City of Malmö trädkontoret. SLU SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES

DIVERSITY IN URBAN FORESTRY

BRINGING PEOPLE, TREES, AND IDEAS TOGETHER

EFUF European Forum on Urban Forestry

PROGRAMME

About EFUF: The European Forum on Urban Forestry (EFUF) is a meeting place for practitioners, policymakers, managers, educators and scientists who are active in urban forestry, urban greening and green infrastructure. Founded in 1998, EFUF meets annually to discuss new developments, to exchange experiences, and to visit examples of good practices on planning, design and management of urban forests (from woodland to urban parks and street trees). EFUF is associated with the International Union of Forest Research Organisations' (IUFRO Division 6.07.00 – Urban forestry) urban forestry group, as well as with several European and Nordic networks for urban forestry.

Legal: The European Forum on Urban Forestry is established as an international not-for-profit association according to the Belgian Law (ivzw, aisbl) with enterprise number 0800.823.486.

Directors 2025/26: Clive Davies (Chair), Rik de Vreese (Treasurer), Alan Simson (Secretary), Jerylee Wilkes-Allemann (Vice-chair and Comms), Colm O Driscoll, Stefan Stevanovic, Dirk Voets, Ivana Zivojinovic, Robert Hostnik, Aleksandra Zienkiewicz, Simone Borelli, Andrea Gion Saluz

Membership: EFUF operates a membership (with voting rights) and supporter scheme (without voting rights) for those who wish to contribute to the running costs of EFUF as an advocate for urban forestry in Europe and beyond.
Please consider joining and if already a member renewing your membership.

Your contribution is invaluable. (QR code link to membership signup) or visit https://efuf.org/efuf-membership-scheme/

Photos by Johan Östberg, if not mentioned otherwise.

WELCOME
TO THE 28TH EUROPEAN FORUM ON URBAN FORESTRY (EFUF)

Welcome to EFUF 2026, which is being held in the City of Malmö for the first time. It is also good that EFUF is returning to Sweden after a gap of 17 years. On that occasion, EFUF was held in the City of Stockholm. It is good to be back.

Organising an EFUF is not the sole responsibility of one organisation so I would like to thank The Tree Office (Trädkontoret) for their leading role, The Swedish University of Agricultural Sciences (SLU), The City of Malmö as well as the EFUF Association for the help in the organisation. I would also like to mention the International Union of Forest Research Organisations (IUFRO), European Forest Institute (EFI) and the United Nations FAO for their ongoing support. I would also like to thank the International Society of Arboriculture (ISA) who have generously offered funding to support student attendance.

It is a considerable privilege to write this forward for the 28th Annual EFUF which is testament to the enthusiasm that exists for urban forests across our continent and beyond. As is usual for 2026 you will find in attendance researchers, practitioners and other professionals dealing with urban forests, green infrastructure, urban nature and green spaces. For 2026 we have the overarching theme of **'Diversity in Urban Forestry - bringing people, trees and ideas together'.** The theme is of course a broad title, so we have split this across six sub themes.

- 'Counting What Counts: Turning Urban Tree Data into Impact';
- 'Building Resilient Urban Forests Through Governance and Collaboration';
- 'Urban Tree Access in Numbers: Equity, Cooling and Health';
- 'Rethinking Urban Forest Forms: From Tiny Forests to Living Labs';
- 'Beyond Shade: Measuring the Environmental Performance of Urban Green'
- 'Culture, Community and Climate: Putting Urban Forestry into Practice'.

Clive Davies, Chair of the EFUF Board of Directors

WELCOME TO MALMÖ

We are delighted to welcome you to Malmö, a vibrant and forward-looking city in the heart of the dynamic Öresund Region, closely connected to Copenhagen via the Öresund Bridge. As Sweden's third largest city, with a population of over 350,000, Malmö is known for its diversity, openness and rapid development.

Over recent decades, Malmö has undergone a remarkable transformation from an industrial city into an international example of innovation, sustainability and green urban development. Today, the city is widely recognised for its work in sustainable planning, climate adaptation and the integration of green infrastructure.

Parks, urban forests, waterfront landscapes and green corridors are essential elements of Malmö's identity and play a key role in shaping a resilient and liveable city. These environments support biodiversity, contribute to improved public health and offer accessible nature experiences for both residents and visitors.

The overall theme of EFUF 2026, "Diversity in Urban Forestry – Bringing People, Trees and Ideas Together", reflects many of the qualities that define Malmö today. The city's approach to urban development highlights the importance of ecological, social and cultural diversity, as well as collaboration across sectors and disciplines.

We hope that Malmö will provide an inspiring setting for exchange, learning and new ideas as we explore the future of urban forestry together.

Johan Östberg and the conference organizers

TUESDAY 26 MAY

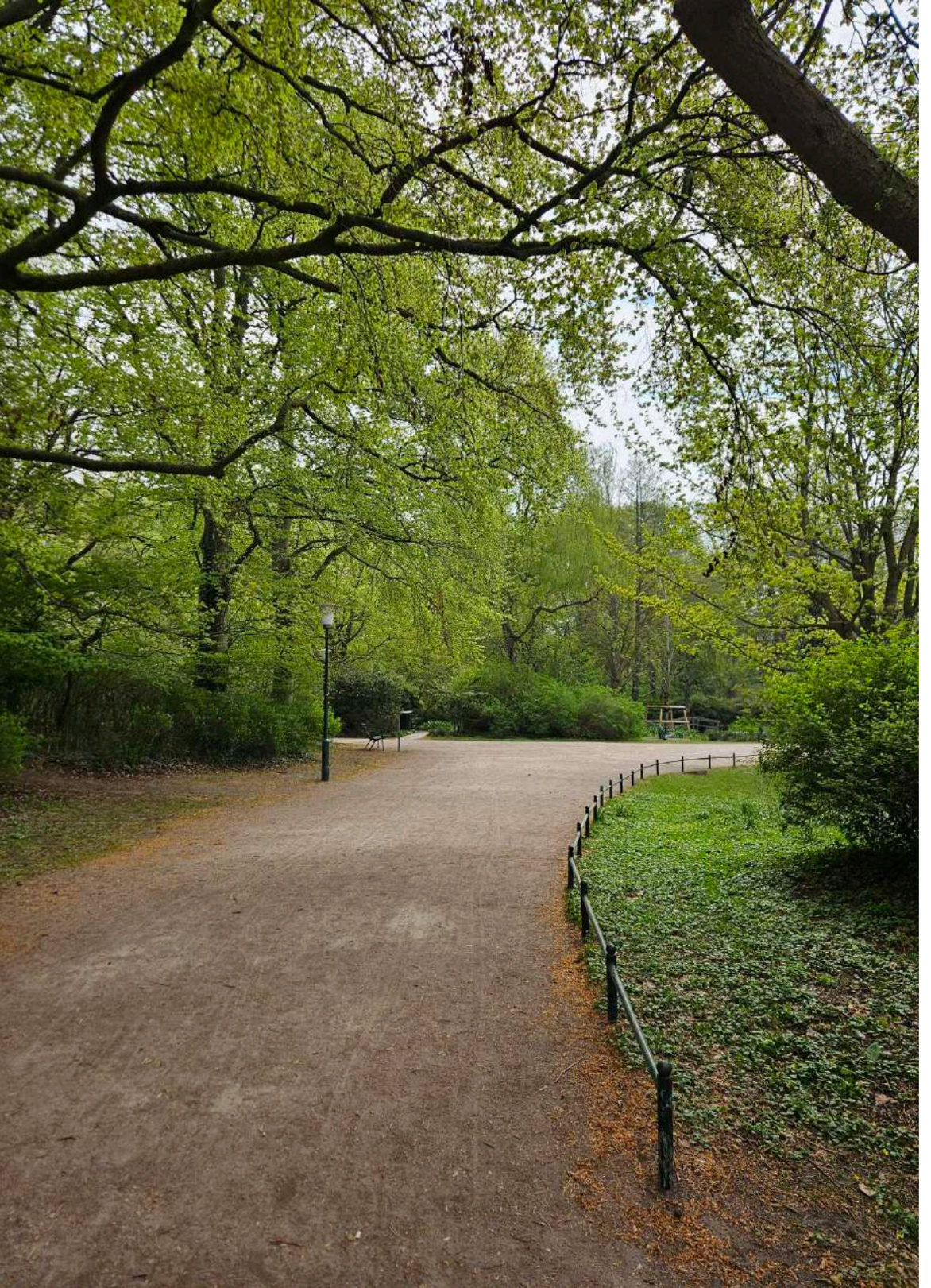
LOCATION: CITY HALL - RÅDHUSET

Stortorget 2, 211 34 Malmö

18:00 Icebreaker
Complementary from the City of Malmö

City of Malmö

Malmö City Hall, Rådhuset. Photo by Bojana Lukac



PROGRAMME

WEDNESDAY 27 MAY

LOCATION: SANKT GERTRUD KONFERENS
Östergatan 7B, 211 25 Malmö

08:00 - 08:45 **Registration & Coffee**

08:45 - 09:00 **Welcome & practical information**

09:00 - 09:10 **Andreas Schönström**
Municipal councilor for the Social Democrats

09:10 - 09:30 **Keynote 1 - Finn Williams**
Malmö City Architect
The superdiverse city: diversity as a design strategy in Malmö

09:30 - 09:50 **Keynote 2 - Elin Einarsson**
Head of Section, Urban Environment, City of Malmö
Towards a Greener Malmö: Integrating Trees into Urban Development

10:00 - 10:30 **COFFEE BREAK**

10:30 - 12:30 **Parallel Sessions 1-3. See next page**
Full abstracts can be found following the conference program in this booklet

10:30 - 12:30 Parallel Session

Time	**Session 1** **Trees Under Pressure: Physiology, Stress and Survival in the City** *Moderator: Cecil Konijnendijk*	**Session 2** **Future-Proofing Urban Trees: Diversity, Data and Decisions** *Moderator: Rene Van der Velde*	**Session 3** **Urban Nature for All: Equity, Health and Inclusion** *Moderator: Chris Baines*
10.30-10.45	Right Tree, Right Place – How Spatial Data Can Strengthen Urban Living Environments -*Tørres Rasmussen (Norway)*	Communicating the benefits of trees - *Gustav Näsländer (Sweden)*	Global perspectives on tree equity - *Livia Shamir (Italy)*
10.48-11.03	Fifteen Years on the Footpath: What Dublin's Street Trees Reveal About Growth, Space and Urban Futures - *Tine Ningal (Ireland)*	Accumulation of particulate matter and metals in six species in the urban environment – a case study from Gothenburg -*Jenny Lindén (Sweden)*	Tree Equity for Hartlepool - *Leah Johnstone (UK)*
11.06-11.21	Lessons learnt from a ten-year-long study of how a solitary tree interacts with the wind - *Ebba Dellwik (Denmark)*	Species Diversity and Growth Responses of Urban Trees under Climate Stress - *Leila Parhizgar (Germany)*	Barriers and systemic gaps hindering fair distribution of urban nature benefits among vulnerable populations - *Rik De Vreese (Belgium)*
11.24-11.39	Pruning increases invertebrate populations across growing zones dependent upon average temperatures, tree size, and degree of built environment - *Stella Dee (USA)*	New methods and tools to increase urban forest diversity and resilience - *Annick St-Denis (Canada)*	A Socio-Economic Perspective on Access to Urban Greenspace (UGS) - *Kjell Nilsson (Sweden)*

Time	**Session 1** **Trees Under Pressure: Physiology, Stress and Survival in the City** *Moderator: Cecil Konijnendijk*	**Session 2** **Future-Proofing Urban Trees: Diversity, Data and Decisions** *Moderator: Rene Van der Velde*	**Session 3** **Urban Nature for All: Equity, Health and Inclusion** *Moderator: Chris Baines*
11.42-11.57	After the Malmö Tree Vandalism: What Can We Learn About Helping Damaged Trees Recover? - *Johan Östberg (Sweden)*	From Global Assessment to Urban Action: Safeguarding Tree Diversity in Urban Environments - *Malin Rivers (UK)*	Co-creating indicators for Assessing the Socio-Political and Socio-Cultural Aspects of Nature-Based Solutions (NBS) - *Gerd Lupp (Germany)*
12.00-12.15	Exploring Spatial and Seasonal Diversity of Tree-Associated Communities in Urban Forests Using Environmental DNA - *Zoe Petridis (Germany)*	Guardians of Urban Trees: A European Network for Urban Tree Biosecurity (UB3Guard) - *Johanna Witzell (Sweden)*	From Pixels to Planning: A Multi-Scale Data Framework for Urban Forest Resilience and Climate Adaptation - *Aleksandra Zienkiewicz (Polan*d)
12.18-12.33	Urban trees tap deep: How urban density affects water uptake in Zurich's trees - *Sophie Emberger (Switzerland)*	Tree Crown Detection on Historical Orthophoto Images: A Comprehensive Review - *Blaz Klobucar (Sweden)*	Birmingham, a super-diverse city for both people and trees. How are Birmingham's newest urban trees settling in? - *Deanne Brettle (United Kingdom)*

12:45 - 13:30 **LUNCH**

13:30 - 17:00 **Excursion 1a - Urban sustainability (Long walk)**
Grönare Möllan, Folkets park, Davidshallstorg and more
Guide: Gustav Näsländer
Meeting point 1a

Excursion 1b - Urban sustainability (Long walk)
Grönare Möllan, Folkets park, Davidshallstorg and more
Guide: Johan Östberg
Meeting point 1b

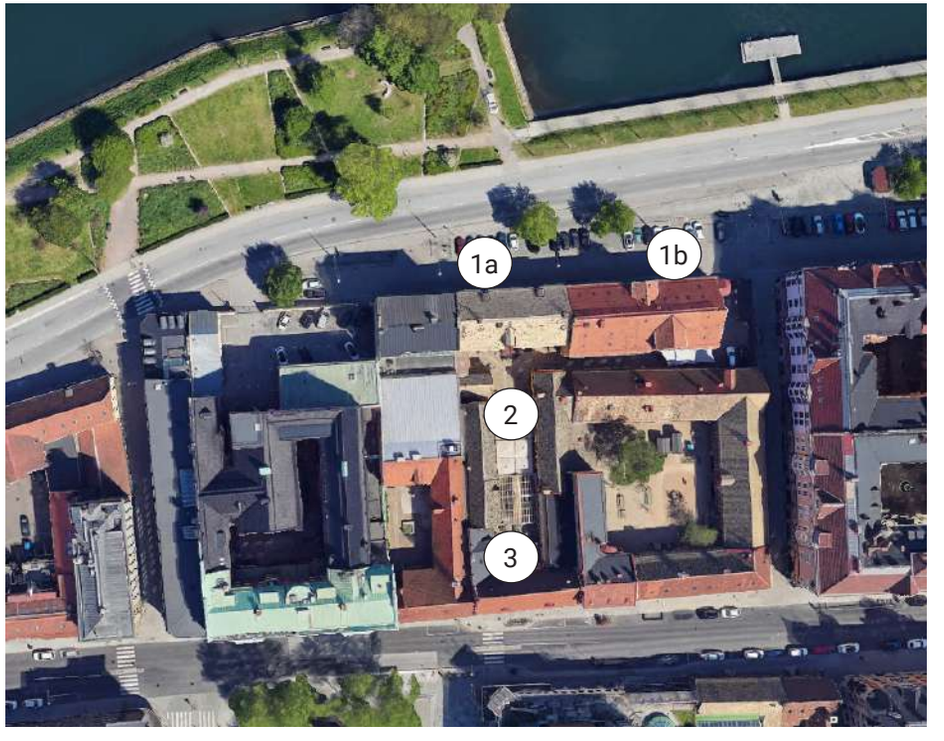
Excursion 2 - Historic parks
Kungsparken, Slottsparken and Pildammsparken
Guides: Anna Peterson & Larsola Bromell
Meeting point 2

Excursion 3 - Modern plantings and sustainability (shorter walk)
Caroli, Nyhamnen/urbana skogen, Varvstaden,
Citadellskajen and Malmö Live
Guides: Magnus Svensson & Patrick Bellan
Meeting point 3

The end-time for the excursions are preliminary.
Therefor, please allow some extra time for delays.

17:15 - 18:30 **China/EU Meeting (By invitation only)**
Location: *The Tree Office*
Stortorget 27, 211 34 Malmö

MEETING POINTS



THURSDAY 28 MAY

LOCATION: SANKT GERTRUD KONFERENS
Östergatan 7B, 211 25 Malmö

08:00 - 09:00 **Registration & Coffee**

09:00 - 09:30 **Keynote 3 - Björn Wiström**
Urban Forestry Researcher at SLU
Alnarp Landscape Laboratory – young minds and old references in the search for creative management

09:30 - 10:00 **Poster Speed-dating. See next page**
Full abstracts can be found following the conference program in this booklet

10:00 - 10:30 **COFFEE BREAK**

10:30 - 12:30 **Parallel Sessions 4-6. See next pages**
Full abstracts can be found following the conference program in this booklet

09:30 - 10:00 Poster Speed-dating

- Cyclic Performance Trees – Cooling and Biomass Production through Cyclic Tree Management
  - *Carlos Arrufat Grümer.* Independent researcher. Germany

- Data-Driven Urban Forestry in Complex Public Spaces: Evidence from Gdańsk, Poland
  - *Joanna Badach.* Gdańsk University of Technology. Poland

- EFIBioCities: Translating Urban Forest Research into Actionable Solutions for Resilient Cities
  - *Simone Borelli*. European Forestry Institute. Italy

- AirBiD – The biological diversity of air shaped by urban green elements
  - *Antonella Cristofori.* Research and Innovation Centre, Fondazione Edmund Mach. Italy.

- Reducing Light Pollution through Citizen Science and Policy-Oriented Urban Forestry Planning in National Park Forests of Brabant (Flanders, Belgium)
  - *Bert De Somviele*. National Park Forests of Brabant. Belgium

- A CO2 footprint of urban trees in Germany
  - *Vera J. Hörmann*. Technische Universität Braunschweig, Institute of Geoecology, Braunschweig, Germany; Julius Kühn-Institut (JKI) – Federal Research Center for Cultivated Plants, Institute for Plant Protection in Horticulture and Urban Green, Braunschweig, Germany .

- Simulation of wind loading on urban trees to support planning and scenario-based design
  - *Gustav Kettil.* Fraunhofer-Chalmers Research Centre. Sweden

- Tree health matters! - the European public awareness and urban tree biosecurity behaviour survey
  - *Silvija Krajter Ostoić*. Croatian Forest Research Institute. Croatia

- Quantifying morphological complexity of urban tree crowns using 3D LiDAR data
  - *Johanna Krischke*. Institute of Landscape Planning and Ecology (ILPÖ), University of Stuttgart. Germany

- Site- and species specific carbon storage in urban trees
  - *Anna Levinsson*. SLU. Sweden

09:30 - 10:00 Poster Speed-dating

- Species-specific effects of artificial light at night on the seasonal physiology and growth of urban trees
  - *Ermes Lo Piccolo*. Department of Agriculture, Food, Environment and Forestry, University of Florence. Italy

- QUERCON project: Participatory management of the Fagarè forest for the renewal of oaks
  - *Mariateresa Montisci*. Freelance Professional Forester. Italy

- Regional Diversity in Forest Perceptions: Insights from Slovenia
  - *Mojca Nastran*. University of Ljubljana, Biotechnical Faculty. Slovenia

- Urban tree assessment: exploring the potential of LiDAR data with field measurements in the city of Coimbra, Portugal
  - *Leónia Nunes*. Centre for Applied Ecology "Professor Baeta Neves" (CEABN), InBIO, School of Agriculture, University of Lisbon. Portugal

- Improved Woodlands and Mental Health: A Longitudinal Scottish Study
  - *Scott Ogletree*. The University of Edinburgh. United Kingdom

- From open landscapes to urban green: a long-term perspective on green space transformation in Kraków
  - *Krzysztof Ostafin*. Jagiellonian University in Krakow. Poland

- Sustaining the urban natural capital development: an integrated digital platform in the Milan Metropolitan Area
  - *Maria Chiara Pastore*. Politecnico di Milano, Dipartimento di Architettura e Studi Urbani - Fondazione Forestami. Italy

- Urban forest management and social cohesion: Case Study Čačalica Memorial Park
  - *Marija Perkunic*. Academy of Applied Studies Polytechnic, Belgrade.Serbia

- A supply-demand framework for evaluating health-relevant urban green space equity
  - *Eline Rega*. KU Leuven. Belgium

09:30 - 10:00 Poster Speed-dating

- Planting the future: simulating Miyawaki forest growth to quantify potential benefits
  - *Tes Siarnacki*. University of Massachusetts Amherst. USA

- Linking Perceived Sensory Dimensions and Spatial Metrics in Urban Parks: Integrating User Perceptions and UAV-Based Landscape Analysis
  - *Isidora Simović*. BioSense Institute, University of Novi Sad. Serbia

- Optimising tree planting to achieve 2050 targets
  - *Eleanor Smith*. School of Earth and Environment, University of Leeds. UK

- Nature commons matter: valuing the social impact of bottom-up forestry
  - *Federico Tonegatti*. University of Bologna - Ama Mater Studiorum. Italy

- Watering Smart, Not Hard: Evidence-Based Irrigation Strategies for Four Urban Tree Species
  - *Jan Niklas Totzki*. Karlsruhe Institute of Technology. Germany

- èVRgreen: Nature-Based Solutions and ecosystem services as urban planning tools for climate resilience for the city of Verona
  - *Giulia Vallone*. University of Padua. Italy

- Landscapes of encounter: practical approaches to manage zoonotic risks in urban nature
  - *Eline van Remortel*. Wageningen Environmental Research. Netherlands

- Building capacity for Urban Nature Plans
  - *Ian Whitehead*. EFI. Germany

- The Urban Forest as a 'Third Forest Type'
  - *Eva Willemsen*. Amsterdamse Bos, municipality of Amsterdam. Netherlands

10:30 - 12:30 Parallel Sessions

Time	**Session 4** **Counting What Counts: Turning Urban Tree Data into Impact** *Moderator: Johan Östberg*	**Session 5** **Building Resilient Urban Forests Through Governance and Collaboration** *Moderator: Jerylee Wilkes Allemann*	**Session 6** **Urban Tree Access in Numbers: Equity, Cooling and Health** *Moderator: Simone Borelli*
10.30-10.45	Open-source GIS street tree inventory: multi-criteria assessment for neighborhood-scale urban forestry management in Rome - *Lorenzo Rotella (Italy)*	1–2–3: Oslo's New Tree Strategy - Three Core Goals — with Preservation as Goal Number One - *Siril Stenerud (Norway)*	Five years of the 3+30+300 principle: lessons learnt and future perspective - *Cecil Konijnendijk (Netherlands)*
10.47-11.02	From parking spaces to micro-forests: A GIS-Based Suitability Analysis for Heat-Resilient and Biodiversity-Positive Urban Development – A Swiss example - *Jean-Laurent Pfund (Switzerland)*	Resilience and Adaptation in Urban Forest Governance: Thirty Years of the Mersey Forest - *Anna Lawrence (UK)*	Bridging the Gap Between Science and Practice in Urban and Community Forestry: Assessment of the 3+30+300 rule in Washington, DC - *Kasey Yturralde (USA)*
11.04-11.19	Turning Remote Sensing into Targeted Urban Tree Care: Evidence from 587,026 Trees in Copenhagen and Lisbon - *Miloslav Kaláb (Czechia)*	Urban Forest Metrics & the UNECE Urban Forest Compass: A European Standard for Greener, Healthier Cities - *Kenton Rogers (UK)*	Quantifying street-level visible tree exposure: Implications for health and equity - *Melissa Kelley Lee (Belgium)*

Time	**Session 4** **Counting What Counts: Turning Urban Tree Data into Impact** *Moderator: Johan Östberg*	**Session 5** **Building Resilient Urban Forests Through Governance and Collaboration** *Moderator: Jerylee Wilkes Allemann*	**Session 6** **Urban Tree Access in Numbers: Equity, Cooling and Health** *Moderator: Simone Borelli*
11.21-11.36	Playful Technologies for Equitable Forest Engagement: Insights from the PlayFair Forest Network - *Philip Chambers (Finland)*	Business ecosystems around urban forest related nature-based solutions: case of the three Finnish cities - *Anne Toppinen (Finland)*	From Recognition to Transformation: The Role of Growth Awards in Urban Forestry Leadership and Governance - *Ana Macias (Spain)*
11.38-11.53	Building cross-sectoral and inclusive urban forest management partnerships - *Dimitri Athanassiadis (Sweden)*	How do specific site and soil characteristics impact urban tree growth? - *Yasha Magarik (Germany)*	Cooling efficiency of urban green spaces affected by heat, humidity and solar radiation - *Eva Beele (Belgium)*
11.55-12.10	Missing the Forest for the Trees: A New Way to Think about Urban Forests - *Josh Behounek (USA)*	From Urban Tree Removal to Circular Materials. Technical and Policy Pathways for European Cities - *Paul Hickman (USA)*	Connecting Research, Education, and Society: Innovative Approaches to Outdoor Learning in Urban Forests - *Urša Vilhar (Slovenia)*
12.12-12.27	Linking Urban Form, Population and Green Infrastructure for Climate-Resilient Cities - *Luisa Di Lucchio (Denmark)*	Integrating participatory mapping and ecological data to understand socio-ecological resilience in urban forests - *Angela Beckmann-Wübbelt (Germany)*	Neighborhood Greening Agenda in Arnhem - *Ali Saad (Netherlands)*

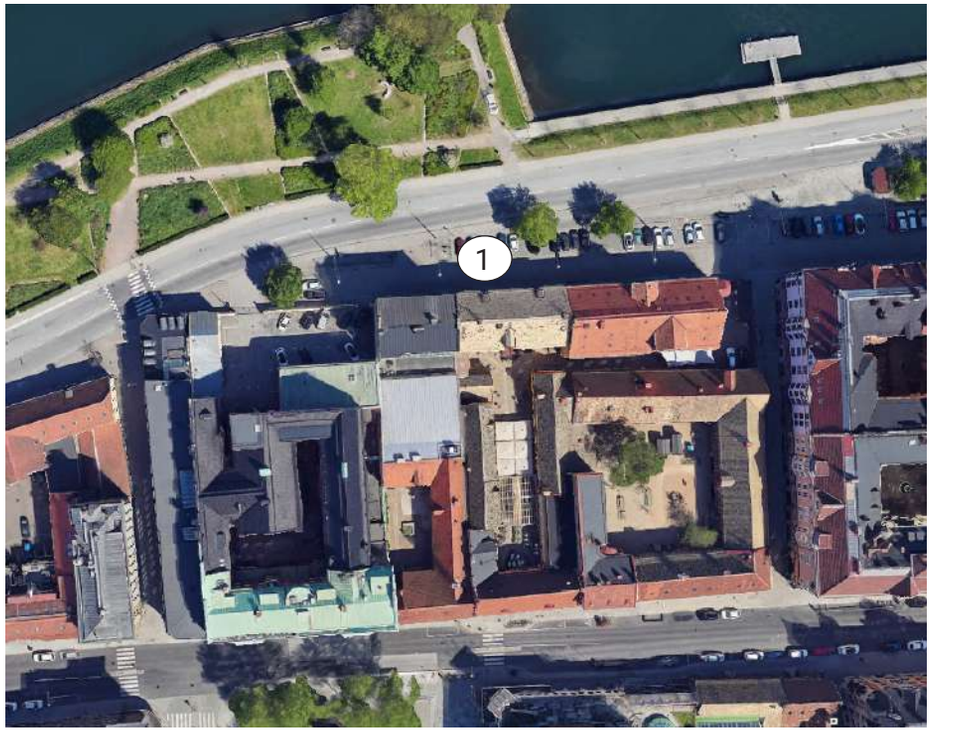
12:45 - 13:30 **LUNCH**

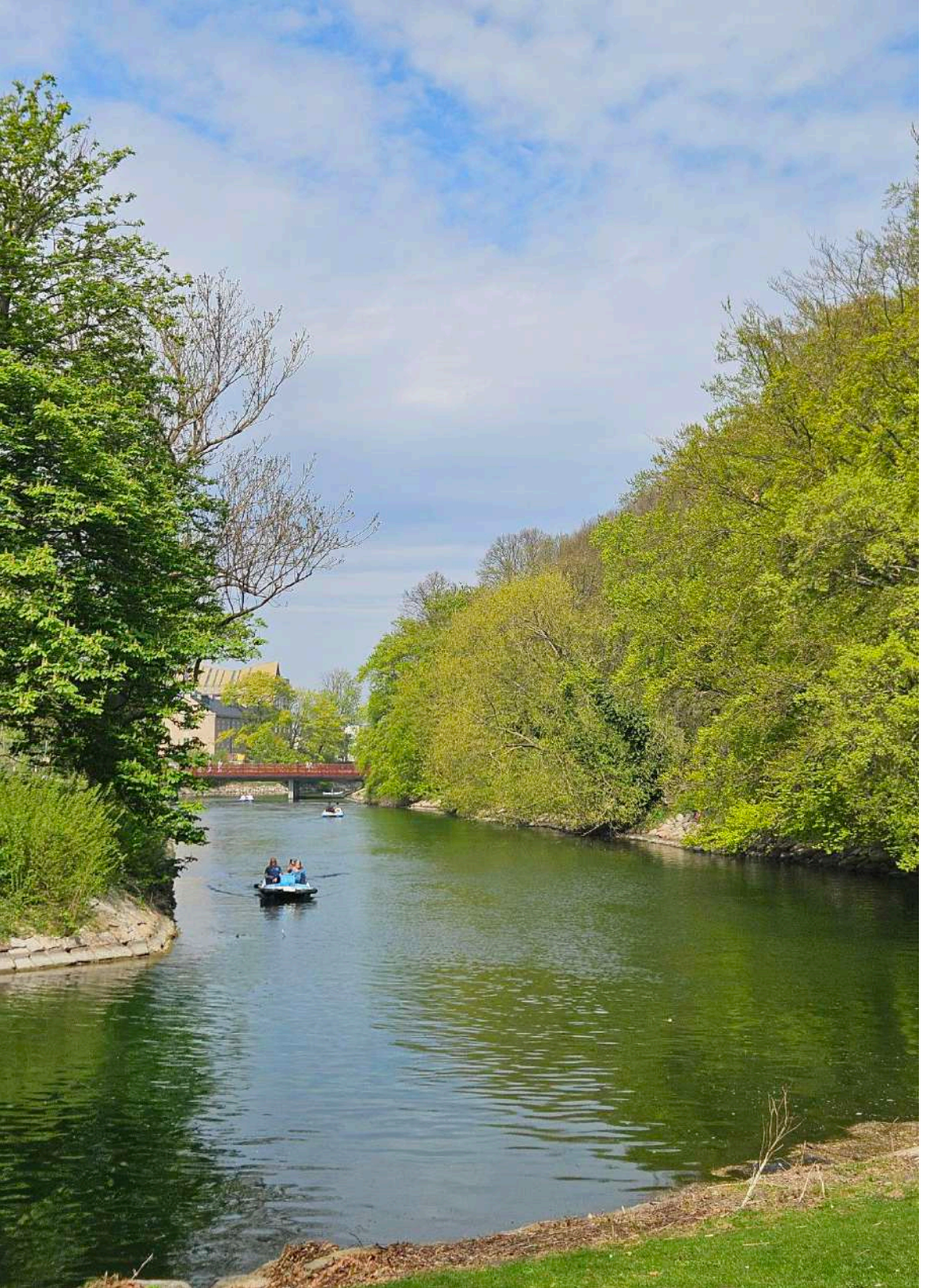
13:30 - 16:00 **Excursion 3 - Alnarp & The Landscape Laboratory**
Meeting point 1

The end-time for the excursions are preliminary.
Therefor, please allow some extra time for delays.

16:45 - 17:45 **Open Session with EFUF Association**
The meeting is open to all. You are encouraged to join the EFUF Association at the forum or online in advance at https://efuf.org/efuf-membership-scheme but membership is not required to attend this session. This is your opportunity to find out more about future plans.
Location: Sankt Gertrud, Malmö

19:00 **Conference Dinner at MJ's**
Location: MJ's Restaurant
Mäster Johansgatan 13, 211 21 Malmö





FRIDAY 29 MAY

LOCATION: SANKT GERTRUD KONFERENS
Östergatan 7B, 211 25 Malmö

08:00 - 09:00	**Registration & Coffee**
09:00 - 09:30	**Keynote 4 - Sharon Jean Philippe** Professor of Urban Forestry, Unites States of America *Rooted in Society: Exploring the Societal Impacts of Urban Forestry*
09:30 - 10:00	**Keynote 5 - Liisa Tyrväinen** Research professor at LUKE *From Research to Practice: Mainstreaming Nature-Based Solutions for Well-Being in Nordic Cities*
10:00 - 10:30	**COFFEE BREAK**
10:30 - 12:00	**Parallel Sessions 7-9. See next page** Full abstracts can be found following the conference program in this booklet

City of Malmö trädkontoret. SLU SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES

EFUF European Forum on Urban Forestry

10:30 - 12:00 Parallel Sessions (preliminary)

Time	**Session 7** **Rethinking Urban Forest Forms: From Tiny Forests to Living Labs** *Moderator: Dirk Voets*	**Session 8** **Beyond Shade: Measuring the Environmental Performance of Urban Green** *Moderator: Nerys Jones*	**Session 9** **Culture, Community and Climate: Putting Urban Forestry into Practice** *Moderator: Alan Simson*
10.30-10.45	Urban Tiny Forests in a Hyper-dense City: Planning and Governance Insights from Long-term Miyawaki-Method Projects in Tokyo - *Tomoko Takeuchi (Japan)*	Urban Forestry and Air Quality: When Trees Help and When They Don't *- Hai-Ying Liu (Norway)*	Between Belief and Biodiversity: Rethinking Danish Churchyards in Urban Forestry *- Fanny Møller (Denmark)*
10.47-11.02	Urban Mini Forests in Austria - Living Laboratories *- Erik Szamosvári (Austria)*	Quantifying air pollution removal by tree species in a periurban temperate forest through FlorTree Model: The case study of Parco Burcina natural reserve, Italy *- Alessio Santosuosso (Italy)*	Diverse Governance Pathways for Urban Green Spaces: Insights from Korea and Germany - *Jaewon Son (Germany)*
11.04-11.19	Microforest, a new tree planting design in the city: how is it influencing the activity of vertebrates? - *Lucas Roger (France)*	Can benefits from bushes, plant beds and green walls equal that from urban trees? - *Jenny Lindén (Sweden)*	Exploring meaning of urban rewilding within transdisciplinary literature *- Georgina Mitchell (UK)*
11.21-11.36	Worlding trees: Reflecting on placemaking, reciprocal care and multi-species commons in the 'Bos op Poten' Living Lab, Handelsplein Rotterdam - *Rene Van der Velde (Netherlands)*	Social preferences for retrofitting shoreline armouring into green-blue infrastructure - *Wendy Chen (China)*	Citizens' willingness to participate in the management of urban green spaces: The case of Umeå, Sweden - *Pedro Obregon Santander (Sweden)*
11.38-11.53	Reinventing Urban Nature - The Science of Tree Choice in a Warming World final - *Franscesco Ferrini (Italy)*	The Canopy Plan of the City of Liège, Belgium : a tree-based innovative climate adaptation strategy for citizens and a powerfull tool to improve the functional diversity of a public urban forest - *Thomas Halford (Belgium)*	Evolving Priorities in European Urban Forest Management Plans: A Thematic Analysis of Policy Aims and Objectives - *Eugene McGee (UK)*

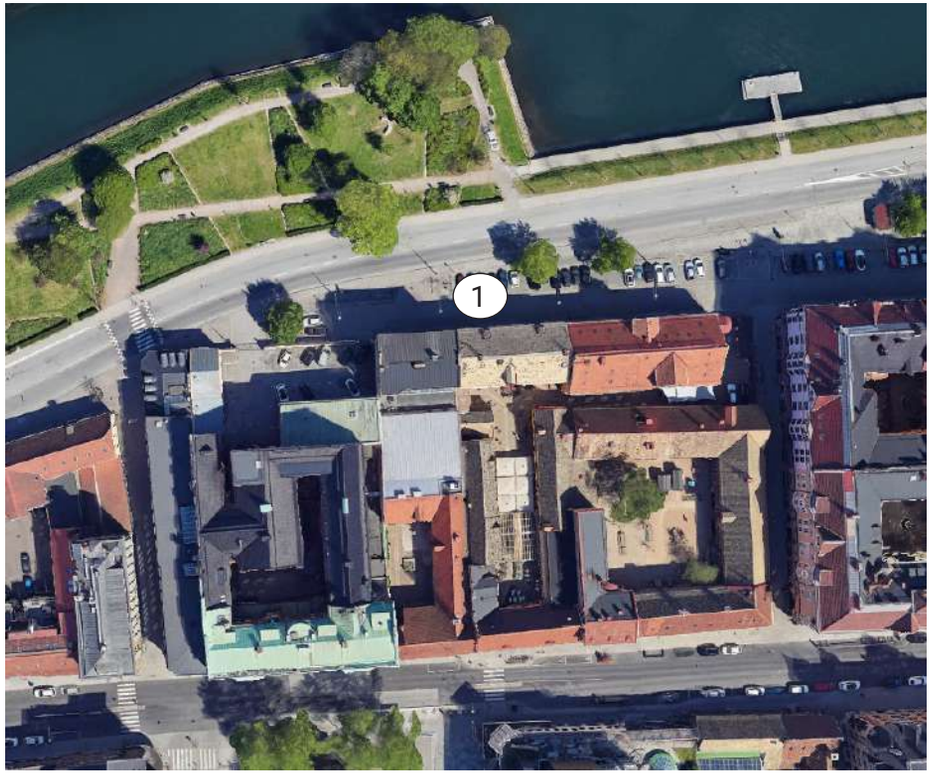
12:00 - 12:10 **Presentation from the City of Leipzig, hosts of EFUF 2027**

12:10 - 12:20 **European Young Urban Forester of the Year award 2026**

12:20 - 13:30 **LUNCH**

13:30 - 17:00 **Excursion 4 - Östra kyrkogården & Millennieskogen**
Millennieskogen Guides: Patrick Bellan & Charlotta Gard
Meeting point 1

The end-time for the excursions are preliminary.
Therefor, please allow some extra time for delays.



EXCURSION PROGRAM

WEDNESDAY 27 MAY

Excursion 1a - Urban sustainability (Long walk)
Grönare Möllan, Folkets park, Davidshallstorg and more
Guide: Gustav Nässlander
Please note: This is a long walking excursion

Excursion 1b - Urban sustainability (Long walk)
Grönare Möllan, Folkets park, Davidshallstorg and more
Guide: Johan Östberg
Please note: This is a long walking excursion

Excursion 2 - Historic parks
Kungsparken, Slottsparken and Pildammsparken
Guides: Anna Peterson & Larsola Bromell

Excursion 3 - Modern plantings and sustainability (shorter walk)
Caroli, Nyhamnen/urbana skogen, Varvstaden, Citadellskajen and Malmö Live
Guides: Magnus Svensson & Patrick Bellan

THURSDAY 28 MAY

Excursion 4 - Alnarp & The Landscape Laboratory
Guide: Björn Wiström

FRIDAY 29 MAY

Excursion 5 - Östra kyrkogården & Millennieskogen
Guides: Patrick Bellan & Charlotta Gard

KEYNOTE ABSTRACTS

KEYNOTE 1 (27 MAY)

FINN WILLIAMS
Malmö City Architect

The superdiverse city: diversity as a design strategy in Malmö

Over half of Malmö's population has a foreign background – placing it amongst a small but growing number of 'superdiverse' majority-minority cities. From the outside, this is sometimes assumed to present challenges for urban planning to address. But from the inside, the diversity of Malmö's culture, local economy and built environment are often seen as its greatest strengths.

At a time of global instability, research suggests that less homogenous ecologies and urban structures tend to be more adaptable to change. In this talk, Malmö's City Architect Finn Williams explores diversity as a design strategy for building resilient and inclusive urban landscapes. Through projects on the ground across Malmö, the presentation reflects on how diversity — ecological, social and spatial — can be harnessed to strengthen a city's capacity to adapt to uncertainty.

KEYNOTE 2 (27 MAY)

ELIN EINARSSON
Head of Section, Urban Environment, City of Malmö

Towards a Greener Malmö: Integrating Trees into Urban Development

Over the past decade, the city of Malmö has undergone a significant shift in how urban trees are valued and integrated into city planning. What was once considered an aesthetic addition has become recognized as essential green infrastructure for climate adaptation, public health, biodiversity, and urban resilience.

In this keynote, Elin Einarsson, landscape architect and Head of Section at the City of Malmö, reflects on Malmö's journey toward embedding trees as a fundamental component of urban development. Drawing from practical experiences within one of Scandinavia's fastest-transforming cities, the presentation explores how interdisciplinary collaboration, long-term planning, and evidence-based decision-making have strengthened the role of urban forestry in municipal processes.

The talk will highlight the importance of organizational competence, the strategic use of GIS and spatial data to support planning and prioritization, and how large-scale tree loss events helped mobilize both political commitment and public engagement. Through examples from Malmö, the presentation illustrates how urban trees can move from being perceived as optional elements to becoming central assets in creating resilient, livable, and sustainable cities.

KEYNOTE 3 (28 MAY)

BJÖRN WISTRÖM
Urban Forestry Researcher at SLU

Alnarp Landscape Laboratory – young minds and old references in the search for creative management

The landscape cannot be forced into to a laboratory for study, so laboratory thinking needs to be moved to the landscape. Guided by this thinking, the Swedish University of Agricultural Sciences (SLU) in Alnarp has since the 1980:s step by step, established a full-scale landscape laboratory on its campus to serve interdisciplinary research, teaching and demonstration. Rather than trying to find the 'best' solution, a whole set of alternatives and complementary choices and prototypes are demonstrated and tested. This presentation will demonstrate the conceptual background of the Alnarp landscape laboratory and present insights from it, for the design and management of multifunctional urban woodlands. Using creative management as a scale-based framework for design by management, it will explore how small woodlands can create big experiences also as young, especially when departing from old reference landscapes and young minds in its creation.

KEYNOTE 4 (29 MAY)

SHARON JEAN PHILIPPE
Professor of Urban Forestry, USA

Rooted in Society: Exploring the Societal Impacts of Urban Forestry
This presentation will explore the societal impacts of urban forestry and its role as essential green infrastructure that improves the health, resilience, and livability of cities worldwide. As nearly 70% of the global population is expected to live in urban areas by 2050, urban forests will play an increasingly important role in mitigating heat islands, improving air quality, and managing stormwater. The talk will also examine how trees support mental and physical health, encourage social interaction, and strengthen community identity through shared green spaces. In addition, it will highlight the economic value of urban forests through increased property values, reduced infrastructure costs, and enhanced local business activity. Urban forestry is not simply tree management, but a long-term investment in public well-being, environmental equity,
and sustainable cities.

KEYNOTE 5 (29 MAY)

LIISA TYRVÄINEN
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From Research to Practice: Mainstreaming Nature-Based Solutions for Well-Being in Nordic Cities

Nature-based solutions (NbS) are increasingly recognized as essential components of sustainable urban development, offering integrated responses to climate change, public health challenges, and biodiversity loss. In Nordic cities, where strong cultural connections to nature and progressive planning frameworks already exist, NbS present unique opportunity to sustain and enhance urban well-being while also delivering measurable economic benefits. This presentation draws on current scientific evidence and practical experiences to examine how the multiple benefits of NbS can be mainstreamed in urban environments.

Although full-scale economic assessments remain limited, NbS have been demonstrated to provide cost-effective alternatives—not only by replacing conventional grey infrastructure, particularly in stormwater management, but also by increasing property values. Moreover, access to green spaces is associated with improved mental and physical health, including reduced stress, and lower risks of key public health problems such as depression, thereby contributing to long-term savings in healthcare costs.

For nature-based solutions (NbS) to move from pilot projects to mainstream practice, their benefits must be translated into clear economic terms—such as return on investment and avoided public expenditures—and assessed using methods comparable to those applied to conventional grey infrastructure and healthcare costs. As NbS projects and their ecosystem services vary significantly across contexts, cost–benefit analyses must be tailored to each case. Consequently, valuing these solutions requires a range of assessment approaches to capture different types of ecosystem services, such as regulatory and cultural benefits. Therefore, strengthening the evidence base on the economic value of NbS is a strategic requirement for informed decision-making and wider implementation.

Empirical examples from Nordic cities demonstrate that nature-based solutions, when embedded in long-term strategies and planning, can deliver multiple co-benefits. Well-designed solutions can simultaneously provide flood risk reduction, urban cooling, recreational value, and biodiversity gains, reinforcing NbS as a strategic investment in resilient, health promoting and economically viable urban environments. The discussion further identifies key enablers and barriers to implementation emphasizing decision-relevant valuation methods, co-design, and policy integration as critical for scaling NbS.

POSTER ABSTRACTS

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Cyclic Performance Trees – Cooling and Biomass Production through Cyclic Tree Management

Urban trees are increasingly central to climate adaptation. Current urban forestry discourse largely focuses on tree survival under extreme site conditions, while paying far less attention to how urban trees can deliver a consistently high functional system performance for climate regulation and resource use over their entire life cycle.

This contribution introduces the concept of the Cyclic Performance Tree (CPT). A CPT is a cyclically managed performance tree, typically a regionally established light-demanding species with high transpirational growth rates and elevated hydraulic risk, whose crown is regularly rejuvenated through periodic heavy pruning (pollarding).

Compared to linearly developing, unmanaged trees, CPT systems enable a faster onset of functional effects and a higher ecosystem performance over time, while maintaining controlled crown size, adaptation to limited soil volumes, and active risk management, providing cooling benefits earlier in the tree's life cycle, not only at maturity.

Biomass is understood not merely as an indicator, but as an explicit management objective. Cyclically managed urban spaces can contribute to alleviating biomass scarcity without additional land consumption, while local conversion into biochar enables permanent carbon removal (CDR).
The enhanced cooling performance of CPT systems is primarily based on a strongly shifted root–shoot ratio following pruning, where a large root system supplies a newly rebuilt crown with disproportionate water and nutrients. This sustains high transpiration and cooling during heat periods, when linearly developed trees often become hydraulically limited.

The CPT approach measures urban ecosystem performance by biomass growth, the basis of transpiration-driven cooling. Urban green systems are thus compared by their performance over time.

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Data-Driven Urban Forestry in Complex Public Spaces: Evidence from Gdańsk, Poland

Urban trees can significantly influence local environmental conditions, including air quality, microclimate, and pedestrian comfort. In complex urban settings, tree planting and regreening interventions must balance multiple objectives, as poorly placed vegetation may hinder ventilation or exacerbate local pollution exposure. Building on a previous pilot monitoring campaign in a street canyon in Gdańsk, Poland, this contribution presents an extended monitoring approach developed within the Driving Urban Transitions Urban ElemenTREE project.
The monitoring campaign, conducted at Heweliusza Street in Gdańsk, expands the earlier focus on wind and air quality to a more complex urban setting: a major public space adjacent to a high-traffic road, exposed to air pollution and noise while serving important social and mobility functions. Concurrently, the municipality of Gdańsk is implementing a regreening project at this site, creating an opportunity to integrate environmental monitoring into planning processes and to explore before–after scenarios.

The monitoring framework broadens the scope beyond air quality and wind to include thermal conditions, soil properties, and water management, complemented by UAV-based pedestrian flow analysis, traffic monitoring, and digital scanning techniques. Crucially, the campaign is co-designed with municipal departments, enabling results to directly inform planting and design decisions. These decisions address both opportunities for environmental improvement and "do no more harm" scenarios, such as avoiding reduced ventilation or pollutant accumulation.

The contribution discusses the design and comparative value of the two monitoring campaigns, explores low-cost and integrated monitoring approaches, and reflects on the benefits and challenges of co-creative, data-driven urban forestry. The work lays the foundation for future decision-support schemes integrating environmental performance with spatial design and pedestrian comfort.

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EFIBioCities: Translating Urban Forest Research into Actionable Solutions for Resilient Cities

As European urban policy evolves through the Nature Restoration Regulation, Urban Nature Plans, climate adaptation priorities and growing public health challenges, cities need integrated, science-based and actionable solutions. In this context, EFIBioCities aims to serve as a strategic science-policy-practice platform supporting the transition towards nature-positive, climate-resilient and socially inclusive cities.

EFIBioCities positions itself as a reference hub connecting forests, cities and people, translating scientific research into practical impact and placing nature at the heart of Europe's urban transformation. It brings together scientific excellence, policy relevance and practical innovation within a coherent platform that supports decision-makers, strengthens co-creation, actively engages local communities, and accelerates nature-based urban transitions. Rather than acting as a direct implementer, EFIBioCities operates as a connector and facilitator, mobilizing EFI's network of research institutions, cities, practitioners and solution providers to link knowledge with municipal needs.

At its core, EFIBioCities fosters a European ecosystem for learning, collaboration and innovation. The Biocities Academy would build capacity among public administrations and practitioners, while the Biocities Marketplace provides access to trusted knowledge, tools and expert networks. A European Week on Urban Forests, organized with EFUF and partners, would offer a convening space for policy, science and practice. A continuous knowledge-transfer programme will support an active community working on urban resilience, health, and equity. Together, these elements position EFIBioCities as a strategic platform contributing to Europe's transition towards greener, healthier and more resilient cities. Cities, research organizations, public authorities and practitioners are invited to engage with EFIBioCities and explore opportunities for partnership and collaboration.

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AirBiD – The biological diversity of air shaped by urban green elements

The air we breathe contains large amounts of biological particles (bioaerosols) such as bacteria, fungi, and pollen (the aerobiome), which can affect our health and well-being in many ways. Urban green elements, such as urban woodlands, parks, gardens, etc., play a fundamental role in shaping this invisible world. The aim of the AirBiD project (airbidproject.eu) is to find connections between green spaces, air biodiversity, and human well-being.

The project includes building spatial biodiversity maps of five European cities, by collecting samples of airborne biological particulate matter in the green spaces of Trento (IT), Vienna (AU), Evora (ES), Copenhagen (DK) and Gothenburg (SW), over a year. Sampling design involved the classification of green areas into 9 categories with the installation of 25 sampling points per city, according to a grid covering the entire urban area. Ground-based and satellite-based information on the quantity and diversity of vegetation in green areas of cities was also collected. Studies in controlled indoor settings will evaluate the transition of plant microbes to indoor air. Health data is collected in all cities, within a focus group and the occupants of the controlled indoor setting.
Local communities are involved in biodiversity outreach initiatives through workshops and events, and in data collection through citizen science approaches.

Aerobiological samples will be analyzed using advanced DNA methods and conventional light microscopy analysis to characterize the aerobiome. Biodiversity data will be mapped and modeled according to the FAIR principles, showing how green spaces influence air quality, biodiversity, well-being, and human health. Findings will facilitate informed decision-making processes by policymakers, stakeholders, and communities in the planning and management of urban greenery. The state of advancement of the project will be presented.

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Reducing Light Pollution through Citizen Science and Policy-Oriented Urban Forestry Planning in National Park Forests of Brabant (Flanders, Belgium)

Artificial light at night is an often-overlooked pressure on (peri-)urban ecosystems, affecting biodiversity, human health and energy use. This contribution presents an integrated approach to mapping, understanding and reducing light pollution within the Nationaal Park Brabantse Wouden, designated in 2023 and covering around 30,000 hectares at the urban fringe of the Brussels metropolitan area.

The park connects large forest cores with a fragmented and densely populated area of towns, villages and more open areas, making it particularly vulnerable to light pollution and habitat fragmentation. To address this, a multi-layered project combines satellite-based light mapping and targeted field measurements. Citizens contribute via mobile app to measure light levels, increasing spatial coverage while raising awareness and public engagement.

These data are integrated into a comprehensive light map and interpreted by an expert group with ecological and species-specific knowledge to identify priority zones for intervention. Rather than producing a purely technical output, the project translates results into concrete, locally applicable light plans. Municipalities are actively supported in designing and implementing tailored lighting strategies, in cooperation with infrastructure operators.

A timely aspect is that cities and municipalities across Flanders are currently replacing conventional public lighting with LED technology. This transition offers a crucial opportunity to optimise lighting in a targeted way—reducing light pollution, reconnecting habitats, improving nocturnal biodiversity and energy use.

The contribution illustrates how urban forestry planning can integrate darkness as a spatial quality, recognising that reconnecting fragmented urban forests requires not only new green infrastructure but also the removal of barriers such as excessive light and noise, while balancing biodiversity protection, safety and sustainability in highly urbanised landscapes.

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A CO2 footprint of urban trees in Germany

Trees sequester carbon in their biomass during their lifetime. However, tree production, plantation, and urban tree management are associated with emissions. As many cities and municipalities aim for achieving carbon neutrality, identifying carbon sources and sinks within the urban space is increasingly important. For urban trees, this balance can be assessed by comparing lifetime carbon sequestration with CO_2 emissions in order to determine the net-zero point. The aim of this study was to evaluate the net-zero point of selected urban tree species and to identify the main processes of emissions. The observed species are pyramid oak (Quercus robur 'Fastigiata'), Turkish hazel (Corylus colurna), and small-leaved linden (Tilia cordata). We conducted interviews with tree nurseries, municipal tree management personnel and external tree service companies in Germany.

Based on their answers, three emission scenarios were developed: low, mean, and high. These scenarios were used to identify the main emission processes during nursery production, urban tree management, and further use of trees. The study indicates that the majority of the emissions occur during the urban tree management phase, particularly during the pest management, pruning, and irrigation practices. Depending on the species and emission scenario, reaching the net-zero point takes several years at the urban planting site. The findings can provide valuable insights for municipalities and help them to optimize their management practices, to further move toward carbon-neutral urban green infrastructure. Also, the results stress the importance of suitable tree sites, which secure the trees health for a long time.

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Simulation of wind loading on urban trees to support planning and scenario-based design

Urban trees contribute to climate adaptation, public well-being, and the quality of urban spaces, yet their stability is strongly influenced by wind conditions shaped by buildings, street geometry, and surrounding vegetation. Trees adapt over time to the wind climates in which they grow. However, sudden changes in urban form or vegetation structure can alter local wind patterns and increase mechanical loading, raising the risk of structural failure. We present a simulation framework for studying wind flow and mechanical loading on individual urban trees, with a focus on supporting planning, maintenance and scenario-based design in urban forestry.

Tree form is derived from three-dimensional scans or surface models, allowing realistic representation of crown shape and the surrounding urban context. Wind flow is simulated using a flexible numerical approach that can handle complex tree and building shapes within the same model. The tree canopy is treated as a permeable structure, capturing how leaves and branches slow down and redirect the wind without requiring detailed modeling of every individual leaf.

The framework supports comparative analysis of alternative design scenarios, including the removal or planting of trees, changes in crown structure, and modifications to surrounding urban form. Wind-induced load indicators, such as drag forces and bending moment proxies, are evaluated across varying wind directions and speeds to assess how development plans and maintenance interventions alter exposure and mechanical stress on remaining and potentially planted trees.

By linking advanced flow simulation with practical planning questions, the method provides a decision-support tool for risk-informed tree management, resilient green infrastructure design, and the integration of vegetation into urban development processes.

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Tree health matters! - the European public awareness and urban tree biosecurity behaviour survey

Public awareness and behaviour plays a critical role in preventing the introduction and spread of tree pests and diseases. Still, studies addressing this topic, especially those conducted on a larger scale, are scarce. Within the scope of the COST action "Safeguarding European urban trees and forests through improved biosecurity" (UB3Guard), a public survey was administered in 2025 in 21 languages with a total of 3417 participants.

When tree-related professionals were removed from the sample, the "true" public accounted for 2346 respondents from 31 European countries. The majority were women, highly educated and frequent green space visitors, those who did not own a garden or a forest and those who were not environmental NGO members. The survey addressed public awareness of the most common urban tree pests and diseases, their concern about the impact of pests and diseases on urban trees, knowledge of potential introduction pathways, their preventive biosecurity behaviour (such as avoiding plant transport from abroad, avoiding moving soil and firewood, etc.), knowledge of potential pathways for pests and diseases, support for measures against the introduction and spread of pests and diseases, and sources of information.

The results show that the vast majority of respondents were concerned about the impact of pests and diseases. They were mostly concerned about reduced air quality, carbon capture loss, health impacts and loss of tree species, while least about the cost to the government. The respondents were mostly aware of potential pathways, such as importing plants from abroad and climate change, but fewer recognised construction timber, firewood or wood packaging. Preventive and environmentally friendly measures were strongly supported, while use of chemicals was the least supported. Regression analysis delved into how sociodemographic factors and concern shape their biosecure behaviour and support of measures.

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Quantifying morphological complexity of urban tree crowns using 3D LiDAR data

Structural attributes of urban and peri-urban forests have a decisive influence on urban microclimates and, consequently, on the health of urban populations. They also shape habitat quality and biodiversity within the urban fabric. However, the spatial patterns and drivers of structural attributes, such as the structural complexity of urban tree crowns, remain insufficiently understood.
The presented project addresses this knowledge gap by evaluating the structural complexity of approximately 55,000 urban tree crowns using high-resolution, LiDAR-based 3D digital twins derived from the URBORETUM project. We developed and implemented an analytical framework based on fractal analysis to quantify and map structural complexity at the individual-tree level across three cities in south-west Germany.

Preliminary analyses revealed spatial patterns in tree crown structural complexity and the ecosystem services associated with it. Ongoing statistical analyses will identify inter- and intra-urban variability and its association with parameters of the surrounding urban matrix, including grey, green, and blue infrastructure. Identifying key drivers of these patterns enables the generalizability and applicability of the approach across diverse urban, peri-urban, and regional settings, supporting decision-making towards ecosystem-service-promoting urban planning.

This integrated analysis aims to improve understanding of urban tree crown structural complexity in relation to ecosystem services and to explore how it is shaped by the interrelation of surrounding natural and urban structures. The findings are expected to provide a foundation for future research on implications for urban climate regulation and for arboricultural planning strategies that support resilient, diverse, and climate responsive urban forests, thereby contributing to this year's EFUF conference theme, "Diversity in Urban Forestry – bringing People, Trees and Ideas together."

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Site- and species specific carbon storage in urban trees

In the context of carbon footprints connected to urban areas, trees are often exclusively considered as carbon sinks, potentially mitigating carbon release from human activities. However, before an urban tree becomes a carbon sink it will instead contribute to carbon emission due to operations and activities in its nursery production, planting, establishment and following maintenance. The extent of the carbon emissions and the time needed for the trees to become carbon neutral depends on a large complex of variables, where species-specific growth and carbon storage capacity, as well as spatial organisation of the trees and chosen planting bed substrate, will have great impact on the time needed to carbon neutrality.

The objective of this project is to investigate how carbon storage in urban trees is affected by species selection and planting strategy, as well as to estimate the carbon footprint of an urban tree's complete life.

In this study, we are making comparisons in growth patterns and carbon storage capacity between single trees and tree stands, planted either in parks or as street trees, in three species commonly used in an urban context in Sweden (Quercus robur, Betula pendula and Tilia x Europea). The project includes both a geographical and a wood density gradient, with samplings made in three large Swedish cities, from north to south. We used dendrochronological sampling to evaluate growth rates in different situations over time, and explored the use of LiDar-scanning to estimate whole-tree biomass and carbon storage. In a next step, this data will be included in life cycle assessments to gain knowledge of critical aspects in an urban tree's carbon budget.

The results will be discussed in relation to how planning and management of urban trees can be performed to improve sustainability in urban areas, from a carbon-perspective.

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QUERCON project: Participatory management of the Fagarè forest for the renewal of oaks

The Quercon project will be carried out within the Fagarè Forest (Province of Treviso, Italy in the Municipality of Cornuda). It aims to address the problem of the difficulty in renewing oak (Quercus robur and Quercus petraea), key species of the formation, which leads to critical issues in the evolution of the forest, resulting over time in its simplification, decreased resilience, and potential worsening of ecosystem services provided.

After a data collection phase, the project plans to apply operational silvicultural techniques aimed at promoting the establishment and dominance of oaks and improving over time some ecosystem services, along with verifying the results. Additionally, the project involves engaging specific stakeholders at various levels in strategic and operational decisions through interactive management models, and activating educational and recreational activities aimed at acquiring further information during data collection and providing guidelines for operational phases, following innovative approaches of co-decision, co-participation, and shared responsibility.

Below are the main expected outputs, opportunities provided, and potential uses: Identification of management criteria, methodologies, and approaches most effective in achieving the silvicultural objectives of the project.

- Implementation and/or creation of updated faunistic databases;
- Drafting of operational protocols synthesized in a technical manual, also for the purpose of replicability;
- Dissemination of results to various local, national, and international stakeholders, also through the tools of the PAC 2030 network.
- Implementation of knowledge databases and procedures to continue activities of analysis, monitoring, and management even after the project's completion.

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Regional Diversity in Forest Perceptions: Insights from Slovenia

Forests are central to human well-being, providing ecological, social, and economic benefits. Yet, perceptions of forests vary across regions, shaped by cultural, geographic, and urban–rural contexts. This study explores how residents from different Slovenian regions perceive forest functions and values, emphasizing diversity in attitudes and interactions.

Using an online survey with over 1,700 respondents, we analyzed regional differences in priorities such as ecological services, recreation, and economic uses. Results reveal contrasting perspectives: urban populations tend to value forests for recreation and aesthetics, while rural communities emphasize practical and economic functions. These variations reflect not only forest composition but also socio-cultural identities and lifestyles.

Understanding this diversity is crucial for urban forestry and sustainable forest management. Tailoring communication and planning strategies to local preferences can strengthen connections between people and trees, foster inclusive decision-making, and support resilient landscapes. By integrating regional voices, policymakers and managers can create urban and peri-urban forests that truly meet community needs and contribute to long-term environmental and social well-being.

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Urban tree assessment: exploring the potential of LiDAR data with field measurements in the city of Coimbra, Portugal

Urban planning and the managing of public street trees is challenging due to social, economic and impactful climate scenarios. Portuguese legislation (Law 59/2021) establishes the legal regime for urban tree management imposing that all municipalities prepare a complete inventory of the urban trees in both public and private domains in order to adopt integrated strategies for planning, maintenance, and risk assessment of urban trees using standardized methodologies. So, municipalities need data about composition, diversity, size, geolocation and public safety of tree status. Several municipalities do not gather yet this information, which could lead to non-compliance with current legislation, mostly because these efforts are time-consuming and costly.

Previous work carried out in urban areas of Lisbon, Cascais and Almada, showed that the leaf area is the key variable to estimate the environmental benefits of trees in the studied municipalities. Leaf area changes with season, tree condition and management. A system that combines field work to measure stems and crowns diameters with LiDAR data can respond to the various requirements to estimate most environmental benefits.

In this study we used the field work in the city of Coimbra as a pilot to explore systems to monitor urban trees and leaf areas using LiDAR data provided by the Direção-Geral do Território. A sample of 120 trees selected randomly from the main species, from a total of 2600 trees measured in the urban setting of Coimbra were used to test the accuracy and precision of LiDAR estimates compared with field measurements. The results show that correlations are different between species. We proposed the use of double sampling methods to combine LiDAR data with field measurements in order to increase the precision of the estimates.

This approach will facilitate more frequent inventories to comply with the legislation while providing updated information to the public on tree benefits.

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Improved Woodlands and Mental Health: A Longitudinal Scottish Study

Mental health has become a major global public health concern. Natural spaces have potential to improve mental health conditions such as depression and anxiety. As governments and agencies seek efficient ways to improve mental health, investing in natural areas can be one solution. Urban woodlands present an opportunity to provide local residents with nearby green and natural areas, if they are safe, inviting, and easy to access.

Our research examines a broad program of woodland improvements that targeted less advantaged communities in Scotland, implemented by Scottish Forestry. To identify the effects these improved spaces might have on mental health, we relied on large administrative datasets containing individual residential histories and mental health prescription use over a 5-year period (2012-2016). By employing longitudinal models, we assessed the impact of within-individual changes in improved woodland exposure, thereby minimising the risks of individual-level confounding.

This talk will introduce the woodland programme as well as the research and up-to-date findings. This presentation intends to discuss the importance of woodland investment as a preventative public health strategy.

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From open landscapes to urban green: a long-term perspective on green space transformation in Kraków

This study examines nearly 180 years of transformation of green spaces in Kraków, one of the largest cities in Poland, whose administrative area expanded more than fortyfold in the analysed period.

We vectorised Austro-Hungarian cadastral maps at a scale of 1:2880 (mid-19th century) and maps of the Kraków Fortress at a scale of 1:10,000 (early 20th century), supplemented by historical statistical records. Based on these materials we reconstructed historical land cover within the present-day administrative boundaries of Kraków and compared them with contemporary land use and land cover data (Sentinel-2 and digital Database of Topographic Objects, BDOT10k).

We found out that still at the beginning of the 20th century, the area of the present-day Kraków—beyond its compact urban core—was dominated by open landscapes, including cropland, grasslands and pastures, while forests accounted for only 4.5% of its area. The incorporation of surrounding rural areas into the city and their intensive urbanisation or industrialization led to the widespread loss of agricultural land. However, the share of forests or tree-covered areas increased to over 11% and several former agricultural areas were converted to urban green, especially around structures of the Kraków fortress, built around Kraków mostly in the second half of the 19th century. In conclusion, we suggest that identifying persistent and non-persistent forms of green space from a historical perspective supports urban policy-making and spatial planning by highlighting areas critical for ecosystem continuity, thus guiding the long-term protection and development of urban green infrastructure under ongoing urbanisation pressure.

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Sustaining the urban natural capital development: an integrated digital platform in the Milan Metropolitan Area

The Italian National Urban Green Strategy (2017), framed within the 2030 EU Biodiversity Strategy, highlights the need for municipalities to adopt tools for assessing natural capital and guiding ecological transition policies. In line with this policy framework, the urban afforestation project Forestami, in collaboration with R3Gis and with the support of Fondazione Cariplo, developed a shared digital platform in 2025 for the systemic management of natural capital across the Milan Metropolitan Area.

The platform documents planting and maintenance activities through an extensive spatial mapping of grown forested areas, individual trees, and small-scale urban afforestation interventions, such as those implemented by Forestami since 2018, while assessing the related ecosystem services.
Planting data are collected, mapped, field-verified, and returned to municipalities and public bodies through a structured collaborative process. This approach goes beyond a quantitative database, offering a spatial representation of the natural capital and supporting the development of monitoring models. Continuous updates on plant health, weather conditions, irrigation, and mulching provide detailed knowledge of vegetation status over time.

This study returns a method for integrating data from various administrations (133 municipalities), public Bodies, and regional Parks, highlighting the potential of an integrated platform to overcome sectoral fragmentation by providing the same information and resources to all. It also reflects on the opportunity to reduce territorial disparities and strengthen local capacity in planning and monitoring green assets.

Finally, the study seeks to analyze the current complexities of working with multiple institutions, both public and private, in an effort to spatialize large volumes of information that are now necessary for planning and for monitoring results that can support three target groups: institutions, research bodies, a nd citizens.

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Urban forest management and social cohesion: Case Study Čačalica Memorial Park

Urban forests contribute to essential ecosystem services and strengthen social cohesion by providing spaces for recreation, education, and community engagement. The Čačalica Memorial Park is a beloved recreational area and an important symbol of the city of Požarevac. Its primary functions are cultural, historical, and recreational, but the park's forest also provides a range of vital ecological and protective services.

The importance of this urban forest is highlighted by the fact that the total area of forest in Požarevac accounts for only 6.8% of the city's territory. Although Čačalica is primarily a memorial park, it is increasingly recognized by local residents as a vital urban green oasis. The significance of the floristic diversity of Čačalica is reflected in the presence of endemic and relict species, most of which are classified as tertiary relicts and the occurrence of endangered species has also been recorded. Its biodiversity is characterized by key forest ecosystem attributes, including species heterogeneity, uneven-aged stand structure, and a high level of preservation.

This case study illustrates how urban forests can integrate ecological, cultural, and social diversity to provide multiple ecosystem services, emphasizing the importance of careful planning and management of urban green spaces. In 2022, a multi-stakeholder partnership was established between the City of Požarevac, the Environmental Association "Friends of Čačalica", and the Academy of Applied Studies Polytechnic. This collaboration integrates local government, civil society, and academic expertise with the shared goal of protecting and enhancing the park's floristic diversity through urban forestry practices. The outcomes of this initiative are expected to contribute to local environmental policy development, and serve as a model for participatory governance in urban forest conservation.

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A supply-demand framework for evaluating health-relevant urban green space equity

Equitable access to diverse urban green spaces, including parks, forests and other vegetated landscapes, is important for public health and social wellbeing. Yet many spatial assessments still focus on how much green space is available or accessible, rather than whether provision meets the needs of different communities. This study addresses this gap by developing the Urban Green Equity Index (UGEI), a multidimensional framework that evaluates equity by linking health-relevant green supply with population-specific demand.

On the supply side, the framework innovates by combining green space quantity, entrance-based accessibility through network analysis, and quality indicators like tree cover and biological value. A broader functional typology is applied, covering parks, urban forests and peri-urban or agricultural landscapes, mapped using openly available datasets including OpenStreetMap, satellite imagery and mobility-based indicators of actual use (e.g. Strava). On the demand side, the framework considers social and environmental conditions influencing how groups benefit from urban green, including urban form, socio-economic context and the surrounding green setting (e.g. private gardens). This enables inequities to be interpreted in relation to social and ecological diversity and supports more context-sensitive planning.

Applied at a fine spatial resolution across Flanders, Belgium, the UGEI identified inequities from regional to residential scale, revealing that 18% of residents lack sufficient green access despite high demand. Regression analyses showed that these areas are significantly associated with social and health deprivation, highlighting the need to better align provision with community needs. The framework offers a practical, scalable tool for planners and policymakers to target interventions, such as improving tree cover, accessibility or ecological quality, where they can most effectively support healthier and more inclusive urban landscapes.

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Species-specific effects of artificial light at night on the seasonal physiology and growth of urban trees

Artificial light at night (ALAN) has been observed to affect tree phenology since the mid-20th century by first noting delayed leaf senescence in trees near streetlamps. Moreover, recent studies highlighted a disturbance in the physiological responses of trees exposed to ALAN. However, this area of study remains largely underexplored, with many aspects of the phenomenon still not fully understood.

Therefore, this study investigated potential ALAN-induced alterations in physiology and growth of four common urban species differing in taxonomy and phenological strategies: Quercus ilex (QI), Quercus cerris (QC), Liquidambar styraciflua (LS) and Ginkgo biloba (GB). Throughout an annual vegetative cycle, we compared night-illuminated and control trees by monitoring stem radial growth, key physiological parameters (measured at dawn, midday and night), and biogenic volatile organic compound emissions. Responses to ALAN were strongly species- and season-dependent. In spring, GB exhibited the highest sensitivity to ALAN. Whereas in summer, QI, LS and QC showed marked reductions in leaf net photosynthesis (Pn) and stomatal conductance (gs) at both dawn and midday, with consequential limitations on stem growth. ALAN also stimulated nocturnal isoprene emissions in QI and LS, whereas GB did not display significant changes. In autumn, ALAN maintained higher photosynthetic performance (Pn, Fv/Fm and chlorophyll index) in deciduous treated species compared to controls and this phenomenon was associated with delayed senescence, except in GB. In winter, QI again showed physiological alterations resembling those detected in summer at dawn.

Overall, the observed variability across taxa highlights the need for species-specific sensitivity classifications to ALAN, supporting evidence-based selection of urban trees and improved lighting strategies to safeguard ecosystem functioning and resilience under increasing nighttime illumination.

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Planting the future: simulating Miyawaki forest growth to quantify potential benefits

Modern cities face the dual challenges of climate change and population growth, which concentrate increasing proportions of the human population in zones of amplified environmental stresses (Jones et al. 2018, Huang et al. 2019). Expanding tree canopy has emerged as a way to blunt the effects of climate change (McPherson et al. 2005, Berland et al. 2017).
Miyawaki forests are a popular new method of afforestation (Miyawaki 1999). Forest creators extol an array of benefits; however, there is little peer-reviewed research that supports these claims.

In North America, there are no sites that offer the opportunity to study the long-term growth of Miyawaki forests. Thus, we turned to forest growth dynamics modeling to forecast the ecosystem benefits and species' responses. Using SORTIE-ND version 7.05 (http://www.sortie-nd.org, Canham et al. 2005), we modeled several Miyawaki forests in the eastern United States over 50 years. We parameterized the model with stem maps, species allometry, and climate inputs for each site. We ran 100 simulation replicates per site. We processed the model outputs in R Studio (Posit team, 2025) to extract annual growth and mortality rates by species, basal area, and leaf area index (LAI). We used linear and generalized linear mixed-effects models to analyze outputs, with time as a fixed effect and species, site, and replicate as random effects. We quantified productivity, structural development, and species-specific responses using basal area increment, canopy metrics, and mortality rates. We evaluated model uncertainty using variability across replicates.

The results provide a forecast of the ecosystem benefits of these forests over time, as well as individual species performance that will help inform species selection, forest planning, and public education and outreach as Miyawaki forests are increasingly employed as climate resilience tools.

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Linking Perceived Sensory Dimensions and Spatial Metrics in Urban Parks: Integrating User Perceptions and UAV-Based Landscape Analysis

Urban forestry integrates tools, users, and methods to maximize the benefits of green spaces that extend beyond measurable attributes. This study combines social and spatial data, linking user characteristics and park structure with Perceived Sensory Dimensions (PSDs) to examine how experiential park qualities relate to quantified landscape features.

The study was conducted in four central urban parks, surveying 400 users via systematic sampling. The questionnaire captured socio-demographics, recreational behavior, self-perceived health, and park element preferences without explicitly referencing PSDs, allowing an indirect assessment of links to well-being. UAV multispectral imagery was used to map park features through object-based image analysis and automatic segmentation. Coverage, spatial configuration, and NDVI-derived vegetation quality were quantified and linked to PSDs. The associations between PSDs and measured park features were modest, indicating that park qualities emerge from the interaction between people and park structure. Mature tree cover and higher NDVI values were associated with Natural and Sheltered dimensions, while spatial uniformity and vegetation layering supported Cohesive and Diverse perceptions.

The Social and Cultural dimensions were strongly expressed in parks with high visitation rates, dense seating infrastructure, and proximity to institutional or symbolic urban landmarks. The Serene dimension was consistently absent, reflecting strong urban pressures. Preferences for park elements often contrast with their spatial availability, highlighting perceptual compensation and diverse user needs. This reinforces the argument that PSDs are not direct proxies for physical attributes, but experiential outcomes shaped by user–environment interactions. By integrating user perceptions with landscape metrics, the study supports inclusive, evidence-based urban forestry and design, while acknowledging limits to causal inference and generalization.

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Optimising tree planting to achieve 2050 targets

Only 1.2% of buildings in seven English cities meet all three elements of 3-30-300 guidance, suggesting low levels of access to trees, greenspaces and their benefits (Smith et al., 2025). Our findings suggest that adhering to 3-30-300 guidance is, and will remain, challenging, with many areas setting their own targets according to what they feel is achievable. In England, the goal set by the Environmental Improvement Plan (EIP) 2025 is to increase tree canopy and woodland cover to at least 16.5% of total land area by 2050.

Four of the English cities we previously investigated are within the White Rose Forest (WRF), the Community Forest for North and West Yorkshire. The WRF has aligned its 2050 goals with the EIP, setting canopy cover targets for each local authority area.

We investigate how optimising tree placement for 3-30-300 success in urban neighbourhoods can help to reach canopy cover targets in these four WRF local authorities, alongside maximising visibility of trees and influencing urban temperatures.

We apply realistic constraints on tree placement such as avoiding narrow pavements, placing trees at least 5 m from buildings, and only planting around the edges of recreational greenspaces, as well as limiting the maximum number of trees 'planted' to that deemed feasible for each local authority. Aiming for 3-tree visibility, 30% canopy cover and evenly distributed canopy across neighbourhoods within each local authority, we produce tree planting maps indicating the best locations for new trees to meet these goals.
We consider diverse planting scenarios including randomised placement and more strategic placement, such as favouring grass verges, and estimate how new planting in each scenario would impact overall canopy, tree visibility and urban temperatures. Through the WRF working groups, made up of partners from local and combined authorities, we facilitate academic-policy engagement and explore how these scenarios could be applied in decision making.

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Nature commons matter: valuing the social impact of bottom-up forestry

Bottom-up urban forestry initiatives offer an innovative response to the environmental and social challenges of contemporary cities. This study examines Il Bosco di Lorenzo, a memorial micro-forest project in Lombardy, Italy, to understand how interactions among actors and socio-ecological variables generate social well-being within small-scale urban forest systems.

The study adopts an integrated approach. First, grassroot governance dynamics are understood by applying Ostrom's framework. Then, social impact related to the management of urban commons is measured through the Social Return On Investment (SROI) methodology. A key contribution lies in applying Ostrom's framework to analyse how interactions among actors and socio-ecological variables generate social well-being within small-scale urban forest systems. Integrating these two perspectives clarifies how bottom-up governance arrangements shape the measured social impact and supports the systematization of a replicable model for community-driven urban forestry. Through document analysis and semi-structured interviews, Ostrom's variables are identified to unfold commons-management dynamics and collaborative strategies among actors involved in the micro-forest. Further, social outcomes are identified and estimated by following SROI principles, based on stakeholder involvement, transparency and use of verifiable sources and financial proxies.

Preliminary findings highlight the substantial social value produced by this governance model in terms of psychological well-being, increased social capital, and volunteer engagement, while revealing challenges related to its long-term sustainability and scalability. The analysis offers relevant policy recommendations to support the replication of similar initiatives and reflects on the role of micro-forests in fostering environmental justice, community stewardship, and urban well-being.

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Watering Smart, Not Hard: Evidence-Based Irrigation Strategies for Four Urban Tree Species

Climate change intensifies challenges for urban trees through increased temperatures and water scarcity, reducing vitality and threatening ecosystem services. This study investigates species-specific drought tolerance and irrigation timing effects on urban tree water stress through a collaborative experiment with Karlsruhe's horticulture department in Southwest Germany.

We monitor 48 street trees across four species with contrasting xylem anatomy: Aesculus hippocastanum, Celtis australis, Platanus × acerifolia, and Tilia tomentosa. Trees (DBH 15-40 cm) are assigned to three treatments: control (no irrigation), May-July, and July-September irrigation (200L/bi-weekly). We continuously measure stem radial changes using band dendrometers, sap flow dynamics, and soil moisture at 20 cm depth. Normalized Tree Water Deficit (TWD), derived from dendrometer data, serves as our drought stress indicator.

First-year results from Bayesian hierarchical models reveal pronounced species-specific responses to climate and irrigation. Precipitation significantly reduces TWD. Vapor pressure deficit (VPD) sensitivity varies dramatically: Tilia tomentosa shows highest vulnerability, followed by Aesculus hippocastanum, while Platanus × acerifolia and Celtis australis were relatively VPD-tolerant. Direct irrigation effects were weak and inconsistent, but species-specific treatment interactions revealed that Aesculus hippocastanum benefited from July-September irrigation, while Platanus × acerifolia showed complex temporal patterns with May-July irrigation providing carry-over benefits. Surface sealing and crown light exposure showed inconsistent cross-species effects.

Our first year findings already demonstrate that irrigation timing must match species-specific water use strategies to effectively mitigate drought stress. These evidence-based results support practitioners in optimizing species selection and irrigation schedules for climate-adapted urban forestry management.

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èVRgreen: Nature-Based Solutions and ecosystem services as urban planning tools for climate resilience for the city of Verona

While Verona is one of the italian cities most affected by land consumption (ISPRA, 2025) and high levels of PM10 (Legambiente, 2025), the administration which is now leading its Municipality is the first, in the history of the city, to have a department dedicated to "ecological transition. Its ambitious goal is to reverse the dramatic trend that has been underway for some years. This change in governance offers, moreover, an opportunity to explore new paths for urban and territorial regeneration, ensuring that environmental goals drive long-lasting change, not just in the city but also in the lifestyles of its residents.

In this brand new political and cultural context, the project èVRgreen was born: a research initiative funded by the Cariverona Foundation and coordinated by the University of Verona, with partners the University of Padua and the Municipality of Verona. The methodology, which is intended to describe in this contribution, combines environmental monitoring (air, temperature), biodiversity analysis (bees and lichens), socio-demographic mapping and participatory processes. This has revealed climate vulnerability hotspots in the existing urban fabric. The team of the University of Padua outlined, through small nature-based interventions within the urban fabric, a system of "pocket parks" as devices for climate adaptation, ecological and social regeneration. In fact, the defined "pocket parks" are configured as the application of a selection of the most suitable Nature-Based Solutions to overcome the vulnerabilities previously identified. Pursuing a scientific approach, the research includes the assessment of the ecosystem services (carbon storage and mitigation, urban fllood risk, urban colling and recreation and tourism) in their current state and as planned. The methodology is designed as a replicable model for other cities, contributing to the debate on environmental justice and integrated green planning.

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Landscapes of encounter: practical approaches to manage zoonotic risks in urban nature

Urban nature is expected to deliver a wide range of benefits to cities regarding climate adaptation, biodiversity and human (physical and mental) health.
At the same time, urban nature can also influence human health negatively when zoonotic risks (pathogens transmitted from animals to humans) arise. These risks may increase due to changes in species richness or composition enhanced by climate change or intensified human use. Despite their growing relevance, zoonotic risks are rarely considered in the design of urban green infrastructure. To support urban planners and landscape architects in addressing these challenges, practical tools are needed to navigate the trade-offs between zoonotic risk management and goals for climate adaptation, biodiversity and human health.

We explored these trade-offs through a multidisciplinary design workshop. Using a challenging real-life case study, participating experts translated scientific insights on zoonoses into spatial design considerations. The workshop revealed key trade-offs that urban forestry practitioners face, such as climate resilience buffers versus mosquito breeding grounds, and facilitating predator habitats whilst also creating habitat for vector species associated with zoonotic risks (e.g. rats). The process resulted in practice-oriented design principles, including insights in the role of zoning strategies, mowing regimes and the spatial placement of trees, water bodies, seating areas, and path structures. With the input of the experts, we identified a set of actionable 'no-regret' principles that can help park managers and architects navigate these trade-offs and support decision-making.

Addressing zoonotic risks when designing urban nature requires an understanding of the intersection between ecological processes and human use. At EFUF, we aim to share and discuss our findings on how zoonotic risks can be integrated into urban green spaces without undermining their diverse ecological and social values.

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Building capacity for Urban Nature Plans

Urban nature such as greenspaces, semi-natural areas and green roofs provide diverse benefits for nature and people. The EU Nature Restoration Law and Biodiversity Strategy 2030 calls for cities of 20,000+ inhabitants to produce Urban Nature Plans (UNPs) for biodiversity, climate resilience and improved quality of life. The EU funded UNP+ Project develops this agenda. To facilitate the "10 Steps" of the UNP process, a primary output of the Project is the Capacity Building Programme (CBP). Guidelines for robust capacity building are proposed to target diverse stakeholder groups, including municipality staff, urban actors, civil society, grassroots groups, NGOs and tertiary education sectors.

The UNP+ CBP focuses on four core learning objectives: i) Increased knowledge on NbS, urban nature and green infrastructure, and how to design, implement and maintain urban nature plans ii) Improved critical thinking on enablers, opportunities, barriers and challenges for UNPs; iii) deeper understanding of key topics behind urban nature plans, including governance, policy, planning, financing, partnerships, justice, well-being and assessment and monitoring iv) Expanded ability to navigate tensions and trade-offs facing urban nature plans through a combination of competences.

For fundamental change, this requires the need for cities to be perceived as ecosystems which are integrated and connected to nature whilst linking to place-making perspectives to create attractive, accessible and engaging spaces for communities. It also requires bridging silos across municipal departments, sectors, strategies and initiatives.

However, the full potential of UNPs will be better realised through cocreation approaches which unlock the potential contribution of civil society through citizen science, volunteering and participation in the management of urban greenspaces and nature.

Link to the UNP+ Capacity Building Programme:
https://urbanbynature.eu/community/projects/urban-nature-plans

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The Urban Forest as a 'Third Forest Type'

The original objective and design of the Amsterdamse Bos, a large urban forest on the edge of Amsterdam, marked a turning point in landscape architecture and large urban park design. It was not designed as a production or natural forest, but as a social forest park: a weekend green space for the entire population, accommodating both ecological processes and active leisure. Conventional forest frameworks rely primarily on the distinction between production forests and natural forests, yet urban forests do not fully fit either category. This results in an ongoing tension between managing a forest and managing a park.

This tension calls for critical reflection on the urban forest as a 'third forest type': a hybrid form that differs from traditional forest and park models by integrating ecology, production, recreation and aesthetics, and by explicitly linking forestry with landscape architecture. Unlike traditional forests, urban forests are deliberately designed to be experienced; they provide space for use, sensory engagement and aesthetic appreciation.

Current redevelopment strategies for the Amsterdamse Bos reinforce the need to reconsider the urban forest through this lens. The research explores the limitations of existing forest-oriented frameworks in addressing spatial quality, identity and experiential value, and investigates how spatial layering, legibility, sensory experience and place-based identity shape urban woodlands. The research is embedded within the Forest lab (Bos-lab), an interdisciplinary and international collaboration between TU Delft, the Amsterdamse Bos and partner institutions. Functioning as an open classroom and exchange platform, the Forest lab enables comparative research, shared experimentation and knowledge exchange across European urban forest contexts. Developing a clearer conceptual and scientific framework for this third forest type is essential for understanding, governing and designing resilient urban forest systems.

PARALLEL SESSIONS ABSTRACTS

PARALELL SESSION 1
Trees Under Pressure: Physiology, Stress and Survival in the City

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Right Tree, Right Place – How Spatial Data Can Strengthen Urban Living Environments

Urban environments present challenging growing conditions for trees, and many fail to reach their full potential. To support sustainable urban tree planting, robust and spatially informed decision-making is required.
At Multiconsult, we use GIS tools and spatial analyses as a foundation for holistic urban forestry strategies. Urban trees provide essential ecosystem services such as shading, cooling, stormwater regulation, biodiversity support, and aesthetic value, while also representing significant economic assets. Effective prioritization therefore depends on identifying where new planting will provide the greatest combined benefit.

Based on experience from urban tree management in Oslo and expertise in geospatial analysis, we demonstrate how multi-criteria analysis can be used as a structured decision-support framework to identify suitable locations for new tree planting at an early planning stage. The selection of spatial datasets is structured around supporting, regulating, provisioning, and cultural ecosystem services, and integrated to evaluate ecosystem functions, site conditions, and societal needs in a transparent and comparable way.

The resulting spatial layer provides a clear basis for decision-making, enabling planners to balance desired effects with economic ambitions and to prioritize where tree planting will deliver the highest overall value. A key advantage of this approach is that tree species selection and species diversity are embedded in the decision process from the outset. Spatial data on microclimate, soil conditions, pollution levels, and urban flood dynamics allows species to be matched to site conditions while supporting a diverse and resilient tree population. This strengthens long-term survival and ecosystem functioning, reduces vulnerability to climate change, pests, and diseases, and enhances the capacity of urban forests to support both ecological and social diversity.

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Fifteen Years on the Footpath: What Dublin's Street Trees Reveal About Growth, Space and Urban Futures

Cities evolve fast; trees grow slowly. Urban trees are long-term infrastructure, yet their growth is rarely assessed over timeframes that align with how cities plan and invest. This presentation offers a rare 15-year, like-for-like comparison of Dublin's street trees, pairing a detailed 2009/2010 field inventory - covering over 10,000 trees, approximately 6% canopy cover within the canals, and a streetscape dominated by lime and London plane—with 2024 measurements of the same trees. Tracking the same urban fabric over time provides robust evidence of how street trees grow under real conditions in a European capital facing increasing pressure from densification, traffic, climate change and competition for space.

Using repeat measurements of stem diameter and canopy extent, growth rates are analysed across species, street typologies and planting contexts. Results show strongly divergent growth trajectories, shaped less by species than by rooting volume, soil quality, traffic exposure, pruning regimes and legacy street design. Some trees demonstrate steady, resilient growth, while others stagnate or decline, revealing the long-term consequences of constrained planting pits, buried services and vehicle-oriented design assumptions.

Observed growth changes are translated into ecosystem service outcomes, including shade provision, carbon storage, stormwater interception and microclimate regulation. Even modest increases in tree size deliver disproportionate environmental benefits. Aligned with the EFUF 2026 theme "Diversity in Urban Forestry: Bringing People, Trees and Ideas Together," the Dublin case shows how long-term data can bridge silos between arboriculture, planning and climate adaptation, helping cities design streets that work better for people, trees and future resilience.

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Lessons learnt from a ten-year-long study of how a solitary tree interacts with the wind

An in-depth research study on a solitary European oak tree has taken place near Roskilde, Denmark over the last ten years. The study's main focus has been to describe how the oak tree interacts with the wind and how this effect can be accurately described in wind models. To study the wind, two masts were erected on either side of the tree and these were instrumented with anemometers. In addition, the wind field was scanned using a technique based on doppler wind lidars, which was developed at Risø / DTU. To study how the tree reacted to the wind, strain gauges were mounted on the lower part of the stem and these were calibrated with a known load. The combination of these two types of measurements enabled an accurate quantification of how strong the wind-induced force on the tree was for a given wind speed.

This understanding is important when describing the effect of trees in meteorological models in urban areas, because the most common tree parameterization is formulated as a drag force. Since wind-tree interaction strongly influences urban ventilation, air pollution, urban wind risk and wind comfort, it is important that trees, and the wind-induced forces that they have to withstand, are correctly described. In this work, we describe how and to what extent the methods developed from the long experiment on the oak tree can be generalized to other trees in order to create a better understanding for the complex wind-tree interactions in urban areas.

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Pruning increases invertebrate populations across growing zones dependent upon average temperatures, tree size, and degree of built environment

Urban foresters prune trees to mitigate risk. However, wounding the tree carries risk of its own, including the possibility of introducing infestation. We recently found that arboricultural pruning can increase the population of herbivorous invertebrates associated with a tree and decrease the ratio of predatory: herbivorous invertebrates for up to two years across three different species.

However, this was in a single location in the Northeastern United States. Therefore, we examined how these results might differ in more heavily built environments and across growing zones to understand how tree size, the built environment and climate change might impact the response of invertebrates to pruning. We considered 89 Gleditsia triancanthos exemplars in groups of 15 growing at six different sub-sites across three growing zones: New Jersey (Zone 7b), Massachusetts (Zone 6b) and Vermont (Zone 5b). We pruned at three different severities (approximately 0%, 10% and 20% of total primary branch cross-sectional area), and hung invertebrate traps following pruning. The next summer we measured epicormic regrowth, wound occlusion, leaf area index (LAI) and hung traps at two vertical strata. Our findings confirmed that pruning can increase the population of herbivorous invertebrates associated with a tree across climatic zones, tree sizes and environments, and in a fourth species.

Our data suggest that the total population of herbivorous invertebrates increases in growing zones with warmer average climates, in trees of larger size and decreases in more heavily-built environments. Our results further suggest the decrease in predatory:herbivorous invertebrate ratio that we previously found may not be experienced by all species. Species selection may therefore mitigate the responsiveness of invertebrates to pruning in the built environment. Our findings can help forest managers understand how to balance ecosystem biodiversity with tree health in a changing climate.

JOHAN ÖSTBERG, The Tree Office, Sweden

After the Malmö Tree Vandalism: What Can We Learn About Helping Damaged Trees Recover?

During the winter of 2020 to 2021, Malmö was hit by an unusual case of large-scale tree vandalism, where 248 urban trees were deliberately damaged. This created a unique opportunity to study how trees respond to real injuries in an urban setting. Two organisations managed the damaged trees differently: one wrapped the wounds with plastic shortly after the damage occurred, while the other left them untreated.

In this study, we followed how these trees responded over time by analysing wound occlusion between 2021 and 2023, focusing on Acer, Betula, and Tilia. The results indicate differences in how trees responded to treatment, suggesting that plastic wrapping may influence the recovery process under certain conditions.

The vandalism event also triggered strong public reactions, which have since influenced local discussions and priorities around urban tree management and protection in Malmö. Together, the case offers rare insights from real urban conditions and raises practical questions relevant for tree managers.

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Exploring Spatial and Seasonal Diversity of Tree-Associated Communities in Urban Forests Using Environmental DNA

Urban forests comprise diverse tree species growing in heterogeneous urban sites, providing habitat for many organisms and offering ecological and social benefit to cities. However, assessments of biodiversity are often limited to particular taxonomic groups or specific points in time. We use non-invasive environmental DNA metabarcoding (eDNA) to investigate the spatial and temporal patterns of biodiversity in urban trees, covering multiple organism across different seasons and locations.

Our study sampled five common urban tree species—Acer platanoides, Quercus rubra, Quercus robur, Robinia pseudoacacia, and Tilia cordata—in three habitat types: street, park, and peri-urban forest in Karlsruhe, Germany. eDNA was collected from tree trunks during two campaigns (winter 2024 and summer 2025) following a factorial design. Using PCR and next-generation sequencing, we analyzed vertebrate, arthropod, fungal, and bacterial communities associated with these trees.

We investigated how species richness and community composition change depending on season, habitat type, and tree species, taking into account factors such as tree size and management practices. Preliminary results indicate contrasting seasonal patterns among taxonomic groups: overall species richness was higher in winter, largely driven by increased fungal and bacterial diversity, whereas eukaryotic richness was higher in summer. Analyses of community composition suggest moderate differentiation among habitat types, with street, park, and forest trees hosting partially distinct assemblages. Ongoing analyses further explore the relative influence of seasonality, habitat context, and host tree characteristics on biodiversity patterns.

Integrating data on macro- and microorganisms, various tree species, and contrasting urban habitats enhances our understanding of urban biodiversity. These findings can inform future monitoring strategies and support evidence-based urban tree management.

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NINA BUCHMANN, ETH Zürich, Switzerland

Urban trees tap deep: How urban density affects water uptake in Zurich's trees

Urban forestry sits at the intersection of human decisions about where and how trees are planted and cared for, about biodiversity, and the ecological processes that determine tree function and survival. From an ecophysiological perspective, tree performance in cities is strongly shaped by water relations, including root water uptake, the ability to buffer heat and drought stress, and associated constraints of carbon dioxide uptake. However, these processes can vary widely across species and within heterogeneous urban environments, and the knowledge about the hydraulic strategies of urban trees remains limited.

In this study, we address this knowledge gap using stable water isotopes to identify the water sources of three common urban tree species (Acer platanoides, Prunus avian, Prunus ‚Umineko') across street and park sites along an urban density gradient in Zurich, Switzerland. Twig samples and soil cores, down to 80 cm depth, were collected during six field campaigns throughout the 2024 and 2025 growing seasons. Water was cryogenically extracted from soils and xylem, and stable isotope compositions ($\delta^{18}O$ and $\delta^{2}H$) were measured using stable isotope ratio mass spectrometry. The resulting isotope data were used to estimate proportional contributions of potential water sources with a probabilistic model.

First results suggest that xylem water is not always explained by soil water from the 0-80 cm profile alone. Instead, our data show that trees access "old" water from deeper depths, i.e., winter precipitation taken up in summer. Further analyses will quantify species- and site-specific source contributions and their temporal variability along the urban density gradient. Overall, these results will support evidence-based planning and management of resilient urban green infrastructure under increasing heat and drought stress.

PARALELL SESSION 2 Future-Proofing Urban Trees: Diversity, Data and Decisions

GUSTAV NÄSSLANDER, The Tree Office, Sweden

Communicating the benefits of trees

To build greener, more resilient cities, we need political and stakeholder support. Achieving this requires effectively promoting the full range of benefits and ecosystem services provided by trees and urban greenery.

The days when only urban forestry professionals understood these benefits are long gone. Today, both policymakers and the public are eager for more knowledge about green infrastructure. This is our opportunity to communicate the value of trees—and secure greater funding for projects that matter.

This session will address why communication is critical, what benefits and values to emphasize, and how to deliver these messages effectively, and preferably visually appealing. Gustav will share numerous examples from around the world, including media coverage, tree tags, public campaigns, art installations, and other creative approaches.

Attendees will leave with practical ideas and proven strategies to apply in their own cities and projects—tools that can truly influence outcomes. Us within the urban forestry industry know the value of trees; now it's time to share that knowledge widely.

Presenter: Gustav Nässlander, CEO of The Tree Office. Gustav has a bachelor in horticultural science and have done presentation at numerous international conferences.

JENNY LINDÉN, IVL Swedish Environmental Research Institute
JENNY KLINGBERG, Gothenburg Botanical Garden, Sweden
JONNA PETERSSON, University of Gothenburg, Sweden
HÅKAN PLEIJEL, University of Gothenburg, Sweden
ÅGOT WATNE, IVL Swedish Environmental Research Institute, Sweden
MALIN GUSTAFSSON, IVL Swedish Environmental Research Institute, Sweden

Accumulation of particulate matter and metals in six species in the urban environment – a case study from Gothenburg

Particulate matter (PM) is considered one of the most harmful pollutants to human health. Vegetation can potentially remove substantial amounts of pollutants and improve urban air quality. Increased knowledge of the pollutant removal efficiencies of different species is essential for understanding the potential benefits.

In this study we investigated the accumulation of PM (size fraction PM2.5-10 and PM10-100) and metals on the surface and in the wax of the leaves of six species, the tree species Tilia cordata, Eucommia ulmoides, Zelkova serrata, Pinus nigra and the climbers Parthenocissus tricuspidata and Hedera helix. Leaves and needles were collected at a roadside site in Gothenburg City, Sweden, during the growing season of 2024. Three age classes of Pinus nigra needles were sampled both at the roadside site and in a park. In addition, air concentrations were measured.

The results show that the PM content in P. nigra needles were increasing with age and highest in the oldest needle age class. PM content in P. nigra needles were lower at the park site, where the air concentration of PM was lower, compared to the roadside site. The PM content in wax of P. nigra was highly correlated to the wax amount.

At the roadside site, where all species were sampled, P. nigra had the highest PM content (expressed as µg cm-2). Among the broad-leaved species Z. serrata had the highest PM accumulation.

Out of 14 analysed metals, zinc (Zn) and manganese (Mn) had the highest leaf content. Many of the metals were highly correlated with each other, indicating a common source, most likely traffic. Except cadmium (Cd), the surface concentration of metals correlated well with PM10–100 on the leaf surface.

In summary, urban greenery can accumulate PM from the air and thus improve air quality. P. nigra showed high potential, but a combination of species and leaf traits is preferable to promote the accumulation.

LEILA PARHIZGAR, Technical University of Munich, Germany

Species Diversity and Growth Responses of Urban Trees under Climate Stress

Urban trees are important components of urban green infrastructure, yet increasing drought frequency and intensity associated with climate change pose growing challenges to their long-term performance and vitality. Enhancing species diversity could be a strategy to improve urban forest resilience, but empirical evidence on species-specific growth responses under contrasting urban climates remains limited.

This study presents dendrochronological analyses of growth dynamics and drought sensitivity of eleven deciduous urban tree species, including both commonly planted and uncommonly planted species, across two Central European cities with contrasting climatic conditions (Munich – wet; Würzburg – comparably dry). Tree-ring data from 375 urban trees were analyzed to quantify long-term growth trends, changes in growth since the early 2000s, and species-specific responses to drought under urban conditions.

Results reveal a general decline in radial growth across most species since the early 2000s, indicating a strong climate-related signal affecting urban trees irrespective of planting frequency. However, growth responses to drought varied markedly among species and between cities. Several commonly planted species, such as Fagus sylvatica and Tilia cordata, exhibited pronounced drought sensitivity, while selected uncommon species, including Sophora japonica and Sorbus intermedia, showed comparatively stable growth and more favorable post-drought recovery. Importantly, uncommon species were not consistently more drought-resilient than widely planted species such as Quercus robur or Robinia pseudoacacia.

Our findings demonstrate that urban tree resilience is highly species- and context-dependent and cannot be inferred from planting frequency alone. Climate-sensitive species selection should therefore integrate empirical growth data, local site conditions, and anticipated future climate stressors to support resilient and diverse urban forests.

ANNICK ST DENIS, Université du Québec en Outaouais (UQO), Canada
MAXIME NICOL, Université du Québec à Montréal, Canada
MANUEL ESPERON-RODRIGUEZ, Western Sydney University, Australia
MARIE-JEAN MEURS, Université du Québec à Montréal, Canada
CHRISTIAN MESSIER, Université du Québec en Outaouais, Canada

New methods and tools to increase urban forest diversity and resilience

The importance of urban tree diversity for enhancing resilience is increasingly recognized by decision makers. Urban foresters seek to prevent the overrepresentation of individual species across streets and neighborhoods as homogeneity can lead to substantial canopy loss following large-scale disturbances such as droughts or the introduction of exotic pests and diseases.

At the same time, they require practical guidance adapting their urban forest to ongoing and future climate change. We present SylvCiT (sylvcit.ca), an open-source decision-support tool designed to analyze urban forest characteristics across multiple spatial scales and to support the planting of diverse tree species representing different functional groups.

These groups share similar functional traits, including seed mass, specific leaf area, drought tolerance, and flood tolerance. SylvCiT provides users with a rapid, spatially explicit assessment of urban forest composition and structure, including species richness, functional diversity, structural diversity, and carbon storage. Using optimization and machine learning algorithms, SylvCiT identifies underrepresented functional groups and overabundant species, and recommends suitable tree species to enhance diversity and improve resilience to global change.

In addition, we have developed a novel Urban Tree Risk Index (UTRI) to assess the vulnerability of tree species to climate change. This index integrates five components: climatic safety margins (reflecting exposure to climates beyond species tolerance limits), species abundance, tree size and age, and traits associated with tolerance or resistance to environmental stressors. Finally, a new SylvCiT module is currently under development to further support the selection of tree species better adapted to future climate conditions.

MALIN RIVERS, Botanic Gardens Conservation International, UK

From Global Assessment to Urban Action: Safeguarding Tree Diversity in Urban Environments

Trees are vital to life on Earth, yet many species are quietly disappearing. Preventing tree extinctions requires relevant and reliable information to guide conservation action. The Global Tree Assessment, co-led by Botanic Gardens Conservation International (BGCI) and the IUCN Species Survival Commission Global Tree Specialist Group, is the first initiative to assess the conservation status of all nearly 60,000 tree species worldwide. It provides essential evidence to support scientists, policymakers, practitioners, gardeners and funders in taking informed and timely action.

This presentation highlights the relevance of the Global Tree Assessment to urban environments. By identifying species' extinction risk and key threats - the Global Tree Assessment offers insights for urban forestry. Understanding global, regional and local risk patterns helps guide more resilient planting strategies and can also support the long-term conservation of tree diversity within cities.

Urban trees, woodlands and forests deliver a wide range of ecosystem services, from climate regulation and biodiversity enhancement to improved public health and social wellbeing. As cities face growing pressures from a changing climate, invasive pests and emerging diseases, maintaining diversity and applying evidence-based knowledge in urban forestry has never been more important. By linking research findings with on-the-ground experience, urban forestry networks can strengthen planning, species selection and long-term management decisions.

Overall, this presentation demonstrates how the Global Tree Assessment can enhance urban forestry practices by safeguarding tree diversity and help cities adapt to environmental change for the benefit of present and future generations.

JOHANNA WITZELL, Linnaeus University, Sweden

Guardians of Urban Trees: A European Network for Urban Tree Biosecurity (UB3Guard)

UB3Guard (Urban Tree Guard) was a pan-European COST Action (CA20132) running from October 2021 to October 2025 and funded by the European Cooperation in Science and Technology (COST). Its core mission was to enhance the biosecurity of urban trees and forests across Europe by building an interdisciplinary network of researchers, practitioners, policymakers, and other stakeholders who shared knowledge, tools, and strategies to respond to the growing threat of pests and pathogens in urban green infrastructure. The project was motivated by the observation that biosecurity systems often fail to detect or prevent these threats effectively, particularly in complex urban environments where early detection, rapid response, and integrated management are crucial.

UB3Guard addressed these challenges by integrating scientific and stakeholder knowledge, collecting information on innovative tools and solutions, and supporting policy implementation under the EU plant health regime. The Action brought together more than 250 participants across multiple disciplines (entomology, pathology, landscape planning, social sciences, urban forestry, etc.) and sectors, supported early-career researchers through mobility grants, and disseminated results through policy briefs, scientific publications, workshops, and events.

This presentation highlights the legacy of the project, including the development of a comprehensive European Urban Tree Inventory (EUTI) comprising over 8 million records from municipalities across Europe, the creation of teaching and decision-support resources, and the promotion of participatory approaches such as horizon scanning and stakeholder mapping to strengthen biosecurity practices. UB3Guard demonstrated both the opportunities and challenges involved in empowering cities and communities to better prevent, detect, and manage tree health risks, contributing to greener, healthier, and more resilient urban environments.

BLAZ KLOBUCAR, Swedish University of Agricultural Sciences, Sweden

Tree Crown Detection on Historical Orthophoto Images: A Comprehensive Review

Historical panchromatic black and white orthophoto images represent a valuable but challenging data source for tree crown detection and forest monitoring. This report synthesizes findings from published research papers to provide a comprehensive overview of methods, challenges, and applications in detecting individual tree crowns (ITC) from single-channel historical aerial imagery.

While modern multispectral and hyperspectral sensors dominate current remote sensing applications, historical panchromatic photographs offer unique opportunities to study long-term forest dynamics, treeline shifts, and landscape changes spanning several decades. The analysis reveals that both traditional computer vision algorithms (watershed segmentation, template matching, active contours) and modern deep learning approaches (U-Net variants, Mask R-CNN, BlendMask) have been successfully adapted for panchromatic imagery.

However, the absence of spectral information, reduced image quality, shadows, and film artifacts pose significant challenges that require specialized preprocessing and domain adaptation strategies. Recent advances in deep learning, particularly transfer learning from modern to historical imagery through careful augmentation, show promise for operational deployment.

PARALELL SESSION 3
Urban Nature for All: Equity, Health and Inclusion

LIVIA SHAMIR, Stefano Boeri Architetti, Italy
ADAM CORMACK, Woodland Trust UK, UK
SIMONE MARCHETTI, Stefano Boeri Architetti, Italy
KENTON ROGERS,Treeconomics, UK
PAUL ARMSTRONG, Woodland Trust UK, UK
LUIS PIMENTEL, Stefano Boeri Architetti, Venezuela
SOFIA PAOLI, Stefano Boeri Architetti, Italy

Global perspectives on tree equity

Towns and cities around the world are aiming to increase tree cover in response to challenges facing urban populations, including heat risk from climate change and other public health concerns. There is now an opportunity to support countries in developing best practices for tree equity initiatives by establishing a shared international definition, exploring cross-country similarities and differences, and establishing a set of ethical principles to guide such efforts. This contribution will examine existing policies on tree equity to identify methodologies for comparing how different principles to urban forestry and tree equity have been applied across various continents. The goal is to provide a clear and comparative overview of current approaches.

This analysis aims to support national governments, public administrations and technical partners in identifying the most suitable approach based on local urban morphologies, environmental conditions, and operational capacity. It will also offer guidance on tools, actions, and strategies that could lead policymakers to promote a more equitable distribution of gardens, parks, and trees in cities. Currently, no global policy review focuses exclusively on tree equity. This contribution will fill that gap by presenting case studies and a guideline to invest on trans-disciplinary policies with the potential for multi-level impact across health, urban planning, and green infrastructure – ultimately offering a practical, actional resource for policymakers.

LEAH JOHNSTONE, Trees for Cities, UK
RODDY SHAW, Trees for Cities, UK

Tree Equity for Hartlepool

The UK is the first country outside the USA to have adopted Tree Equity scores, with the Tree Equity Score UK map launched in December 2023. In 2024, Trees for Cities assembled a diverse partnership to bring different stakeholders together and begin the long-term challenge of addressing the second lowest scoring town in England - marking the first such project in the UK to take a holistic town wide approach. Having secured funding in early 2025, the partnership has completed its first delivery year and seen a diverse array of community engagement pieces alongside planting activities and the creation of a new urban forest masterplan for the town.

Beginning as one of the highest priority areas in the UK for Tree Equity, showing the urgent need for urban forestry interventions, the project will ultimately guide the town of Hartlepool from low scores to being recognised as a Tree City of the World come 2026. The work is demonstrating how urban forestry can bring diverse groups together to collaborate on everything from strategic masterplans down to the smallest community engagement activity.

This presentation will set the scene for urban forestry in the UK as well as the local context of a town facing social and environmental challenges. Lastly, the presentation will show how this ambitious project is aiming to raise Tree Equity across an entire town and offer early thoughts on what hopes to become a replicable model.

RIK DE VREESE, European Forest Institute, Belgium
AMANDA GALUSHA, University of Freiburg/European Forest Institute, CA/DE
STEFANIE HENKEL, UFZ/iDiv, Germany
NINA-MARIA STRATIL, UFZ/iDiv, Germany
ALETTA BONN, UFZ/iDiv, Germany
ANAHITA RASHIDFAROKHI, University of Helsinki, Finland

Barriers and systemic gaps hindering fair distribution of urban nature benefits among vulnerable population

Urban nature is increasingly recognised for its potential to enhance health, wellbeing, and climate resilience in cities. However, benefits are not fairly distributed, particularly for vulnerable and marginalised groups. This review synthesises findings from 53 European case studies to identify barriers and systemic gaps in achieving distributional justice in urban greening. Applying a critical realist approach, we examine barriers through two complementary perspectives: community-level experiential challenges and institutional shortcomings in city planning.

Seven recurring themes emerge: (1) distribution, access, and quality; (2) safety, fear, and usability; (3) green gentrification and displacement; (4) cultural and social belonging; (5) economic and resource constraints; (6) climate and environmental justice; and (7) data and knowledge gaps. While urban nature planning often prioritises quantitative metrics such as proximity and area, these fail to capture lived experiences of exclusion, cultural relevance, and safety concerns. Evidence on health outcomes for vulnerable groups remains limited, revealing a critical research gap.

The review argues for reframing environmental justice beyond spatial distribution to include recognitional and procedural dimensions, emphasizing inclusive governance, intersectionality, and integrated planning across housing, mobility, and social policy. Strategies for more equitable urban nature include anti-displacement safeguards, context-sensitive design, recognition of informal green spaces, and mixed-method knowledge practices. The presentation will end with illustrating how these strategies can be implemented in practice.

KJELL NILSSON, Nilsson Landscape Inc., Sweden
AGNES PIERRE, European Environment Agency, Denmark
NEIL SANG, Swedish University of Agricultural Science, Sweden
THOMAS RANDRUP, Swedish University of Agricultural Science, Denmark

A Socio-Economic Perspective on Access to Urban Greenspace (UGS)

The objective of this study was to establish a data-driven, replicable framework that quantifies green space equity at city district level. Specifically, the research seeks to (i) identify key indicators of greenspace availability and socio-economic status that can be measured consistently across Swedish municipalities; (ii) develop a composite relationship (a matrix or an index) that integrates these indicators to provide insights for urban planners and policymakers, and (iii) to test the applicability of this index in Malmö, illustrating its potential to guide future investments in UGS for equitable urban development.

Data sources include GIS-based analyses, municipal records, and socio-economic data from Statistics Sweden. All computations of UGS rely on open datasets, which are updated at varying frequencies but not always regularly.
A Green Equity Matrix was developed, including seven indicators 'UGS per capita', 'canopy cover', 'distance to UGS' as Green Space Status (GSS) indicators, and 'age dependency', 'household income', 'education level', and 'employment rate', as Socio-Economic Status (SES) indicators. Each indicator was computed and combined into two individual indexes. All indicators were combined unweighted.

Contrary to widespread assumptions, the analysis reveals that neighbourhoods with lower SES often have higher GSS in Malmö. Lower SES neighbourhoods were often developed in the 1960's and early 1970's, where larger parks and green spaces were prioritized. We believe these areas have benefited from earlier planning efforts aimed at providing green amenities to balance socio-economic disadvantages, and that the effects of these efforts are still notable in a Swedish context. However, while higher GSS in lower SES areas is a positive finding, it does not necessarily reflect equitable quality or functionality of green spaces. Socio-economic disparities might still influence the usability, safety, and maintenance of these areas.

GERD LUPP, Chair for Strategic Landscape Planning and Management, TUM School of Life Sciences, Technical University of Munich, Germany
ANDREI BARBAS, Centre for Social Studies, University of Coimbra, Portugal
BEATRIZ CAITANA, Centre for Social Studies, University of Coimbra, Brazil
JOANA SANTOS, Centre for Social Studies, University of Coimbra, Portugal

Co-creating indicators for Assessing the Socio-Political and Socio-Cultural Aspects of Nature-Based Solutions (NBS)

Nature-Based Solutions (NBS) such as creating and enhancing Urban Forests are increasingly implemented to adapt cities to climate change to adress issues related to more frequent and more intense severe weather events and to enhance biodiversity. An increasing focus of NBS is laid on their ability to enhance social and well-being benefits for humans. However, the evaluation of NBS interventions and related co-creation processes are mainly based biophysical, expert-driven indicators that insufficiently reflect socio-ecological and socio-cultural effects.

In the EU-Horizon project TRANS-lighthouses, a collaborative approach with several phases was implemented do develop and choose indicators with the local stakeholders. Starting with reviewing existing catalogues of indicators, an interdisciplinary team of researchers, practitioners, and pilot case representatives iteratively identified, filtered and operationalised a set of meaningful indicators for assessing the co-creation processes of NBS. Key criteria were both their importance across the different contexts of the cases and cross-case comparability. The indicators were grouped along the five dimensions of the TRANS-lighthouses guiding framework – participatory governance, social, nature, economic, and cultural aspects reflecting the "more-than-green" ambition of TRANS-lighthouses. Guiding principles were relational, procedural, and experiential aspects of NBS such as inclusivity, learning, stewardship, and creating reciprocal human–nature relations.

By co-producing indicators with stakeholders, this framework contributes to advancing transdisciplinary evaluation practices for NBS.
It demonstrates how participatory indicator development can enhance legitimacy, usability, and transformative potential, offering a transferable approach for monitoring more inclusive, more just, and context-responsive NBS across diverse governance settings.

ALEKSANDRA ZIENKIEWICZ, The Municipal Greenery Auhthority in Wroclaw, Poland
MONIKA PEC-SWIECICKA, The Municipal Greenery Auhthority in Wroclaw (Zarzad Zieleni Miejskiej we Wroclawiu), Poland

From Pixels to Planning: A Multi-Scale Data Framework for Urban Forest Resilience and Climate Adaptation

Urban forests and green infrastructure are key components of urban climate adaptation, addressing impacts such as urban heat islands, extreme rainfall, and increasing thermal stress. However, effective management often struggles with fragmented data and limited integrated spatial analyses. This presentation introduces a comprehensive framework for urban forest management developed within the LifeCoolCity project, which utilises an innovative integration of satellite imagery (e.g. Sentinel, Landsat), high-resolution aerial hyperspectral data, LiDAR, and GIS-based analyses, supported by AI and Machine Learning.

The methodology focuses on five crucial components shaping a city's adaptive capacity: surface sealing, thermal conditions, blue infrastructure, green infrastructure, and biodiversity. In the demonstration city of Wrocław, the resulting outputs include a range of spatial products, among them detailed urban canopy and biodiversity maps enabling consistent assessment of the structure, distribution, and condition of the city's vegetation.

For practitioners, the framework operates as a Decision Support System that identifies priority intervention areas—so-called hotspots—where nature-based solutions can deliver the highest environmental and social benefits. It supports planning, design, and monitoring of urban blue-green infrastructure. At the strategic level, the CoolCity Ranking, currently being developed for more than 10,000 European cities, will, once published, enable comparative analyses between cities with similar characteristics, supporting benchmarking and knowledge exchange across regions.

For researchers, the approach offers a standardised, repeatable methodology for monitoring and cross-city comparisons. By translating complex geospatial data into actionable knowledge, the LifeCoolCity framework bridges the gap between scientific modelling and municipal decision-making, and can strengthen resilient, inclusive, and climate-responsive urban forestry.

DEANNE BRETTLE, University of Birmingham, UK
LEE CHAPMAN, University of Birmingham, UK
TONIA CLARKE, Birmingham TreePeople, UK
EMMA FERRANT, University of Birmingham, UK
SARAH GREENHAM, University of Birmingham, UK
NINA GRIFFITHS, Birmingham TreePeople, UK
IAN MCDERMOTT, TreePeople, UK
SIMON NEEDLE, Birmingham City Council, UK

Birmingham, a super-diverse city for both people and trees. How are Birmingham's newest urban trees settling in?

Birmingham is the UK's first Nature City (since 2025), a Biophilic City (since 2014), and a Tree City of World (since 2019). In 2021 it became the first UK city to adopt an 'Urban Forest Master Plan (UFMP) which sets a 30-year vision for the city's urban forest. A 5-year review of the UFMP reveals Birmingham is well on the way to understanding the diversity of the urban forest and is taking appropriate actions.

A 2023 iTree Eco study shows Birmingham's urban forest has a variety of species, and of the nearly 1.13million trees, only one species exceeds 10% of the total tree population (Betula pendula, 11.1%). However, an analysis of Birmingham's street tree inventory from 2015 showed significantly less diversity, with the Tilia genus making up 26.3% of the street tree population, and Tilia x europaea species dominating at 17.5%. From 2015 to 2020, in an active approach to diversify the street tree population, a mix of 100 species and cultivars were planted with a citizen science-led monitoring programme initiated to assess their progress. This has reduced the Tilia genus street tree population to 25.2% and the Tilia x europaea species to 15.46% over 5 years.

The following results show i) some of the species that have been planted in greater numbers; ii) the percentage increase in their numbers; iii) percentage of trees monitored; and iv) survivorship: Celtis australis (488% increase, 49% monitored, 94.9% survivorship), Ostrya carpinifolia (291% increase, 41% monitored, 90.5% survivorship), Liquidambar styraciflua 'Worplesdon' (269% increase, 42% monitored, 87.1% survivorship), Liriodendron tulipifera (255% increase, 51% monitored, 81.6% survivorship), Metasequoia glyptostroboides (144% increase, 100% monitored, 92.3% survivorship) and Crataegus x lavalleei 'Carrierei' (178% increase, 48% monitored, 88% survivorship).
Further details on the health of new trees will be shared, along with insights from the five-year performance review of the Birmingham UFMP.

PARALELL SESSION 4
Counting What Counts: Turning Urban Tree Data into Impact

LORENZO ROTELLA, Sapienza University of Rome, Italy

Open-source GIS street tree inventory: multi-criteria assessment for neighborhood-scale urban forestry management in Rome

Systematic inventories of urban street trees are essential for evidence-based planning, yet constrained by methodological standardization and economic challenges. This study presents a replicable protocol for field-based digital street tree census, applied in a densely built central and in a low-density suburban area of Rome.

Field surveys documented a set of 15 parameters, including species identity, dendrometric and tree pit parameters, acquired using open-source QGIS/QField tools. Subsequent analysis evaluated floristic diversity, population structure, and climate suitability at neighborhood scale, enabling the identification of context-specific vulnerabilities. The testing of the methodology shown in this work involved 13,017 georeferenced tree pits, pointing out substantial pit restoration needs and insufficient soil conditions in the most densely urbanized area, whereas the suburban area shows optimal conditions with extensive road verge green spaces.

Joint interpretation of the considered parameters reveals that high floristic diversity alone does not guarantee climate resilience: high-diversity neighborhoods can exhibit substantial non-climate-resilient species and limited alignment with local species recommendations, demonstrating that comprehensive evaluation of street tree populations requires integrated analysis.

The operationalized protocol establishes a replicable, municipally-scalable methodological framework, providing policymakers with fine-scale, actionable insights enabling differentiated urban forestry strategies addressing both infrastructure deficits and long-term species climate suitability.

JEAN-LAURENT PFUND, Bern University of Applied Sciences (BFH), School of Agricultural, Forest and Food Sciences (HAFL), Switzerland
MICHAEL KAHLER, BFH, HAFL, Switzerland
JERYLEE WILKES-ALLEMANN, BFH, HAFL, Switzerland

From parking spaces to micro-forests: A GIS-Based Suitability Analysis for Heat-Resilient and Biodiversity-Positive Urban Development – A Swiss example

Rapid urbanisation and densification intensify e.g., urban heat islands and biodiversity loss, while municipalities face growing pressure to allocate scarce land resources transparently amid competing ecological, social and economic demands. Although urban greening is widely promoted as a key adaptation strategy, its spatial focus and implementation quality remains unclear in dense inner-city areas where ground-level transformation potential is limited. Large above-ground car parks constitute a functionally underutilised yet spatially significant land-use category with substantial, largely untapped potential for climate adaptation and biodiversity promotion.

This study presents a GIS-based decision-making model to prioritise micro-forest locations in Bern, Switzerland. The framework integrates (i) multi-criteria suitability modelling in QGIS using Analytic Hierarchy Process (AHP) weighting, (ii) thermal hotspot analysis based on summer composites of land surface temperature (LST; Landsat 8) and vegetation indices (NDVI; Sentinel-2), and (iii) cross-profile-based spatial typology derived from the QGIS StreetCanyonAnalysis tool, developed for this study, calculates height-to-width (H/B) ratios for all streets and buildings at the municipal scale. Additionally, the AHP model included seven criteria (LST, NDVI, plot size, ownership, slope, surface runoff and spatial type) and demonstrated acceptable consistency, with the highest weights assigned to LST and NDVI.

Results show that combining local Z-standardisation of LST with an NDVI threshold identifies 253 thermal priority clusters. Of 4,905 mapped parking spaces, 736 intersect these hotspots; after excluding steep slopes and infrastructure conflicts, 637 sites remain suitable for potential conversion. Scenario-based prioritisation identified intervention areas between 0.05 and 0.13 hectares, demonstrating the model's applicability for targeted, implementable urban greening (micro-forest) strategies

MILOSLAV KALÁB, ASITIS, Czechia

Turning Remote Sensing into Targeted Urban Tree Care: Evidence from 587,026 Trees in Copenhagen and Lisbon

Urban trees are under increasing pressure from heat, drought and soil stress. Cities need tools that quickly show where trees are coping well and where intervention is urgent.

UpGreen is a remote sensing based greenery audit that maps individual tree crowns from satellite imagery and evaluates their condition at city scale. Tree crowns larger than 30 m2 are segmented and assessed using time series vegetation data. For each tree we derive indicators that describe productivity, stress, survival capacity, cooling effect and carbon sequestration, and aggregate them to neighbourhood and city level.

In Copenhagen, UpGreen analysed 280 192 trees. One fifth of them show below average productivity, and more than 1 300 trees experience elevated stress. Around 18 500 trees, or 6.6%, are classified as vulnerable or endangered. These trees cluster mainly in dense inner districts such as Østerbro, Indre By and Vesterbro-Kongens Enghave, where more than 10% of trees fall into risk categories. Citywide tree carbon sequestration reaches about 15 000 t(CO2) per year, while neighbourhood cooling effects range from 0.03 °C to 0.19 °C, highlighting large spatial differences in ecosystem service delivery.

In Lisbon, 306 834 trees were identified. Productivity is lower than in Copenhagen, with 24% of trees below average. Stress levels are markedly higher, as 9.2% of trees are under extreme stress and 3.9% under high stress. More than one third of all trees, around 111 000, are classified as vulnerable or endangered. Administrative units such as Olivais and Marvila stand out with more than 10% of trees in critical condition, while historic central districts have very low tree densities, below 6 trees per hectare. Total annual carbon sequestration is estimated at about 3 300 t(CO2).

The comparison shows how climate context shapes management priorities. The outputs are directly usable by urban foresters, planners and decision makers without additional modelling.

PHILIP CHAMBERS, University of Eastern Finland, Finland
CLAIRE NARRAWAY, Earthwatch EU, UK
ANA MACÍAS, Universidad Rey Juan Carlos, Spain
DIMITRIS ATHANASSIADIS, Swedish University of Agricultural Sciences, Sweden
CLAUDIA MENÉNDEZ, Arbocity, Spain

Mapping Communication and Participation Tools in Urban Forestry across Europe

Constructive communication and meaningful community involvement are increasingly recognised as essential aspects of successful urban forestry. However, smaller municipalities often face limitations in funding, staff capacity, and technical expertise, which limit their ability to adopt effective communication and participation tools.

This contribution outlines the design and initial insights of a Europe-wide survey conducted within COST Action CA23148 (INTUF), Working Group 3, Task 4. The survey aims to curate and analyse a diverse range of communication tools and projects used in urban and community forestry, with a focus on their applicability to smaller or resource-limited municipalities. The survey captures information on tool characteristics, delivery modes, communication types, target audiences, thematic areas, skill requirements, and perceived suitability for small municipal settings.

By systematically mapping existing tools and practices, the survey seeks to identify low-cost, scalable, and transferable approaches that support inclusive communication, participation, co-creation, and community stewardship in urban forestry initiatives. This work highlights emerging patterns, identifies gaps and opportunities, and considers how communication tools can improve social diversity, trust, and collaboration between municipalities, professionals, and local communities.

The survey results and analysis will be presented at EFUF 2026. The findings aim to support practitioners, policymakers, and researchers by providing evidence-based insights and practical guidance for selecting and adapting communication tools in diverse urban forestry contexts across Europe.

DIMITRIS ATHANASSIADIS, SLU Urban Futures - Swedish University of Agricultural Sciences, Sweden

Building cross-sectoral and inclusive urban forest management partnerships

Managers of urban forests can neither overlook nor disregard stakeholder perceptions, demands and preferences. Communication in two directions is required: from the city/municipality or private (urban) forest owners to the stakeholders and vice versa. When managing urban trees, a top-down approach too often results in resistance, objections, action groups, bad social media publicity, etc. Moreover, effective communication is essential to help stakeholders recognize the immense value of privately and city/municipality/private owned urban forests in achieving a climate-resilient city. Effective stewardship should include different communication levels: a) one-way communication (e.g. capacity building, educational materials and guidelines), b) two-way dialogue between involved stakeholders, and c) active community involvement for collaborative decision- making processes and citizen science.
In this presentation we will discuss results from a survey to municipalities in the north of Sweden mainly on the challenges in effective communication between the stakeholders involved in urban forestry.

Ownership of urban forests is dominated by municipalities and the church, with stands that often exceed 20 hectares. Urban forest management is active but is characterized by a lack of resources, communicative conflicts of objectives and limited guidance specifically for urban contexts. Stakeholder resistance often concerns ignorance, safety risks, a static view of the landscape and logging measures.

Based on the survey results we present five distinct frameworks for active stakeholder participation in urban forest management, each grounded in widely recognized governance and engagement principles

JOSH BEHOUNEK, Davey Resource Group, United States of America

Missing the Forest for the Trees: A New Way to Think about Urban Forests

Urban forestry has made tremendous progress over the last several decades with better inventories, improved risk assessment, stronger science, and growing recognition of the value trees provide to cities. Yet despite more data, more tools, and more urgency, many communities still struggle to deliver resilient, equitable, and healthy urban forests over time.

This session explores a simple but uncomfortable question: are we managing individual trees well, while failing to manage the urban forest as a living system?

Drawing inspiration from how medicine has shifted from reactive care to preventive with what is called Health 2.0 with healthspan-focused models, this talk reframes urban forestry through a systems lens using the 5 dimensions of AI, technology (sensing), trees (biology), ecosystems, & human health & well being to achieve key outcomes of Resilience, Human Health, Equity, Biodiversity, & Positive ROI & Value. Rather than focusing on single moments in time, this approach emphasizes trajectories, feedback, and the interactions that ultimately determine long-term outcomes.

Attendees will be challenged to rethink familiar practices, recognize why this moment is different than the past, and consider how emerging tools and knowledge allow us to manage urban nature in fundamentally new ways. The goal is not to replace traditional urban forestry but to expand it into a more holistic, future-ready model for cities facing climate, equity, and public health challenges.

LUISA DI LUCCHIO, GAF AG, Denmark

Linking Urban Form, Population and Green Infrastructure for Climate-Resilient Cities

Urban forestry and green infrastructure play a growing role in climate adaptation, disaster risk reduction and inclusive urban development. Yet in many cities, particularly in climate-vulnerable and data-constrained contexts, decisions on where to prioritise trees and vegetated spaces are rarely supported by integrated spatial evidence.

This contribution presents a spatial decision-support approach that combines Earth Observation data, built-up area delineation and population distribution to analyse urban exposure, density and vulnerability at settlement and neighbourhood scale. By focusing analysis on built-up areas rather than administrative boundaries, the approach improves the identification of urban zones where green infrastructure and urban forestry interventions can deliver the greatest benefits, including flood mitigation, heat stress reduction and post-disaster recovery support.

Drawing on applications in coastal and island cities affected by extreme rainfall events, the presentation demonstrates how spatial indicators of urban form and population concentration can guide the strategic placement of urban trees, green corridors and nature-based solutions. The approach supports collaboration between urban planners, climate adaptation practitioners and Earth Observation specialists, translating complex spatial data into planning-relevant insights.

The contribution highlights how transparent, scalable spatial frameworks can strengthen the integration of urban forestry into climate-resilient urban planning, bridging scientific analysis and on-the-ground decision-making.

PARALELL SESSION 5 Building Resilient Urban Forests Through Governance and Collaboration

SIRIL STENERUD, Agency for Urban Environment in Oslo, Norway
IRENE STEINSLAND, Agency for Urban Environment in Oslo, Norway
UNA BRÄNNSTRÖM SVERDRUP, Agency for Urban Environment in Oslo, Norway

1–2–3: Oslo's New Tree Strategy - Three Core Goals — with Preservation as Goal Number One

Oslo's Agency for Urban Environment has created a new strategy for managing the city's urban forest. Many municipalities invest in green infrastructure. However, their efforts often focus on planting new trees, rather than preserving the valuable trees they already have. Development projects are labeled "green" even when mature trees are removed and replaced with young ones that contribute far less. As a result, the urban forest often ends up losing more than it gains.

Oslo's new tree strategy aims to shift the focus back to what truly matters. With a simple, one-page format and language that is easy for anyone to understand. The strategy communicates three main goals — each supported by three challenges and focus areas. This gives Oslo a clear framework for better managing and developing its urban forest across disciplines.

This presentation will include a quick overview of the three goals: Preserve, Plant, and Management through cooperation, in prioritized order. The talk will also include challenges and work that still lies ahead. We hope that the presentation, by providing a clear framework for green efforts that really matters, will help other municipalities communicate more effectively and provide tools for politicians and the public.

ANNA LAWRENCE, University of the Highlands and Islands, UK

Resilience and Adaptation in Urban Forest Governance: Thirty Years of the Mersey Forest

Success in urban forestry is more than a numbers game. Planting targets are relatively easy to fund and monitor, but tree survival, long term benefits, and durable system change are harder to secure. We need long-term studies to understand how to support these dynamics.

The Mersey Forest offers an exceptional 30 year perspective on what sustained success looks like in practice. Established in 1994 to regenerate post industrial landscapes in northwest England, it has planted nearly 10 million trees, created 600 km of accessible paths, and hosted 42,000 community events. Its influence extends beyond delivery: embedding green infrastructure in planning, pioneering health and education programmes, shaping national policy, and now managing over £200 million for England's Trees for Climate programme. It has not only endured but continually learnt, adapted and expanded to remain relevant amid shifting political priorities, funding regimes, and ideas about what urban forestry is for.

The paper analyses the structures and relationships that underpin such longevity and outcomes. It highlights five factors:
(1) Longevity as success in itself: surviving 30 years of political and economic change is rare.
(2) Partnership with local government, anchored by a hybrid, boundary spanning team: governance enables continuity with innovation and diverse partners.
(3) Embedding transformation: iterative planning and co production captured in the evolving straplines of successive Mersey Forest Plans—'More Trees,' 'More from Trees,' and 'More with Trees'—which signal shifts in vision and approach.
(4) Evidence as currency: exception commitment to monitoring and research have secured credibility, funding, and policy influence.
(5) Learning culture: support for new thinking, 'Ideas Lab', and reflection enable evolution through uncertainty.

KENTON ROGERS, Treeconomics, UK
DANIEL GRISWOLD, UNECE, Switzerland

Urban Forest Metrics & the UNECE Urban Forest Compass: A European Standard for Greener, Healthier Citie

Many cities lack consistent ways to measure, compare, and manage their urban forests, limiting their ability to plan, invest, and act at scale. This presentation introduces the UNECE Urban Forest Compass, a structured, pan-European framework for assessing and celebrating urban forests. At its core, the Compass identifies a set of key indicators that reflect the state, management, and outcomes of urban forestry in a given area.

Metrics include canopy cover, green space accessibility, street tree cover, planting and survival rates, expenditure, community engagement, equitable access and more. Together, these indicators serve as both a diagnostic and planning tool, revealing where forests are thriving, where they are lacking, and where investments will have greatest impact.

Accurate, standardised data strengthens the ability to benchmark, justify investment and measure outcomes. It also provides credible indicators to build political and community support. Measuring urban forests is thus a strategic action that helps cities understand where they are and how they can get where they want to go.

The Compass, grounded in a detailed questionnaire, offers a standardized approach for municipalities of all sizes to collect, report, and compare urban forest data. It supports both a "light" and "full" assessment, enabling smaller towns to engage without excessive burden while allowing larger cities to provide richer datasets.

This presentation will show how the Compass can help cities of all sizes make resilient planning decisions, justify investment, and share knowledge across borders. By adopting standard shared metrics, cities gain a common language for urban nature, empowering cities to reaffirm trees as foundational infrastructure for greener, healthier, and more equitable societies.

ANNE TOPPINEN, University of Helsinki, Finland
JANINA HARMANEN, Helsingin Seudun Ympäristöpalvelut Oy, Finland
ANNE VILJANEN, University of Helsinki, Finland

Business ecosystems around urban forest related nature-based solutions: case of the three Finnish cities

This study addresses barriers and opportunities for mainstreaming nature-based solutions (NBS) driven from urban forests using the lens of urban business ecosystems. Focusing on data collected from three cities in southern Finland that are ambitiously pursuing carbon-neutrality goals, we analysed semi-structured interview and expert workshop data by using reflexive thematic analysis. Our study provides novel insights into the factors influencing sustainable urban forest management and NBS adoption and offers suggestions for actionable solutions on how to overcome existing barriers to sustainability. Across all case cities, the NBS ecosystem is composed of four actor types: customers and end-users, firms in the green infrastructure value chain, the municipality itself, and specialist consultancies and NGOs as intermediaries.

According to our analysis, market potential may increase as city officials recognize the diverse benefits of NBS and translate that nto city planning. Opportunities emerge at three spatial scales: at micro-scale (such as individual buildings adopting green roofs or façades), at meso-scale (neighbourhood-level greening boosting resident nature connectedness), and citywide networks of green infrastructure (enhancing urban resilience) at macro-scale that is most closely connected to urban forests.

Five main barriers were identified: (i) economic and financing hurdles, (ii) governance and institutional inertia, (iii) weak valuation of green infrastructure in property markets, (iv) technical and infrastructure constraints, and (v) fragmentation of the local business ecosystems. Despite these challenges, stakeholder groups regard role of urban green as essential for long-term urban resilience. To unlock this potential, and also to meet ambitions of European Nature Restoration Law into 2040, cities should clarify their priorities with ecosystem-service management and private sector needs further development in their business models and collaboration.

YASHA MAGARIK, University of Freiburg, Germany

How do specific site and soil characteristics impact urban tree growth?

We all know that urban trees of the same species grow differently depending on site -- but to what degree is this true? Which particular site and soil characteristics actually show up in the tree rings? More broadly, does urban tree growth vary more with regard to inherent or environmental characteristics?

We investigate the growth response of urban trees to extreme heat and drought events in the Upper Rhine Valley of Germany. Our works aims to help urban foresters better anticipate how different tree species in different sites will fare in the next few decades. We also hope to identify appropriate adaptations to make their urban forests more resilient to climatic extreme events(e.g., which species are performing better than others, which specific site alterations might be most effective).

To accomplish this, we have collected increment cores from 584 trees of 12 species in street, park and peri-urban forest sites in Freiburg and Karlsruhe, in southwestern Germany. We also measured a variety of physical and chemical soil properties from 477 corresponding samples. Finally, we recorded site and crown variables for each tree.

Our research (which is a part of the URBORETUM project) is therefore well-positioned to offer guidance on which site variables haveinfluenced urban tree growth and vitality, particularly in recent decades, as the climate has changed dramatically in Central Europe. Here we will present dendroecological results from across a range of sites as a case study for both researchers and practitioners.

PAUL HICKMAN, Urban Ashes, USA

From Urban Tree Removal to Circular Materials. Technical and Policy Pathways for European Cities

Cities across Europe invest significant resources in inventories, canopy goals, climate adaptation and urban forest planning, yet almost none extend this work to the material that comes from necessary removals, including those driven by storms, pests, development and wildfire risk. This presentation introduces a practical framework that connects urban forestry with circular material systems, carbon accounting and local governance. The model traces each tree from removal to sorting and staging, then through processing and final use, and generates usable data on species, volume, recovery rates, carbon retention, CO2e avoidance and community value. These data points are integrated into existing municipal asset systems and climate reporting.

Examples from several United States cities will show how structured log and woody debris recovery, simple tracking tools and defined material pathways create measurable climate, economic and social benefits. In practice, this work is carried out by city foresters, sustainability teams and procurement staff who use urban wood recovery to strengthen purchasing standards, support local manufacturers, guide economic development and improve public engagement by showing residents where their trees go and how they continue to serve the community. The same framework supports responsible use of lower grade material for biochar where appropriate, returning carbon to soils and reducing emissions.

This session outlines a largely missing but increasingly needed pathway for European cities to align urban wood recovery with circular economy goals, climate action plans and local industry. It offers a clear technical and policy route that brings transparency to material flows, reduces waste, expands climate benefits and creates opportunities for local workers and small businesses. The model complements existing urban forest planning while extending the value of the urban forest far beyond its standing life.

ANGELA BECKMANN-WÜBBELT, University Koblenz, Germany
JOHANNA KRISCHKE, University Stuttgart, Germany
SOMIDH SAHA, Karlsruhe Institute of Technology (KIT), Germany

Integrating participatory mapping and ecological data to understand socio-ecological resilience in urban forests

Participatory mapping has become increasingly prominent in urban forestry as a means to capture place based perceptions, values, and everyday experiences of diverse urban residents. In line with the 2026 EFUF theme "Diversity in Urban Forestry – bringing People, Trees and Ideas together", this contribution reflects on the methodological opportunities and challenges of integrating such social–spatial data with ecological assessments to better understand urban forests as socio ecological systems.

We draw on two empirical studies. In Karlsruhe (Germany), we conducted a map based survey of well being locations and perceived biodiversity and linked these data with remotely sensed canopy cover and tree genera diversity. Correlation analyses revealed strong associations between perceived biodiversity, tree cover and subjective well being, while illustrating challenges related to spatial scale and resolution. In Kumasi (Ghana), participatory mapping on the perception and use of urban trees was combined with ecological field measurements and ecosystem services modelling using i Tree Eco. Spatial cluster analyses revealed distinct patterns and mismatches between perceived benefits and ecosystem service provision.

Across both studies, integrating participatory and ecological data proved valuable for identifying socio ecological hotspots and revealing spatial mismatches relevant for equity and management prioritization. Focusing on methodological reflections, we highlight challenges related to data harmonization, sample bias, and the translation of subjective indicators into analytically robust spatial variables. We conclude by outlining research questions for which such integrative approaches may be particularly suitable and discuss how future methodological developments and learnings from related disciplines such as transformational studies may advance socio ecological research in urban forestry.

PARALELL SESSION 6
Urban Tree Access in Numbers: Equity, Cooling and Health

CECIL KONIJNENDIJK, Nature Based Solutions Institute, The Netherlands

Five years of the 3+30+300 principle: lessons learnt and future perspective

In February 2021, the author proposed a new 3+30+300 rule (later: principle) for greener and healthier communities. The principle highlights the importance of visible, functional / climate, and recreational green, with trees in focus, setting proposed thresholds for the visibility of mature trees, neighbourhood canopy cover, and proximity publicly accessible parks and other green spaces.

At the time of EFUF, the principle will have been around for over five years. Since its launch, it has had major impact, with adoption and implementation by local and other governments, organisations, and community groups. It has also been used in a large amount of research studies and enhanced recognition of the importance of nearby trees and green space among decision makers, affiliated urban professionals, and residents. There has also been some criticism, primarily warning for using the principle to strictly without consideration of local context, conditions, and communities.

This presentation will discuss the use of the 3+30+300 principle to date, identifying lessons learnt, responding to criticism and reservations, and drawing perspectives for sound future use.

KASEY YTURRALDE, Urban Forestry Division/District Department of Transportation, USA
EARL EUTSLER, Urban Forestry Division/District Department of Transportation, USA

Bridging the Gap Between Science and Practice in Urban and Community Forestry: Assessment of the 3+30+300 rule in Washington, DC

The 3+30+300 rule is a novel urban greening guideline that seeks to expand the scale at which trees and canopy are measured in communities. The metric recommends that each resident can view three mature trees from their home, school, or workplace, neighborhoods have a minimum of 30% tree canopy cover, and each resident lives within a 300 m walk to a park or green space.

These guidelines improve upon existing urban tree canopy goals by achieving sufficient tree canopy cover at the neighborhood scale, where people live, work, and play. Achieving the 3+30+300 rule will enhance access to tree benefits, which are greatly needed with nearly 70% of the world's population projected to live in urban areas by 2050. With climate change, urban populations will experience extreme heat as global warming exacerbates the urban heat island effect.

The 3+30+300 rule is a promising tool for communication, urban forest management, and achieving equitable access to the benefits of trees. However, implementation lies in the hands of practitioners such as urban foresters, arborists, city planners and volunteers. The assessment and application of the 3+30+300 rule should be easily understood by practitioners and the communities they serve.

The Urban Forestry Division applied these metrics to the District using existing urban tree canopy assessments, Urban Forest Inventory and Analysis data, and municipal data. The 3+30+300 rule expands on the District's 40% urban tree canopy goal by addressing access to trees and associated benefits at the neighborhood scale. The District scores moderately well in all three metrics. This talk will present a case study of the 3+30+300 rule, documenting the challenges encountered by municipal foresters in applying the metrics and opportunities for improving equitable access to trees and canopy for District residents.

MELISSA KELLEY LEE, KU Leuven, Belgium
JOS VAN ORSHOVEN, KU Leuven, Belgium
RAF AERTS, KU Leuven, Belgium
BENSOMERS, KU Leuven, Belgium

Quantifying street-level visible tree exposure: Implications for health and equity

Urban trees are increasingly recognized as a key component of nature-based solutions. Visual exposure to nature has demonstrated benefits for mental health, including stress recovery and cognitive restoration. Despite popular implementation of the 3+30+300 guideline, large-scale, objective assessments of visible greenery remain limited. This study operationalizes the "three visible trees" component of the guideline evaluating socioeconomic inequalities and health outcomes associated with visible tree exposure across Flanders, Belgium.

Using a pretrained YOLOv8-based object detection model applied to Google Street View panoramas, we quantified visible trees at 264,622 street-level locations. Spatial analyses showed a median of five visible trees with 20% of samples observing fewer than three visible trees. This number increased to 28% in urban samples compared to 17% of rural samples. Socioeconomic analyses revealed clear disparities: more deprived neighborhoods experienced lower tree visibility, with stronger negative effects in urban areas, particularly in housing- and health-deprived neighborhoods. In contrast, neighborhoods with higher median income and larger proportions of elderly residents were associated with greater visible tree exposure. Health analyses associated higher visible tree exposure with greater life satisfaction and reduced psychological distress. These associations showed stronger benefits among females, higher-income individuals, and rural residents, who experienced better mental health and well-being outcomes, including lower distress, anxiety, and depression.

By incorporating tree visibility beyond window views, this study translates the "three visible trees" principle of the 3+30+300 guideline into an objective, reproducible indicator. The findings highlight visible urban trees as an unevenly distributed environmental resource with meaningful implications for health equity and targeted urban forestry interventions.

ANA MACIAS, Universidad Rey Juan Carlos, Arbocity, Spain
SOPHIE PLITT, Arbor Day Foundation, USA
SOLARIA ANZILOTTI, Alberitalia, Italy
CLAUDIA MENENDEZ, Arbocity, Spain
FABIO SALBITANO, University of Sassari, Alberitalia, Italy
RODERICK SHAW, Trees for Cities, UK
INDRA-JEET MISTRY, Food and Agriculture Organisation, Italy

From Recognition to Transformation: The Role of Growth Awards in Urban Forestry Leadership and Governance

Global urban forestry initiatives have traditionally relied on recognition frameworks to establish baseline standards and stimulate municipal engagement. The Growth Award, introduced by FAO and the Arbor Day Foundation, marks a significant evolution beyond the Tree Cities of the World (TCOW) program, aiming to foster continuous improvement and innovation in urban forest governance. Building on TCOW's five foundational standards—which have successfully mobilized cities worldwide—the Growth Award transforms them into five advanced categories: responsibility (strengthening leadership and workforce capacity), rules (adopting progressive policies and guidelines), knowledge (enhancing data-driven planning), resources (expanding investment and partnerships), and celebration (deepening community engagement and awareness). These categories are currently being tested through a pilot phase involving national partners and participating cities, enabling a collaborative co-creation process informed by local feedback and experience.

This expanded framework seeks to shift recognition from a static achievement to a dynamic learning pathway. By spotlighting exemplary practices and rewarding municipalities that go beyond foundational standards, the Growth Award promotes adaptive planning, participatory approaches, and integration of ecosystem service valuation into urban forestry strategies. Expected impacts include accelerating peer learning, incentivizing innovation, and embedding resilience and equity considerations into local governance. Early trends from TCOW participation suggest strong potential for the Growth Award to catalyse long-term improvements, positioning cities as leaders in creating greener, healthier, and more liveable urban environments worldwide.

EVA BEELE, Division Forest, Nature and Landscape, Department of Earth & Environmental Sciences, KU Leuven, Belgium
RAF AERTS, KU Leuven, Belgium
MAARTEN REYNIERS, Royal Meteorological Institute of Belgium
NICOLE VAN LIPZIG, KU Leuven, Belgium
BEN SOMERS, KU Leuven, Belgium

Cooling efficiency of urban green spaces affected by heat, humidity and solar radiation

The urban heat island effect poses considerable risks for public health, especially during prolonged heat events. Urban green spaces can help reduce temperatures through evapotranspiration and shading, yet their cooling performance under extreme meteorological conditions remains poorly understood, limiting effective design and management. This study examines the cooling efficiency of urban green spaces in a compact Belgian city using a three-year (2022–2024), quality-controlled dataset from 125 consumer grade citizen science weather stations. Daily daytime and night-time cooling efficiencies were quantified as the slope between green space cover (trees versus grasses and shrubs) and mean air temperatures. Next, these efficiencies were linked to weather variables describing heat intensity, heat excess, humidity, solar radiation, and soil moisture. Analyses were conducted for the full growing season and for the 25% hottest days.

Consistent with previous studies, tree cooling was strongest during the day, while grasses and shrubs cooled most at night. However, daytime tree cooling declined under humid atmospheric conditions and limited soil moisture, and in combination with high solar radiation and low heat intensity. Night-time cooling by grasses and shrubs weakened under humid atmospheric and cloudy conditions, and with higher heat intensity. Across the hottest days, sufficient soil moisture was essential to sustain cooling.

These findings demonstrate that urban green space cooling is highly context-dependent and cannot be guaranteed under extreme heat and drought. For practice, this implies that effective heat mitigation requires not only increasing green space cover but also diversified vegetation structures and integrated soil- and water-management strategies. The results provide actionable guidance for urban foresters and planners aiming to design resilient green infrastructure under increasing climate extremes.

URŠA VILHAR, Slovenian Forestry Institute, Slovenia

Connecting Research, Education, and Society: Innovative Approaches to Outdoor Learning in Urban Forests

Dr Urša Vilhar, senior researcher at the Forest Ecology Department of the Slovenian Forestry Institute will highlight the importance of engaging children and teenagers in urban forests and emphasise the benefits of outdoor teaching and learning.

She will present experiences and results from the LIFE+ EMoNFUr project, which monitored urban forests in Milan and Ljubljana over a three-year period. Furthermore, she will introduce various activities and online resources that support outdoor learning in urban forests, considering children and teenagers as opinion shapers and future decision-makers in urban areas.

From outdoor teaching materials for teachers and educators, workshops for kindergartens and schools in urban forests, open days at the Slovenian Forestry Institute for the general public, special events for families, to children's books and cartoons, online learning resources, and outdoor activities designed for children with special educational needs in the frame of Erasmus + project Green Learning Environments, and the Forest planetarium as part of the Interreg Danube project URBforDAN – Dr Vilhar will demonstrate that there are countless ways to engage both children and adults with urban forests.

Would you like to learn more? Take a closer look at The Handbook for Learning and Play in the Forest, which aims to connect activities with outdoor learning experiences through play in nature. Designed for curious forest enthusiasts of all ages and those wishing to gain more knowledge and experience about the many processes occurring in forests, the Handbook follows four main themes: trees, forest animals, water and genetic diversity. A range of enjoyable activities offers unique opportunities to explore the forest with all senses and to adapt learning process to participants' individual needs, following the principle of "flow learning", which takes into account excitement and enthusiasm, focus of attention, direct experience, and sharing of inspiration.

ALI SAAD, Municipality of Arnhem, The Netherlands

Neighborhood Greening Agenda in Arnhem

Cities across Europe are seeking ways to enhance climate resilience, restore biodiversity, and involve residents more actively in shaping their living environment. In Arnhem, the Wijkgroenagenda (Neighborhood Greening Agenda) provides a participatory framework through which residents and the municipality jointly identify, design, and implement greening measures at neighborhood level. By collecting ideas for greener streets, gardens, and public spaces through workshops, digital platforms, and local outreach, each neighborhood develops its own set of short- and long-term actions tailored to local needs and community priorities.

This presentation highlights how Arnhem applies this approach in diverse neighborhoods, including areas with limited greenery. Co-created plans in these neighborhoods include planting trees and shrubs, replacing paved surfaces with vegetation, and revitalizing small public areas. These actions strengthen local biodiversity, contribute to climate adaptation, and promote social engagement. Beyond its ecological aims, the Wijkgroenagenda functions as a shared-responsibility model that reconnects communities with nature within dense grey infrastructure dominated by buildings, streets, and underground utilities. Its implementation demonstrates both opportunities and challenges: reaching less-engaged groups, balancing different neighborhood priorities, and navigating spatial or technical constraints remain ongoing tasks.

By sharing Arnhem's experiences, this presentation illustrates how participatory greening can help reintroduce nature into urban environments and offers a replicable model for cities seeking to expand green infrastructure, support community involvement, and build healthier, more biodiverse neighborhoods.

PARALELL SESSION 7 Rethinking Urban Forest Forms: From Tiny Forests to Living Labs

TOMOKO TAKEUCHI, Chiba Univercity, Japan

Urban Tiny Forests in a Hyper-dense City: Planning and Governance Insights from Long-term Miyawaki-Method Projects in Tokyo

Recently, the Miyawaki Method of afforestation has gained traction in European cities as a nature-based solution (NbS) for climate adaptation, often referred to as "tiny forests." However, evidence remains limited regarding its long-term performance and governance within extremely dense urban environments.

This study examines urban afforestation projects implemented since 2009 in Toshima Ward, Tokyo — one of Japan's most densely populated municipalities. Guided by the principle of "planting wherever possible," over 100,000 native trees, selected based on potential natural vegetation, have been densely planted across schools, parks, and residual urban spaces under the direct guidance of Akira Miyawaki.

The analysis utilizes municipal records, interviews with officials and facility managers, and citizen participation data. It evaluates site selection under severe spatial constraints, long-term maintenance practices, and the integration of site-level greening into broader urban planning.

Findings indicate that these forests enhance the visibility of greenery and foster environmental awareness. Crucially, maintenance practices have been flexibly tailored to each site's institutional, budgetary, and safety requirements. While demonstrating the potential of high-density planting, the Toshima case also highlights the limitations of fragmented, site-based units.

The study suggests that integrating tiny forests into citywide green space and land-use planning is essential for long-term sustainability. Tokyo's extensive trial-and-error process provides strategic insights for global cities adopting tiny forests to combat climate change and increasing urban density.

ERIK SZAMOSVÁRI, Austrian Research Centre for Forests (BFW), Austria
ANNICK KLEINER, Austrian Research Centre for Forests (BFW), Austria
CECILIE FOLDAL, Austrian Research Centre for Forests (BFW), Austria
IRIS OTTERSPEER, HBLFA Schönbrunn, Austria
THOMAS ROTH, HBLFA Schönbrunn, Austria
FRANK SCHUMACHER, University of Vienna. Austria
ANDREA KODYM, Austrian Research Centre for Forests (BFW), Austria

Urban Mini Forests in Austria - Living Laboratories

Our term mini forest refers to a densely planted, small-scale and species-rich urban green oasis established on a couple hundred square meter. The establishment of these sites are based on scientific knowledge and expert information with the aim of developing climate fit , cost-effective, research based and low-maintenance solutions for future urban greening. In the last two years, our team established four research based mini forests in Vienna and Lower-Austria, which are currently under monitoring, together with an additional Tiny Forest.

The research covers multiple aspects, including site selection, planting design, climate fitness of the woody species, environmental parameters, biodiversity development, and social acceptance. We evaluate potential species composition that promote biological and genetic diversity, test planting strategies that support structurally diverse communities and assess assisted migration as a climate change adaptation strategy. Our research is also concentrating on low-maintenance management approaches and their effects on plant survival and growth.

Ecological performance is assessed through the monitoring of different biodiversity indicators such as vegetation, wild bees and ground beetles. In addition, ecosystem functions often attributed to such green spaces, namely carbon sequestration potential and microclimatic effects, are examined. Social aspects are also investigated, focusing on public use and acceptance. Our overall goal is to develop evidence-based and feasible guidelines that enable municipalities and local communities to implement mini forests as resilient and multifunctional elements of urban green infrastructure in a changing climate.

LUCAS ROGER, INRAE Université de Bordeaux; Plante et Cité, France
IRENE CASTAÑEDA GONZÁLEZ, INRAE Université de Bordeaux, France
SARAH POUCHAUD, INRAE Université de Bordeaux,France
MÉLISSA HAOUZI, Plante et Cité, France
ANNABEL PORTÉ, INRAE Université de Bordeaux, France

Microforest, a new tree planting design in the city: how is it influencing the activity of vertebrates?

During the last decade, microforests have largely been planted in European temperate cities as a means of increasing ecological functioning in urban areas: cooling, carbon stock, depollution, habitat for biodiversity. These plantations are characterized by a high tree and shrub species richness (over 20 species in average) and a high density (often reaching 3 individuals per square meter). However, the functions of these new planting structures in urban forestry have hardly been characterized.

Generally, microforests are delimited by barriers and have a high vegetation density. Therefore, we hypothesize that it could favor vertebrate activity, by preventing most human-caused disturbances. We also tested the impact of the surrounding land cover, such as the proportion of anthropized areas on the vertebrate activity.

Thus, our objective was to quantify the support for biodiversity provided by these dense woody patches, in comparison with urban control sites, characterized by a lower density of woody plants. To track the animals exploiting the area under the woody cover, passive motion-triggered camera traps were installed at the center of microforests and control sites for one month during the summer of 2025. Over 108,000 images were collected, representing more than 15,000 detection events. Using an automatic identification procedure, with a manual correction approach, we classified the detection events into species or morphospecies (e.g. Common blackbird, European rabbit, micromammal).

This study will provide unique quantified pieces of information on the support services that microforests can provide in urban areas and will guide decision making of urban forest managers for biodiversity.

RENE VAN DER VELDE, University of Technology Delft, Netherlands
LEA HARTMEYER, University of Technology Delft, Netherlands
SANNE KEIZER, Komovo, Netherlands

Worlding trees: Reflecting on placemaking, reciprocal care and multi-species commons in the 'Bos op Poten' Living Lab, Handelsplein Rotterdam

An emerging trajectory for developing healthy, future-proof greenspace is the use of temporary mobile forests which, beyond their regular contribution to urban greening, become spaces of experimentation in which various futures of urban forestry practice can be trialed. We reflect on three-year living lab project in a post-war neighborhood in the city of Rotterdam with 35 semi-mature trees in movable containers.

Residents, researchers, municipal tree managers and industry professionals were involved in developing new forms of greenspace design and post-installation care practices. The project expands on the notion of relationality in urban forestry praxis with multiple novel results. By actively engaging residents in the care and configuration of the urban forest the project enhances human-nature relationships, bringing citizens 'up close and personal' to urban trees.

The hands-on care needed by the trees also catalyzes an awareness of the reciprocal care trees offer urban environments and communities, shifting the focus away from a one-way 'services' logic to a situation where the production and re-production of the urban forest to a more complex multidirectional - and multi-species - relationality. The mobility of the trees also changes the way an urban forest is perceived, with citizens actively involved in shaping different tree configurations and urban wooded spaces over multiple years.

This activity engenders a new iteration of place-making, with mobile trees and their care transforming an underutilized urban space into a place which citizens became attached to in novel ways. This act of shaping - in which a group of citizens come to an agreement about the configuration of space with trees – is a critical dimension of the emergence of a 'commons'. The relationship between citizens, designers, managers and researchers is also revised, informing potential systemic change for future greenspace and urban forestry practice.

FRANCESCO FERRINI, University of Florenc, Italy

Reinventing Urban Nature - The Science of Tree Choice in a Warming World final

Urban tree planting is increasingly promoted as a key strategy to mitigate climate change impacts, enhance biodiversity, and improve human well-being. However, traditional approaches to urban greening—largely aesthetic, maintenance-intensive, and species-limited—are no longer adequate in the context of rapid urbanization and a warming climate. The talk will argue for a paradigm shift toward functional, adaptive, and evidence-based urban nature, placing tree choice at the center of urban resilience strategies.

Drawing on the principles of "Evidence-Based Arboriculture" and "Functional Arboriculture", it emphasizes the need to move from intuition-driven species selection toward data-informed decisions based on functional traits, genetic diversity, provenance, and future climate suitability. Special attention is given to drought tolerance, biodiversity as a climate-regulating factor, and the role of nurseries as proactive actors in urban forestry planning rather than passive suppliers.

The presentation highlights emerging tools such as species distribution models, trait-based analyses, and decision-support systems to guide long-term, strategic tree selection under climate uncertainty. Case studies and recent research illustrate that species diversity—independent of canopy cover—can significantly mitigate urban heat, while poorly adapted species risk widespread failure by the end of the century.

Ultimately, reinventing urban nature requires integrating ecology, design, and social well-being, recognizing trees as living infrastructure, and fostering interdisciplinary collaboration. Urban green spaces must be planned as dynamic systems capable of adapting over time, ensuring that today's planting decisions remain viable in tomorrow's cities.

PARALELL SESSION 8 Beyond Shade: Measuring the Environmental Performance of Urban Green

HAI-YING LIU, Stiftelsen NILU, Norway

Urban Forestry and Air Quality: When Trees Help and When They Don't

Urban forestry is increasingly recognised in research and policy as part of broader strategies addressing air quality, public health, and liveability. Trees in streets, parks, and other urban settings are often expected to reduce air pollution through canopy structure and leaf–atmosphere interactions. Evidence from empirical studies and implemented projects, however, shows that these effects are strongly context-dependent and not consistently positive.

This study combines mechanistic understanding with insights from European urban forestry and Nature-Based Solution (NBS) projects to examine how trees influence concentrations of particulate matter ($PM_{2.5}$, PM_{10}), nitrogen dioxide (NO_2), and ozone (O_3) in real urban environments. Six key pathways are identified through which urban trees interact with air pollutants, including particle deposition and uptake, modification of airflow and ventilation, near-road barrier effects, biogenic volatile organic compound (BVOC) emissions, microclimatic modification, and allergenic pollen release.

Across a range of urban contexts, well-designed and adequately maintained urban forestry interventions are associated with reductions in local PM concentrations of approximately 10–30%, with higher reductions in favourable street-scale configurations. Effects on NO_2 are more variable and sensitive to species selection and canopy density, but local reductions of around 5–10% are achievable where tree placement supports sufficient ventilation. Conversely, dense canopies in narrow street canyons, unsuitable species choices, limited maintenance, and weak post-implementation stewardship can increase pollutant accumulation or exposure at pedestrian level.

Overall, the findings highlight the need to plan and manage urban trees as functional components of urban air-quality systems, while integrating their broader social–ecological and climate-related benefits with long-term monitoring, adaptive management, and clear governance responsibilities.

ALESSIO SANTOSUOSSO, D.R.E.Am. Italia, Italy
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Quantifying air pollution removal by tree species in a periurban temperate forest through FlorTree Model: The case study of Parco Burcina natural reserve, Italy

Tropospheric ozone (O_3), nitrogen dioxide (NO_2), and particulate matter (PM) represent major atmospheric pollutants associated with cardiorespiratory morbidity, with European urban areas frequently exceeding WHO air quality guidelines. Woody tree species provide climate regulation and air pollution mitigation services, with removal efficiency being highly species-specific and mediated by leaf functional traits and environmental conditions. Conservation of species-rich periurban forests adjacent to densely populated areas thus represents a strategic priority.

This study quantified air pollution removal capacity of Riserva Naturale del Parco Burcina, a 57-ha periurban forest in northern Italy. We assessed 30 ha containing 1,817 trees across 77 species, dominated by deciduous taxa (Fagus sylvatica, Quercus spp.) and conifers (Pinus nigra, Pseudotsuga menziesii). Non-destructive measurements via terrestrial laser scanning were performed to derive dendrometric parameters including diameter at breast height, total height, crown basal area, and wood volume. Species-specific removal rates for O_3, NO_2, and PM_{10} were quantified using the FlorTree model, integrating canopy architecture, leaf ecophysiological traits, and environmental drivers at individual-tree resolution.

Deciduous broadleaves exhibited an average removal rate of 7.10 g tree^{-1} day^{-1} for O_3, 9.51 g tree^{-1} day^{-1} for NO_2, and 1.93 g tree^{-1} day^{-1} for PM_{10}. Conifers recorded lower means for O_3 (4.43 g tree^{-1} day^{-1}) and NO_2 (6.24 g tree^{-1} day^{-1}) but higher for PM_{10} (3.05 g tree^{-1} day^{-1}). Top-performing species include Fagus sylvatica and Quercus ilex among broadleaves trees, while Pseudotsuga menziesii and Picea abies showed the highest removal rates among conifers.

Tree detection and Individual-tree ecosystem service quantification provides critical data to demonstrate health and climate benefits to stakeholders, supporting evidence-based investments in green infrastructure.

JENNY LINDÉN, IVL Swedish Environmental Research Institute
MALIN GUSTAFSSON, IVL Swedish Environmental Research Institute, Sweden

Can benefits from bushes, plant beds and green walls equal that from urban trees?

Despite the well-documented benefits of urban greenery, cities continue to struggle to meet greening targets. Urban greening efforts often prioritize trees, which require substantial space both above and below ground. In dense urban environments, however, intense competition for limited space presents a major constraint. Complementing trees with more diverse greening measures—such as green roofs, green walls, and planted beds—may therefore be essential for achieving urban greenery goals.

In collaboration with the City of Malmö, Sweden, we have identified plantable spots and practically feasible green solutions in areas that typically lack vegetation. We compare the potential for increasing urban greenery using trees alone, and using diverse vegetation types. In addition, we assess the added greening potential under scenarios where current regulatory constraints are revised to better enable implementation.

We present an evaluation of how these greening solutions influence local air pollution and the urban climate, with focus on thermal comfort, in the selected areas. The analysis is based on high-resolution calculations using the CFD model PALM, and quantifies the relative benefits of tree-focused versus diversified greening strategies.

By explicitly accounting for spatial constraints and implementation feasibility, this work assesses how much greenery can realistically be integrated in dense urban settings beyond tree planting alone, as well as what benefits to the urban environment can be expected from the different approaches.

WENDY CHEN, University of Hong Kong, China

Social preferences for retrofitting shoreline armouring into green-blue infrastructure

Spurred by a widened awareness of the loss of natural coastal habitats and the low biodiversity associated with traditional concrete sea defense structures in urbanized cities, retrofitting shoreline armouring into ecologically engineered shorelines (i.e., eco-shorelines) as integrated part of urban green-blue infrastructure has gained traction amongst policymakers.

However, limited empirical evidence exists pertinent to social preferences, which might hinder the integration of social dimension into the design of eco-shorelines as multifunctional green-blue infrastructure. Using Hong Kong as a case, this study evaluates social preferences for various eco-shoreline design alternatives focusing on three key aspects: morphological changes (to enhance coastal defense facing climate change), biodiversity enhancement (to improve ecological resilience), and the provision of recreational facilities (to augment cultural services). A discrete choice experiment was administered, with a total of 308 valid responses collected.

The analytical results, based on the mixed logit models and the Equality Constrained Latent Class model, reveal that mangrove eco-shoreline is the most preferred, followed by rocky eco-shoreline and vertical eco-shoreline, while biodiversity enhancement and provision of recreational facilities are less preferred. About 54.9% of the respondents pay little attention to the amount of donation associated with eco-shoreline retrofit, corroborating a relatively strong social preference for transforming existing seawalls into eco-shorelines.

THOMAS HALFORD, Ville de Liège & Université Catholique de Louvain Belgium

The Canopy Plan of the City of Liège, Belgium : a tree-based innovative climate adaptation strategy for citizens and a powerfull tool to improve the functional diversity of a public urban forest

The City of Liège has been implementing the Canopy Plan since 2020, placing urban trees at the heart of its strategy for adapting the municipal territory to climate change. The project aims to reduce the effects of urban heat islands and improve the thermal comfort of the population by establishing an additional 200 hectares of tree cover by 2050.

A detailed assessment of the territory was carried out, including mapping of urban tree cover, heat islands, and potential tree-planting sites, to develop a comprehensive strategy with ambitious yet realistic objectives. The preservation and expansion of urban tree cover are being achieved in public spaces through development projects and in private spaces through urban planning guidelines and citizen involvement. To date, more than 5,000 additional ornamental trees have been planted in public spaces, increasing the total number of urban trees from 22,000 to 27,000 in five years.

This large-scale planting of urban trees helps reduce socio-environmental inequalities by improving the quality of certain green spaces. In a complementary approach, we are conducting a scientific research project to assess the resilience of urban trees to drought and heat waves. The objective is to identify promising species adapted to future climates. One aspect of the study is dedicated to a trait-based classification and a functional group approach to categorize the potential ecophysiological response profiles of urban trees. This analysis is applied to the public urban forest to measure its functional diversity and guide planting projects to improve its resilience to future environmental uncertainties.

PARALELL SESSION 9 Culture, Community and Climate: Putting Urban Forestry into Practice

FANNY MØLLER, TræEnighed, Denmark

Between Belief and Biodiversity: Rethinking Danish Churchyards in Urban Forestry

Churchyards constitute some of the most characterful and ecologically valuable green spaces in Danish towns and cities. As burial practices change and competition for urban land intensifies, these traditionally formal and strictly maintained landscapes are undergoing substantial transformation. This presentation explores how Danish churchyards, long shaped by a controlled horticultural tradition distinct from that of many other European countries, are beginning to reinterpret their role within the urban green structure.

New biodiversity initiatives, combined with recreational use and shifting expectations from local communities, are challenging established norms. At the same time, churchyards hold olde and culturally significant urban trees, which contribute not only to ecological connectivity but also to the symbolic qualities of these sites.

By acknowledging churchyards as urban green spaces embedded in the hearts of cities, the talk highlights the intersection of religion, tradition, and contemporary urban nature. It offers insights into how these multifunctional landscapes can support both heritage and ecological resilience, and discusses the potential of churchyard trees to play a meaningful role in the future of diverse urban forestry.

JAEWON SON, Institute for Technology Assessment and Systems Analysis (ITAS), Karlsruhe Institute of Technology (KIT), Germany
JULIETTE MARTIN,International Institute for Applied Systems Analysis (IIASA), University of Natural Resources and Life Sciences (BOKU), Austria
JO-ANNE LINNEROOTH-BAYER, (IIASA), Austria
SOMIDH SAHA, (ITAS), Karlsruhe Institute of Technology (KIT), Institute of Geography and Geoecology (IFGG), Karlsruhe Institute of Technology (KIT), Germany

Diverse Governance Pathways for Urban Green Spaces: Insights from Korea and Germany

Urban green spaces (UGS) are essential nature-based solutions (NbS) that help cities mitigate heat, manage floods, improve air quality, and support biodiversity and public well-being. Yet, their governance is shaped by institutional, cultural, and political dynamics that can enable or constrain effective and equitable implementation. This study examines how governance structures in Korea and Germany—two economically advanced but culturally distinct countries—influence UGS planning and management.

The research addresses three questions: (i) Which policies and stakeholders shape UGS governance? (ii) What factors facilitate or hinder its effectiveness? (iii) How do expert perspectives on governance challenges and opportunities converge or diverge across sectors?

Drawing on 30 semi-structured interviews with UGS professionals in multiple cities across both countries, transcripts were analyzed using MAXQDA. Findings reveal shared enablers such as communication, awareness, and supportive policies, alongside common barriers like resource constraints and stakeholder engagement. Context-specific challenges reflect deeper institutional dynamics: Korea struggles with weak policy support, while Germany faces land-related issues. Expert views varied by institutional and sectoral affiliation.

The study concludes that Korea's centralized governance model enables rapid implementation but faces challenges in long-term planning and demonstrating benefits, whereas Germany's decentralized system supports participatory, tailored approaches but often lacks coordination and efficiency. These contrasting strengths highlight opportunities for mutual learning: Korea could adopt Germany's emphasis on integrated, long-term planning, while Germany might benefit from Korea's streamlined implementation processes.

GEORGINA MITCHELL, University of York, UK

Exploring meanings of urban rewilding within transdisciplinary literature

'Urban rewilding' is an emerging concept that aims to integrate biodiverse nature into urban and peri-urban sites. It is currently being explored by researchers from a range of disciplinary and applied backgrounds, yet syntheses of their insights to deepen holistic understanding on the concept and enable its successful implementation are currently limited.

This research explores meanings of urban rewilding through reflexive interpretation of definitions, themes and case studies across recent academic and grey literature, aiming to highlight the ways in which it is distinct from related concepts whilst identifying its current conceptions. Compared with rewilding in rural areas, I find that urban rewilding concerns a more diverse range of stakeholders and ecosystems with greater variation in scale and use. It is a distinct form of greening in that it has the specific aim of restoring natural processes to create more resilient urban ecosystems.

Highlighted conceptions of urban rewilding include those that focus on reintroducing native species, promoting human-nature coexistence and its consideration as a nature-based solution to improve degraded ecosystems. I argue that urban rewilding is shaped by the unique socio-ecological-technological systems in which it is implemented, calling for further research exploring current approaches and their outcomes to inform future best practices.

PEDRO OBREGON SANTANDER, Swedish University of Agricultural Sciences, Sweden
DO-HUN KIM, Swedish University of Agricultural Sciences, Sweden

Citizens' willingness to participate in the management of urban green spaces: The case of Umeå, Sweden

Urban green spaces (UGS) provide various ecosystem services essential for citizens' welfare, especially as cities grow more diverse and densely populated. Participatory and adaptive governance can enhance the sustainability of UGS management, but close examination of citizens' willingness to participate is scarce. Using a discrete choice experiment, we explored citizens' willingness to participate in UGS management in Umeå, a medium-sized city in Northern Sweden. Participatory schemes reflecting the ladders of citizen participation and natural resource governance principles were selected as the experimental attributes.

Results from a two-group latent class logit revealed a strong divergence: 55% of our sample were willing to allocate their time, but the other 45% were not. Willingness to participate values were higher for participatory schemes that improve key governance principles with lower responsibilities. Our findings point to a need for flexible and multi-layered UGS governance that incorporates participatory options with varying degrees of time commitment and responsibility to enhance inclusiveness, legitimacy, and accountability without compromising efficiency or adaptability.

Keywords: Urban Green Spaces, participation, adaptive governance, discrete choice experiment, latent class logit, willingness to participate.

EUGENE MCGEE, University of Birmingham, UK

Evolving Priorities in European Urban Forest Management Plans: A Thematic Analysis of Policy Aims and Objectives

Urban trees are nature-based solutions (NbS) to climatic and biodiversity challenges. Benefits provided by urban forests are maximised when they are diverse, mature and healthy. Tree Strategies and Urban Forest Management Plans (UFMP) are essential for guiding the strategic vision and management of the urban treescape to ensure maximum potential as a NbS.

This study presents the first review of the aims, objectives, and broader content UFMPs in Europe, and assesses the temporal variation, the current state of knowledge, best practice, and varying approaches to urban tree management. Inductive and deductive coding was used to analyse the content of 76 UFMP.

Objectives were strongly concentrated within intervention and governance-related themes. Management interventions dominated thematic priorities, with landscape level interventions present in 71.1% of plans. Governance themes are primarily driven by strategic planning and knowledge systems. Climate related objectives were mostly framed as adaptation, mitigation and resilience. Thematic distribution of aims increases over time.

These findings suggest that European UFMPs remain predominantly operational in function, with climate and ecosystem service integration comparatively underdeveloped, but have become increasingly more holistic with time. This demonstrates a closing disconnect between the role of trees as a NbS and the aspirations of municipalities and their UFMP. Furthermore, less than 10% of UFMPs detail performance indicators; without these the effectiveness of UFMP cannot be monitored or evaluated. Future work will provide recommendations for the design of UFMPs, and their integration with other policy documents.

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