Lecture Notes in Computer Science 13382

Founding Editors

Gerhard Goos
Karlsruhe Institute of Technology, Karlsruhe, Germany
Juris Hartmanis
Cornell University, Ithaca, NY, USA

Editorial Board Members

Elisa Bertino
Purdue University, West Lafayette, IN, USA
Wen Gao
Peking University, Beijing, China
Bernhard Steffen
TU Dortmund University, Dortmund, Germany
Moti Yung
Columbia University, New York, NY, USA

More information about this series at https://link.springer.com/bookseries/558

Osvaldo Gervasi · Beniamino Murgante ·
Sanjay Misra · Ana Maria A. C. Rocha ·
Chiara Garau (Eds.)

Computational Science and Its Applications – ICCSA 2022 Workshops

Malaga, Spain, July 4–7, 2022
Proceedings, Part VI

Springer

Editors
Osvaldo Gervasi
University of Perugia
Perugia, Italy

Sanjay Misra
Østfold University College
Halden, Norway

Chiara Garau
University of Cagliari
Cagliari, Italy

Beniamino Murgante
University of Basilicata
Potenza, Potenza, Italy

Ana Maria A. C. Rocha
University of Minho
Braga, Portugal

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-031-10591-3 ISBN 978-3-031-10592-0 (eBook)
https://doi.org/10.1007/978-3-031-10592-0

© The Editor(s) (if applicable) and The Author(s), under exclusive license
to Springer Nature Switzerland AG 2022
Chapters "A Mobile App to Help People Affected by Visual Snow" and "Strategies for the Digitalization of Cultural Heritage" 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 reserved 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.

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

Preface

These six volumes (LNCS 13377–13382) consist of the peer-reviewed papers from the workshops at the 22nd International Conference on Computational Science and Its Applications (ICCSA 2022), which took place during July 4–7, 2022. The peer-reviewed papers of the main conference tracks are published in a separate set consisting of two volumes (LNCS 13375–13376).

This year, we again decided to organize a hybrid conference, with some of the delegates attending in person and others taking part online. Despite the enormous benefits achieved by the intensive vaccination campaigns in many countries, at the crucial moment of organizing the event, there was no certainty about the evolution of COVID-19. Fortunately, more and more researchers were able to attend the event in person, foreshadowing a slow but gradual exit from the pandemic and the limitations that have weighed so heavily on the lives of all citizens over the past three years.

ICCSA 2022 was another successful event in the International Conference on Computational Science and Its Applications (ICCSA) series. Last year, the conference was held as a hybrid event in Cagliari, Italy, and in 2020 it was organized as virtual event, whilst earlier editions took place in Saint Petersburg, Russia (2019), Melbourne, Australia (2018), Trieste, Italy (2017), Beijing, China (2016), Banff, Canada (2015), Guimaraes, Portugal (2014), Ho Chi Minh City, Vietnam (2013), Salvador, Brazil (2012), Santander, Spain (2011), Fukuoka, Japan (2010), Suwon, South Korea (2009), Perugia, Italy (2008), Kuala Lumpur, Malaysia (2007), Glasgow, UK (2006), Singapore (2005), Assisi, Italy (2004), Montreal, Canada (2003), and (as ICCS) Amsterdam, The Netherlands (2002) and San Francisco, USA (2001).

Computational science is the main pillar of most of the present research, and industrial and commercial applications, and plays a unique role in exploiting ICT innovative technologies. The ICCSA conference series provides a venue to researchers and industry practitioners to discuss new ideas, to share complex problems and their solutions, and to shape new trends in computational science.

Apart from the 52 workshops, ICCSA 2022 also included six main tracks on topics ranging from computational science technologies and application in many fields to specific areas of computational sciences, such as software engineering, security, machine learning and artificial intelligence, and blockchain technologies. For the 52 workshops we have accepted 285 papers. For the main conference tracks we accepted 57 papers and 24 short papers out of 279 submissions (an acceptance rate of 29%). We would like to express our appreciation to the Workshops chairs and co-chairs for their hard work and dedication.

The success of the ICCSA conference series in general, and of ICCSA 2022 in particular, vitally depends on the support of many people: authors, presenters, participants, keynote speakers, workshop chairs, session chairs, organizing committee members, student volunteers, Program Committee members, advisory committee

members, international liaison chairs, reviewers, and others in various roles. We take this opportunity to wholehartedly thank them all.

We also wish to thank our publisher, Springer, for their acceptance to publish the proceedings, for sponsoring some of the best papers awards, and for their kind assistance and cooperation during the editing process.

We cordially invite you to visit the ICCSA website https://iccsa.org where you can find all the relevant information about this interesting and exciting event.

July 2022

Osvaldo Gervasi
Beniamino Murgante
Sanjay Misra

Welcome Message from Organizers

The ICCSA 2021 conference in the Mediterranean city of Cagliari provided us with inspiration to offer the ICCSA 2022 conference in the Mediterranean city of Málaga, Spain. The additional considerations due to the COVID-19 pandemic, which necessitated a hybrid conference, also stimulated the idea to use the School of Informatics of the University of Málaga. It has an open structure where we could take lunch and coffee outdoors and the lecture halls have open windows on two sides providing optimal conditions for meeting more safely.

The school is connected to the center of the old town via a metro system, for which we offered cards to the participants. This provided the opportunity to stay in lodgings in the old town close to the beach because, at the end of the day, that is the place to be to exchange ideas with your fellow scientists. The social program allowed us to enjoy the history of Malaga from its founding by the Phoenicians...

In order to provoke as much scientific interaction as possible we organized online sessions that could easily be followed by all participants from their own devices. We tried to ensure that participants from Asia could participate in morning sessions and those from the Americas in evening sessions. On-site sessions could be followed and debated on-site and discussed online using a chat system. To realize this, we relied on the developed technological infrastructure based on open source software, with the addition of streaming channels on YouTube. The implementation of the software infrastructure and the technical coordination of the volunteers were carried out by Damiano Perri and Marco Simonetti. Nine student volunteers from the universities of Málaga, Minho, Almeria, and Helsinki provided technical support and ensured smooth interaction during the conference.

A big thank you goes to all of the participants willing to exchange their ideas during their daytime. Participants of ICCSA 2022 came from 58 countries scattered over many time zones of the globe. Very interesting keynote talks were provided by well-known international scientists who provided us with more ideas to reflect upon, and we are grateful for their insights.

Eligius M. T. Hendrix

Organization

ICCSA 2022 was organized by the University of Malaga (Spain), the University of Perugia (Italy), the University of Cagliari (Italy), the University of Basilicata (Italy), Monash University (Australia), Kyushu Sangyo University (Japan), and the University of Minho, (Portugal).

Honorary General Chairs

Norio Shiratori	Chuo University, Japan
Kenneth C. J. Tan	Sardina Systems, UK

General Chairs

Osvaldo Gervasi	University of Perugia, Italy
Eligius Hendrix	University of Malaga, Italy
Bernady O. Apduhan	Kyushu Sangyo University, Japan

Program Committee Chairs

Beniamino Murgante	University of Basilicata, Italy
Inmaculada Garcia Fernandez	University of Malaga, Spain
Ana Maria A. C. Rocha	University of Minho, Portugal
David Taniar	Monash University, Australia

International Advisory Committee

Jemal Abawajy	Deakin University, Australia
Dharma P. Agarwal	University of Cincinnati, USA
Rajkumar Buyya	Melbourne University, Australia
Claudia Bauzer Medeiros	University of Campinas, Brazil
Manfred M. Fisher	Vienna University of Economics and Business, Austria
Marina L. Gavrilova	University of Calgary, Canada
Sumi Helal	University of Florida, USA, and University of Lancaster, UK
Yee Leung	Chinese University of Hong Kong, China

International Liaison Chairs

Ivan Blečić	University of Cagliari, Italy
Giuseppe Borruso	University of Trieste, Italy

Elise De Donker	Western Michigan University, USA
Maria Irene Falcão	University of Minho, Portugal
Robert C. H. Hsu	Chung Hua University, Taiwan
Tai-Hoon Kim	Beijing Jiaotong University, China
Vladimir Korkhov	St Petersburg University, Russia
Sanjay Misra	Østfold University College, Norway
Takashi Naka	Kyushu Sangyo University, Japan
Rafael D. C. Santos	National Institute for Space Research, Brazil
Maribel Yasmina Santos	University of Minho, Portugal
Elena Stankova	St Petersburg University, Russia

Workshop and Session Organizing Chairs

Beniamino Murgante	University of Basilicata, Italy
Chiara Garau	University of Cagliari, Italy
Sanjay Misra	Ostfold University College, Norway

Award Chair

Wenny Rahayu	La Trobe University, Australia

Publicity Committee Chairs

Elmer Dadios	De La Salle University, Philippines
Nataliia Kulabukhova	St Petersburg University, Russia
Daisuke Takahashi	Tsukuba University, Japan
Shangwang Wang	Beijing University of Posts and Telecommunications, China

Local Arrangement Chairs

Eligius Hendrix	University of Malaga, Spain
Inmaculada Garcia Fernandez	University of Malaga, Spain
Salvador Merino Cordoba	University of Malaga, Spain
Pablo Guerrero-García	University of Malaga, Spain

Technology Chairs

Damiano Perri	University of Florence, Italy
Marco Simonetti	University of Florence, Italy

Program Committee

Vera Afreixo	University of Aveiro, Portugal
Filipe Alvelos	University of Minho, Portugal

Hartmut Asche	Hasso-Plattner-Institut für Digital Engineering gGmbH, Germany
Ginevra Balletto	University of Cagliari, Italy
Michela Bertolotto	University College Dublin, Ireland
Sandro Bimonte	TSCF, INRAE, France
Rod Blais	University of Calgary, Canada
Ivan Blečić	University of Sassari, Italy
Giuseppe Borruso	University of Trieste, Italy
Ana Cristina Braga	University of Minho, Portugal
Massimo Cafaro	University of Salento, Italy
Yves Caniou	ENS Lyon, France
Ermanno Cardelli	University of Perugia, Italy
José A. Cardoso e Cunha	Universidade Nova de Lisboa, Portugal
Rui Cardoso	University of Beira Interior, Portugal
Leocadio G. Casado	University of Almeria, Spain
Carlo Cattani	University of Salerno, Italy
Mete Celik	Erciyes University, Turkey
Maria Cerreta	University of Naples Federico II, Italy
Hyunseung Choo	Sungkyunkwan University, South Korea
Rachel Chieng-Sing Lee	Sunway University, Malaysia
Min Young Chung	Sungkyunkwan University, South Korea
Florbela Maria da Cruz Domingues Correia	Polytechnic Institute of Viana do Castelo, Portugal
Gilberto Corso Pereira	Federal University of Bahia, Brazil
Alessandro Costantini	INFN, Italy
Carla Dal Sasso Freitas	Universidade Federal do Rio Grande do Sul, Brazil
Pradesh Debba	Council for Scientific and Industrial Research (CSIR), South Africa
Hendrik Decker	Instituto Tecnológico de Informática, Spain
Robertas Damaševičius	Kaunas University of Technology, Lithuania
Frank Devai	London South Bank University, UK
Rodolphe Devillers	Memorial University of Newfoundland, Canada
Joana Matos Dias	University of Coimbra, Portugal
Paolino Di Felice	University of L'Aquila, Italy
Prabu Dorairaj	NetApp, India/USA
M. Noelia Faginas Lago	University of Perugia, Italy
M. Irene Falcao	University of Minho, Portugal
Florbela P. Fernandes	Polytechnic Institute of Bragança, Portugal
Jose-Jesus Fernandez	National Centre for Biotechnology, Spain
Paula Odete Fernandes	Polytechnic Institute of Bragança, Portugal
Adelaide de Fátima Baptista Valente Freitas	University of Aveiro, Portugal
Manuel Carlos Figueiredo	University of Minho, Portugal
Maria Celia Furtado Rocha	Federal University of Bahia, Brazil
Chiara Garau	University of Cagliari, Italy
Paulino Jose Garcia Nieto	University of Oviedo, Spain

Raffaele Garrisi	Polizia di Stato, Italy
Jerome Gensel	LSR-IMAG, France
Maria Giaoutzi	National Technical University of Athens, Greece
Arminda Manuela Andrade Pereira Gonçalves	University of Minho, Portugal
Andrzej M. Goscinski	Deakin University, Australia
Sevin Gümgüm	Izmir University of Economics, Turkey
Alex Hagen-Zanker	University of Cambridge, UK
Shanmugasundaram Hariharan	B.S. Abdur Rahman Crescent Institute of Science and Technology, India
Eligius M. T. Hendrix	University of Malaga, Spain and Wageningen University, The Netherlands
Hisamoto Hiyoshi	Gunma University, Japan
Mustafa Inceoglu	Ege University, Turkey
Peter Jimack	University of Leeds, UK
Qun Jin	Waseda University, Japan
Yeliz Karaca	UMass Chan Medical School, USA
Farid Karimipour	Vienna University of Technology, Austria
Baris Kazar	Oracle Corp., USA
Maulana Adhinugraha Kiki	Telkom University, Indonesia
DongSeong Kim	University of Canterbury, New Zealand
Taihoon Kim	Hannam University, South Korea
Ivana Kolingerova	University of West Bohemia, Czech Republic
Nataliia Kulabukhova	St. Petersburg University, Russia
Vladimir Korkhov	St. Petersburg University, Russia
Rosa Lasaponara	National Research Council, Italy
Maurizio Lazzari	National Research Council, Italy
Cheng Siong Lee	Monash University, Australia
Sangyoun Lee	Yonsei University, South Korea
Jongchan Lee	Kunsan National University, South Korea
Chendong Li	University of Connecticut, USA
Gang Li	Deakin University, Australia
Fang (Cherry) Liu	Ames Laboratory, USA
Xin Liu	University of Calgary, Canada
Andrea Lombardi	University of Perugia, Italy
Savino Longo	University of Bari, Italy
Tinghuai Ma	Nanjing University of Information Science and Technology, China
Ernesto Marcheggiani	Katholieke Universiteit Leuven, Belgium
Antonino Marvuglia	Public Research Centre Henri Tudor, Luxembourg
Nicola Masini	National Research Council, Italy
Ilaria Matteucci	National Research Council, Italy
Nirvana Meratnia	University of Twente, The Netherlands
Fernando Miranda	University of Minho, Portugal
Giuseppe Modica	University of Reggio Calabria, Italy
Josè Luis Montaña	University of Cantabria, Spain

Maria Filipa Mourão	Instituto Politécnico de Viana do Castelo, Portugal
Louiza de Macedo Mourelle	State University of Rio de Janeiro, Brazil
Nadia Nedjah	State University of Rio de Janeiro, Brazil
Laszlo Neumann	University of Girona, Spain
Kok-Leong Ong	Deakin University, Australia
Belen Palop	Universidad de Valladolid, Spain
Marcin Paprzycki	Polish Academy of Sciences, Poland
Eric Pardede	La Trobe University, Australia
Kwangjin Park	Wonkwang University, South Korea
Ana Isabel Pereira	Polytechnic Institute of Bragança, Portugal
Massimiliano Petri	University of Pisa, Italy
Telmo Pinto	University of Coimbra, Portugal
Maurizio Pollino	Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy
Alenka Poplin	University of Hamburg, Germany
Vidyasagar Potdar	Curtin University of Technology, Australia
David C. Prosperi	Florida Atlantic University, USA
Wenny Rahayu	La Trobe University, Australia
Jerzy Respondek	Silesian University of Technology, Poland
Humberto Rocha	INESC-Coimbra, Portugal
Jon Rokne	University of Calgary, Canada
Octavio Roncero	CSIC, Spain
Maytham Safar	Kuwait University, Kuwait
Chiara Saracino	A.O. Ospedale Niguarda Ca' Granda, Italy
Marco Paulo Seabra dos Reis	University of Coimbra, Portugal
Jie Shen	University of Michigan, USA
Qi Shi	Liverpool John Moores University, UK
Dale Shires	U.S. Army Research Laboratory, USA
Inês Soares	University of Coimbra, Portugal
Elena Stankova	St Petersburg University, Russia
Takuo Suganuma	Tohoku University, Japan
Eufemia Tarantino	Polytechnic Universiy of Bari, Italy
Sergio Tasso	University of Perugia, Italy
Ana Paula Teixeira	University of Trás-os-Montes and Alto Douro, Portugal
M. Filomena Teodoro	Portuguese Naval Academy and University of Lisbon, Portugal
Parimala Thulasiraman	University of Manitoba, Canada
Carmelo Torre	Polytechnic University of Bari, Italy
Javier Martinez Torres	Centro Universitario de la Defensa Zaragoza, Spain
Giuseppe A. Trunfio	University of Sassari, Italy
Pablo Vanegas	University of Cuenca, Equador
Marco Vizzari	University of Perugia, Italy
Varun Vohra	Merck Inc., USA
Koichi Wada	University of Tsukuba, Japan
Krzysztof Walkowiak	Wroclaw University of Technology, Poland

Zequn Wang	Intelligent Automation Inc, USA
Robert Weibel	University of Zurich, Switzerland
Frank Westad	Norwegian University of Science and Technology, Norway
Roland Wismüller	Universität Siegen, Germany
Mudasser Wyne	National University, USA
Chung-Huang Yang	National Kaohsiung Normal University, Taiwan
Xin-She Yang	National Physical Laboratory, UK
Salim Zabir	France Telecom Japan Co., Japan
Haifeng Zhao	University of California, Davis, USA
Fabiana Zollo	Ca' Foscari University of Venice, Italy
Albert Y. Zomaya	University of Sydney, Australia

Workshop Organizers

International Workshop on Advances in Artificial Intelligence Learning Technologies: Blended Learning, STEM, Computational Thinking and Coding (AAILT 2022)

Alfredo Milani	University of Perugia, Italy
Valentina Franzoni	University of Perugia, Italy
Osvaldo Gervasi	University of Perugia, Italy

International Workshop on Advancements in Applied Machine-Learning and Data Analytics (AAMDA 2022)

Alessandro Costantini	INFN, Italy
Davide Salomoni	INFN, Italy
Doina Cristina Duma	INFN, Italy
Daniele Cesini	INFN, Italy

International Workshop on Advances in Information Systems and Technologies for Emergency Management, Risk Assessment and Mitigation Based on the Resilience (ASTER 2022)

Maurizio Pollino	ENEA, Italy
Marco Vona	University of Basilicata, Italy
Sonia Giovinazzi	ENEA, Italy
Benedetto Manganelli	University of Basilicata, Italy
Beniamino Murgante	University of Basilicata, Italy

International Workshop on Advances in Web Based Learning (AWBL 2022)

Birol Ciloglugil	Ege University, Turkey
Mustafa Inceoglu	Ege University, Turkey

International Workshop on Blockchain and Distributed Ledgers: Technologies and Applications (BDLTA 2022)

Vladimir Korkhov	St Petersburg State University, Russia
Elena Stankova	St Petersburg State University, Russia
Nataliia Kulabukhova	St Petersburg State University, Russia

International Workshop on Bio and Neuro Inspired Computing and Applications (BIONCA 2022)

Nadia Nedjah	State University of Rio De Janeiro, Brazil
Luiza De Macedo Mourelle	State University of Rio De Janeiro, Brazil

International Workshop on Configurational Analysis For Cities (CA CITIES 2022)

Claudia Yamu	Oslo Metropolitan University, Norway
Valerio Cutini	Università di Pisa, Italy
Beniamino Murgante	University of Basilicata, Italy
Chiara Garau	Dicaar, University of Cagliari, Italy

International Workshop on Computational and Applied Mathematics (CAM 2022)

Maria Irene Falcão	University of Minho, Portugal
Fernando Miranda	University of Minho, Portugal

International Workshop on Computational and Applied Statistics (CAS 2022)

Ana Cristina Braga	University of Minho, Portugal

International Workshop on Computational Mathematics, Statistics and Information Management (CMSIM 2022)

Maria Filomena Teodoro	University of Lisbon and Portuguese Naval Academy, Portugal

International Workshop on Computational Optimization and Applications (COA 2022)

Ana Maria A. C. Rocha	University of Minho, Portugal
Humberto Rocha	University of Coimbra, Portugal

International Workshop on Computational Astrochemistry (CompAstro 2022)

Marzio Rosi	University of Perugia, Italy
Nadia Balucani	University of Perugia, Italy
Cecilia Ceccarelli	Université Grenoble Alpes, France
Stefano Falcinelli	University of Perugia, Italy

International Workshop on Computational Methods for Porous Geomaterials (CompPor 2022)

Vadim Lisitsa	Sobolev Institute of Mathematics, Russia
Evgeniy Romenski	Sobolev Institute of Mathematics, Russia

International Workshop on Computational Approaches for Smart, Conscious Cities (CASCC 2022)

Andreas Fricke	University of Potsdam, Germany
Juergen Doellner	University of Potsdam, Germany
Salvador Merino	University of Malaga, Spain
Jürgen Bund	Graphics Vision AI Association, Germany/Portugal
Markus Jobst	Federal Office of Metrology and Surveying, Austria
Francisco Guzman	University of Malaga, Spain

International Workshop on Computational Science and HPC (CSHPC 2022)

Elise De Doncker	Western Michigan University, USA
Fukuko Yuasa	High Energy Accelerator Research Organization (KEK), Japan
Hideo Matsufuru	High Energy Accelerator Research Organization (KEK), Japan

International Workshop on Cities, Technologies and Planning (CTP 2022)

Giuseppe Borruso	University of Trieste, Italy
Malgorzata Hanzl	Lodz University of Technology, Poland
Beniamino Murgante	University of Basilicata, Italy

Anastasia Stratigea	National Technical University of Athens, Grece
Ginevra Balletto	University of Cagliari, Italy
Ljiljana Zivkovic	Republic Geodetic Authority, Serbia

International Workshop on Digital Sustainability and Circular Economy (DiSCE 2022)

Giuseppe Borruso	University of Trieste, Italy
Stefano Epifani	Digital Sustainability Institute, Italy
Ginevra Balletto	University of Cagliari, Italy
Luigi Mundula	University of Cagliari, Italy
Alessandra Milesi	University of Cagliari, Italy
Mara Ladu	University of Cagliari, Italy
Stefano De Nicolai	University of Pavia, Italy
Tu Anh Trinh	University of Economics Ho Chi Minh City, Vietnam

International Workshop on Econometrics and Multidimensional Evaluation in Urban Environment (EMEUE 2022)

Carmelo Maria Torre	Polytechnic University of Bari, Italy
Maria Cerreta	University of Naples Federico II, Italy
Pierluigi Morano	Polytechnic University of Bari, Italy
Giuliano Poli	University of Naples Federico II, Italy
Marco Locurcio	Polytechnic University of Bari, Italy
Francesco Tajani	Sapienza University of Rome, Italy

International Workshop on Ethical AI Applications for a Human-Centered Cyber Society (EthicAI 2022)

Valentina Franzoni	University of Perugia, Italy
Alfredo Milani	University of Perugia, Italy

International Workshop on Future Computing System Technologies and Applications (FiSTA 2022)

Bernady Apduhan	Kyushu Sangyo University, Japan
Rafael Santos	INPE, Brazil

International Workshop on Geodesign in Decision Making: Meta Planning and Collaborative Design for Sustainable and Inclusive Development (GDM 2022)

Francesco Scorza	University of Basilicata, Italy
Michele Campagna	University of Cagliari, Italy
Ana Clara Mourão Moura	Federal University of Minas Gerais, Brazil

International Workshop on Geomatics in Agriculture and Forestry: New Advances and Perspectives (GeoForAgr 2022)

Maurizio Pollino	ENEA, Italy
Giuseppe Modica	University of Reggio Calabria, Italy
Marco Vizzari	University of Perugia, Italy

International Workshop on Geographical Analysis, Urban Modeling, Spatial Statistics (Geog-An-Mod 2022)

Giuseppe Borruso	University of Trieste, Italy
Beniamino Murgante	University of Basilicata, Italy
Harmut Asche	Hasso-Plattner-Institut für Digital Engineering gGmbH, Germany

International Workshop on Geomatics for Resource Monitoring and Management (GRMM 2022)

Alessandra Capolupo	Polytechnic of Bari, Italy
Eufemia Tarantino	Polytechnic of Bari, Italy
Enrico Borgogno Mondino	University of Turin, Italy

International Workshop on Information and Knowledge in the Internet of Things (IKIT 2022)

Teresa Guarda	State University of Santa Elena Peninsula, Ecuador
Filipe Portela	University of Minho, Portugal
Maria Fernanda Augusto	Bitrum Research Center, Spain

13th International Symposium on Software Quality (ISSQ 2022)

Sanjay Misra	Østfold University College, Norway

International Workshop on Machine Learning for Space and Earth Observation Data (MALSEOD 2022)

Rafael Santos	INPE, Brazil
Karine Reis Ferreira Gomes	INPE, Brazil

International Workshop on Building Multi-dimensional Models for Assessing Complex Environmental Systems (MES 2022)

Vanessa Assumma	Politecnico di Torino, Italy
Caterina Caprioli	Politecnico di Torino, Italy
Giulia Datola	Politecnico di Torino, Italy

Federico Dell'Anna	Politecnico di Torino, Italy
Marta Dell'Ovo	Politecnico di Milano, Italy

International Workshop on Models and Indicators for Assessing and Measuring the Urban Settlement Development in the View of ZERO Net Land Take by 2050 (MOVEto0 2022)

Lucia Saganeiti	University of L'Aquila, Italy
Lorena Fiorini	University of L'aquila, Italy
Angela Pilogallo	University of Basilicata, Italy
Alessandro Marucci	University of L'Aquila, Italy
Francesco Zullo	University of L'Aquila, Italy

International Workshop on Modelling Post-Covid Cities (MPCC 2022)

Beniamino Murgante	University of Basilicata, Italy
Ginevra Balletto	University of Cagliari, Italy
Giuseppe Borruso	University of Trieste, Italy
Marco Dettori	Università degli Studi di Sassari, Italy
Lucia Saganeiti	University of L'Aquila, Italy

International Workshop on Ecosystem Services: Nature's Contribution to People in Practice. Assessment Frameworks, Models, Mapping, and Implications (NC2P 2022)

Francesco Scorza	University of Basilicata, Italy
Sabrina Lai	University of Cagliari, Italy
Silvia Ronchi	University of Cagliari, Italy
Dani Broitman	Israel Institute of Technology, Israel
Ana Clara Mourão Moura	Federal University of Minas Gerais, Brazil
Corrado Zoppi	University of Cagliari, Italy

International Workshop on New Mobility Choices for Sustainable and Alternative Scenarios (NEWMOB 2022)

Tiziana Campisi	University of Enna Kore, Italy
Socrates Basbas	Aristotle University of Thessaloniki, Greece
Aleksandra Deluka T.	University of Rijeka, Croatia
Alexandros Nikitas	University of Huddersfield, UK
Ioannis Politis	Aristotle University of Thessaloniki, Greece
Georgios Georgiadis	Aristotle University of Thessaloniki, Greece
Irena Ištoka Otković	University of Osijek, Croatia
Sanja Surdonja	University of Rijeka, Croatia

International Workshop on Privacy in the Cloud/Edge/IoT World (PCEIoT 2022)

Michele Mastroianni	University of Campania Luigi Vanvitelli, Italy
Lelio Campanile	University of Campania Luigi Vanvitelli, Italy
Mauro Iacono	University of Campania Luigi Vanvitelli, Italy

International Workshop on Psycho-Social Analysis of Sustainable Mobility in the Pre- and Post-Pandemic Phase (PSYCHE 2022)

Tiziana Campisi	University of Enna Kore, Italy
Socrates Basbas	Aristotle University of Thessaloniki, Greece
Dilum Dissanayake	Newcastle University, UK
Nurten Akgün Tanbay	Bursa Technical University, Turkey
Elena Cocuzza	University of Catania, Italy
Nazam Ali	University of Management and Technology, Pakistan
Vincenza Torrisi	University of Catania, Italy

International Workshop on Processes, Methods and Tools Towards Resilient Cities and Cultural Heritage Prone to SOD and ROD Disasters (RES 2022)

Elena Cantatore	Polytechnic University of Bari, Italy
Alberico Sonnessa	Polytechnic University of Bari, Italy
Dario Esposito	Polytechnic University of Bari, Italy

International Workshop on Scientific Computing Infrastructure (SCI 2022)

Elena Stankova	St Petersburg University, Russia
Vladimir Korkhov	St Petersburg University, Russia

International Workshop on Socio-Economic and Environmental Models for Land Use Management (SEMLUM 2022)

Debora Anelli	Polytechnic University of Bari, Italy
Pierluigi Morano	Polytechnic University of Bari, Italy
Francesco Tajani	Sapienza University of Rome, Italy
Marco Locurcio	Polytechnic University of Bari, Italy
Paola Amoruso	LUM University, Italy

14th International Symposium on Software Engineering Processes and Applications (SEPA 2022)

Sanjay Misra	Østfold University College, Norway

International Workshop on Ports of the Future – Smartness and Sustainability (SmartPorts 2022)

Giuseppe Borruso	University of Trieste, Italy
Gianfranco Fancello	University of Cagliari, Italy
Ginevra Balletto	University of Cagliari, Italy
Patrizia Serra	University of Cagliari, Italy
Maria del Mar Munoz Leonisio	University of Cadiz, Spain
Marco Mazzarino	University of Venice, Italy
Marcello Tadini	Università del Piemonte Orientale, Italy

International Workshop on Smart Tourism (SmartTourism 2022)

Giuseppe Borruso	University of Trieste, Italy
Silvia Battino	University of Sassari, Italy
Ainhoa Amaro Garcia	Universidad de Alcalà and Universidad de Las Palmas, Spain
Maria del Mar Munoz Leonisio	University of Cadiz, Spain
Carlo Donato	University of Sassari, Italy
Francesca Krasna	University of Trieste, Italy
Ginevra Balletto	University of Cagliari, Italy

International Workshop on Sustainability Performance Assessment: Models, Approaches and Applications Toward Interdisciplinary and Integrated Solutions (SPA 2022)

Francesco Scorza	University of Basilicata, Italy
Sabrina Lai	University of Cagliari, Italy
Jolanta Dvarioniene	Kaunas University of Technology, Lithuania
Iole Cerminara	University of Basilicata, Italy
Georgia Pozoukidou	Aristotle University of Thessaloniki, Greece
Valentin Grecu	Lucian Blaga University of Sibiu, Romania
Corrado Zoppi	University of Cagliari, Italy

International Workshop on Specifics of Smart Cities Development in Europe (SPEED 2022)

Chiara Garau	University of Cagliari, Italy
Katarína Vitálišová	Matej Bel University, Slovakia
Paolo Nesi	University of Florence, Italy
Anna Vanova	Matej Bel University, Slovakia
Kamila Borsekova	Matej Bel University, Slovakia
Paola Zamperlin	University of Pisa, Italy

Federico Cugurullo	Trinity College Dublin, Ireland
Gerardo Carpentieri	University of Naples Federico II, Italy

International Workshop on Smart and Sustainable Island Communities (SSIC 2022)

Chiara Garau	University of Cagliari, Italy
Anastasia Stratigea	National Technical University of Athens, Greece
Paola Zamperlin	University of Pisa, Italy
Francesco Scorza	University of Basilicata, Italy

International Workshop on Theoretical and Computational Chemistry and Its Applications (TCCMA 2022)

Noelia Faginas-Lago	University of Perugia, Italy
Andrea Lombardi	University of Perugia, Italy

International Workshop on Transport Infrastructures for Smart Cities (TISC 2022)

Francesca Maltinti	University of Cagliari, Italy
Mauro Coni	University of Cagliari, Italy
Francesco Pinna	University of Cagliari, Italy
Chiara Garau	University of Cagliari, Italy
Nicoletta Rassu	Univesity of Cagliari, Italy
James Rombi	University of Cagliari, Italy
Benedetto Barabino	University of Brescia, Italy

14th International Workshop on Tools and Techniques in Software Development Process (TTSDP 2022)

Sanjay Misra	Østfold University College, Norway

International Workshop on Urban Form Studies (UForm 2022)

Malgorzata Hanzl	Lodz University of Technology, Poland
Beniamino Murgante	University of Basilicata, Italy
Alessandro Camiz	Özyeğin University, Turkey
Tomasz Bradecki	Silesian University of Technology, Poland

International Workshop on Urban Regeneration: Innovative Tools and Evaluation Model (URITEM 2022)

Fabrizio Battisti	University of Florence, Italy
Laura Ricci	Sapienza University of Rome, Italy
Orazio Campo	Sapienza University of Rome, Italy

International Workshop on Urban Space Accessibility and Mobilities (USAM 2022)

Chiara Garau	University of Cagliari, Italy
Matteo Ignaccolo	University of Catania, Italy
Enrica Papa	University of Westminster, UK
Francesco Pinna	University of Cagliari, Italy
Silvia Rossetti	University of Parma, Italy
Wendy Tan	Wageningen University and Research, The Netherlands
Michela Tiboni	University of Brescia, Italy
Vincenza Torrisi	University of Catania, Italy

International Workshop on Virtual Reality and Augmented Reality and Applications (VRA 2022)

Osvaldo Gervasi	University of Perugia, Italy
Damiano Perri	University of Florence, Italy
Marco Simonetti	University of Florence, Italy
Sergio Tasso	University of Perugia, Italy

International Workshop on Advanced and Computational Methods for Earth Science Applications (WACM4ES 2022)

Luca Piroddi	University of Cagliari, Italy
Sebastiano Damico	University of Malta, Malta

International Workshop on Advanced Mathematics and Computing Methods in Complex Computational Systems (WAMCM 2022)

Yeliz Karaca	UMass Chan Medical School, USA
Dumitru Baleanu	Cankaya University, Turkey
Osvaldo Gervasi	University of Perugia, Italy
Yudong Zhang	University of Leicester, UK
Majaz Moonis	UMass Chan Medical School, USA

Additional Reviewers

Akshat Agrawal	Amity University, Haryana, India
Waseem Ahmad	National Institute of Technology Karnataka, India
Vladimir Alarcon	Universidad Diego Portales, Chile
Oylum Alatlı	Ege University, Turkey
Raffaele Albano	University of Basilicata, Italy
Abraham Alfa	FUT Minna, Nigeria
Diego Altafini	Università di Pisa, Italy
Filipe Alvelos	Universidade do Minho, Portugal

Marina Alexandra Pedro Andrade	ISCTE-IUL, Portugal
Debora Anelli	Polytechnic University of Bari, Italy
Gennaro Angiello	AlmavivA de Belgique, Belgium
Alfonso Annunziata	Università di Cagliari, Italy
Bernady Apduhan	Kyushu Sangyo University, Japan
Daniela Ascenzi	Università degli Studi di Trento, Italy
Burak Galip Aslan	Izmir Insitute of Technology, Turkey
Vanessa Assumma	Politecnico di Torino, Italy
Daniel Atzberger	Hasso-Plattner-Institute für Digital Engineering gGmbH, Germany
Dominique Aury	École Polytechnique Fédérale de Lausanne, Switzerland
Joseph Awotumde	University of Alcala, Spain
Birim Balci	Celal Bayar University, Turkey
Juliana Balera	INPE, Brazil
Ginevra Balletto	University of Cagliari, Italy
Benedetto Barabino	University of Brescia, Italy
Kaushik Barik	University of Alcala, Spain
Carlo Barletta	Politecnico di Bari, Italy
Socrates Basbas	Aristotle University of Thessaloniki, Greece
Rosaria Battarra	ISMed-CNR, Italy
Silvia Battino	University of Sassari, Italy
Chiara Bedan	University of Trieste, Italy
Ranjan Kumar Behera	National Institute of Technology Rourkela, India
Gulmira Bekmanova	L.N. Gumilyov Eurasian National University, Kazakhstan
Mario Bentivenga	University of Basilicata, Italy
Asrat Mulatu Beyene	Addis Ababa Science and Technology University, Ethiopia
Tiziana Binda	Politecnico di Torino, Italy
Giulio Biondi	University of Firenze, Italy
Alexander Bogdanov	St Petersburg University, Russia
Costanza Borghesi	University of Perugia, Italy
Giuseppe Borruso	University of Trieste, Italy
Marilisa Botte	University of Naples Federico II, Italy
Tomasz Bradecki	Silesian University of Technology, Poland
Ana Cristina Braga	University of Minho, Portugal
Luca Braidotti	University of Trieste, Italy
Bazon Brock	University of Wuppertal, Germany
Dani Broitman	Israel Institute of Technology, Israel
Maria Antonia Brovelli	Politecnico di Milano, Italy
Jorge Buele	Universidad Tecnológica Indoamérica, Ecuador
Isabel Cacao	University of Aveiro, Portugal
Federica Cadamuro Morgante	Politecnico di Milano, Italy

Rogerio Calazan	IEAPM, Brazil
Michele Campagna	University of Cagliari, Italy
Lelio Campanile	Università degli Studi della Campania Luigi Vanvitelli, Italy
Tiziana Campisi	University of Enna Kore, Italy
Antonino Canale	University of Enna Kore, Italy
Elena Cantatore	Polytechnic University of Bari, Italy
Patrizia Capizzi	Univerity of Palermo, Italy
Alessandra Capolupo	Polytechnic University of Bari, Italy
Giacomo Caporusso	Politecnico di Bari, Italy
Caterina Caprioli	Politecnico di Torino, Italy
Gerardo Carpentieri	University of Naples Federico II, Italy
Martina Carra	University of Brescia, Italy
Pedro Carrasqueira	INESC Coimbra, Portugal
Barbara Caselli	Università degli Studi di Parma, Italy
Cecilia Castro	University of Minho, Portugal
Giulio Cavana	Politecnico di Torino, Italy
Iole Cerminara	University of Basilicata, Italy
Maria Cerreta	University of Naples Federico II, Italy
Daniele Cesini	INFN, Italy
Jabed Chowdhury	La Trobe University, Australia
Birol Ciloglugil	Ege University, Turkey
Elena Cocuzza	Univesity of Catania, Italy
Emanuele Colica	University of Malta, Malta
Mauro Coni	University of Cagliari, Italy
Elisete Correia	Universidade de Trás-os-Montes e Alto Douro, Portugal
Florbela Correia	Polytechnic Institute of Viana do Castelo, Portugal
Paulo Cortez	University of Minho, Portugal
Lino Costa	Universidade do Minho, Portugal
Alessandro Costantini	INFN, Italy
Marilena Cozzolino	Università del Molise, Italy
Alfredo Cuzzocrea	University of Calabria, Italy
Sebastiano D'amico	University of Malta, Malta
Gianni D'Angelo	University of Salerno, Italy
Tijana Dabovic	University of Belgrade, Serbia
Hiroshi Daisaka	Hitotsubashi University, Japan
Giulia Datola	Politecnico di Torino, Italy
Regina De Almeida	University of Trás-os-Montes and Alto Douro, Portugal
Maria Stella De Biase	Università della Campania Luigi Vanvitelli, Italy
Elise De Doncker	Western Michigan University, USA
Itamir De Morais Barroca Filho	Federal University of Rio Grande do Norte, Brazil
Samuele De Petris	University of Turin, Italy
Alan De Sá	Marinha do Brasil, Brazil
Alexander Degtyarev	St Petersburg University, Russia

Federico Dell'Anna	Politecnico di Torino, Italy
Marta Dell'Ovo	Politecnico di Milano, Italy
Ahu Dereli Dursun	Istanbul Commerce University, Turkey
Giulia Desogus	University of Cagliari, Italy
Piero Di Bonito	Università degli Studi della Campania, Italia
Paolino Di Felice	University of L'Aquila, Italy
Felicia Di Liddo	Polytechnic University of Bari, Italy
Isabel Dimas	University of Coimbra, Portugal
Doina Cristina Duma	INFN, Italy
Aziz Dursun	Virginia Tech University, USA
Jaroslav Dvořak	Klaipėda University, Lithuania
Dario Esposito	Polytechnic University of Bari, Italy
M. Noelia Faginas-Lago	University of Perugia, Italy
Stefano Falcinelli	University of Perugia, Italy
Falcone Giacomo	University of Reggio Calabria, Italy
Maria Irene Falcão	University of Minho, Portugal
Stefano Federico	CNR-ISAC, Italy
Marcin Feltynowski	University of Lodz, Poland
António Fernandes	Instituto Politécnico de Bragança, Portugal
Florbela Fernandes	Instituto Politecnico de Braganca, Portugal
Paula Odete Fernandes	Instituto Politécnico de Bragança, Portugal
Luis Fernandez-Sanz	University of Alcala, Spain
Luís Ferrás	University of Minho, Portugal
Ângela Ferreira	Instituto Politécnico de Bragança, Portugal
Lorena Fiorini	University of L'Aquila, Italy
Hector Florez	Universidad Distrital Francisco Jose de Caldas, Colombia
Stefano Franco	LUISS Guido Carli, Italy
Valentina Franzoni	Perugia University, Italy
Adelaide Freitas	University of Aveiro, Portugal
Andreas Fricke	Hasso Plattner Institute, Germany
Junpei Fujimoto	KEK, Japan
Federica Gaglione	Università del Sannio, Italy
Andrea Gallo	Università degli Studi di Trieste, Italy
Luciano Galone	University of Malta, Malta
Adam Galuszka	Silesian University of Technology, Poland
Chiara Garau	University of Cagliari, Italy
Ernesto Garcia Para	Universidad del País Vasco, Spain
Aniket A. Gaurav	Østfold University College, Norway
Marina Gavrilova	University of Calgary, Canada
Osvaldo Gervasi	University of Perugia, Italy
Andrea Ghirardi	Università di Brescia, Italy
Andrea Gioia	Politecnico di Bari, Italy
Giacomo Giorgi	Università degli Studi di Perugia, Italy
Stanislav Glubokovskikh	Lawrence Berkeley National Laboratory, USA
A. Manuela Gonçalves	University of Minho, Portugal

Leocadio González Casado	University of Almería, Spain
Angela Gorgoglione	Universidad de la República Uruguay, Uruguay
Yusuke Gotoh	Okayama University, Japan
Daniele Granata	Università degli Studi della Campania, Italy
Christian Grévisse	University of Luxembourg, Luxembourg
Silvana Grillo	University of Cagliari, Italy
Teresa Guarda	State University of Santa Elena Peninsula, Ecuador
Carmen Guida	Università degli Studi di Napoli Federico II, Italy
Kemal Güven Gülen	Namık Kemal University, Turkey
Ipek Guler	Leuven Biostatistics and Statistical Bioinformatics Centre, Belgium
Sevin Gumgum	Izmir University of Economics, Turkey
Martina Halásková	VSB Technical University in Ostrava, Czech Republic
Peter Hegedus	University of Szeged, Hungary
Eligius M. T. Hendrix	Universidad de Málaga, Spain
Mauro Iacono	Università degli Studi della Campania, Italy
Oleg Iakushkin	St Petersburg University, Russia
Matteo Ignaccolo	University of Catania, Italy
Mustafa Inceoglu	Ege University, Turkey
Markus Jobst	Federal Office of Metrology and Surveying, Austria
Issaku Kanamori	RIKEN Center for Computational Science, Japan
Yeliz Karaca	UMass Chan Medical School, USA
Aarti Karande	Sardar Patel Institute of Technology, India
András Kicsi	University of Szeged, Hungary
Vladimir Korkhov	St Petersburg University, Russia
Nataliia Kulabukhova	St Petersburg University, Russia
Claudio Ladisa	Politecnico di Bari, Italy
Mara Ladu	University of Cagliari, Italy
Sabrina Lai	University of Cagliari, Italy
Mark Lajko	University of Szeged, Hungary
Giuseppe Francesco Cesare Lama	University of Napoli Federico II, Italy
Vincenzo Laporta	CNR, Italy
Margherita Lasorella	Politecnico di Bari, Italy
Francesca Leccis	Università di Cagliari, Italy
Federica Leone	University of Cagliari, Italy
Chien-sing Lee	Sunway University, Malaysia
Marco Locurcio	Polytechnic University of Bari, Italy
Francesco Loddo	Henge S.r.l., Italy
Andrea Lombardi	Università di Perugia, Italy
Isabel Lopes	Instituto Politécnico de Bragança, Portugal
Fernando Lopez Gayarre	University of Oviedo, Spain
Vanda Lourenço	Universidade Nova de Lisboa, Portugal
Jing Ma	Luleå University of Technology, Sweden
Helmuth Malonek	University of Aveiro, Portugal
Francesca Maltinti	University of Cagliari, Italy

Benedetto Manganelli	Università degli Studi della Basilicata, Italy
Krassimir Markov	Institute of Electric Engineering and Informatics, Bulgaria
Alessandro Marucci	University of L'Aquila, Italy
Alessandra Mascitelli	Italian Civil Protection Department and ISAC-CNR, Italy
Michele Mastroianni	University of Campania Luigi Vanvitelli, Italy
Hideo Matsufuru	High Energy Accelerator Research Organization (KEK), Japan
Chiara Mazzarella	University of Naples Federico II, Italy
Marco Mazzarino	University of Venice, Italy
Paolo Mengoni	University of Florence, Italy
Alfredo Milani	University of Perugia, Italy
Fernando Miranda	Universidade do Minho, Portugal
Augusto Montisci	Università degli Studi di Cagliari, Italy
Ricardo Moura	New University of Lisbon, Portugal
Ana Clara Mourao Moura	Federal University of Minas Gerais, Brazil
Maria Mourao	Polytechnic Institute of Viana do Castelo, Portugal
Eugenio Muccio	University of Naples Federico II, Italy
Beniamino Murgante	University of Basilicata, Italy
Giuseppe Musolino	University of Reggio Calabria, Italy
Stefano Naitza	Università di Cagliari, Italy
Naohito Nakasato	University of Aizu, Japan
Roberto Nardone	University of Reggio Calabria, Italy
Nadia Nedjah	State University of Rio de Janeiro, Brazil
Juraj Nemec	Masaryk University in Brno, Czech Republic
Keigo Nitadori	RIKEN R-CCS, Japan
Roseline Ogundokun	Kaunas University of Technology, Lithuania
Francisco Henrique De Oliveira	Santa Catarina State University, Brazil
Irene Oliveira	Univesidade Trás-os-Montes e Alto Douro, Portugal
Samson Oruma	Østfold University College, Norway
Antonio Pala	University of Cagliari, Italy
Simona Panaro	University of Porstmouth, UK
Dimos Pantazis	University of West Attica, Greece
Giovanni Paragliola	ICAR-CNR, Italy
Eric Pardede	La Trobe University, Australia
Marco Parriani	University of Perugia, Italy
Paola Perchinunno	Uniersity of Bari, Italy
Ana Pereira	Polytechnic Institute of Bragança, Portugal
Damiano Perri	University of Perugia, Italy
Marco Petrelli	Roma Tre University, Italy
Camilla Pezzica	University of Pisa, Italy
Angela Pilogallo	University of Basilicata, Italy
Francesco Pinna	University of Cagliari, Italy
Telmo Pinto	University of Coimbra, Portugal

Fernando Pirani	University of Perugia, Italy
Luca Piroddi	University of Cagliari, Italy
Bojana Pjanović	University of Belgrade, Serbia
Giuliano Poli	University of Naples Federico II, Italy
Maurizio Pollino	ENEA, Italy
Salvatore Praticò	University of Reggio Calabria, Italy
Zbigniew Przygodzki	University of Lodz, Poland
Carlotta Quagliolo	Politecnico di Torino, Italy
Raffaele Garrisi	Polizia Postale e delle Comunicazioni, Italy
Mariapia Raimondo	Università della Campania Luigi Vanvitelli, Italy
Deep Raj	IIIT Naya Raipur, India
Buna Ramos	Universidade Lusíada Norte, Portugal
Nicoletta Rassu	Univesity of Cagliari, Italy
Michela Ravanelli	Sapienza Università di Roma, Italy
Roberta Ravanelli	Sapienza Università di Roma, Italy
Pier Francesco Recchi	University of Naples Federico II, Italy
Stefania Regalbuto	University of Naples Federico II, Italy
Marco Reis	University of Coimbra, Portugal
Maria Reitano	University of Naples Federico II, Italy
Anatoly Resnyansky	Defence Science and Technology Group, Australia
Jerzy Respondek	Silesian University of Technology, Poland
Isabel Ribeiro	Instituto Politécnico Bragança, Portugal
Albert Rimola	Universitat Autònoma de Barcelona, Spain
Corrado Rindone	University of Reggio Calabria, Italy
Ana Maria A. C. Rocha	University of Minho, Portugal
Humberto Rocha	University of Coimbra, Portugal
Maria Clara Rocha	Instituto Politécnico de Coimbra, Portugal
James Rombi	University of Cagliari, Italy
Elisabetta Ronchieri	INFN, Italy
Marzio Rosi	University of Perugia, Italy
Silvia Rossetti	Università degli Studi di Parma, Italy
Marco Rossitti	Politecnico di Milano, Italy
Mária Rostašová	Universtiy of Žilina, Slovakia
Lucia Saganeiti	University of L'Aquila, Italy
Giovanni Salzillo	Università degli Studi della Campania, Italy
Valentina Santarsiero	University of Basilicata, Italy
Luigi Santopietro	University of Basilicata, Italy
Stefania Santoro	Politecnico di Bari, Italy
Rafael Santos	INPE, Brazil
Valentino Santucci	Università per Stranieri di Perugia, Italy
Mirko Saponaro	Polytechnic University of Bari, Italy
Filippo Sarvia	University of Turin, Italy
Andrea Scianna	ICAR-CNR, Italy
Francesco Scorza	University of Basilicata, Italy
Ester Scotto Di Perta	University of Naples Federico II, Italy
Ricardo Severino	University of Minho, Portugal

Jie Shen	University of Michigan, USA
Luneque Silva Junior	Universidade Federal do ABC, Brazil
Carina Silva	Instituto Politécnico de Lisboa, Portugal
Joao Carlos Silva	Polytechnic Institute of Cavado and Ave, Portugal
Ilya Silvestrov	Saudi Aramco, Saudi Arabia
Marco Simonetti	University of Florence, Italy
Maria Joana Soares	University of Minho, Portugal
Michel Soares	Federal University of Sergipe, Brazil
Alberico Sonnessa	Politecnico di Bari, Italy
Lisete Sousa	University of Lisbon, Portugal
Elena Stankova	St Petersburg University, Russia
Jan Stejskal	University of Pardubice, Czech Republic
Silvia Stranieri	University of Naples Federico II, Italy
Anastasia Stratigea	National Technical University of Athens, Greece
Yue Sun	European XFEL GmbH, Germany
Anthony Suppa	Politecnico di Torino, Italy
Kirill Sviatov	Ulyanovsk State Technical University, Russia
David Taniar	Monash University, Australia
Rodrigo Tapia-McClung	Centro de Investigación en Ciencias de Información Geoespacial, Mexico
Eufemia Tarantino	Politecnico di Bari, Italy
Sergio Tasso	University of Perugia, Italy
Vladimir Tcheverda	Institute of Petroleum Geology and Geophysics, SB RAS, Russia
Ana Paula Teixeira	Universidade de Trás-os-Montes e Alto Douro, Portugal
Tengku Adil Tengku Izhar	Universiti Teknologi MARA, Malaysia
Maria Filomena Teodoro	University of Lisbon and Portuguese Naval Academy, Portugal
Yiota Theodora	National Technical University of Athens, Greece
Graça Tomaz	Instituto Politécnico da Guarda, Portugal
Gokchan Tonbul	Atilim University, Turkey
Rosa Claudia Torcasio	CNR-ISAC, Italy
Carmelo Maria Torre	Polytechnic University of Bari, Italy
Vincenza Torrisi	University of Catania, Italy
Vincenzo Totaro	Politecnico di Bari, Italy
Pham Trung	HCMUT, Vietnam
Po-yu Tsai	National Chung Hsing University, Taiwan
Dimitrios Tsoukalas	Centre of Research and Technology Hellas, Greece
Toshihiro Uchibayashi	Kyushu University, Japan
Takahiro Ueda	Seikei University, Japan
Piero Ugliengo	Università degli Studi di Torino, Italy
Gianmarco Vanuzzo	University of Perugia, Italy
Clara Vaz	Instituto Politécnico de Bragança, Portugal
Laura Verde	University of Campania Luigi Vanvitelli, Italy
Katarína Vitálišová	Matej Bel University, Slovakia

Daniel Mark Vitiello	University of Cagliari, Italy
Marco Vizzari	University of Perugia, Italy
Alexander Vodyaho	St. Petersburg State Electrotechnical University "LETI", Russia
Agustinus Borgy Waluyo	Monash University, Australia
Chao Wang	USTC, China
Marcin Wozniak	Silesian University of Technology, Poland
Jitao Yang	Beijing Language and Culture University, China
Fenghui Yao	Tennessee State University, USA
Fukuko Yuasa	KEK, Japan
Paola Zamperlin	University of Pisa, Italy
Michal Žemlička	Charles University, Czech Republic
Nataly Zhukova	ITMO University, Russia
Alcinia Zita Sampaio	University of Lisbon, Portugal
Ljiljana Zivkovic	Republic Geodetic Authority, Serbia
Floriana Zucaro	University of Naples Federico II, Italy
Marco Zucca	Politecnico di Milano, Italy
Camila Zyngier	Ibmec, Belo Horizonte, Brazil

Sponsoring Organizations

ICCSA 2022 would not have been possible without tremendous support of many organizations and institutions, for which all organizers and participants of ICCSA 2022 express their sincere gratitude:



Springer International Publishing AG, Germany (https://www.springer.com)



Computers Open Access Journal (https://www.mdpi.com/journal/computers)



Computation Open Access Journal (https://www.mdpi.com/journal/computation)



University of Malaga, Spain (https://www.uma.es/)



University of Perugia, Italy
(https://www.unipg.it)



University of Basilicata, Italy
(http://www.unibas.it)



Monash University, Australia
(https://www.monash.edu/)



Kyushu Sangyo University, Japan
(https://www.kyusan-u.ac.jp/)



University of Minho, Portugal
(https://www.uminho.pt/)

Contents – Part VI

International Workshop on Sustainability Performance Assessment: Models, Approaches and Applications Toward Interdisciplinary and Integrated Solutions (SPA 2022)

Road Infrastructure as a Guarantee of Social Inclusion: The Case of Tourists' satisfaction in the South of Italy 3
Nicola Montesano, Giuseppina Anatriello, Elisabetta Cicchiello, and Francesca Pagliara

Challenges in the Implementation of the 2030 Agenda at the Local Scale. The Case Study of the Municipal Masterplan of Cagliari 19
Maddalena Floris and Francesca Leccis

Implementing Solutions for SECAP Transport Sector Towards Climate Neutrality 31
Luigi Santopietro and Francesco Scorza

Tourism and Abandoned Inland Areas Development Demand: A Critical Appraisal 40
Rachele Gatto, Luigi Santopietro, and Francesco Scorza

Roghudi: Developing Knowledge of the Places in an Abandoned Inland Municipality 48
Rachele Gatto, Luigi Santopietro, and Francesco Scorza

A First Financial Assessment of SEAP Public Energy Interventions Performance Through Municipal Budget 54
Luigi Santopietro, Silvia Solimene, Ferdinando Di Carlo, Manuela Lucchese, Francesco Scorza, and Beniamino Murgante

International Workshop on Specifics of Smart Cities Development in Europe (SPEED 2022)

A Preliminary Survey on Smart Specialization Platforms: Evaluation of European Best Practices 67
Simone Chiordi, Giulia Desogus, Chiara Garau, Paolo Nesi, and Paola Zamperlin

Industry 4.0 Technologies and Italian Urban System: Between Smart Development and Increasing Inequalities 85
Michela Lazzeroni and Paola Zamperlin

Measuring Urban Competitiveness Through the Lens of Sustainability: An Application at the Urban Districts Level in the City of Naples (Italy) 93
Sabrina Sgambati, Gerardo Carpentieri, and Carmela Gargiulo

Lack of Correlation Between Land Use and Pollutant Emissions: The Case of Pavia Province 109
Roberto De Lotto, Marilisa Moretti, Elisabetta M. Venco, Riccardo Bellati, and Melissa Monastra

Smart Solution for a Smart City: Using Open Source Maps in Municipal Waste Management 125
Ingrid Majerova, Radim Dolak, and Martin Murys

Smart Interventions for Smart Cities: Using Behavioral Economy in Increasing Revenue from Local Fees and Why It Might Sometimes Fail 141
Nikoleta Jakuš Muthová, Mária Murray Svidroňová, and Katarína Vitálišová

A Traffic Model with Junction Constraints for Smart Cities Development . . . 157
Sabrina Francesca Pellegrino

Searching for Heterogeneous Geolocated Services via API Federation 173
Ala Arman, Pierfrancesco Bellini, and Paolo Nesi

Communication as a Part of Smart Governance in Local Municipalities 191
Katarína Vitálišová, Kamila Borseková, Anna Vaňová, Darina Rojíková, and Peter Laco

The Market Concentration as the Public Services Contracting Out Efficiency Factor at the Local Government Level: The Case of Slovakia 204
Beáta Mikušová Meričková, Daniela Mališová, and Kristína Murínová

The Value Chains in Smart Regions – The Role of ICT Through the Eyes of Consumers 219
Lenka Veselovská, Mária Pomffyová, and Mária Sirotiaková

International Workshop on Theoretical and Computational Chemistry and Its Applications (TCCMA 2022)

A Theoretical Study on *trans*-Resveratrol - Cu(I) Complex. 237
Concetta Caglioti, Antonella De Luca, Chiara Pennetta, Lorenzo Monarca, Francesco Ragonese, Paola Sabbatini, Maria Noelia Faginas Lago, Andrea Lombardi, Federico Palazzetti, and Bernard Fioretti

Theoretical Study of the Reaction O(^{3}P) + 1,2-Butadiene 249
Gianmarco Vanuzzo, Andrea Giustini, Marzio Rosi, Piergiorgio Casavecchia, and Nadia Balucani

The Assembly of a Computing Platform for Studying Protein Inhibitors Against COVID-19 Replication 264
Leonardo Pacifici, Ribi Akbar, Andrea Lombardi, Giuseppe Vitillaro, and Maria Noelia Faginas Lago

Confinement of CO_2 Inside (20,0) Single-Walled Carbon Nanotubes 275
Noelia Faginas-Lago, Andrea Lombardi, Yusuf Bramastya Apriliyanto, and Leonardo Pacifici

Structural Basis of the Biomolecular Action of Paddlewheel- and N-Heterocyclic-Carbene-Based Antitumor Metallodrugs: A Computational Perspective 290
Iogann Tolbatov and Alessandro Marrone

Quantum Confinement Effects in Materials for Daytime Radiative Cooling: An *Ab-initio* Investigation 305
Costanza Borghesi, Claudia Fabiani, Anna Laura Pisello, and Giacomo Giorgi

Coding Cross Sections of an Electron Charge Transfer Process 319
Emília Valença Ferreira de Aragão, Luca Mancini, Xiao He, Noelia Faginas-Lago, Marzio Rosi, Daniela Ascenzi, and Fernando Pirani

Simulation of CO_2 Sorption from the Gas Stream by the Grain of Soda-Lime Sorbent 334
Vadim Lisitsa, Tatyana Khachkova, Yaroslav Bazaikin, and Vladimir Derevschikov

Protein Networks by Invariant Shape Coordinates and Deformation Indexes 348
Lombardi Andrea, Noelia Faginas-Lago, and Leonardo Pacifici

International Workshop on Urban Form Studies (UForm 2022)

Modernist Housing Estates – Examining the Conditions of Redevelopment of Outdoor Space. The Case Study from Łódź, Bałuty 363
Małgorzata Hanzl

International Workshop on Urban Regeneration: Innovative Tools and Evaluation Model (URITEM 2022)

On the Phenomenon of Depopulation of Inland Areas 381
Federica Russo, Alessandra Marra, Roberto Gerundo, and Antonio Nesticò

International Workshop on Urban Space Accessibility and Mobilities (USAM 2022)

A Smart Approach for Integrated Land-Use and Transport Planning—An Application to the Naples Metro Station Areas 395
Carmen Guida, Gerardo Carpentieri, and John Zacharias

Developing Cities for Citizens: Supporting Gender Equity for Successful and Sustainable Urban Mobility 410
Tiziana Campisi, Georgios Georgiadis, and Socrates Basbas

Sustainable Mobility and Accessibility to Essential Services. An Assessment of the San Benedetto Neighbourhood in Cagliari (Italy) 423
Gloria Pellicelli, Barbara Caselli, Chiara Garau, Vincenza Torrisi, and Silvia Rossetti

Health and Mobility in the Post-pandemic Scenario. An Analysis of the Adaptation of Sustainable Urban Mobility Plans in Key Contexts of Italy . . . 439
Alfonso Annunziata, Giulia Desogus, Francesca Mighela, and Chiara Garau

International Workshop on Virtual Reality and Augmented Reality and Applications (VRA 2022)

A Multi-agent Body Tracking Application Framework Applied to Physical and Neurofunctional Rehabilitation 459
Felipe Reis Valente, Marcelo de Paiva Guimarães, Elder José Reioli Cirilo, and Diego Roberto Colombo Dias

A Mobile App to Help People Affected by Visual Snow 473
Damiano Perri, Marco Simonetti, Osvaldo Gervasi, and Natale Amato

Strategies for the Digitalization of Cultural Heritage 486
Osvaldo Gervasi, Damiano Perri, Marco Simonetti, and Sergio Tasso

International Workshop on Workshop on Advanced and Computational Methods for Earth Science Applications (WACM4ES 2022)

UAV Photogrammetry for Volume Calculations. A Case Study of an Open Sand Quarry 505
Giuessppina Vacca

The *Pulcinella* Diagnostic Project: Introduction to the Study of the Performances of Close-Range Diagnostics Targeted to a Wooden Physical Twin of a Carnival Historical Mask 519
Luca Piroddi, Ilaria Catapano, Emanuele Colica, Sebastiano D'Amico, Luciano Galone, Gianfranco Gargiulo, and Stefano Sfarra

Joint Use of GPR Surveys, Terrestrial and Aerial Photogrammetry for the Study of the Portico of the Cathedral of S. Pietro (Isernia, Italy) 534
Marilena Cozzolino, Vincenzo Gentile, Paolo Mauriello, and Enza Zullo

Integrated Methodologies for the Survey and the Documentation of Two Byzantine Churches at the UNESCO Archaeological Site of Umm ar-Rasas (Jordan) 547
Andrea Angelini, Marilena Cozzolino, Roberto Gabrielli, Pasquale Galatà, Vincenzo Gentile, and Paolo Mauriello

Diffraction Imaging After Diffraction Separation in Data Domain 560
M. Protasov

An Integrated and Cooperative Approach Between Regional and Local Public Authorities to Sustainable Development: City Logistics Projects in Calabria 572
Francesco Russo, Giuseppe Iiritano, Giovanna Petrungaro, and Maria Rosaria Trecozzi

Geotechnologies for Geological Mapping at the State of Tocantins/Brazil 585
Pedro Benedito Casagrande, Diego Guilherme da Costa Gomes, Jonas de Oliveira Laranjeira, and Ítalo Sousa de Sena

International Workshop on Workshop on Advanced Mathematics and Computing Methods in Complex Computational Systems (WAMCM 2022)

An Example of Use of Variational Methods in Quantum Machine Learning 597
Marco Simonetti, Damiano Perri, and Osvaldo Gervasi

International Workshop on Transport Infrastructures for Smart Cities (TISC 2022)

Sardinia Granite Scraps Application in Road Pavement Layers 613
J. Rombi, F. Maltinti, and M. Coni

Sidewalk Cafe: Analysis of Safe Solutions for Customers 624
Francesca Maltinti, Nicoletta Rassu, Alessandro Plaisant, and Francesco Pinna

Performance Evaluation of in Situ Application of Anhydrous Calcium Sulphate in Pavement Layers 640
J. Rombi, M. Olianas, M. Salis, A. Serpi, and M. Coni

Safety Oriented Road Asset Management Methodology for Urban Areas 650
Mauro D'Apuzzo, Azzurra Evangelisti, Giuseppe Cappelli, and Vittorio Nicolosi

Deflection and Friction Performance of Waste-Wooden Block Pavements . . . 663
Mauro Coni, Giovanna Concu, Carla Carcangiu, tand Francesca Maltinti

Author Index 679