ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/354629253

Urban Services to Ecosystems: Green Infrastructure Benefits from the Landscape to the Urban Scale

Book · September 2021

CITATIONS
0

6 authors, including:



Maria Beatrice Andreucci
Sapienza Università di Roma, Italy
59 PUBLICATIONS **111** CITATIONS
SEE PROFILE



Chiara Catalano
Zurich University of Applied Sciences
14 PUBLICATIONS **104** CITATIONS
SEE PROFILE

Some of the authors of this publication are also working on these related projects:

Biodiverse Green Roofs in Temperate and Mediterranean Climate View project

Expert Working Group on: Which types and components of urban and peri-urban blue / green spaces have a significant impact on human mental health and mental well-being? View project

All content following this page was uploaded by Maria Beatrice Andreucci on 16 September 2021.

The user has requested enhancement of the downloaded file.

Future City 17

Chiara Catalano · Maria Beatrice Andreucci · Riccardo Guarino · Francesca Bretzel
Manfredi Leone · Salvatore Pasta *Editors*

Urban Services to Ecosystems

Green Infrastructure Benefits from the Landscape to the Urban Scale

The aim of this book is to bring together multidisciplinary research in the field of green infrastructure design, construction and ecology. The main core of the volume is constituted by contributions dealing with green infrastructure, vegetation science, nature-based solutions and sustainable urban development.

The green infrastructure and its ecosystem services, indeed, are gaining space in both political agendas and academic research. However, the attention is focused on the services that nature is giving for free to and for human health and survival. What if we start to see things from another perspective? Our actions shall converge for instance to turn man-made environment like cities from heterotrophic to autotrophic ecosystems. From landscape ecology to urban and building design, like bricks of a wall, from the small scale to the bigger landscape scale via ecological networks and corridors, we should start answering these questions: what are the services that are we offering to Nature? What are we improving? How to implement our actions?

This book contains four Open Access chapters, which are licensed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0).

This book contains four Open Access chapters, which are licensed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0).

Life Sciences

ISBN 978-3-030-75928-5

9 783030 759285

springer.com

17 Catalano · Andreucci · Guarino Bretzel · Leone · Pasta *Eds.*

Urban Services to Ecosystems

Future City 17



Chiara Catalano · Maria Beatrice Andreucci
Riccardo Guarino · Francesca Bretzel
Manfredi Leone · Salvatore Pasta *Editors*

Urban Services to Ecosystems

Green Infrastructure Benefits from the Landscape to the Urban Scale

Springer

Future City

Volume 17

Series Editor
Cecil C. Konijnendijk, Nature Based Solutions Institute, Barcelona, Spain

Advisory Boards
Jack Ahern, Department of Landscape Architecture and Regional Planning, University of Massachusetts, Amherst, MA, USA
John Bolte, Biological & Ecological Engineering Department, Oregon State University, Corvallis, OR, USA
Richard J. Dawson, School of Civil Engineering & Geosciences, University of Newcastle upon Tyne, Newcastle upon Tyne, UK
Patrick Devine-Wright, School of Environment and Development, Manchester School of Architecture, University of Manchester, Manchester, UK
Almo Farina, Institute of Biomathematics, Faculty of Environmental Sciences, University of Urbino, Urbino, Italy
Ray Green, Faculty of Architecture, Building & Planning, University of Melbourne, Parkville, VIC, Australia
Glenn R. Guntenspergen, National Resources Research Institute, US Geological Survey, Duluth, MN, USA
Dagmar Haase, Department of Computational Landscape Ecology, Helmholtz Centre for Environmental Research GmbH – UFZ, Leipzig, Germany
Mike Jenks, Oxford Institute of Sustainable Development, Department of Architecture, Oxford Brookes University, Oxford, UK
Joan Nassauer, School of Natural Resources and Environment, Landscape Ecology, Perception and Design Lab, University of Michigan, Ann Arbor, MI, USA
Stephan Pauleit, Chair for Strategic Landscape Planning and Management, Technical University of Munich (TUM), Freising, Germany
Steward Pickett, Cary Institute of Ecosystem Studies, Millbrook, NY, USA
Robert Vale, School of Architecture and Design, Victoria University of Wellington, Wellington, New Zealand
Ken Yeang, Llewelyn Davies Yeang, London, UK
Makoto Yokohari, Graduate School of Sciences, Institute of Environmental Studies, Department of Natural Environment, University of Tokyo, Kashiwa, Chiba, Japan

Future City Description

As of 2008, for the first time in human history, half of the world's population now live in cities. And with concerns about issues such as climate change, energy supply and environmental health receiving increasing political attention, interest in the sustainable development of our future cities has grown dramatically.

Yet despite a wealth of literature on green architecture, evidence-based design and sustainable planning, only a fraction of the current literature successfully integrates the necessary theory and practice from across the full range of relevant disciplines.

Springer's *Future City* series combines expertise from designers, and from natural and social scientists, to discuss the wide range of issues facing the architects, planners, developers and inhabitants of the world's future cities. Its aim is to encourage the integration of ecological theory into the aesthetic, social and practical realities of contemporary urban development.

More information about this series at http://www.springer.com/series/8178

Chiara Catalano • Maria Beatrice Andreucci
Riccardo Guarino • Francesca Bretzel
Manfredi Leone • Salvatore Pasta
Editors

Urban Services to Ecosystems

Green Infrastructure Benefits from the Landscape to the Urban Scale

Springer

Editors
Chiara Catalano
Department of Life Sciences and Facility Management (LSFM), Institute of Natural Resource Sciences (IUNR)
Zurich University of Applied Sciences (ZHAW)
Wädenswil, Switzerland

Riccardo Guarino
Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF) – Botanical Unit
University of Palermo
Palermo, Italy

Manfredi Leone
Department of Architecture
University of Palermo
Palermo, Italy

Maria Beatrice Andreucci
Department of Planning, Design, Technology of Architecture (PDTA)
Sapienza University of Rome
Rome, Italy

Francesca Bretzel
Research Institute on Terrestrial Ecosystems (IRET), Unit of Pisa
Italian National Research Council (CNR)
Pisa, Italy

Salvatore Pasta
Institute of Biosciences and BioResources (IBBR), Unit of Palermo
Italian National Research Council (CNR)
Palermo, Italy

ISSN 1876-0899 ISSN 1876-0880 (electronic)
ISBN 978-3-030-75928-5 ISBN 978-3-030-75929-2 (eBook)
https://doi.org/10.1007/978-3-030-75929-2

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2021
Chapters 2, 3 and 21 are licensed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/). For further details see license information in the chapters.
This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Cover illustration: Zurich-Irchel University Campus, 10 May 2017, Deborah Hasler, Green Space Development Research Group, Institute for Natural Resources Science (IUNR), Zurich University of Applied Science (ZHAW)

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The idea of editing this book arose during the 60th *Symposium of the International Association for Vegetation Science* (IAVS) held in Palermo from the 20th to the 24th June 2017, entitled *Vegetation Patterns in Natural and Cultural Landscapes*.

Initially, the book was meant to collect the contributions of the session *Green Infrastructure and Vegetation Science*, chaired by Riccardo Guarino (editor of this book and organizer of the mentioned IAVS symposium) for the Future City series. The proposal came from Springer, in recognition of the novel and multidisciplinary approaches presented at the session, in which a broad-ranging concept of GI was adopted, from regional ecological networks to urban green roofs, designed as stepping-stones for natural ecosystems.

However, after some reflection, the editors agreed that the book would have lacked its main purpose if it had been open only to scholars of vegetation ecology and related disciplines, in the domain of natural sciences. In fact, the concept of green infrastructure was originally coined in the context of territorial planning and urban design, and responds to the specific aim of ensuring accessibility to a wide range of nature's contributions to people, through a strategically planned network of natural and semi-natural areas, which interpenetrate widely the places where most people live their daily lives.

Therefore, the editors decided to contact and involve other scientists/practitioners, not necessarily having a background in vegetation ecology, namely architects, landscape architects and agronomists. The final book counts 26 contributions and involves 75 authors from 14 countries. All the chapters were blind peer reviewed by the editors as well as by independent parties.

It is still early to say whether this experiment of cultural integration has been successful, but we can already say that the experience of editing this book has been very stimulating, collaborative and truly transdisciplinary. It is hoped that the contributions included in this book will help readers overcome the cultural barriers that

lead, at one extreme, to considering the vegetation of green infrastructure as a motionless and indistinct construction material and, at the other extreme, as elements of the natural world that do not need human intervention to continue to exist, thrive and spread.

Wädenswil, Switzerland — Chiara Catalano

Rome, Italy — Maria Beatrice Andreucci

Palermo, Italy — Riccardo Guarino

Pisa, Italy — Francesca Bretzel

Palermo, Italy — Manfredi Leone

Palermo, Italy — Salvatore Pasta

Acknowledgements

We thank Dr Valeria Rinaudo, publishing Editor at Springer, who approached us at the IAVS Symposium in 2017 and solicited us to initiate the present editorial project for the Future City Series. The session Green Infrastructure and Vegetation Science organised at the mentioned Symposium was indeed a great opportunity to start the fruitful exchange among vegetation scientists, foresters, agronomists and designers operating in the green infrastructure sector, which eventually developed into this book.

We thank Prof. Luigi Badalucco and Prof. Bruno Massa from SAAF (Scienze Agrarie, Alimentari e Forestali Department of the University of Palermo, Italy), Mr. Gary Grant from Green Infrastructure Consultancy Ltd. (London, UK), Dr Michael Nobis from WSL (Swiss Federal Research Institute, Birmensdorf, Switzerland), and Dr Patrice Prunier from HEPIA (Haute École du Paysage d'Ingénierie et d'Architecture, Jussy, Switzerland) for their helpful comments and constructive remarks while revising some of the chapters.

We hope that this book might enhance the opportunities for scientists and practitioners to cooperate, merging ecological principles into the designing of Urban Green Infrastructure by adopting science-driven Nature-Based Solutions.

Dr Catalano's editorial activity was partially funded by the Institute of Natural Resource Sciences (IUNR) of the Zurich University of Applied Sciences (ZHAW).

Contents

1 **Urban Services to Ecosystems: An Introduction** 1
Riccardo Guarino, Maria Beatrice Andreucci, Manfredi Leone, Francesca Bretzel, Salvatore Pasta, and Chiara Catalano

Part I Green Infrastructure, Urban Ecology and Vegetation Science

2 **Improving Extensive Green Roofs for Endangered Ground-Nesting Birds** 13
Nathalie Baumann, Chiara Catalano, and Salvatore Pasta

3 **A Plant Sociological Procedure for the Ecological Design and Enhancement of Urban Green Infrastructure** 31
Chiara Catalano, Salvatore Pasta, and Riccardo Guarino

4 **Functional and Phylogenetic Characteristics of Vegetation: Effects on Constructed Green Infrastructure** 61
Amy Heim, Garland Xie, and Jeremy Lundholm

5 **Green Infrastructure Within Urban and Rural Landscapes Following Landscape Bionomics** 85
Vittorio Ingegnoli

6 **Roof Greening with Native Plant Species of Dry Sandy Grasslands in Northwestern Germany** 115
Kathrin Kiehl, Daniel Jeschke, and Roland Schröder

7 **Nature-Based Solutions as Tools for Monitoring the Abiotic and Biotic Factors in Urban Ecosystems** 131
Federica Larcher, Chiara Baldacchini, Chiara Ferracini, Monica Vercelli, Martina Ristorini, Luca Battisti, and Carlo Calfapietra

8 Anthosart Green Tool: Selecting Species for Green Infrastructure Design 151
Patrizia Menegoni, Riccardo Guarino, Sandro Pignatti, Claudia Trotta, Francesca Lecce, Federica Colucci, Maria Sighicelli, and Loris Pietrelli

9 Stewardship Innovation: The Forgotten Component in Maximising the Value of Urban Nature-Based Solutions 165
Caroline Nash, Heather Rumble, and Stuart Connop

10 Nature as Model: Evaluating the Mature Vegetation of Early Extensive Green Roofs 183
Christine Thuring and Nigel Dunnett

11 Less Is More: Soil and Substrate Quality as an Opportunity for Urban Greening and Biodiversity Conservation 207
Francesca Vannucchi, Francesca Bretzel, Roberto Pini, and Heather Rumble

Part II Planning and Implementation of Green Infrastructure

12 How Urban Agriculture Can Contribute to Green Infrastructure in Japanese Cities 227
Noriko Akita

13 Anticipating an Urban Green Infrastructure Design for the Turkish Mediterranean City of Antalya 243
Meryem Atik, Veli Ortaçeşme, and Emrah Yıldırım

14 Multifunctional Ecological Networks as Framework for Landscape and Spatial Planning in Italy 265
Serena D'Ambrogi and Matteo Guccione

15 The Foodscape as Ecological System. Landscape Resources for R-Urban Metabolism, Social Empowerment and Cultural Production 279
Sara Favargiotti and Angelica Pianegonda

16 Policies and Planning of Urban Green Infrastructure and Sustainable Urban Drainage Systems 297
Daniele La Rosa and Viviana Pappalardo

17 Soil and Water Bioengineering as Natural-Based Solutions 317
Paola Sangalli, João Paulo Fernandes, and Guillermo Tardío

18 Guided by Water: Green Infrastructure Planning and Design Adapted to Climate Change 333
Camila Gomes Sant'Anna, Ian Mell, and Luciana Bongiovanni Martins Schenk

19 Abandoned Lands on Lower Danube's Urban Front as Opportunity to Enhance the River Corridor and the Urban Green Infrastructure 345
Angelica-Ionela Stan and Mihaela Hărmănescu

20 The Collserola Special Protection Plan (PEPNat): A Bid for Co-responsibility in Agricultural and Forest Management 367
Eugènia Vidal-Casanovas, Laura Cid, Antoni Farrero, Patricia García-Rodríguez, and Kyriaki Ilousi

Part III Nature-Based Solutions and Innovative Design Approaches

21 Exploring Regenerative Co-benefits of Biophilic Design for People and the Environment 391
Maria Beatrice Andreucci, Angela Loder, Beth McGee, Jelena Brajković, and Martin Brown

22 Design the Urban Microclimate: Nature-Based Solutions and Technology at Nexus 413
Silvia Coccolo, Marco Delli Paoli, Alessandro Stracqualursi, and Maria Beatrice Andreucci

23 Evolution of the Approaches to Planting Design of Parks and Gardens as Main Greenspaces of Green Infrastructure 435
Maria Ignatieva

24 Environment in Megacities: Tehran Waterscapes 453
Manfredi Leone, Ayda Alehashemi, and Giuditta Lo Tauro

25 Cities Facing the Wild 475
Annalisa Metta and Maria Livia Olivetti

26 Biodiverse Cities: Exploring Multifunctional Green Infrastructure for Ecosystem Services and Human Well-Being 491
Alessio Russo and Katie A. Holzer

27 In Consideration of the Tree: The Importance of Structure and Function in the Realization of Ecological Design 509
Naomi Zürcher

Index 529

Contributors

Noriko Akita Graduate School of Horticulture, Chiba University, Chiba, Japan

Ayda Alehashemi Imam Khomeini International University, Qazvin, Iran

Maria Beatrice Andreucci Department of Planning, Design, Technology of Architecture (PDTA), Sapienza University of Rome, Rome, Italy

Meryem Atik Department of Landscape Architecture, Akdeniz University, Antalya, Turkey

Chiara Baldacchini Department of Ecological and Biological Sciences, University of Tuscia, Viterbo, Italy

Research Institute on Terrestrial Ecosystems (IRET), Headquarter of Porano, Italian National Research Council (CNR), Terni, Italy

Luca Battisti Department of Agricultural, Forest and Food Sciences, University of Turin, Turin, Italy

Nathalie Baumann Institute of Natural Resource Sciences (IUNR), Zurich University of Applied Sciences (ZHAW), Wädenswil, Switzerland

Luciana Bongiovanni Martins Schenk The Institute of Architecture and Urbanism, University of São Paulo, Brazil

Jelena Brajković Faculty of Architecture, University of Belgrade, Belgrade, Serbia

Francesca Bretzel Research Institute on Terrestrial Ecosystems (IRET), Unit of Pisa, Italian National Research Council (CNR), Pisa, Italy

Martin Brown Fairsnape, Inglewhite, Lancashire, UK

Carlo Calfapietra Research Institute on Terrestrial Ecosystems (IRET), Headquarter of Porano, Italian National Research Council (CNR), Terni, Italy

Chiara Catalano Department of Life Sciences and Facility Management (LSFM), Institute of Natural Resource Sciences (IUNR), Zurich University of Applied Sciences (ZHAW), Wädenswil, Switzerland

Laura Cid The Metropolitan Area of Barcelona (AMB), Barcelona, Spain

Silvia Coccolo Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

Concept-Consult Architectes, Lausanne, Switzerland

Federica Colucci Division Protection and Enhancement of the Natural Capital, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rome, Italy

Stuart Connop University of East London, Sustainability Research Institute, London, UK

Serena D'Ambrogi Italian Institute for Environmental Protection and Research (ISPRA), Rome, Italy

Marco Delli Paoli Department of Planning, Design, Technology of Architecture (PDTA), Sapienza University of Rome, Rome, Italy

Nigel Dunnett Department of Landscape, University of Sheffield, Sheffield, UK

Antoni Farrero The Metropolitan Area of Barcelona (AMB), Barcelona, Spain

Sara Favargiotti Department of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, Italy

João Paulo Fernandes Department of Landscape, Environment and Planning, University of Évora, Évora, Portugal

Chiara Ferracini Department of Agricultural, Forest and Food Sciences, University of Turin, Turin, Italy

Patricia García-Rodríguez The Metropolitan Area of Barcelona (AMB), Barcelona, Spain

Riccardo Guarino Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF) – Botanical Unit, University of Palermo, Palermo, Italy

Matteo Guccione Italian Institute for Environmental Protection and Research (ISPRA), Rome, Italy

Mihaela Hărmănescu Faculty of Urban Planning, "Ion Mincu" University of Architecture and Urbanism, Bucharest, Romania

Amy Heim Biology Department, Saint Mary's University, Halifax, Canada

Katie A. Holzer Department of Environmental Services, City of Gresham, Gresham, OR, USA

Maria Ignatieva UWA School of Design, University of Western Australia, Crawley, Australia

Kyriaki Ilousi The Metropolitan Area of Barcelona (AMB), Barcelona, Spain

Vittorio Ingegnoli Department of Environmental Science and Policy (ESP), University of Milan, Milan, Italy

Member of Planetary Health Alliance (PHA), Harvard, MA, USA

Daniel Jeschke Osnabrück University of Applied Sciences, Vegetation Ecology, Osnabrück, Germany

Kathrin Kiehl Osnabrück University of Applied Sciences, Vegetation Ecology, Osnabrück, Germany

Daniele La Rosa Department of Civil Engineering and Architecture, University of Catania, Catania, Italy

Federica Larcher Department of Agricultural, Forest and Food Sciences, University of Turin, Turin, Italy

Francesca Lecce Division Protection and Enhancement of the Natural Capital, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rome, Italy

Manfredi Leone Department of Architecture, University of Palermo, Palermo, Italy

Giuditta Lo Tauro Department of Architecture, University of Palermo, Palermo, Italy

Angela Loder International WELL Building Institute, New York, NY, USA

Jeremy Lundholm Biological Department, Saint Mary's University, Halifax, Canada

Beth McGee School of Human Ecology, Georgia Southern University, Statesboro, GA, USA

Ian Mell The School of Environment, Education and Development, University of Manchester, Manchester, UK

Patrizia Menegoni Division Protection and Enhancement of the Natural Capital, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rome, Italy

Annalisa Metta Department of Architecture, Roma Tre University, Rome, Italy

Caroline Nash Sustainability Research Institute, University of East London, London, UK

Maria Livia Olivetti Department of Architecture, Roma Tre University, Rome, Italy

Veli Ortaçeşme Department of Landscape Architecture, Akdeniz University, Antalya, Turkey

Viviana Pappalardo Department of Civil Engineering and Architecture, University of Catania, Catania, Italy

Salvatore Pasta Institute of Biosciences and Bioresources (IBBR), Unit of Palermo, Italian National Research Council (CNR), Palermo, Italy

Angelica Pianegonda Department of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, Italy

Loris Pietrelli Division Protection and Enhancement of the Natural Capital, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rome, Italy

Sandro Pignatti Forum Plinianum onlus, Rome, Italy

Roberto Pini Research Institute on Terrestrial Ecosystems (IRET), Unit of Pisa, Italian National Research Council (CNR), Pisa, Italy

Martina Ristorini Research Institute on Terrestrial Ecosystems (IRET), Headquarter of Porano, Italian National Research Council (CNR), Terni, Italy

Department of Bioscience and Territory, University of Molise, Campobasso, Italy

Heather Rumble Department of Geography, University of Portsmouth, Portsmouth, UK

Alessio Russo School of Arts, University of Gloucestershire, Cheltenham, UK

Paola Sangalli Sangalli Coronel y Asociados S.L., Donostia San Sebastián, Spain

European Federation of Soil and Water Bioengineering (EFIB), Madrid, Spain

Camila Gomes Sant'Anna Federal University of Goiás, Goiânia, Brazil

Roland Schröder Osnabrück University of Applied Sciences, Vegetation Ecology, Osnabrück, Germany

Maria Sighicelli Division Protection and Enhancement of the Natural Capital, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rome, Italy

Angelica-Ionela Stan Faculty of Urban Planning, "Ion Mincu" University of Architecture and Urbanism, Bucharest, Romania

Alessandro Stracqualursi Department of Planning, Design, Technology of Architecture (PDTA), Sapienza University of Rome, Rome, Italy

Guillermo Tardío European Federation of Soil and Water Bioengineering (EFIB), Madrid, Spain

Christine Thuring Centre for Architectural Ecology, The British Columbia Institute for Technology, Burnaby, BC, Canada

Claudia Trotta Division Protection and Enhancement of the Natural Capital, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rome, Italy

Francesca Vannucchi Research Institute on Terrestrial Ecosystems (IRET), Unit of Pisa, Italian National Research Council (CNR), Pisa, Italy

Monica Vercelli Department of Agricultural, Forest and Food Sciences, University of Turin, Turin, Italy

Eugènia Vidal-Casanovas The Metropolitan Area of Barcelona (AMB), Barcelona, Spain

Garland Xie Department of Biological Sciences, University of Toronto Scarborough, Toronto, Canada

Emrah Yıldırım Department of Landscape Architecture, Akdeniz University, Antalya, Turkey

Naomi Zürcher Arbor Aegis, Luzern, Switzerland

About the Editors

Chiara Catalano, PhD in Technologies for Sustainability and Land Restoration at the University of Palermo (2017) and MSc in Architecture (2008) at the University of Catania. Her eager to travel and to learn different viewpoints took her to live also in London, Zurich, Hannover and České Budějovice where she could alternate professional work, further education, and research activities. From 2017, she got a permanent position as a Researcher at Zurich University of Applied Sciences within the Urban Ecology research group, and currently within the Green Spaces Development. She is engaged in teaching in several BSc modules related to Urban Ecology and Ecosystems Design (in German and English), in supervising both BSc and MSc thesis on these topics, but also in the research and innovation area. Currently, she is leading an international project (DeMo: Design and Modelling of Urban Ecosystems, Switzerland-France), aiming at developing a semi-automatic spatial-based approach to integrate habitats in constructed ecosystems and buildings. Her primary passion as well as the topic of her PhD thesis were near-natural and biodiverse green roof design, construction and monitoring, interests well documented in international peer-review articles and conferences. She landed on the ground of urban green infrastructure inspired by the capability of plants to build dynamic communities able to characterize and reveal specific environmental conditions: plants cannot move, but they give lessons of perfection and slow adaptation, plants cannot speak, but we can observe and study them to plan greener, sustainable and liveable cities.

Maria Beatrice Andreucci, PhD in Environmental Design (Sapienza University of Rome), M.B.A. (INSEAD). She is a registered architect and an economist and focuses her professional activity, research and teaching on the application of environmental technological design and environmental economics theories, principles and methods on urban design, architecture, and landscape architecture projects. Management Committee member of the COST Action "PESFOR-W Payments for Ecosystem Services Forests for Water". Core group member of the COST Action "Circular City: Implementing Nature-based Solutions for creating a resourceful Circular City". Co-chair of the European research project "EKLIPSE - Urban

Biodiversity & Mental Health and Well-being", in cooperation with the French Ministry of the Environment and the World Health Organization. Chair of IFLA "International Federation of Landscape Architects Advisory Circle". Member of SITdA "Italian Society of Technology of Architecture", and EDRA "Environmental Design Research Association". In the last decade, she has authored two books, co-edited four books and published more than eighty papers in peer-reviewed journals and conference proceedings. Her design projects have been published in international journals, and have won recognitions and prizes at international levels. Currently, she works as Research Professor of "Environmental Technological Design", member of the Academic Board of the Ph.D. Program in "Planning, Design, Technology of Architecture"; and expert member of the Scientific Didactic Committee of the II level Master in "Environmental Technological Design", at "Sapienza" University of Rome.

Riccardo Guarino is the victim of an insane passion for plants, which led him to devote his restless youth to the floristic exploration of the southern Alpine and Prealpine Region. From the highest peaks, he slipped downstream and, after years as a castaway in the stormy Sea of Precariousness, he landed at the University of Palermo (Sicily), as a lecturer in Applied and Environmental Botany. His research interests include vegetation ecology, vegetation classification, biogeography, floristics, multifunctional agriculture and conservation biology. About these topics, he authored or co-authored more than 150 peer-reviewed contributions, 8 monographs (including the most recent national flora of Italy, in 4 volumes, digital archives and interactive identification tool), and 11 book chapters. His interest in green infrastructure is driven by the desire to offer plants as much space as possible. Plants have an essential smartness, a simplicity lived with serene grace. Silently passing their time on the earth, they glamorize without clamour, they give without demanding. He who loves plants can see how gross it is to hoard without limits; how illusory it is to claim pre-emption over what, in reality, belongs to everyone; how vain it is to spend time just to satisfy needless needs, believing that this is the right way to escape from a status that looks like "poverty" to our blinded eyes. He who really loves plants realizes that we are getting poorer and poorer while we continue this vast and violent exploitation of our planet.

Francesca Bretzel was born in Milan and now lives in Pisa, where she carried out her superior studies obtaining a degree in Agricultural Sciences with a dissertation on Floriculture. Francesca has achieved a MSc in Landscape and Historic Gardens at Versailles, France. Afterwards, she started her working career at the Institute of Soil Chemistry of the Italian National Research Council in Pisa, now Institute of Research on Terrestrial Ecosystems. Her research interest begun with the dynamics of the soil of urban, degraded and anthropized areas, then widen to the spontaneous and planted vegetation of those areas. Recent projects are focused on the circular economy and the recycle of paper sludges to produce a suitable substrate for plantings and green roofs.

Manfredi Leone, PhD in Sustainable Urban Development at the University of Roma Tre (2001) and MSc in Architecture at the University of Palermo (1996). Registered Architect, founding member of the Italian academic society of Landscape Architecture (I-Asla), and currently a member of the Association of Italian Landscapers (AIAPP). He got a permanent position as Professor of Landscape Architecture at the Department of Architecture of the University of Palermo since 2004. He teaches Landscape Architecture and is also a teacher of Historical Gardens and Architectural Design in MSc and BSc courses at the University of Palermo. He has been teaching as visiting professor at QUT University in Australia, offering lectures nationwide and internationally in Universities in China, Iran, Argentina, Cuba, Spain, Czech Republic and France. Currently, he is involved in two international projects funded by the Erasmus program within the European Network of Universities and Education Institutions: SumCuLa focused on Cultural Landscapes Sustainable Management, and NAWA, about Design thinking as a tool for business and design development. He runs research on public spaces of contemporary cities, low-cost landscapes, the recovery of cultural landscapes, the role of urban communities in bottom-up strategies, the landscape in infrastructures and sustainable mobility. He is the author of books and articles published in peer-reviewed journals and conferences, leading and teaching in several workshops worldwide about Landscape and Resiliency. He is the author of low-cost urban landscape projects including Parco Uditore, Giardino Pop-Up / Salita Raffadali, Maredolce Master Plan, all based in Palermo.

Salvatore Pasta, PhD in Plant Biosystematics and Ecology (University of Florence, 1994–1997). Since 2018 he works as a researcher at the Unit of Palermo (Sicily, Italy) of the Institute of Biosciences and BioResources (IBBR) – Italian National Research Council (CNR). His main fields of interest are floristics, plant conservation, forest ecology, biological invasions, vegetation dynamics, sustainable agroforestry, island biogeography, landscape history and ethnobotany. Quite recently, he started to pay increasing attention to urban ecology and to the floristic composition, structure and role of urban plant communities. He is the author or co-author of more than 180 peer-reviewed contributions, 5 monographs and more than 50 book chapters concerning the above-mentioned topics. He is vice-chair of the Mediterranean Plants Specialist Group (MPSG) of the International Union for the Conservation of Nature (IUCN) and has been collaborating with several universities in Italy (e.g., Palermo, Catania and Florence) and Switzerland (e.g., Bern, Fribourg and ZHAW in Wädenswil). As a freelance botanist, he has carried out many vegetation and floristic surveys, censuses and assessments and participated in the writing of the management plans of many protected areas and special conservation areas of European community interest and took part in numerous projects focused on plant species conservation in several Mediterranean countries (mostly Sicily, but also Sardinia, Crete and Tunisia) as well as in NW-Germany.

View publication stats