Fulbright and Global Catalyst: Frontiers of Sustainable Technologies Conversations for Earth's Tomorrow

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Abstract

This commentary explores the shift towards sustainability in addressing global climate change, with a focus on integrating emerging technologies. Drawing from my experiences as a Fulbright alumnus, this article examines the Fulbright Program's ability to integrate environmental stewardship with its foundational goals of peace and global cooperation. It emphasizes the importance of international collaboration in advancing the United Nations' Sustainable Development Goals, underscoring the Fulbright program's vital contribution to a sustainable future.

Keywords: artificial intelligence • climate change • cultural exchange • SDGs • sustainability

In this era of significant environmental and geopolitical transformations, the Fulbright Program, established by Senator J. William Fulbright in 1946 with the goal of enhancing international goodwill and reducing conflict through knowledge and cultural exchanges, is evolving. Today, it confronts one of the most complex challenges of the 21st century: *global climate change*. Dr. Ian Fry, a United Nations expert, has identified climate change as an unprecedented threat to our environment and societies, a phenomenon that disrupts not just industries and education but also fuels conflicts, migrations, and nationalism—issues Fulbright aimed to alleviate through global understanding.

Facing these challenges, the Fulbright community is increasingly focused on how the program can effectively incorporate climate change into its mission. This involves adopting strategies such as endorsing greener travel for participants by drawing inspiration from initiatives like the Fulbright Leadership Camp 2023, which took place in Mui Ne and challenged participants to create greener community projects. Specifically, the 'Calmpybara' project encouraged greener atmospheres on campus by promoting plant care among students (Fulbright University Vietnam, 2023). We are also weaving environmental sustainability into program orientations, integrating climate actions into service components, infusing sustainability into educational content through the Fulbright-Environmental Protection Agency Award, which offers unique opportunities for postgraduate students or scholars to study or research in the US on critical areas such as climate

change evidence, green and circular economies, and the restoration of natural environments, aligning with national environmental policies and the United Nations' Sustainable Development Goals (Fulbright Ireland-USA, 2023), and nurturing online relationships to minimize carbon footprints. These efforts reflect a deep commitment to social justice and the transformative power of international education in an era marked by environmental crises.

As a Fulbright alumnus, my aspiration is to confront the urgent issue of climate change within the realm of emerging sustainable technologies. This article outlines my vision for integrating sustainability into the core ethos of Fulbright, emphasizing the program's active role in combining environmental stewardship with its long-standing objectives of peace and global cooperation.

Enriching the Fulbright's Mission Through Sustainability

My Fulbright Doctoral Research Fellowship in 2017-18 offered a unique opportunity to advance research at the Wellman Center for Photomedicine at Massachusetts General Hospital, Harvard Medical School, Boston, US. Engaging in groundbreaking projects at the intersection of healthcare and environmental impact allowed me to experience firsthand the program's potential to blend research excellence with addressing real-world challenges. My academic journey, spanning from Boston to Dublin and supported by collaborations with Harvard, MIT, University College Dublin, Enterprise Ireland, and the EU's Marie Skłodowska-Curie Career-FIT PLUS program, represents a testament to the power of international academic collaboration in pushing the boundaries of sustainable development. More than a personal or academic milestone, it highlights the collective effort in promoting sustainable development globally.

For instance, the endeavour to understand and mitigate the complexities of air pollution dynamics, particularly in densely populated urban centres such as Ho Chi Minh City, Vietnam, has highlighted an essential demand for innovative strategies. Although our investigation did not specifically address flooding concerns or engage directly with industries like mining, harbour operations, construction, and extensive retail complexes, we are aware of the profound influence these sectors exert on urban environments and overall sustainability. Our study is designed to contribute to the broader environmental issues that urban areas encounter, particularly focusing on air quality and sustainable urban development. These elements are crucial for enhancing a city's resilience against diverse environmental challenges. By providing insights and findings, we aspire to pave the way for future partnerships and to positively influence industry practices. Thus, this city, emblematic of the challenges faced globally, serves as a reminder of the

urgent necessity to devise effective solutions that can substantially reduce air pollution and its profound effects on public health and the environment. It is within this context that the application of explainable artificial intelligence (AI) methodologies emerges as a beacon of hope and progress.

By employing explainable AI to dissect and tackle the nuances of air pollution, we achieved a more nuanced understanding of its causes, effects, and potential mitigation strategies regarding the case study centered on Ho Chi Minh City. The integration of AI into environmental modelling represents a significant leap towards innovation, marrying the cutting-edge capabilities of technology with the depth of interdisciplinary research. This synergy is crucial in forging new pathways towards sustainability, offering scalable and adaptable solutions that can be customized to the unique needs and conditions of different urban environments.

In light of these advancements, embracing a motto, "*Towards a Breathable Earth*," means actively pursuing projects that reduce environmental impacts and promote sustainable living on our planet. This is exemplified by our initiatives to improve air quality through the adoption of AI and sustainable urban planning, reflecting a clear translation of our motto into actionable outcomes.

Global Dialogues on Sustainable Development Goals (SDGs) for a Sustainable Future

Beyond individual research, my Fulbright journey embraced the ethos of cross-border dialogues and partnerships, particularly with institutions like Rennes University, France, and Marmara University, Turkey, aimed at understanding and advancing the United Nations' 17 SDGs. This collaborative effort highlights the importance of shared objectives and communication in the pursuit of a sustainable future, bolstered by experiences in sustainable computing and AI.

The importance of these efforts is amplified against the context provided by the European Sustainable Development Report 2023/24. This document calls for a renewed European strategy and a collective global push to meet the SDGs in an increasingly divided and complex international landscape. It stresses the need for prompt, concerted actions both within the European Union and globally to prevent irreversible damage to our environment and society, offering essential insights into how academic and technological innovations can drive us towards a more sustainable future.

Additionally, while highlighting pioneering projects like Microsoft's "*Planetary Computer*," it is crucial to approach this discussion with a balanced perspective. We recognize Microsoft's significant strides in environmental preservation and sustainability initiatives. However, it is essential to also consider the broader context of the company's global operations, including its legal challenges and controversies. By presenting a more nuanced discussion,

we acknowledge the dual facets of Microsoft's involvement in environmental efforts–the innovative technologies and strategies they propose, such as the use of AI for earth's sustainability, contrasted against the backdrop of their corporate practices and legal disputes.

Leveraging Sustainable AI to Tackle Environmental Challenges

The rise of sustainable computing alongside the incorporation of AI into environmental research signal a transformative shift in our strategy for confronting ecological challenges. My initiatives in Dublin, enriched through collaborations with institutions and support from leading funding bodies, have showcased the role of AI and sustainable computing can play in tackling pressing environmental issues, such as air pollution and its subsequent health impacts. Beyond these individual endeavours, my active participation in the IEEE (Institute of Electrical and Electronics Engineers) Young Professional Climate and Sustainability Taskforce has immersed me in the wider conversation around sustainable computing, encouraging me to directly address current challenges, stay informed on emerging trends, and identify novel opportunities for breakthroughs in this field.

My involvement with the IEEE taskforce has underscored the importance of a multidisciplinary approach to sustainability, which we refer to as a '*holistic strategy*.' This strategy encompasses integrating technology, policy, and community engagement to ensure a comprehensive approach to environmental sustainability. By 'holistic strategy,' we mean a unified framework that combines sustainable computing and AI with strong policy support and active public involvement. Examples of this in practice include our projects that align AI-driven data analysis with community-led environmental initiatives and policy advocacy, ensuring that technological advances in sustainability are grounded in real-world applications and community needs. At its core, merging AI with sustainable computing practices opens up a critical route for not only comprehensively understanding and tracking environmental issues but also for formulating and executing practical solutions.

Charting the Course: Implications and Pathways for Sustainable Policies

The critical role of the Fulbright Program in promoting sustainable development, especially within the challenging context of implementing the SDGs in a divided global landscape, calls for a visionary outlook. By examining initiatives such as the European Sustainable Development Report and Microsoft's "*Planetary Computer*," I have aimed to delineate the policy

implications that emerge from our collective shift towards sustainability. This scrutiny sheds light on how the Fulbright Program can significantly shape future policy directions, advocating for an integrated approach that seamlessly blends environmental sustainability with technological innovation.

Within this context, the Fulbright Program transcends its traditional reputation for academic and professional excellence, evolving into a dynamic force for global transformation. At the confluence of environmental stewardship and technological innovation, Fulbright scholars worldwide can offer unique perspectives and actionable solutions. Their contributions—ranging from community-based sustainability projects to policy advocacy—illustrate the practical application of our discussions on marrying technology with sustainability. For instance, initiatives led by Fulbright alumni that integrate AI for environmental monitoring in urban areas exemplify how scholarly work can directly influence and enhance community resilience against ecological challenges.

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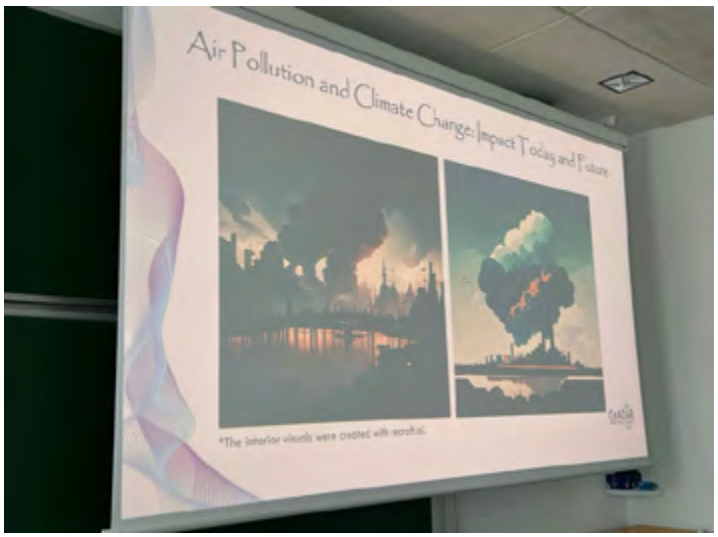
Such collaborative and cross-disciplinary endeavours underscore the imperative of the Fulbright mission in today's world: to not only advance sustainable technologies but also to champion international cooperation for our Earth's tomorrow. By highlighting specific examples of Fulbright scholars' work in the realm of sustainable development, this conclusion aims to provide a clear, actionable vision for how the Fulbright Program can continue to play a crucial role in navigating the complexities of global sustainability challenges.



Fulbright alumnus, Polat Goktas delivering a talk at the Workshop on Artificial Intelligence for Sustainability, 26th European Conference on Artificial Intelligence, Krakow, Poland.

BIOGRAPHY

Dr. Polat Goktas was awarded a Fulbright Doctoral Research Fellowship in 2017-18 at the Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, Boston, US. At present, he is a Senior AI Research Scientist at the UCD School of Computer Science, and Ireland's Centre for Applied Artificial Intelligence. His accolades include the 2016 Young Scientist Award at the Lindau Nobel Laureates Meeting, the 2017 IEEE AP-S Doctoral Research Grant as the top global PhD student, the 2020 Marie-Curie Individual Fellowship, the 2021 METU Serhat Ozyar Young Scientist of the Year Award, among others. He can be reached at polat.goktas@ucd.ie. His social media handles include Twitter: @PolatGoktass and LinkedIn: https://www.linkedin.com/in/polat-goktas-ph-d-29b24b58/