to visualize countries in a coordinate system based on their SDI and HDI scores. Spearman's rank correlation reveals a strong positive relationship between SDI and HDI. The study identifies disparities, with countries like Denmark and Sweden showing high SDI and HDI, while Romania and Bulgaria have lower scores. Northern and Western EU countries generally perform better, whereas Eastern and Southern countries face more challenges, highlighting the need for targeted development strategies. The results emphasize the importance of considering both human and sustainable development in policy design, offering insights for enhancing development outcomes for the EU.

Cihan Çalıkoğlu is a PhD candidate in Economics at Poznan University of Life Sciences, specializing in agriculture and rural development. Previously, Cihan was researching

regional development in Turkey. Current research focuses on the impact of EU IPARD rural development programs. Cihan also has over 5 years of professional experience as an export specialist in international trade, working with one of Turkey's largest textile manufacturers.

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The State of Offshore Wind Development in the Texas Gulf Coast

Jenna A. Lamphere with (co-presenters) Elizabeth Nyman, April Garza, and Lauren Bothwel

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accepted as an oral presentation (talk)

The U.S. Federal Government's goal of deploying 30 gigawatts of offshore wind projects by 2030 has the potential to produce enough clean and renewable energy to power over three million homes, while also providing green jobs, advancing coastal resilience, and addressing the climate crisis. In support of this goal, the U.S. Bureau of Ocean Energy Management recently held four offshore wind lease auctions in the Gulf of Mexico, which resulted in one lease provisionally awarded in the Lake Charles area. Despite offshore wind being a critical piece of the energy transition, lack of interest in the lease sales underscores the challenges to building out wind in the Gulf. Drawing on the Technology Innovation Systems framework, this study seeks to support decision-making around the energy transition in the Texas Gulf Coast by examining the functional dynamics that influence the deployment of offshore wind. Research is multi-method, consisting of a content analysis of major Texas newspapers and 15 semi-structured interviews with industry and policy stakeholders. We found that interest in offshore wind development in the Texas Gulf Coast was primarily driven by federal climate goals and mobilization of resources, particularly via the Inflation Reduction Act. Despite Texas being a national leader in onshore wind, having good offshore wind resources, as well as strong support from regional fishermen and environmental nonprofit groups, state politicians have voiced strong opposition and recently passed a suite of anti-renewable energy bills. Lack of political acceptance appears to be the biggest hinderance to

the development of offshore wind in the Texas Gulf Coast.

Jenna A. Lamphere is an Assistant Professor of Environmental Sociology in the College of Marine Sciences and Maritime Studies at Texas A&M University. Previously, Dr. Lamphere served as a Postdoctoral Associate for the University of Tennessee Green Economy Initiative, which worked with the City of Knoxville on energy efficiency improvements in low-income communities. Dr. Lamphere's current research examines multilevel governance of socio-environmental transitions towards sustainability.

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Valorization of food waste – Microwave-assisted pectin hydrolyses for biofuel production

Garðar Kári Garðarsson

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invited as an oral presentation (talk)

Biomass derived from food waste contains a substantial amount of energy that could be replenished to a greater degree; however, global energy consumption continues to rise while it remains reliant on fossil fuels. With microwave-assisted hydrolyses, structural sugars from biomass can be dilapidated rapidly in an energy-efficient approach. By repurposing the potential energy of food waste with disintegrated sugars, they can be fermented into biofuel or other organic substances which may be useful. In this work, the hydrolysis of complex polysaccharides like pectin and starch was carried out using overripe apples that had been subjected to enzymatic breakdown prior to homogenization and radiation in a sulfuric acid solution. The irradiation time exposure, acid concentration, and substrate loading were analyzed for microwave optimization hydrolyses, determined with a

reducing sugars assay. The hydrolyzed apple supernatant was fermented, and the yield of ethanol and acetate was measured using gas chromatography. The maximum ethanol output from fermentation was obtained using a 50 g/L dried apple substrate loading which yielded 378 mM of ethanol, or 2.21% v/v. The 50 g/L is equivalent to 36% of the theoretical load per kilogram, or 96 g or 12.2% v/v ethanol per kilogram of apples.

After 16 years of experience in cooking, Garðar began studying biotechnology at the University of Akureyri. His goals are to make food production and the food industry more sustainable with environmentally friendly and renewable processes. His interest in the field of bioremediation includes renewable ochre, bioplastic synthesis and other natural polymers that are more easily biodegradable in the environment, as well as promoting the bioremediation of hazardous substances using microorganisms or other means.

'We Are Caribou People': Gwich'in Rights and Responsibilities to the Porcupine Caribou Herd

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accepted as an oral presentation (talk)

The Gwich'in Indigenous People of what is now Alaska and northern Canada have cared for and relied on caribou since time immemorial. Despite two centuries of British, American, and Canadian interference with this relationship, Gwich'in remain deeply connected to the Porcupine Caribou Herd, which continues to migrate across the Alaska-Yukon border that now divides the Gwich'in Nation. Under Gwich'in law, Gwich'in have an ongoing responsibility to protect the herd and its habitat. However, state-based laws facilitating settler exploitation of renewable and non-renewable resources in Gwich'in territory have made it more difficult for Gwich'in to uphold these responsibilities, and climate change is

already disrupting Gwich'in-caribou relations. Since the 1980s, Gwich'in on both sides of the border have fought to protect the herd's coastal calving ground in Alaska from fossil fuel development, which represents an existential threat to the caribou and the Gwich'in culture that would also exacerbate the global climate crisis. This threat became particularly dire during the first Trump presidency and will likely become so again over the next four years. In this talk based on my master's thesis in Polar Law, I discuss ongoing Gwich'in advocacy efforts to prevent fossil fuel exploitation in the calving ground, the inadequacy of existing conservation treaties, and the extent to which international human rights law offers Gwich'in alternative tools with which to protect the caribou.

Renata Colwell is a Canadian-trained lawyer and researcher whose work focuses on Indigenous-State relations and Indigenous rights. She holds an LLM in Polar Law, a JD in Common Law, and a BA(Hons) in History, and is a non-practicing member of the Law Society of British Columbia.

Redirecting Phosphorus from Wastewater – Screening for phosphate accumulating bacteria from clam guts for potential wastewater remediation applications

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Stefansson Student Sustainability Award Winner 2025

Phosphorus serves an important role in the metabolism of both prokaryotes and eucaryotes, such as bacteria, animals and plants. This irreplaceable mineral is used in commercial fertilizer, but imminent shortage of the element could cause crop failure and worldwide famine within a few centuries if nothing is done. Therefore, recirculating phosphorus and preventing its loss to the sea, which can be partially attributed to wastewater effluent, is a pressing issue.

Wastewater treatment in Iceland is underdeveloped compared to other Western countries

and the wastewater from some towns is released untreated into the sea. The challenges of treating wastewater in Arctic regions are comprised of cold climate, small and distributed urban areas and diluted wastewater. The goal of wastewater treatment is to decrease the amount of organic and inorganic substances that end up in the receiving water body. One part of it is comprised of the removal of phosphorus. The utilization of specialized microbes (PAOs), which can accumulate phosphate in abundance and simultaneously synthesize bioplastics (PHA), in a specific type of "live" reactor (EBPR), has given the best results. Herein, five unknown bacterial strains, isolated from the gut of the bivalve Arctica islandica sampled in Eyjafjörður, were examined with regard to aerobic phosphate accumulation and PHA production abilities in both nutrient-rich and nutrient-poor synthetic wastewaters (SWW).

Measurements indicated phosphate accumulation and PHA production for all strains. The highest amount of produced PHA was 0.89 g/L. The strains' phosphate uptake was 17-30% in nutrient-poor SWW initially containing 15.3 mg phosphate/L, which resembles the conditions and efficiency of conventional wastewater treatment plants. The phosphate uptake varied more in the nutrient-rich SWW, with highest removal of 85%, which is close to the efficiency of EBPR. These results urge further research, as strains isolated in Eyjaförður are adapted to the local conditions and could benefit both the remediation and value-addition processes of wastewater in Iceland.

Ísold Egla graduated with a BS degree in biotechnology with an emphasis on resource biotechnology. In her final project, she examined whether it was possible to use microorganisms from mussel shells from Eyjafjörður to absorb phosphorus from sewage. After graduating from the University of Akureyri, Ísold began a master's degree in forestry at the Agricultural University of Iceland. Her final project is an examination of the genetics of Hrymur, a hybrid of European and Siberian larch produced in Iceland. Her core task is developing a paternity test to be used in evaluating growth characteristics of individuals based on pedigree, the protocols should also be applicable to other tree species of interest in Icelandic forestry.

Navigating the Climate Communication Landscape: Challenges Faced by

Environmental NGOs in Competing with Media to Influence Public Understanding of Climate Change

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accepted as a poster presentation

The profound challenge of climate change is merely driven by global warming and has various consequences, including extreme weather events, ecological disruptions, harm to biodiversity, and food supply instability. The interconnectedness of climate change with various consequences underscores the urgent need for effective public communication. As the scientific consensus on climate change continues to solidify, it is crucial to convey this information effectively to the public. Climate change affects all living beings on Earth, making public understanding and engagement essential for driving policy changes and behavioral shifts necessary to combat this crisis.
This thesis aims to explore the complex dynamics of climate communication, focusing on the challenges that Environmental Non-Governmental Organisations (ENGOs) encounter as they compete with the media to influence the public's comprehension of climate change. In addition to using existing literature, the author conducted a research method where qualitative data was collected from 7 participants. The findings revealed that while ENGOs face several challenges, they play a vital role in bridging gaps left by traditional media.
The thesis aims to enhance our understanding of climate change communication dynamics and the critical role ENGOs play in addressing the global climate crisis.

Eva Karen Guðrúnardóttir studied media studies at the University of Akureyri with the goal of using her knowledge to communicate important information about climate change to the public in the hope of driving effective action. Her research endeavours are focused on the importance of communicating information about climate change effectively to the public.

NO2 Emissions Estimation Using OMI Satellite Data – A case study in Ho Chi Minh City, Vietnam

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accepted as a poster presentation

Nitrogen dioxide (NO2) is an air pollutant that impacts human health. NO2 is a precursor to other secondary pollutants such as ozone and acid rain. Studying the emission characteristics of NO2 in the troposphere is essential for air pollution control. The utilization of satellite data as input for NO2 emission inventory models has been developed recently and has proven highly effective and flexible. This study aims to assess NO2 emissions using satellite data in Ho Chi Minh City (HCMC), a large city in Vietnam with many NO2 emissions from traffic and industry. There are few published research results or NO2 emission inventories for HCMC. This study uses a top-down life-cycle adjusted accumulation method (LMAM) using satellite data from the Ozone Monitoring Instrument (OMI) Aura to estimate NO2 emissions for HCMC. The results show that the average emission rate 2019 was approximately 6.56 × 1015 molecules cm–2 hour–1 but decreased to 5.79 × 1015 molecules cm–2 hour–1 in 2020. The highest emission distribution was in the areas with traffic and industrial sources, with an emission rate of about 1.56 × 1016 molecules cm–2 hour–1 in 2019 and 1.08 × 1016 molecules cm–2 hour–1 in 2020. The suburban area had the lowest NO2 emission rate of 6.68 × 1015 molecules cm–2 hour–1 in 2019 and decreased by 6.39 × 1015 molecules cm–2 hour–1 in 2020. The model can calculate the emission distribution by socio-economic sector for Ho Chi Minh City. This result can provide information on NO2 emissions as a reference for future city emission control policies and inventory plans.

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Sociopolitical Barriers to Offshore Wind Energy Adoption in Texas

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Offshore wind energy (OSW) has expanded globally over the past two decades, with Europe and China leading. The U.S. has two operational OSW farms, in Rhode Island and Virginia. Although Texas produces the most onshore wind power of any U.S. state, there has been a hesitance to adopt OSW. This is evident from the 3 federally approved lease sales in the Texas Gulf Coast, where no bids were submitted. This research investigates the sociopolitical factors that hinder Texas's adoption of offshore wind energy, particularly focusing on public political alignment. The study applies a version of the Technological Innovation Systems (TIS) framework to map the experience and views of key industry players, including local and state government officials, environmental groups, local fishermen, and energy experts. The TIS framework analyzes the development and diffusion of emerging technologies by identifying key functions, such as knowledge development and policy influence, that drive or hinder technologies. Qualitative data was collected through semi-structured, anonymous interviews with fifteen respondents, who discussed their expertise in the Gulf of Mexico, experience with offshore wind, and perspectives on the renewable energy industry. Preliminary findings suggest that political uncertainty and limited state-level investment are major barriers to OSW. Multiple participants emphasized the need for more economic research, public education, and the development of an organized coalition in order for this green initiative to succeed. Interviewed fishermen

expressed support for OSW development due to potential ecological benefits, including turbines functioning as artificial reefs, and economic opportunities like job creation. Analysis of transcripts is being done to identify strengths and weaknesses of the potential for OSW in Texas using the TIS framework. This research aims to propose policy changes that could mitigate these barriers, contributing to a more supportive environment for offshore wind energy in Texas.

Lauren Bothwell is an undergraduate Oceans and One Health student at Texas A&M University Galveston Campus. She has explored the potential of offshore wind in the Gulf of Mexico by interviewing experts in energy, policy, and economics, aiming to contribute to a greener Texas energy landscape. This fall, she will be attending medical school at the University of Texas Medical Branch and hopes to continue studying the intersection of environmental and human health policy.

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The Analysis of Particulate Matter in Akureyri, Iceland: Trends, Sources & Concerns

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There are a range of natural and anthropegenic particules in the atmosphere, but the particulate matter of most concern to human health are the those that are less than 10µm in diameter, as they have the ability to penetrate deep into the lungs. These are generally from anthropogenic sources.

On 10 December 2024 the Eyjarfjörður Health Committee reported a high particulate matter peak in Akureyri with a daily limit of more than twice the health protection limit, and the highest peak of eight times the limit. This news has added weight to the concerns of local people regarding higher levels of particulate matter from sources, such as from the use of nailed winter tyres and from the visible exhaust from the increasing number of cruise ships in the port.

The presentation will report on a recent study where particulates have been collected from four roof top stations in Akureyri town and at the port. These have been examined by a range of techniques, including scanning electron microscopy with energy dispersive X-ray analysis (SEM-EDX) with our research partners at Loughborough and Nottingham Trent Universities in the UK.

Audrey Matthews graduated with a Batchelors degree in Chemistry from Huddersfield Polytechnic (UK), and then gained a PhD from Reading University (UK). She is an Assistant Professor in the Faculty of Nursing at the University of Akureyri. Her research interests include the study of effluents and particulate analysis in urban environments, and solutions to plastics waste and recycling.

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