

Lecture Notes in Civil Engineering

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Francesco Zullo
Lorena Fiorini
Lucia Saganeiti *Editors*

Innovation in Urban and Regional Planning

Proceedings of INPUT 2023 - Volume 2

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Lorena Fiorini · Lucia Saganeiti
Editors


Innovation in Urban and Regional Planning


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Dedication

These volumes are the result of the collection of papers from the 12th International Conference on Innovation in Urban and Regional Planning (INPUT2023): “Working for sustainable soil management and the role of land planning” and they are a tribute to the memory of Professor Bernardino Romano, who passed away prematurely on 1st September 2023, just before the conference took place. INPUT 2023 was possible due to his foresight and recognition in the academic world.

Prof. Bernardino Romano has been a full professor of Urban Planning at the University of L’Aquila. He had considerable influence on the development of his subject over a period of more than 30 years and provided much support to a generation of researchers and colleagues.

Since the beginning of his academic career, Prof. Romano has dedicated himself to the study of the relationship between the natural and built environment. He has been passionate about the issue of protected areas and ecological networks, expanding the existing meaning of concepts such as biopermeability and environmental continuity. In the eighties, he has been one of the first promoters of the institution of the main parks in Central Italy. His commitment in this direction was both academic and personal, through an intense activity at top level with the World Wide Fund for Nature (WWF) and the Italian Alpine Club (CAI). During these years, he has developed studies on land planning tools aimed at the establishment of both protected areas in Abruzzo region and the system of European Apennine Parks (APE). He has been a strong supporter of biodiversity conservation, and he made the knowledge of ecosystem dynamics a key point of his courses at university.

Prof. Romano has been a national reference for land take dynamics inspiring research and studies by many research groups. He always has been strongly convinced that land and urban planning plays a key role in sustainability of transformations. In fact, the dynamics of land transformation have always been a focus of his research and he has worked for years for drawing a precise and analytic description of the Italian settlement evolution. In the last period, he was active in the national discussion about drafting a law for stopping land consumption.

He has approached urban planning, ecology, and landscape both inside and outside the academic context, enriching the research with humanity. He has always been fascinated by the computational aspects of urban planning and by the possibility to explore new scientific approaches based on data analysis and indicator engineering. He has been a courageous explorer into this field, always looking for innovating the panorama of techniques and tools for spatial diagnosis.

Thanks to his creative vision, integrity, rigorous research, scientific excellence, and exceptionally broad intellectual horizons, he has left his imprint on the lives of students, PhD students, young researchers as well as many colleagues and collaborators from various institutions. He has also taught the value of autonomy of thought and collaboration.

He did so with passion, dedication, and desire to spread his great knowledge of Land Sciences.

He has left us with a significant legacy that we are going to preserve and share.

November 2023

CENTROPLANECO

Preface

The 12th International Conference on Innovation in Urban and Regional Planning (INPUT2023) has been organized by CENTROPLANECO group of DICEAA – Department of Civil, Construction-Architectural and Environmental Engineering of the University of L’Aquila.

It took place in L’Aquila (Italy) on September 6–8, 2023, and has been titled “Working for sustainable soil management and the role of land planning”. Global challenges related to the sustainability of land transformations require the measurement of land transformations through specific indicators. Spatial planning and land management systems then play a crucial role in addressing issues of policy reform and investment, ecological transition, and sustainability in its three dimensions: environmental, economic, and social aspect. Integrating sustainability into our policies, strategies, and practices is fundamental to making a relevant impact with respect to current issues related to climate change, ecosystem services’ provision and the energy supply.

INPUT2023 has given the opportunity to discuss such central issues and try to find and assess innovative and advanced methodologies to provide decision support systems through land science and indicator engineering.

Those proceedings represent the state of the art of modelling and computational approaches to innovations in urban and regional planning, with a transdisciplinary and borderless character to address the complexity of contemporary socio-ecological systems and following a practice-oriented and problem-solving approach.

In particular, this book presents the collection of 62 papers submitted at the INPUT 2023 Conference. The accepted papers, after a blind-review process, are here organized according to the thematic sessions of the conference:

- Resilient, Circular, and Sustainable Cities
- Integrating Ecosystem Services into Spatial Planning Processes: Sustainable Solutions for Healthier and Safer Urban and Rural Environments
- Supporting the Transition Towards Ecologically-Oriented Urban Planning: What’s the Role of Early-Career Researchers? Innovative Findings, Experiences, and Ways Forward
- Towards Denser and Greener Cities? Methods and Indicators to Monitor Trends and Impacts in Support of Urban Planning and Policies
- Innovative Approaches and Methodologies for Driving Sustainable and Inclusive Urban Regeneration
- The Innovation of Urban Planning Tools for Energy-Resilient Cities
- Smart Happy Region. Relationship between Planning and Subjective Well-Being
- Climate Sensitive Planning: Re-defining Urban Environments for Sustainable Cities
- Urban and Peri-Urban Areas: Building Knowledge and Mapping to Better Plan the Sustainable Green City
- Densification and Urban Regeneration for Climate Adaptation in Sustainable Settlements.

INPUT is a scientific community of Italian university and academic researchers who meet every two years and discuss issues from different fields related to urban and regional planning topics.

The latest editions have been hosted in Viterbo (2018), Turin (2016), Cagliari (2014), Potenza (2012), Catania (2021), and L'Aquila (2023).

During INPUT 2023 (L'Aquila), the conference recorded the following numbers:

- 20 parallel sessions have been organized from experts in different fields of research related to urban and land planning.
- 171 submitted abstracts.
- 124 accepted papers.
- 130 among online and in presence participants.

Keynote Speakers of the INPUT2023 Conference

Three keynote speakers enrich the programme during three plenary sessions. Speeches have been held by:

Sara Meerow, School of Geographical Sciences and Urban Planning, Arizona State University

She is an associate professor in the School of Geographical Sciences and Urban Planning at Arizona State University where she leads the Planning for Urban Resilience Lab. She is an interdisciplinary scholar working at the intersection of urban geography and planning to tackle the challenge of making cities more resilient in the face of climate change and other social and environmental hazards, while at the same time more sustainable and just. Her current projects focus on conceptualizations of urban resilience, planning for urban resilience in a changing climate, and green infrastructure planning in a range of cities in the USA and internationally. She has published over 30 articles in academic journals, in addition to book chapters, reports, and popular press articles on these topics. She has a PhD in Natural Resources and Environment from the University of Michigan and an MS in International Development Studies from the University of Amsterdam.

Title of keynote speech: *Urban climate change resilience planning in theory and practice*

Jacques Teller, Local Environment Management and Analysis, University of Liège, Belgium

He is a professor of urban planning at the University of Liège, where he is leading the Local Environment Management and Analysis (LEMA) research group. He is a member of the Scientific Council of the Lab Research Environment (Vinci, Paritech) and of the Efficacity Research Institute in France. His research typically combines urban governance issues with the modelling of urbanization and densification dynamics. It addresses the impacts of urbanization on energy consumption, heritage management, housing provision, and transport demand. He is presently working on the interactions between urbanization and exposure to floods, combining quantitative modelling and qualitative approaches.

Title of keynote speech: *Urban growth models for regulating urban densification in response to zero net land take policies*

Claudia (van der Laag) Yamu, Department of Built Environment, Oslo Metropolitan University, Oslo, Norway

She is an architect and urban planner. She is a professor of urban analytics at Oslo Metropolitan University. She is an expert on transport land use planning including people's behaviour in cities applying a wide range of analytical techniques including method and tool development at the forefront of virtual modelling. As a former project consultant, she excels in combining the theoretical innovations with practice-oriented solutions and has been involved in numerous international projects in industry and research. Claudia was awarded the prestigious Michael Breheny Prize in 2015 for her work on multiscale, multifractal urban planning models. She is an editorial board member for Springer's The Urban Book Series. She holds a PhD in Architecture from TU Wien connecting architecture, urban planning, and computer science and a PhD in Geography and Regional Planning in complexity-based modelling from Université de Franche-Comté. She dedicates her work to the development of sustainable cities and regions.

Title of keynote speech: *Accessibility and multiscale: fractal urban planning models*

Best Paper Award

Among the contributions, four papers have been selected for the Best Paper awards:

1. **Giovanni Cialone Best Paper Award** addressed to studies on inner areas, protected areas, and sustainable development. The award is dedicated to the memory of Giovanni Cialone: architect, passed away in 2020. He has been a CNR researcher (National Research Council) and served in the 1990s as an environmental councillor for the municipality of L'Aquila. He was highly committed to issues related to environmental protection and education, sustainability, and cultural enhancement of inner areas. He held the position of vice-president of the Gran Sasso–Monti della Laga National Park and was a member of the "Italia Nostra" association and a delegate of Slow Food. He enriched the debate about knowledge and defence of the territory defence, with a strong presence in the media and interventions in the political sphere, consistently displaying a well-regarded balance in his positions and numerous contributions of critique.

The award goes to the paper titled: "*The shapes of the adaptive ground design: formulation of a new taxonomy between spatial quality and ecological performance*" authored by: Simone Porfiri, University of Camerino (Italy).

2. **Giorgio Pipponzi Best Paper Award** addressed to studies on advanced GIS techniques. The award is dedicated to the memory of Giorgio Pipponzi: After his studies in geology and a PhD in geodynamics, he carried out highly professional positions in the Abruzzo Region, with the Basin Authority and the Civil Protection Service. He collaborated in the drafting of the Guidelines for the Seismic Microzoning Plans, in the development and management of computer databases as well as in the Level 3 Microzoning Pilot Project in the municipality of Sulmona. Since 2013 in the USRC, he has carried out his activity as Technical Geologist Directive Instructor, dealing with the geological problems inherent in the Reconstruction Plans and Private Reconstruction projects as well as being responsible for the GIS systems of the USRC. In 2019,

he was appointed Head of the Procedure for the technical-economic investigation of the private reconstruction projects after the 2009 earthquake.

The award goes to the paper titled: *“The applicability of the urban digital twin in the detailed choices of the urban plan”* authored by: Federica Cicalese, University of Salerno (Italy).

3. **LAND Best Paper Award** addressed to studies on urbanization phenomena, densification, and land consumption. The award intends to enhance the merit of young researchers who will present scientifically relevant papers on topics related to urbanization phenomena, densifications, and contrasting land consumption. Work should focus on the role of urban and regional planning in urban growth management with the goal to meet specific needs while increasing the resilience of urban settlements. This award refers to the special issue *“Towards Sustainable Urban Development: New Approaches and Tools for Regeneration Strategies”*.

The award goes to the papers:

- *“Space Syntax vs Agent-Based Modelling in the maze of urban complexity: a critical comparison between top-down and bottom-up approaches and applications”* authored by: Federico Mara, University of Pisa (Italy).
- *“Urban energy resilience and strategic urban planning in Emilia-Romagna: evidence from three cities”* authored by: Giovanni Tedeschi, University of Parma (Italy).
- *“Digital Twin for urban development”* authored by: Angela Martone and Monica Buonocore, University of Sannio (Italy).

November 2023

Alessandro Marucci
Francesco Zullo
Lorena Fiorini
Lucia Saganeiti

Organization

The 12th International Conference on Innovation in Urban and Regional Planning (INPUT2023) was organized by the CENTROPLANECO group of the DICEAA-Department of Civil, Building, Architectural and Environmental Engineering of the University of L'Aquila. The composition of the organizing groups is shown in detail below.

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Borruso Giuseppe	University of Trieste
Fancello Gianfranco	University of Cagliari
Balázs Kulcsár	University of Debrecen

Geospatial Earth Data to Support the Restoration of Soil Ecosystems and Implications for Spatial Planning

Tarantino Eufemia	Polytechnic University of Bari
Esposito Dario	Polytechnic University of Bari
Capolupo Alessandra	Polytechnic University of Bari

Geodesign for Informed Collaborative Spatial Planning and Design

Campagna Michele	University of Cagliari
Mourao Moura Ana Clara	Universidade Federal de Minas Gerais
Scorza Francesco	University of Basilicata

Integrating Ecosystem Services into Spatial Planning Processes: Sustainable Solutions for Healthier and Safer Urban and Rural Environments

Privitera Riccardo	University of Catania
Lai Sabrina	University of Cagliari
Zoppi Corrado	University of Cagliari

The Urban Digital Twin: A New Dimension for the Land Planning

Fistola Romano	University of Naples Federico II
Fasolino Isidoro	University of Salerno

**Supporting the Transition Towards Ecologically-Oriented Urban Planning:
What's the Role of Early-Career Researchers? Innovative Findings, Experiences,
and Ways Forward**

De Luca Claudia	University of Bologna
Ronchi Silvia	Polytechnic University of Milan
Cortinovis Chiara	University of Trento

**Towards Denser and Greener Cities? Methods and Indicators to Monitor Trends
And Impacts in Support of Urban Planning and Policies**

Cortinovis Chiara	University of Trento
Ronchi Silvia	Polytechnic University of Milan
Geneletti Davide	University of Trento

**Innovative Approaches and Methodologies for Driving Sustainable and Inclusive
Urban Regeneration**

Saganeiti Lucia	University of L'Aquila
Fiorini Lorena	University of L'Aquila
Pilogallo Angela	University of L'Aquila

The Innovation of Urban Planning Tools for Energy-Resilient Cities

Guida Carmen	University of Naples Federico II
Gargiulo Carmela	University of Naples Federico II
Cutini Valerio	University of Pisa
Zazzi Michele	University of Parma
Zucaro Floriana	University of Naples Federico II
Carpentieri Gerardo	University of Naples Federico II

**Spreading Porosity: the Contribution of Planning Tools in Increasing Soil
Permeability**

Garda Emanuele	University of Bergamo
Caselli Barbara	University of Parma

Research and Standards for Sustainable Spatial Planning

Esposito Dario	Polytechnic University of Bari
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Bretzel Francesca	National Research Council, Pisa

Tundo Antonella	National Agency for New Technology
Capezuto Pasquale	UNI International Standardization Organization

Coastal Planning: Diagnostic Tools to Address Physical, Social, and Environmental Concerns

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Celli Daniele	University of L'Aquila
Castellino Myrta	Sapienza University of Rome
Scipione Francesca	Sapienza University of Rome
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Territorial Strategies in Place-Based and Community-Led Energy Transitions

Grassini Laura	Polytechnic University of Bari
Bonifazi Alessandro	Polytechnic University of Bari

Innovative Simulations for Urban Planning: Decoding Configuration, Morphology, and Space

Cutini Valerio	University of Pisa
Altafini Diego	University of Pisa

The energy Transition of the Built Environment

Rotilio Marianna	University of L'Aquila
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Smart Happy Region. Relationship Between Planning and Subjective Well-Being

Garau Chiara	University of Cagliari
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Innovations in the 15 Minute-City Approaches: Conceptual, Data-Driven, and Practical Developments Towards a Sustainable Urban Planning

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Climate Sensitive Planning: Re-defining Urban Environments for Sustainable Cities

La Rosa Daniele	University of Catania
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Urban and Peri-Urban Areas: Building Knowledge and Mapping to Better Plan the Sustainable Green City

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Densification and Urban Regeneration for Climate Adaptation in Sustainable Settlements

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- Italian standardization body-UNI (Ente Italiano di Normazione)

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