

PREFACE: TECHNICAL COMMISSION IV

Sisi Zlatanova¹, George Sithole², Jack Barton³

¹ President, University of New South Wales, Sidney, Australia - s.zlatanova@unsw.edu.au

² Vice President, GeoVariant, Cape Town, South Africa - georgesithole@geovariant.com

³ Secretary, University of New South Wales, Australia - jack.barton@unsw.edu.au

Covid-19 global pandemic affected all countries around the world and restricted people from travelling and participating in conferences and meetings. Despite the challenges, ISPRS has organised its XXIV Congress to stimulate, support and connect geospatial researchers around the globe. After two consecutive virtual events, the XXIV Congress was organised as a hybrid event to allow a larger group of researchers to share their knowledge and communicate their research results. Commission IV is proud to share the successful research endeavours of many members of its working groups, their research teams and graduate students. In the last year before the Congress, the commission hosted monthly webinars at which working groups showcased their activities and achievements. We believe this activity has generated a great interest and supported researchers all over the world. The webinars are available at the web site of Commission IV (2020-2022): <https://www2.isprs.org/commissions/comm4/events/>

The years of the pandemic have changed the world. Managing the social and economic challenges brought by lockdowns and restrictions increased the complexity and interconnectivity of activities in human society. New dimensions for collecting, managing and analysing information, and specifically spatial information, have emerged. The increased pressure on understanding and supporting economic, administrative and social life to maintain sustainable growth and create liveable community environments increased the requirements for spatial decision-making tools. There is a tendency to link spatial information to mobility, social and environmental indices such as human travel behaviour, occupancy estimations, efficient use of building space, safety and security in buildings, greenhouse emissions and heat estimates. The focus on dynamic monitoring and processing real-time sensor data has increased significantly. The developments of Spatial Digital Twins are maturing in the context of providing tools and methods for high density human settlements to be more resilient, sustainable, liveable, and safe.

Commission IV Spatial Information Science (2016-2022) is dedicated to advancing research activities in spatial information sciences for modelling, structuring, management, analysis, visualisation and simulation of data. Much focus has been placed on the third spatial dimension. The research related to spatio-temporal aspects, quality and open data is increasing. Special attention is given to the use of standards and linking spatial models about real-world physical phenomena with sensor, land administration, transportation, building and communication models. The work has largely been implemented in cooperation with international organizations such as OGC, ISO and Web3D. The presented papers demonstrate that the Commission has advanced many aspects of data modelling, data fusion and management, visualization (web-based, VR and AR), simulation, city analytics, and 3D applications.

The Commission consists of 10 scientific areas of research that is coordinated by 10 working groups (WG) and one inter commission working group (ICWG) as follows - WG1: Multidimensional spatial models; WG2: Ontologies, semantics and knowledge representation for geospatial information; WG3: Spatial data analysis, statistic and uncertainty modelling; WG4: Collaborative crowdsourced cloud mapping (C³M); WG5: Indoor/outdoor seamless modelling, LBS and mobility; WG6: SDI: Internet of things and spatial decision support; WG7: Geo-data management; WG8: Geo-computation and geo-simulation; WG9: Geovisualisation, augmented and virtual reality; WG10: Advanced geospatial applications for smart cities and regions; ICWG IV/III: Global mapping: updating, verification and interoperability.

The papers received for the XXIV ISPRS reflect the above-mentioned scientific research areas. The reported research ranges from advancements in new and emerging theories, through experiments and analysis to demonstration of technologies in different applications. The research was captured through papers and abstracts published in the collection of ISPRS Annals and ISPRS Archive. The ISPRS Annals contain 38 papers and the ISPRS Archives contain 91 papers. The diversity of the research presented in the published papers clearly indicate the wide range of topics within the field of Spatial Information Science. Most of the presented research was related to different (3D) applications for smart cities and regions, spatial analysis, quality of data and spatial data management. A rigorous peer-review process by the ISPRS TC IV Scientific Committee contributed to high quality proceedings. The Commission is thankful to the 157 reviewers, who helped review abstract and full papers submitted to Commission IV, for their time and valuable comments.

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Giorgio Agugiaro Delft University of Technology, Delft the Netherlands, **Jamal Jokar Arsanjani** Aalborg University, Aalborg, Denmark, **Pawel Boguslawski** Wroclaw University of Environmental and Life Sciences, Wroclaw, Poland, **Martin Breunig** Karlsruhe Institute of Technology, Karlsruhe, Germany, **Jack Barton**, University of New South Wales, Sydney, Australia, **Maria Antonia Brovelli** Politecnico di Milano, Milan, Italy, **Sidonie Christophe** IGN-France, Paris, France, **Arzu Coltekin** University of Applied Sciences and Arts Northwestern Switzerland, Windisch, Switzerland, **Mahmoud R. Delavar** University of Tehran, Tehran, Iran, **Mulhim Al Doori**, Roads and Transport Authority, Dubai, UAE **Cidalia Costa Fonte** University of Coimbra, Coimbra, Portugal, **James Haworth** University College London, London, United Kingdom, **Umit Isikdag** Mimar Sinan Fine Arts University Istanbul, Istanbul, Turkey, **Ivana Ivanova**, Curtin University, Perth, Australia, **Zhizhong Kang** China University of Geosciences, Beijing, China, **Kourosh Khoshelham** University of Melbourne, Melbourne, Australia, **Mila Koeva** University of Twente, Enschede, The Netherlands, **Margarita Kokla** National Technical University of Athens, Athens, Greece, **Yaolin Liu** Wuhan University, Wuhan, China, **Marguerite Madden** University of Georgia, Athens, Georgia, USA, **Mir Abolfazl Mostafavi** Université Laval, Quebec, Canada, **Gerhard Navratil** Technical University Wien, Vienna, Austria, **Dev Raj Paudyal** University of Southern Queensland, Toowoomba, Australia, **Antonia Spano**, Politecnico di Torino, Italy, **George Sithole** GeoVariant, Cape Town, South Africa, **Emmanuel Stefanakis** University of Calgary, Calgary, Canada, **Wei Tu**, Shenzhen University, Shenzhen, China, **Giuseppina Vacca** University of Cagliari, Cagliari, Italy, **Lucia Diaz Vilarino** University of Vigo, Vigo, Spain, **Sarah Wise**, University College London, London UK, **Hao Wu** National Geomatics Center of China, Beijing, China, **Sisi Zlatanova** University of New South Wales, Sydney, Australia, **Xiao Guang Zhou** Central South University, Changsha, Hunan China