The 7th Smart Data Smart Cities and the 17th 3DGeoInfo conferences, UNSW, Sydney 2022

The 7th International Conference of Smart Data and Smart Cities and the 17th 3DGeoIno conferences were jointly held in Sydney, Australia, from 19 - 21 October 2022. Amid COVID19, the World has experienced tremendous challenges and undergone a significant socio-technological transition in distributed systems, data analytics and digital platforms, and faced emerging digital paradigms such as Digital Twin, Metaverse, Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning (ML) and Big Data applications. 3D spatial modelling has become critical for many applications and disciplines. 3D models are seen as a critical component of spatial Digital Twins for urban and city planning, infrastructure monitoring and maintenance, or buildings' efficiency, comfort and safety. Robust 3D modelling frameworks and tools are essential for local and national governments and international peak bodies to support their road maps towards sustainable built environments. 3D models are critical for many cross-discipline and multi-sectoral challenges to drive research and developments for climate adaptability, city and region liveability, and strengthening coping capacity to natural hazards. These topics were extensively discussed at the joint event.

Figure 1: Audience members and presentations.

The Smart Data Smart Cities conferences is organised by the Urban Data Management Society (UDMS, http://udms.net). UDMS carries the spirit of the oldest GIS organisations in Europe such as EGIS, AM/FM International European Division and MIS, going back to 1971. The aim of UDMS has always been to provide a forum for academia and professionals to

discuss new approaches, to consider new technologies and to share practical experiences in the field of urban data management. Traditionally, the focus has largely been on urban applications. However, regional and rural issues have always been well represented, and since 1999 have been formally included in the working scope of the society. The UDMS symposia were organised every 1.5 years in different parts of Europe. The proceedings of the conference have been digitally available at the web site of the Society since 1999 (http://www.udms.net/proceedings). The Smart Data Smart Cities (SDSC) series of conferences aims to reflect the world changes in urban data managements. SDSC became an annual event with the intention to be organised in different continents. SDSC 2022 is the first conference to be organised in the Southern Hemisphere.

The 3DGeoinfo conference aims to bring together international researchers, experts, software developers and professionals to exchange and discuss state-of-the-art research, exchange experiences and ideas, and facilitate the dialogue on emerging topics in the field of 3D geo-information. It also aims to offer an interdisciplinary and cross-domain forum in the fields of 3D data collection, modelling, management, maintenance, analysis, simulation and visualization of 3D geo information. The conference has been the flagship conference for advances in 3D geo-information for 17 years, and was organised in Delft, The Netherlands (2007), Seoul, Korea (2008), Ghent, Belgium (2009), Berlin, Germany (2010) Wuhan, China (2011), Quebec, Canada (2012), Istanbul, Turkey (2013) Dubai (2014), UAE, Kuala Lumpur, Malaysia (2015), Athens, Greece (2016), Melbourne, Australia (2017), Delft, The Netherlands (2018), Singapore (2019), London, UK (2020), New York, USA (2021). Since 2015, it became a tradition to organise the conference under the auspices of ISPRS and publish the accepted papers in the ISPRS proceedings (Archives and Annals).

Figure 2: Presentations and audience members.

Similar to previous editions, this joint event attracted cutting-edge research, experience, and implementation relevant to city and infrastructure data, analytics, collaborative environments, and platforms for smarter decision-making at local, national, and international levels. This was the first conference after opening the Australia borders and lifting Covid-9 restrictions for participation in conferences and meetings. The organisers had the ambition to provide possibilities to a large audience of researchers to meet and elaborate on their achievements. Therefore, the call for papers addressed broad but exciting areas: Sensing technologies, laser scanning and smart cities, Drones for monitoring/inspecting cities and construction sites, 3D/4D modelling of cities, Monitoring systems, Big data/big spatial data analysis and management BIM and infrastructure, BIM/GIS integration and digital twins, Digital twins levels of maturity, ICT and smart cities, Realtime/web-based/interactive data visualisation, Cities' dashboards, Data science, visualisation and City Analytics, Smart Energy efficiency solutions, Mobility data and visualisation, Data and analytics for circular economy in cities, Participation and empowerment, Privacy, data security challenges in digital twins and smart cities, Open data and open urban platforms, Crowdsourcing data collection and analytics, Smart cities during and after Covid-19, Application of Artificial Intelligence (AI) and Machine Learning (ML), Smart transportation, Net zero emission cities, and Blockchain technology for municipal management.

The accepted papers were organised in four volumes: SDSC ISPRS Annals, SDSC ISPRS Archives, 3DGeoInfo Archives and 3DGeoInfo Archives. The Annals contain in total 96 peer-reviewed scientific papers (SDSC- 48 and 3DGeoInfo – 48). These were selected on the basis of double-blind review of full papers among the papers submitted to the joint event. Each paper was reviewed by three scientific reviewers. The authors of the papers were encouraged to revise, extend, and adapt their work to reflect the comments of the reviewers. The Archives contain 73 papers (SDSC – 39 and 3DGeoInfo

34), which were selected on the basis of extended abstract review. The conference organisers are grateful to the 158 reviewers who provided valuable comments, which contributed to the high quality of papers.

Figure 3: Panel discussion at the end of 18th October, the day for the workshops

Three pre-conference workshops were held on 18th December, providing the possibility to learn about CityGML 3.0, Urban Simulations, Web-based visualisation and streaming, 3D modelling and navigation, EU GATE project on Digital Twin, Liveable City Digital Twin project, and the Australian data housing platform. Invited speakers elaborated on tendencies advancing in Digital Twins for urban modelling and infrastructure. The day was open with keynotes from New South Wales, Victoria and Queensland, who presented the state-of-the-art of state Digital Twins. The workshops were closed with a panel session at which professionals, governments and academia discussed challenges for the use of geoinformation in Digital Twins and Smart Cities.

Figure 4: PhD Seminar Award ceremony

A separate event, a PhD seminar, was organised, which attracted a lot of attention. The seminar hosted short PhD presentations which were evaluated by international mentors. At the end of the day, the award for best presentation was given to Negin Zarbaksh (University College Dublin). Runners up were Josephine Roper (UNSW) and Olaf Wysocki (Technical University of Munich). The prize was awarded at the evening reception.

The program consisted of scientific presentations, keynote speeches, panel discussions and workshops. The conference was opened by Minister Rob Stokes and Minister Victor Dominello. The scientific keynotes speakers were Prof. Volker Coors (HFT Stuttgart, Germany, USC, US), Prof. Flora Salim (UNSW, Sydney, Australia), Prof. Nick Bailey (University of Glasgow, UK) Prof. Debra Laefer (NY University, USA), Prof. Michael Batty (UCL, UK), Prof. Sugie Lee (Hanyang University, Korea), Prof. Polly Hudson (UCL, UK) and Prof. Elizabeth Wentz (Arizona State University, USA) who discussed different aspects of Smart Cities, 3D modelling and Digital Twins for various applications.

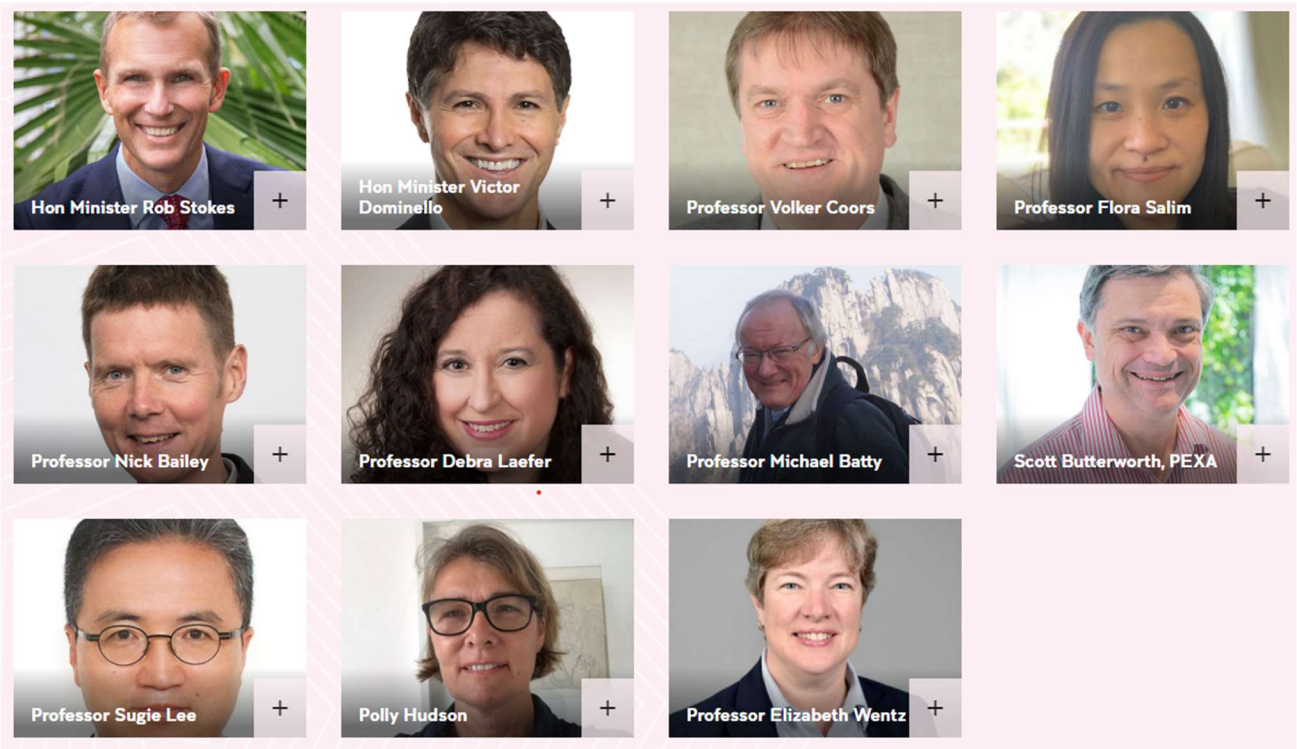

Figure 5: Keynote speakers

All presentations were organised in 27 sessions, under the following themes: Building/City data analytics and modelling (1 and 2), Voxel modelling, Point cloud processing, Smart Cities in action, City and Digital Twin (1 and 2), Climate change and urban energy, Open source and open data modelling, Smart data modelling and simulation (1and 2), COVID-19 and pandemic, Smart cities planning and design (1, 2 and 3), Smart remote sensing, CityGML and its applications, Extended reality and smart cities, Smart active transport, Digital Twin special, Transport data, Spatial Information-based data analytics and modelling, AI and Digital Modelling (1 and 2), Smart transport infrastructure and Smart city analytics. The Scientific sessions were blended with industry presentations to provide more opportunities to exchange ideas and experiences, and connect people and researchers from all over the world. The two industry sessions, Sensing and Visualising Smart Cities**,** and Industry and Government, were very well attended.

Figure 6: Prof. Pettit opens the conference, Minister Dominello gives a talk, and drinks before the Conference dinner

The five awards were presented by the Dean of the Faculty of Arts, Design and Architecture and the deputy Head Research of the School for Built Environment during the conference dinner, as follows:

- Best Paper SDSC: Yi Lu, Shawn Laffan, Christopher Pettit (Australia) THE INTEGRATION OF CELLULAR AUTOMATA AND WHAT IF? FOR SCENARIO PLANNING: FUTURE RESIDENTIAL EXPANSION IN THE CITY OF IPSWICH
- Best young researcher paper SDSC: Xuan Li, Jae Hyun Ha and Sugie Lee, (Korea) MOBILITY RESILIENCE OF COMMUTE TRIPS DURING THE COVID-19 PANDEMIC IN SEOUL, KOREA
- Best Paper 3DGeoInfo: Ihab Hijazi, Andreas Donaubauer, Annika Hamm, Antonia Falkenstein, Thomas H. Kolbe (Germany) URBAN GROWTH SIMULATION USING URBAN DYNAMICS AND CITYGML: A USE CASE FROM THE CITY OF MUNICH
- Best young researcher paper 3DGeoInfo: Son H. Nguyen, Thomas H. Kolbe (Germany) for the paper PATH-TRACING SEMANTIC NETWORKS TO INTERPRET CHANGES IN SEMANTIC 3D CITY MODELS
- Sensors Travel Award: Harshit, Kushwaha, S. K. P.; Jain, Kamal (India) for the paper GEOMETRIC FEATURES INTERPRETATION OF PHOTOGRAMMETRIC POINT CLOUD FROM UNMANNED AERIAL VEHICLE.

The conference was attended by approximately 274 participants from 35 countries. 170 of them were physically present at the UNSW venue and 104 were following on-line.

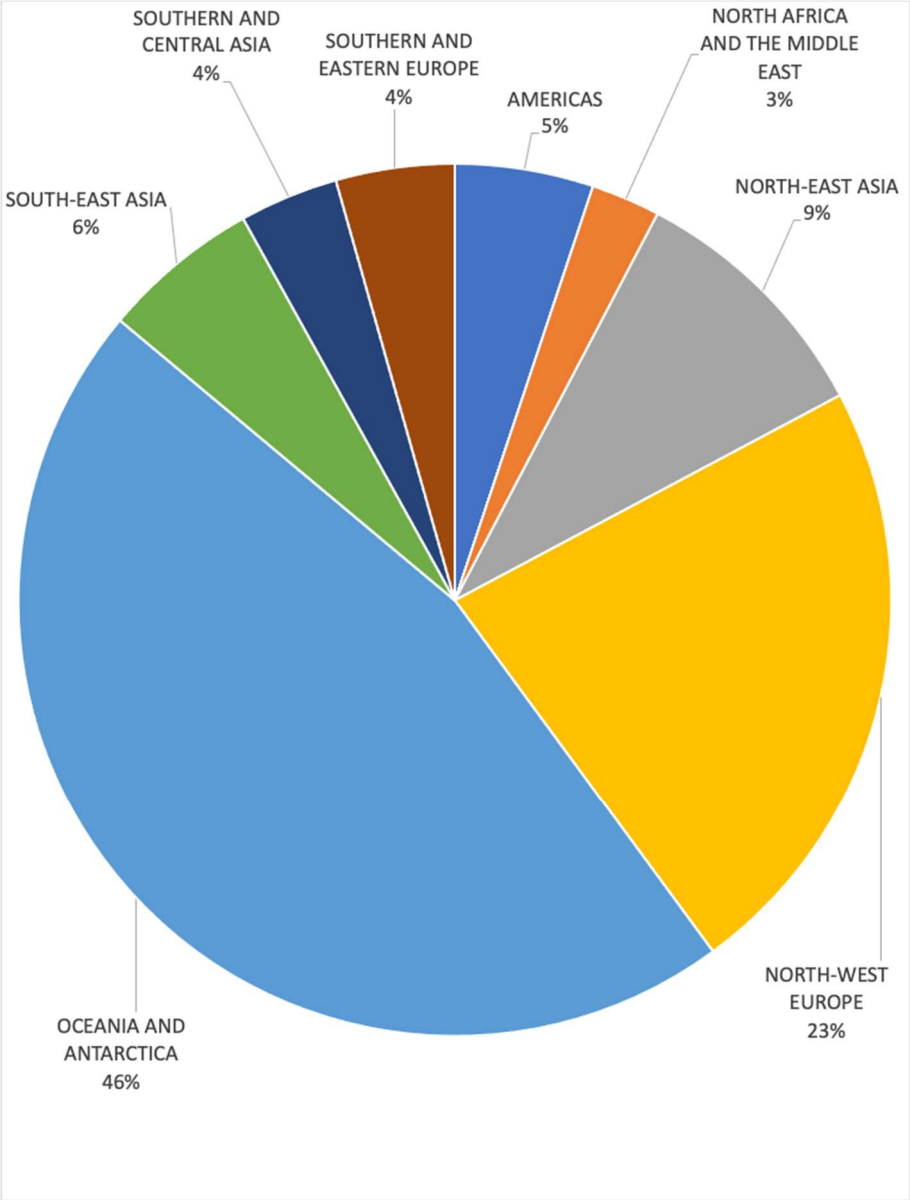

Figure 7: Conference, participants, grouped according to the Standards Australia Classification

The next conferences will be organised again separately in Europe as follows: 3DGeoInfo will be hosted by Technical University Munich, on 12-14 September 2023 in Munich, Germany, and the SDSC conference will be organised by University of West Attica – Athens on 19-22 September 2023, Athens, Greece.

The local organisers of the 7th Smart Data Smart Cities and 17th 3DGeoInfo conferences:

Prof Chris Pettit (chair), Prof. Hoon Han (co-chair), Prof. Sisi Zlatanova, Dr. Cynthia Wang, Dr Sara Shirowzhan, Dr. Brian Lee, Dr. Jack Barton, Claire Daniel, Alessandra Buxton, James Sankar, A/Prof. Mohsen Kalantari, Dr. Mitko Aleksandrov, Dr. Abdoulaye Diakite.