Dresden University of Technology

INREM

UNU FLORES

Online Symposium on

Urban Forestry – Smart Climate Solutions

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AT 13:00 CET

TUESDAY 02 DECEMBER 2025

Sponsored by:

DAAD Deutscher Akademischer Austauschdienst German Academic Exchange Service

Federal Ministry for Economic Cooperation and Development BMZ

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Urban Forestry – Smart Climate Solutions

As cities expand and the climate crisis deepens, ***urban forestry has become a vital strategy*** *for building resilience, enhancing biodiversity, and improving the well-being of urban populations. More than a matter of aesthetics,* ***urban trees and green corridors*** *mitigate heat stress, capture carbon, regulate stormwater, and provide essential habitats in dense cityscapes.*

The symposium will explore how ***urban forestry serves as a smart climate solution,*** *addressing challenges from heat islands and stormwater management to carbon sequestration, while also showcasing innovations such as smart monitoring technologies and socio-ecological research on equity in green space access. With perspectives from both the Global South and Europe, it will highlight community-led initiatives, knowledge exchange across regions, and policy approaches that integrate urban forestry into climate strategies, governance, and financing—positioning urban forests as essential infrastructure for resilient and inclusive cities.*

Program Schedule

Time (CET)	Program	by	Institution
13:00	Welcome words	Dr. Marolyn Vidaurre	Coordinator of International Education, Faculty of Environmental Science, TU Dresden
13:05	Introduction of the INREM - Alumni Expert Network	Dr. Simon Benedikter	Institute of International Forestry and Forest Products, TU Dresden
13:15	Mitigating urban heat island with hydroponic rooftop farming	Shiny Ruth Valencia Suresh Selvaraj	TU Dresden
13:30	Towards an Explicit Understanding of Network Governance in Urban Forestry Management: A Case Study of Portland (OR), USA	Quadri Olatunbosun Taiwo	Urban and Community Forestry Program (UCF), Oregon Department of Forestry
13:45	Q&A	Dr. Marolyn Vidaurre	TUD

Time (CET)	Program	by	Institution
14:00	Integrating Nature-Based Solutions into Urban Forestry Strategies for Climate Resilience in Arid Regions: Lessons from Egypt	Ahmed Mohamed Bayomi Hassan	Holding Company for Water and wastewater
14:15	Bridging green gaps. Empowering participatory governance through tree planting in Barranquilla, Colombia	Gina Serrano	La Iguana ONG
14:30	Q&A	Dr. Marolyn Vidaurre	TUD
14:45	Feedback of the symposium!	Dr. Simon Benedikter	TUD
15:00	Final remarks & Closure	Dr. Marolyn Vidaurre	TUD

Shiny Ruth Valencia Suresh Selvaraj

MSc Water Security and Global Change

TU Dresden

Shiny Ruth Valencia is currently pursuing a joint Masters in Water Security and Global Change offered by TU Dresden, and RWTH Aachen and IIT Madras. She holds a Bachelors in Geoinformatics Engineering and her specialization includes Remote Sensing, GIS, and data analysis, applying this expertise to water resource management, sustainability, and climate research.

MITIGATING URBAN HEAT ISLAND WITH HYDROPONIC ROOFTOP FARMING

Abstract:

Urban areas tend to experience significantly higher temperatures than their rural surroundings due to extensive use of heat retaining materials like concrete and asphalt, combined with limited vegetation. This phenomenon, known as the Urban Heat Island (UHI) effect, increases energy consumption and contributes to thermal discomfort among city residents. Conventional cooling methods, such as air conditioning, further elevate environmental issues through increased greenhouse gas emissions. While passive cooling strategies like fountains, ponds, and springs can help decrease urban heat, their implementation is often constrained by space and construction demands. A more sustainable and space efficient solution lies in urban green infrastructure, particularly rooftop gardens. However, traditional soil-based systems require substantial water and space, limiting their feasibility in compact urban settings. This study proposes a hydroponic rooftop farming system that utilizes treated wastewater as a nutrient-rich resource, integrating climate regulation with sustainable urban agriculture. The system also incorporates IoT-based sensors for real-time monitoring and efficient resource management. By addressing both the UHI effect and urban food production, this approach offers an innovative and environmentally responsible solution for enhancing climate resilience in cities. This study primarily reviewed the proposed method and highlighted its potential benefits for sustainable urban greening, emphasizing its practicality, environmental impact, and future research possibilities for large-scale implementation.

Quadri Olatunbosun Taiwo

B.Sc., M.Sc. Geography

Urban and Community Forestry Program (UCF), Oregon Department of Forestry,USA

My demonstrated expertise in urban forestry, evidenced by my research and publications, is directly applied in my current role as a UCF Network Analyst, where I am tasked with maximizing the impact of the Oregon Department of Forestry's community initiatives.

TOWARDS AN EXPLICIT UNDERSTANDING OF NETWORK GOVERNANCE IN URBAN FORESTRY MANAGEMENT: A CASE STUDY OF PORTLAND (OR), USA

Abstract:

As the climate continues to warm, and municipal leaders look for cost-effective and timely approaches to urban sustainability, one increasingly sought-out approach is the use of tree canopy to cool neighborhoods. Despite widespread efforts to expand tree canopy in cities, an overwhelming body of evidence suggests that urban green space is declining across the U.S., yet little is known about the factors that propel these changes. Understanding the institutional and governance systems can help identify the opportunities for slow consistent declines. Using social network analysis (SNA) metrics, we examined stakeholder roles in power structures and decision-making processes within Portland, Oregon's urban forest management. Our results reveal a highly decentralized urban forestry network (density = 0.0079), with weak cohesion (5.4%) among 162 stakeholders. Moving forward, while network governance may face obstacles from conflicting interests among community and interagency groups, transforming governance models at all levels will require developing periodic, collaborative urban forestry management plans to address nature-based planning challenges. These planning documents should strongly emphasize not only the prioritization of tree equity-related ordinances but also the optimization of eco-literacy and awareness through virtual reality (VR) technology. As a novel approach, immersive simulations demonstrate practical potential for showcasing urban forestry benefits in network governance outreach and consensus-building.

Dr. Ahmed Mohamed Bayomi Hassan

Holding Company for Water and wastewater

Ahmed Bayomi is a Water Quality and Environmental Expert with over 18 years of experience in water resources management, treatment processes, environmental compliance, and sustainable innovation through Nature-Based Solutions (NbS). He works at the Holding Company for Water and Wastewater (HCWW), Egypt, and is an alumnus of TU Dresden, Germany (2023).

INTEGRATING NATURE-BASED SOLUTIONS INTO URBAN FORESTRY STRATEGIES FOR CLIMATE RESILIENCE IN ARID REGIONS: LESSONS FROM EGYPT

Abstract:

Egypt faces critical water challenges, including increasing scarcity, pollution, and the impacts of climate change. Nature-Based Solutions (NbS) offer sustainable, cost-effective approaches by harnessing natural ecosystems and ecological processes. While the NbS framework is still emerging in Egypt's water sector, several entities have begun applying its principles, either intentionally or indirectly. This study provides analysis of NbS wastewater treatment performance across Egyptian governorates, combining spatial distribution, operational metrics, and ecological outcomes. It presents key case studies from the Holding Company for Water and Wastewater (HCWW), highlighting practical implementation of NbS such as oxidation pond wastewater treatment plants (WWTPs) and constructed wetlands (CWs). Oxidation ponds are shallow basins that use sunlight, algae, and microorganisms for natural treatment. CWs replicate natural wetlands using vegetation, soil, and microbial activity to remove contaminants. Treated effluent from both systems is commonly reused to irrigate afforestation projects, combating desertification, enhancing well-being, and supporting climate adaptation. Some systems also support biodiversity by providing habitats for migratory birds. The study evaluates system performance using the Utilization Factor (UF), revealing regional disparities, including overloaded, underutilized, and inactive facilities. While governorates like Sohag and Qena show high adoption, densely populated areas such as Cairo and Alexandria lack NbS systems due to spatial constraints. These findings offer data-driven insights to improve planning and promote efficient use of NbS. The paper concludes with policy recommendations to integrate NbS into Egypt's water strategies, emphasizing the need for institutional coordination, capacity building, and stakeholder engagement.

Gina Serrano

MSc. Tropical Forestry

La Iguana ONG

I hold a Master's degree in Sustainable Tropical Forestry and a background in Architecture, with professional experience in Colombia and Ecuador. I specialize in the integration of green infrastructure and nature-based solutions in urban environments. I approach environmental and urban challenges through a multidisciplinary lens that combines technical, ecological, and design perspectives.

BRIDGING GREEN GAPS. EMPOWERING PARTICIPATORY GOVERNANCE THROUGH TREE PLANTING IN BARRANQUILLA, COLOMBIA

Abstract:

Trees play a critical role as green infrastructure in tropical cities, protecting people and other species from the urban heat island effect and enhancing urban livability through a wide range of ecosystem services. However, the uneven distribution of vegetation, both in quality and quantity, undermines the potential of urban forests to provide these benefits equitably across the city. In many Latin American urban areas, where rapid growth has intensified social and spatial inequalities, this imbalance translates into an unequal access to shade, cleaner air, and cooling benefits, particularly for low-income communities. To address this challenge, several cities have begun to adopt tree-planting programs that combine climate adaptation goals with social inclusion. This presentation focuses on one such initiative implemented in Barranquilla, Colombia, as a model for how public greening programs can be used to reduce climate vulnerability in urban areas experiencing both environmental stress and socioeconomic precarity. Using the i-Tree Canopy tool, the spatial distribution of tree cover across Barranquilla was analyzed to identify disparities and determine priority areas for intervention. The results revealed that neighborhoods in the southern part of the city, typically lower-income, had significantly lower canopy cover and less available space for vegetation. Based on this diagnosis, a participatory tree-planting program was developed and implemented between mid-2021 and December 2022, directing public resources toward areas with both low income and low canopy cover. With a participatory approach, residents selected tree species and planting sites within their homes, schools, and communal spaces. Monitoring during this period showed establishment success rates between 70% and 90%, demonstrating the effectiveness of equity-oriented greening strategies in strengthening social resilience, enhancing ecological connectivity, and providing a replicable model for other tropical cities seeking to integrate social inclusion with climate adaptation.

COORDINATION

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JOIN THE ALUMNI NETWORK!

INREM

ALUMNI EXPERT NETWORK

The professional alumni network "Integrated Natural Resources and Environmental Management (INREM)" was founded in 2022 as a global network of experts. Located at the Faculty of Environmental Sciences of Technische Universität Dresden (TU Dresden), INREM unites international educational programs with developmental relevance in environmental sectors: CIPSEM, M.Sc. Ecosystem Services, M.Sc. Hydroscience, M.Sc. Tropical Forestry and UNU-Flores. As an interdisciplinary North-South-South expert network, INREM brings together alumni in a transnational initiative. It aims to facilitate regular exchange of experiences, joint, social learning, and international networking among its members.

Interdisciplinary and integrative thinking and acting constitute the leitmotif of INREM. Both are essential for sustainable development in the sense of the Agenda 2030 and the Sustainable Development Goals.