

UniCA PhD Book XXXIV Cycle

UNICAp^{ress}/ateneo

edited by
Paolo Ruggerone and Vittorio Pelligra



UniCA PhD Books #2

In the XXXIV Cycle, the PhD programs of the University of Cagliari cover the following areas:

Chemical Sciences and Technologies

Earth and Environmental Sciences and Technologies

History, Cultural Heritage and International Studies

Civil Engineering and Architecture

Electronic and Computer Engineering

Industrial Engineering

Mathematics and Computer Sciences

Molecular and Translational Medicine

Neurosciences

Philosophy, Epistemology, Human Sciences

Physics

Economics and Business

Legal Sciences

Innovation Sciences and Technologies

Life, Environmental and Drug Sciences

Philological and Literary, Historical and Cultural
Studies

UNICApres/ ateneo
UniCA PhD Books
#2

UniCa PhD Books

Editor-in-Chief: Paolo Ruggerone, Università degli Studi di Cagliari

Scientific Committee:

Paola Fadda, Università degli Studi di Cagliari

Alessandro Giua, Università degli Studi di Cagliari

Vittorio Pelligra, Università degli Studi di Cagliari

Cecilia Tasca, Università degli Studi di Cagliari

UniCA PhD Book
XXXIV Cycle

edited by
Paolo Ruggerone and Vittorio Pelligra



Cagliari
UNICApres
2022

UniCa PhD Book – XXXIV Cycle
edited by Paolo Ruggerone and Vittorio Pelligra

© Authors and UNICApres
CC-BY-SA 4.0 license (<https://creativecommons.org/licenses/by-sa/4.0/>)
Cagliari, UNICApres, 2022 (<http://unicapress.unica.it>)

ISBN 978-88-3312-075-1

e-ISBN 978-88-3312-076-8

DOI <https://doi.org/10.13125/unicapress.978-88-3312-076-8>



Giorgio Ghiglieri
(1962-2021)

In memoriam

INDEX

XIII Introduction of the Rector and Vice-rector
Francesco Mola, Gianni Fenu

3 PhD programme in *Chemical Science and Technology*,
Coordinator: Stefano Enzo
Vice-coordinator: Carla Cannas

3: Synthesis and characterisation of "lead free" piezoceramics, *Antonio Iacomini*;
5: Isolation, chemical and biological characterization of natural extracts, *Antonella Ibba*; 7: Metal complexes of environmental and biological interest, *Sebastiano Masuri*; 9: Synthesis and Characterization of MOFs for Sensing and Molecular Spintronics, *Noemi Monni*; 11: Investigation into optical performances of boron-nitride-based systems, *Junkai Ren*; 13: Synthesis and computational study on compounds of biological interest, *Federico Riu*; 17: Biofuels from biocatalysis: the importance of enzyme immobilization, *Davide Tocco*

19 PhD programme in *Earth and Environmental Sciences and Technologies*
Coordinator: Giorgio Ghiglieri

21: The relationships of bryophytes and orchids with environmental pollution, *Antonio De Agostini*; 23: Deep-seated gravitational slope deformation in central Sardinia: Insights into the geomorphological evolution. Innovative survey and monitoring techniques, *Valentino Demurtas*; 25: Valorisation of wet residues through hydrothermal carbonization process, *Gianluigi Farru*; 27: Characterization of fine and ultrafine particles in different exposure scenarios, *Gabriele Marcias*; 29: Conversion of plant wastes into products of cosmeceutical and nutraceutical interest, *Matteo Perra*; 31: Bioremediation of multi-contaminated groundwater using advanced systems, *Giulia Puggioni*; 33: Study of mineralurgical processes for the treatment of mining waste, *Giulio Sogos*

- 35 PhD programme in *History, Cultural Heritage and International Studies*
 Coordinator: Cecilia Tasca
 Vice-coordinators: Mariangela Rapetti, Christian Rossi
 37: Cinema and Video Games: Rethinking Film Education, *Massimo Atzori*; 39: “For a total regeneration of the island”: Il Partito sardo d’azione and its political and organizational recovery (1943-1969), *Stella Barbarossa*; 41: Sacred Harp: the many dimensions of a glocal singing community, *Delia Dattilo*; 43: Implications of Brexit in the international economic context, *Piotr Dariusz Grabara*; 45: The narration of the Risorgimento in the regional newspapers: a digital public history project, *Erica Luciano*; 47: Women’s memories of Oudlājān: From a communitarian neighbourhood to a placeless city, *Monica Mereu*; 49: Hospitality: a central concept for a paradigm of ‘mobilities’, *Gaspare Messana*; 51: The Jewish community of Istanbul suspended between Erdoğan and Aliyah, *Alessandro Porrà*
- 53 PhD programme in *Civil Engineering and Architecture*
 Coordinator: Ivan Blečić; Vice-coordinator: Roberto Deidda
 55: Digital games and interactive storytelling for cultural heritage, *Sara Cuccu*; 57: Hydrogeological risk reduction measures in response to climate change, *Stefano Farris*; 59: Planning the regeneration of disposed public real estate, *Alessio Floris*; 61: The reuse of former psychiatric hospitals. A methodological model on design, memory and empathy, *Claudia Pintor*; 63: Highly directive nonlinear micro-structured mechanical system, *Anar Rakhimzhanova*; 65: Women, spaces, power. A nomadic approach to read the urban space, *Alice Salimbeni*; 67: Seaplane stations and historical airfields. Towards possible enhancement and reuse, *Monica Vargiu*
- 69 PhD programme in *Electronic and Computer Engineering*
 Coordinator: Alessandro Giua
 71: Electric energy storage systems for the dispatching of renewable sources, *Daniele Battaglia*; 73: Malware analysis and detection in personal devices and networks, *Fabrizio Cara*; 75: Non-standard operators for CNN HW accelerators on FPGA, *Marco Carreras*; 77: Cyber security of Discrete Event Systems, *Chao Gao*; 79: Non-blockingness verification and supervisory control of Petri nets, *Chao Gu*; 81: Verification and Application of Detectability based on Petri Nets, *Hao Lan*; 83: RF modeling, design, characterization, and biomedical applications of magnetic scaffolds, *Matteo Bruno Lodi*; 85: Towards Debugging and Improving Adversarial Robustness Evaluations, *Maura Pintor*; 87: Coordination of open multi-agent systems, *Zohreh Al Zahra Sanai Dashti*; 89: Runtime adaptive cognitive IoT nodes for healthcare monitoring, *Matteo Antonio Scrugli*; 91: Data traffic analysis to monitor and understand the people’s mobility in Smart Cities, *Marco Uras*

- 93 PhD programme in *Industrial Engineering*
 Coordinator: Francesco Aymerich
 95: Numerical and experimental analysis of OWC systems with Wells turbine, *Fabio Licheri*; 97: Structural health monitoring & damage detection in composite materials, *Gabriela Loi*; 99: Analytical model for GaN HEMTs in high frequency / high voltage applications, *Paolo Pirino*; 101: Development of an integrated ICT platform for municipal waste management, *Aiman Rashid*; 103: Optimization-based monitoring in Power Systems, *Antonio Vincenzo Solinas*; 105: Robust Optimization of Aeronautical Components, *Irene Viridis*
- 107 PhD programme in *Mathematics and Computer Science*
 Coordinator: Michele Marchesi
 Vice-coordinator: Roberto Tonelli
 109: Machine Learning & Deep Learning approaches applied to financial forecasting and robo-trading, *Andrea Corrigan*; 111: Predictive analytics models and tools for decision support of stakeholders in digital agriculture, *Francesca Maridina Mallocci*; 113: Software engineering techniques and automatic generation of dApps, *Lodovica Marchesi*; 115: On the computation of the minimal-norm solution, *Federica Pes*; 117: Generalized Adaptive Refinement for Grid-based Hexahedral Meshing, *Luca Pitzalis*; 119: Machine Learning powered financial forecasting for statistical arbitrage, *Maria Madalina Stanciu*; 121: Financial time series forecasting using traditional econometrics methods and Artificial Intelligence algorithms, *Nicola Uras*
- 123 PhD programme in *Molecular and Translational Medicine*
 Coordinator: Sebastiano Banni
 125: Angiogenic profile variation in cancer patients receiving anti-angiogenics, *Eleonora Lai*; 127: Novel biomarker for the diagnosis of neurodegenerative disease, *Elias Manca*; 129: Thyroid Hormone in Hepatocellular Carcinoma, *Rajesh Pal*; 131: Gut microbiome analysis in metabolic, neurological, and inflammatory disorders, *Vanessa Palmas*; 133: Metabolomic alterations and dependencies in colorectal cancer cells, *Martina Spada*
- 135 PhD programme in *Neuroscience*
 Coordinator: Paola Fadda
 137: Effects of antiepileptic therapies on neuronal plasticity, *Roberta Coa*; 139: Neurosteroids in Parkinson's disease, *Sara Corsi*; 141: Taste and smell physiological mechanisms and their health implications, *Mariano Mastinu*; 143: Cerebral white matter status and resting state functional MRI, *Michele Porcu*; 145: Investigation on maternal immune activation rat model of schizophrenia; *Michele Santoni*

- 147 PhD programme in *Philosophy, Epistemology, Human Sciences*
 Coordinator: Giuseppe Sergioli
 149: Adam Smith on Human Nature and the Self, *Riccardo Bonfiglioli*; 151: Artistic metaphors and storytelling in Sardinia, *Alice Guerrieri*; 153: Emotion and deduction, *Lucrezia Pelizzon*; 155: Professional development between critical pedagogy's theory and educational practices, *Andrea Spano*; 157: Mathematics and the Pythagorean apocrypha, *Matteo Varoli*
- 159 PhD programme in *Physics*
 Coordinator: Paolo Ruggerone
 Vice-coordinator: Umberto D'Alesio
 161: Highly efficient warm white emission from lead free halide double perovskite, *Fang Liu*; 163: HI survey of the Fornax galaxy cluster, *Alessandro Loni*; 165: Pixel chamber: a solid-state bubble chamber for imaging of charm and beauty, *Alice Mulliri*; 167: CP-violation measurements at LHCb, *Piera Muzzetto*; 169: Dark matter and neutrino physics at low-energy scale, *Emmanuele Picciau*; 171: Structural and optical characterisation of all-inorganic perovskites, *Jessica Satta*; 173: Spin and transverse momentum dependent fragmentation function and their role in hadron production, *Marco Zaccheddu*
- 175 PhD programme in *Economics and Business*
 Coordinator: Vittorio Pelligra
 177: Statistical methods for assessing the impact of military presence in Sardinia, *Rossella Atzori*; 179: The analysis of ordinal data through distance-based approaches and matched pairs models, *Alessio Baldassarre*; 181: ML Models to Classify Social Media Sentiment and Predict Stock Trends, *Giacomo Camba*; 183: Electricity market and renewable energy production, *Laura Casula*; 185: The future of tourism sector. Environmental education for tourist children, *Marta Fundoni*; 187: Luxury goods market. Analysis of the driving forces behind consumers' purchase intention in the context of Persian Luxury hand-woven carpets, *Parichehr Yarahmadi Dehnavi*; 189: Eye tracking and sentiment analysis to evaluate user behavior and opinions, *Gianpaolo Zammarchi*
- 191 PhD programme in *Legal Sciences*
 Coordinator: Gianmario Demuro
 Vice-coordinator: Silvia Corso
 193: Conscientious objection and right to abortion, *Stefania Flore*; 195: The right to therapeutic self-determination in the end of life choices, *Alessandra Leuzzi*; 197: The difficult interaction between political power and globalized economic power, *Lorenzo Moroni*

- 199 PhD programme in *Innovation Sciences and Technologies*
Coordinator: Roberto Orrù
201: Home-based EXergames To impRove cognitivE function in Multiple Sclerosis, *Letizia Castelli*; 203: Analysis and screening of microalgal strains for advanced biotechnological applications, *Giacomo Fais*; 205: Characterisation of cardiac functions with imaging in healthy populations, *Sara Magnani*; 207: Fabrication strategies of noble and non-noble nanoporous metals, *Andrea Pinna*; 209: Evaluation of beach-cast litter influence on coastal morphodynamics, *Daniele Trogu*
- 211 PhD programme in *Life, Environmental and Drug Sciences*
Coordinator: Simona Distinto
Vice-coordinator: Enzo Tramontano
213: Delivery of a corticosteroidal nanosuspension via electronic cigarette, *Luca Casula*; 215: Different proteomic approaches on saliva of Alzheimer's disease subjects, *Cristina Contini*; 217: Reproductive biology and ecology of the sea cucumber *Holothuria tubulosa*, *Viviana Pasquini*; 219: Exploring the pharmaceutical profile of furobenzopyrone derivatives, *Lisa Sequeira*
- 221 PhD programme in *Philological and Literary, Historical and Cultural Studies*
Coordinator: Mauro Pala
Vice-coordinator: Tiziana Pontillo
223: A Study of the homometric occurrences in ancient Greek strophic poetry, *Alessio Faedda*; 225: Ancient language and modern literature, *Marta Karcz*; 227: A new milestone in the medieval visionary literature of allegorical voyages, *Andrea Macciò*; 229: The revision of the Neoliberal concept of human nature in the science fictional Utopias of 1970s, *Francesco Nieddu*
- 231 Index of names

Introduction of the Rector and Vice-rector

We are very honored to write the introduction to this book. The concept of the volume stemmed from the close attention the University of Cagliari reserves on post-graduation courses and on PhD courses. Allowing the worthiest graduates to access highly professional PhD courses, is of crucial importance, not only for the future of our University, but especially to achieve an elevated specialization to be spent in the world of research and in the regional, national and international workforce. In recent years, the policy of our University has greatly enhanced its focus on the internationalization of our courses, and it is highly rewarding for us that many European academies have started to share our cultural proposal of advanced education.

Our University has many talented students who deserve to be inspired and encouraged to nurture and enhance their potential. Additionally, it has all the requirements to be attractive to students from other universities. We must be grateful to the professors and researchers of our academy for working hard to maintain the high level of our PhD courses, and for supporting our PhD students even in such difficult times caused by the COVID19 emergency. The same gratitude should be deserved to the administration, in particular the Direzione Didattica, for ensuring the appropriate working framework to students and academics.

The volume summarizes the interesting and stimulating research led by our PhD students, showing the excellent level of their skills and expertise. Of course, the ultimate scope of this volume is to support

the growth and development of the Sardinian society thanks to the participation and work of our PhD students. We hope this cultural achievement may continue in the future:

An important remark: the volume is dedicated to Prof. Giorgio Ghiglieri, the coordinator of the PhD course in Earth and Environmental Sciences and Technologies, who died in August 2021. He was a very engaged coordinator, and his energy and attitude were a source of ideas and suggestions always associated with a smile. We miss Giorgio very much.

Francesco Mola
Rector of the University of Cagliari

Gianni Fenu
Vice-rector of the University of Cagliari

Planning the regeneration of disposed public real estate

Alessio Floris



Architect. Graduated with honours in 2015 in Architecture at the Faculty of Engineering and Architecture of the University of Cagliari, with a thesis focused on the containment of urbanisation phenomenon. After gaining experience in a few architectural firms, he continues his professional and research path by contributing to the organisation and development of a wide range of academic initiatives, including international workshops and research projects, carrying out teaching support activities of university courses in the field of urban planning and urban design, and collaborating to the drafting of urban plans for several local municipalities. His scientific interests focus on urban, regional and landscape planning, land take, the recovery of historic centers, ecosystem services, military areas and public real estate. Since 2018, after having been awarded of a scholarship funded by the Department of Civil, Environmental Engineering and Architecture (DICAAR), he is Ph.D. student in Civil Engineering and Architecture at the University of Cagliari. During his doctoral studies, he spent a semester as a visiting researcher in the Netherlands, at the Institute for Housing and Urban Development Studies (IHS) of the Erasmus University of Rotterdam (EUR), a multi-disciplinary research institute at the forefront of the study of urban planning strategies and policies.

His doctoral research, entitled *Planning, regeneration and reuse of public real estate. Guidelines for disposed public properties*, supervised by Prof. Anna Maria Colavitti, focuses on the extent, role and functions of public real estate as a resource in urban regeneration processes, promoting its strategic role to trigger virtuous mechanisms aimed at countering some of the crisis phenomena in contemporary cities. The interest

raised by the topic is given by the uncertainty of the policies developed and the limited consideration of the potential of this resource within the operational practice of spatial planning in the Italian context. These assumptions have led to ineffective processes, as they lack an understanding of the needs and characteristics of the territory, in favor of market-oriented approaches, giving priority to economic and financial aspects. The research aims to define a system of theoretical and operational references to build an urban planning model that integrates public property management into planning practice, in a systemic perspective. The project follows an inductive approach, defining a knowledge framework given the transversality of the research subject, to investigate the relationship between the management of public real estate and urban planning. Particular attention is given to governance and decision-making processes, as well as to the involvement of institutions and different stakeholders, with an emphasis on how the interaction between these actors can contribute to the development of the planning process. From an empirical point of view, the study focuses on the identification of representative case studies, selecting different contexts in which programs and models oriented to the reuse and regeneration of public properties have been applied, analysing their structure, procedures, actors and properties involved, to deepen their relationship with urban regulations and planning tools. On this premises, the research is therefore aimed towards the organisation of a holistic framework, which integrates the potential offered by the availability of public real estate assets within a broader urban development strategy, allowing the definition of a responsible planning process.

Colavitti A.M., Floris A., The enhancement of public real estate as a resource in urban regeneration processes, in Gospodini A. (eds). *Proceedings of the International Conference on Changing Cities IV: Spatial, Design, Landscape & Socio-Economic dimensions*; Chania, Crete Island, Greece, June 24-29, 2019. ISBN: 978-960-99226-9-2.

Acknowledgements

We thank the PhD students, the members of the PhD School Boards, the Supervisors and Co-supervisors for the activities related to the life of a PhD program. For the administration of all PhD programs, we gratefully acknowledge the crucial work of the Director of the Direzione Didattica, Dr. Giuseppa Locci, of Dr. Alessandra Ortu, and of the staff of the Settore Dottorati e Master, namely Drs. Monica Melis, Stefania Angioni, Monica Carta, Roberta Leu.

This volume reports, in brief, the experience of the students enrolled in the XXXIV cycle of the PhD courses at the University of Cagliari. The contributions are grouped by course and are preceded by a presentation of the coordinators of each PhD program. In two pages each student gives the reader an idea of his/her personal experience and of the results of his/her research.

