Conferences Program and Information

Geo Delft Conferences 2018

ISPRS Technical Commission IV Symposium

1 – 5 October

13th 3D GeoInfo Conference

1 - 2 October

6th International FIG Workshop on 3D Cadastres

2 – 4 October

3rd International Conference on Smart Data and Smart Cities

4 – 5 October

SUPPORTED BY:

KONINKLIJKE NEDERLANDSE
AKADEMIE VAN WETENSCHAPPEN

ORGANISED BY:

UNSW AUSTRALIA

Hochschule für Technik Stuttgart

UNIVERSITY OF TWENTE.

TU Delft Delft University of Technology

isprs information from imagery

3D GeoInfo CONFERENCE

EuroSDR

3D Cadastres

erc European Research Council Established by the European Commission

UDMS urban data management society

VOLTA innoVation in geOspatiaL and 3D daTA

OGC® Open Geospatial Consortium, Inc.

FIG

GIN Geo-Informatie Nederland

SPONSORED BY:

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SLAGBOOM EN PEETERS AERIAL SURVEYS

ORACLE

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esri Nederland

Gemeente Rotterdam

Springer

1spatial

MEDIAPARTNERS:

remote sensing an Open Access Journal by MDPI

GEOSPATIAL WORLD

GeoConnexion

urban science an open access journal by MDPI

sensors an Open Access Journal by MDPI

MY DEAR DRONE

GIS magazine

isprs International Journal of Geo-Information an Open Access Journal by MDPI

Content

LOCAL ORGANISING COMMITTEE
GEO DELFT CONFERENCES 2018

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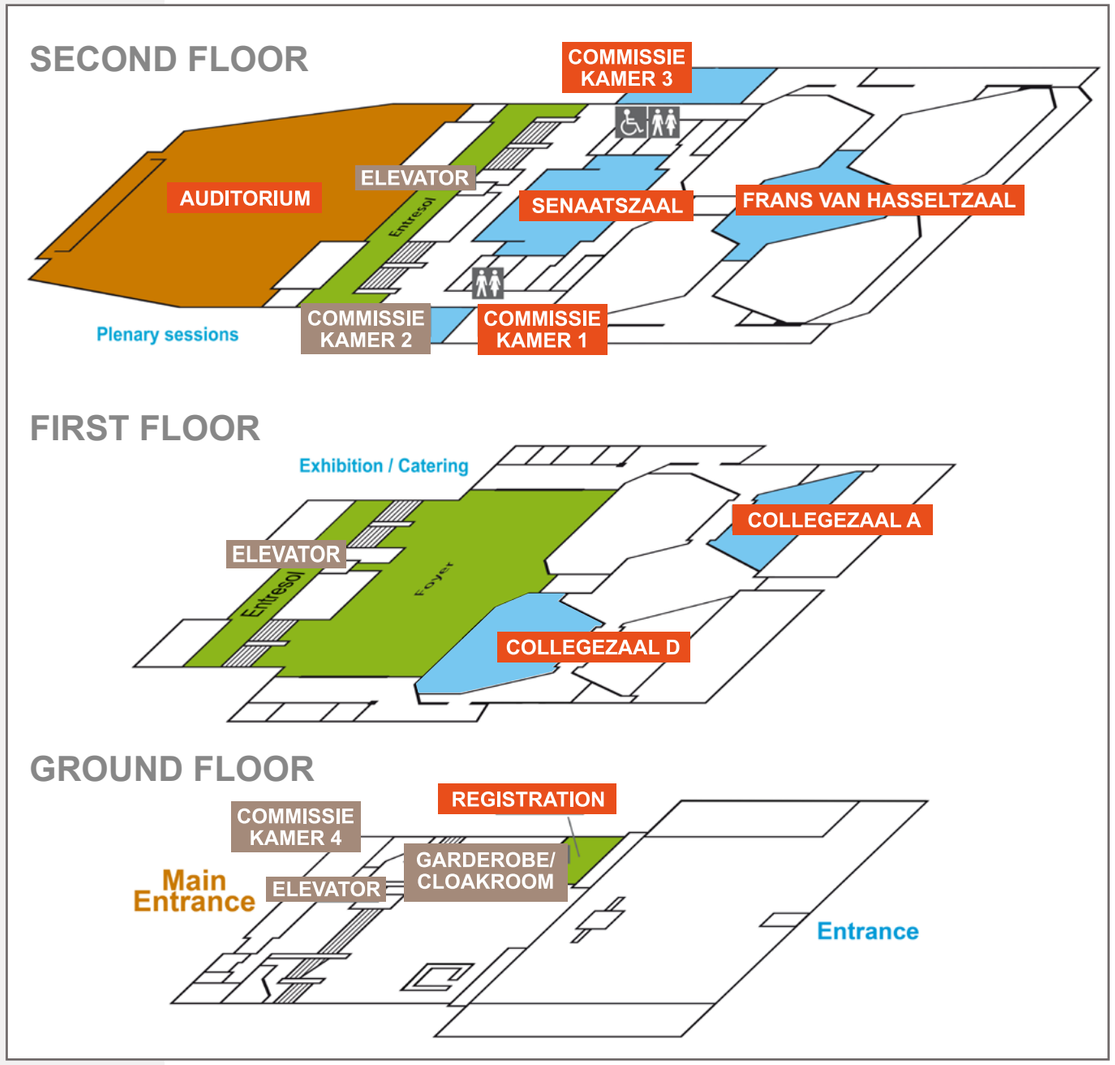
Aula floor map



Word of welcome

Delft, October, 2018

Dear participants,

A warm welcome to the Geo Delft Conferences 2018 in the Aula Congress Center at Delft University of Technology! By organizing together four renowned geo-information events, there is a lot of great content to choose from. We hope and expect that the interaction between the four communities will be highly appreciated. The four events are: 1. the ISPRS (International Society for Photogrammetry and Remote Sensing) Technical Commission IV Spatial Information Science Symposium, 2. the 13th 3D GeoInfo Conference, 3. the 6th International FIG (International Federation of Surveyors) Workshop on 3D Cadastres, and 4. the 3rd International Conference on Smart Data and Smart Cities by the Urban Data Management Society (UDMS). Never before did these four events join forces.

This programme booklet contains all practical information needed to find your optimal route through the conferences. Based on open call for contributions, authors have submitted their proposals to one of the four events. The contributions have been reviewed by the members of the relevant Programme Committees. Based on the reviews the programme chairs have selected the papers, which we asked to submit a revised full paper considering the review comments. The scientific content has been collected in proceedings, which are all open access. The FIG publishes the proceedings of the 3D Cadastres workshop. Copernicus publishes in the ISPRS Annals and ISPRS Archives the proceedings of the three other events.

In total 500 participants are expected, attending the conferences and the related activities, such as the exhibition, field trips, posters, joint plenary sessions, best paper awards, and various social events. The plenary opening is combined with a session 'Best of the Netherlands', in which we proudly present a range of advanced geo-information solutions. The keynote presentations are all planned in plenary session, where the different event mingle. A range of exiting field trips are organized, including: Delft Spoorzone (the first ever real 3D parcels registered by Dutch Cadastre), Monitoring tilting Old Church in Delft (by Sweco), Maeslantkering (and visit to Datalab Rijkswaterstaat), 3D Rail corridor modelling (by Fugro), 3D-SDI/ SmartCity (Rotterdam).

The partner organizations are acknowledged for their enthusiastic collaboration during the preparation of the Geo Delft 2018 Conferences: University of New South Wales, Hochschule für Technik Stuttgart, University of Twente, International Society for Photogrammetry and Remote Sensing, International Federation of Surveyors, Geo-Informatie Nederland, Open Geospatial Consortium, and Delft University of Technology. Further thanks to the following media partners for announcing the workshop via their various channels. We are grateful to the generous contributions of our sponsors. We are extremely proud that our event is supported by the Royal Netherlands Academy of Arts and Sciences (KNAW)!

Finally, we would like to thank all authors for their submission, the Programme Committee members for their diligent work in assessing the quality of the contributions. We are very much looking forward to great content and stimulating interactions within the Geo Delft 2018 Conferences!

Peter van Oosterom, *Delft University of Technology, the Netherlands, 3D Cadastres*
Sisi Zlatanova, *University of New South Wales, Sydney, Australia, ISPRS,*
Jantien Stoter, *Delft University of Technology, the Netherlands, Co-chair 3D GeoInfo*
Mila Koeva, *University of Twente, the Netherlands, Co- chair 3D GeoInfo*
Volkers Coors, *Hochschule für Technik Stuttgart, Germany, Smart Data Smart Cities*

LINKS TO THE OPEN AND ON-LINE PROCEEDINGS

The ISPRS TC IV 'Spatial Information sciences' Symposium (1 – 5 October 2018):
- https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/IV-4/
- https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-4/

The 13th International 3D GeoInfo Conference (1 – 2 October 2018):
- https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/IV-4-W6/
- https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-4-W10/

The 6th International FIG Workshop on 3D Cadastres (2 – 4 October 2018):
- http://www.gdmc.nl/3DCadastres/workshop2018/programme/

The 3rd International Conference on Smart Data and Smart Cities (4 – 5 October 2018):
- https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/IV-4-W7/
- https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-4-W11/

Welcome to Delft

Creating History, is the slogan of Delft. The city has a lot of history for example the famous painter Johannes Vermeer, the Old and New church in the city center and Museum Prinsenhof. It is also home of the Technical University. The university is well known for its diverse studies. Every year thousands of (inter)national students come to Delft to start their bachelor, masters or their PhD. Together with the historical city center and the University, Delft is creating history.

PRACTICAL INFORMATION

WIFI

Network: GeoDelft2018
Password: tudelft2018

TRANSPORT

Taxi
For a taxi you can call:
Deltax, +31 (0)15 219 19 19 or visit www.dtdeltax.nl
Taxi Delft +31 (0)15 261 21 21 or visit www.ataxidelft.nl

Dam Delft shuttle
Cruise to your next destination in an electronical tuk tuk in Delft. From Monday to Friday they are available from 10:00 in the morning until 18:00 in the evening. For more information you can call +31 (0)6 211 42 987 or you can visit www.dam-nederland.nl

Public transportation
The auditorium is accessible via public transport. The following busses will bring you from the Central Train Station Delft to the Auditorium of the TU

- Bus 69 (direction TU Zuid): alight at stop “TU Aula”
- Bus 40 (direction Rotterdam Centraal): alight at stop “TU Aula”
- Bus 55 (direction Zoetermeer): alight at stop “TU Aula”.

MoBike
Since March Delft has a sharing bike concept. At the campus of the TU Delft and in the city centre you can find grey and orange bikes. This is the MoBike, you download an app and fill in your contact- and credit card details. After that you can scan your bike and go. Per 30 mins you pay €0,50.

ADDITIONAL CONFERENCES INFORMATION

Certificate of attendance
Certificate of Attendance can be received at the registration desk when you hand in the completed evaluation form

Badges/Tickets
All participants will receive a personal badge upon registration. Please be so kind to wear your badge during all Conference sessions and social events.
Accompanying persons are not allowed to attend the scientific programme, coffee breaks and/or lunches or social events if not paid for.

Lunches and coffee breaks
During the conferences, the coffee breaks and lunches will be held in the Foyer on the first floor. Coffee/tea and lunches are included in the registration fee.

Mobile phones
As a courtesy to speakers, we kindly request you to switch off your mobile phones before
entering conference sessions.

Conference language
The official conference language is English. There will be no simultaneous interpretation available.

Exhibition
The exhibition will start on Tuesday 2 October and will end on Thursday 4 October 18:00. Several companies will present or promote their products or will provide you with information. The companies that will on the exhibition floor are: Kadaster, CGI, Slagboom & Peeters Luchtfotografie B.V., Sweco, Pix4D and Bentley Systems. Geo Information Netherlands (GIN) will also have an exhibition.

ISPRS Poster display
Posters will be displayed in the foyer during the whole duration of the conference.

Presenting
Authors are kindly requested to be present at their poster for presentation on:
Tuesday October 2 from 12:30-13:30
Dismantling on:
Friday, October 5 - as of 17:00.
Posters not removed after 18:00 will be discarded

First Aid
At the reception desk at the entrance of the Aula Conference Centre a first aid station is available.

Emergency contact information
At the conference venue a certified first aid worker is available.

Delft Police Department
Jacoba van Beierenlaan 1
2613 HT Delft
Phone: 0900 – 8844 (general phone number in the Netherlands)
Emergencies: 112 which will connect you to the police, ambulance or fire department.

Hospital
Reinier de Graaf Gasthuis
Reinier de Graafweg 5
2625 AD Delft
Phone: +31 15 260 30 60

Liability
The Organising Committee cannot accept any responsibility for personal accidents or loss / damage of private property of the participants. Participants are advised to take out insurance as they consider necessary.

Lost and found
For lost and found objects please go to the reception desk at the entrance of the Aula Conference Centre.

PLANNING YOUR JOURNEY

For planning your transportation you can use the site www.9292.nl and you can download the app. Here you can plan your journey within Delft.

SOCIAL EVENTS

Welcome reception Monday 1 October 18:30 - 20:30
To start the conferences there will be a welcome reception for all participants. There are several speakers during this reception to welcome you at the Technical University of Delft, the conferences and to welcome you in Delft.

- Prof. dr.ir. Tim van der Hagen, Rector Magnificus & President Delft University of Technology;
- Prof. dr. Sisi Zlatanova, President Technical Commission IV Spatial Information Science – International Society for Photogrammetry and Remote Sensing & University of New South Wales, Sydney, Australia;
- Ir. Bas Vollebregt of the Municipality of Delft. He is the alderman of Economy, Culture, Real Estate and Land Issues.

Conference dinner Tuesday 2 October 19:00
The first conference dinner is on Tuesday 2 October and will be at Lijm and Culture on the TU Campus. It is a 10 minute walk from the auditorium. You head to the Cornelis Drebbelweg, then at the Cornelis Drebbelweg you turn right. Walk for 350 meter straight and when you are on the Rotterdamseweg you turn left. Walk for 270 meter and Lijm and Culture will be on your right hand. A pre-registration is required for this conference dinner. On site registration is not possible.Transportation from the auditorium to the dinner location will not be organized.

UNSW reception Wednesday 3 October 17:30
On Wednesday there will be a UNSW reception. This reception will also take place in the foyer of the Aula. The Dean of UNSW will also say a few words on video.

Conference dinner Thursday 4 october 19:00
The second conference dinner will be held on the 4th of October on Thursday at X- TU Delft. This location also has a walkable distance from the auditorium. If you head to the Cornelis Drebbelweg you walk 750 meter an you are there!. A pre-registration is required for this conference dinner. On site registration is not possible. Transportation from the auditorium to the dinner location will not be organized.

ADDRESSES

Geo Delft 2018 Conferences will take place in the Aula
Mekelweg 5
2628 CC Delft

The first conference dinner will take place at Lijm and Culture
Rotterdamseweg 272
2628 AT Delft

The second conference dinner will take place at X-Delft
Mekelweg 8 -10
2628 CD Delft

Program at a Glance

			ISPRS track 1	ISPRS track 2	3D Geoinfo track 1	3D Cadastres track 1	SDSC track 1	SDSC track 2
Monday 1 October 2018	Session 1: Plenary/keynote	09:00 - 10:30	*Keynote speaker Dorine Burmanje* Special session: Best of the Netherlands					
	Coffee break	10:30 - 11:00	Foyer					
	Session 2	11:00 - 12:30	Collegezaal A	Frans v. Hasselt	Senaatzaal			
	Lunch	12:30 - 13:30	Foyer					
	Session 3	13:30 - 15:00						
	Field trip Sweco	13:30 - 17:00	Monitoring tilting Tower old Church Delft					
	Coffee break	15:00 - 15:30	Foyer					
	Session 4	15:30 - 17:00			(End: 18:00)			
	Welcome reception	18:30 - 20:30	Foyer					
Tuesday 2 October 2018	Session 5	09:00 - 10:30			(Start: 08:00)			
	Field trip Gemeente Delft	09:00 - 12:00	Train Station/City Hall Delft, 3D Cadastre					
	Coffee break	10:30 - 11:00	Foyer					
	Session 6	11:00 - 12:30						
	Lunch/Poster viewing	12:30 - 13:30	Foyer					
	Session 7: Plenary/keynote	13:30 - 15:00	*Keynote speakers: Claus Nagel en Rod Thompson* Best paper award 3D Cadastres Announcement: 3D Singapore 2019					
	Coffee break	15:00 - 15:30	Foyer					
	Session 8	15:45 - 17:15			(15:30 - 18:00)	Collegezaal D		
	Conference dinner	19:00	Lijm en Cultuur					
Wednesday 3 October 2018	Session 9	09:00 - 10:30						
	Field trip Rijkswaterstaat	09:00 - 12:00	Maeslantkering Rijkswaterstaat					
	Coffee break	10:30 - 11:00	Foyer					
	Session 10	11:00 - 12:30						
	Lunch	12:30 - 13:30	Foyer					
	Session 11	13:30 - 15:00						
	Field trip Gemeente Rotterdam	13:30 - 17:00	3D-SDI/SmartCity Rotterdam					
	Coffee break	15:00 - 15:30	Foyer					
	Session 12	15:30 - 17:00						
	Welcome reception UNSW	17:30 - 19:30	Foyer					
Thursday 4 October 2018	Session 13	09:00 - 10:30					Senaatzaal	Comm.Kamer 3
	Coffee break	10:30 - 11:00	Foyer					
	Session 14: Plenary/keynote	11:00 - 12:30	*Keynote speakers: Antonio Jara and Ruizhi Chen*					
	Lunch	12:30 - 13:30	Foyer					
	Session 15	13:30 - 15:00						
	Field trip Fugro	13:30 - 17:00	3D Rail corridor modelling - Start at Station Delft					
	Coffee break	15:00 - 15:30	Foyer					
	Session 16	15:30 - 17:00						
	Oracle point cloud tutorial	15:30 - 17:00	Commissiekamer 1					
	Conference dinner	19:00	X- TU Delft					
Friday 5 October 2018	Session 17	09:00 - 10:30	Collegezaal A	Frans v. Hasselt			Collegezaal A	Collegezaal A
	Coffee break	10:30 - 11:00	Foyer					
	Session 18	11:00 - 12:30					Senaatzaal	Comm.Kamer 3
	Lunch	12:30 - 13:30	Foyer					
	Session 19	13:30 - 15:00						
	Coffee break	15:00 - 15:30	Foyer					
	Session 20: Plenary/keynote	15:30 - 17:00	Awards session ISPRS and SDSC Closing session					

Conferences program

Best of NL-session Monday 1 October 09:00 - 10:30

Municipality of Rotterdam

Joris Goos, *Digital City Rotterdam: new technologies, smart collaborations*

There is a world of endless hard work behind our transition from suboptimal business silos to the effective use of virtual (3D and 4D) cities. Our business cases slowly shift from “keeping the secret” to “sharing the knowledge”. Our users become proficient and ask for complex self-service solutions that crossover many domains.

The city of Rotterdam has been working with digital data for 40 years. Companies and governments worldwide have introduced common languages and open standards and many of the traditionally expensive information (on just about anything) have become open data or at the very least easily accessible. We’ve collected and organized huge amounts of data and the skills to transform it into information and knowledge… now is the time to enjoy the benefits.

Think digital cities, smart assets and smart citizens, digital collaborations, building information management and the merger of geo-information and business intelligence. Rotterdam is one of the most dynamic and action happy local governments in the Netherlands – well aware of the changing roles of local government – and we are ambitious.

CGI

Robert Voûte, *One world to live in*

The environment we live in is a continuous space. Whether you will look at it as a globe, or more locally, you will always find a 3D way to describe or measure this world. So far geodesy and surveying were merely looking at the outdoor parts of our world stopping the description at the front door and walls of buildings. Architects though looked at the (more private) parts behind these walls. But for a human it is all part of one world, with doors and windows connecting the two usable parts.
Now we are pushed to connect the descriptions as well, because we do not want to use two separate systems anymore: two apps, two coordinates systems and intermittent navigation. Buildings become larger and more complex so they will behave just like an outdoor world at the same time.
CGI is focused on combining the two worlds, trying to use outdoor methods of measuring in buildings, experimenting with geodetic principles in indoor surveying and making seamless navigation available. So we participate in scientific research because many issues will have to be solved.

Geocraft, geo information accessibele for everyone

Teenagers build the future of the Netherlands in Minecraft. Geo information is not only for adults. Children in The Netherlands organise themselves in a Minecraft community with their own rules in the game. They developed Geocraft it has become a platform which plays an important role in education and epoch-making projects. The kids on stage will let everyone know that geo information is accessible for everyone. Thanks to GeoFort this concept is implemented. During the Best of the Netherland session the children will come up.

Keynotes

MONDAY 1 OCTOBER 9:10 – 9:35: DORINE BURMANJE

Dorine Burmanje

New Dimensions, Better Information

Dorine Burmanje is the CEO of Kadaster, the Netherlands' Cadastre, Land Registry and Mapping Agency which collects and registers administrative and spatial data on property and the rights involved. This also goes for ships, aircraft and telecom networks. Doing so, Kadaster protects legal certainty. Kadaster is also responsible for national mapping and maintenance of the national reference coordinate system. Furthermore, it is an advisory body for land-use issues and national spatial data infrastructures.
Dorine Burmanje's international orientation is reflected in her active involvement as Co-Chair of the United Nations initiative on Global Geospatial Information Management (UN-GGIM).

TUESDAY 2 OCTOBER 13:30 – 15:00: CLAUS NAGEL AND ROD THOMPSON

Claus Nagel

Use Cases of 3D City Information Models

Dr. Claus Nagel is CTO of the company virtualcitySYSTEMS GmbH located in Berlin, Germany. virtualcitySYSTEMS is a leading expert in the field of 3D city modelling and provides software solutions for the management, distribution, web-based presentation as well as analysis and simulation of massive 3D geo data based on open standards and interfaces. Dr. Claus Nagel graduated as Master of Science at the University of Applied Sciences Karlsruhe in 2007, and worked on early methods for the conversion from BIM/IFC to OGC CityGML in his Master's thesis. From 2007 to 2013, he was research assistant in the research group of Prof. Dr. Thomas H. Kolbe at the Institute for Geodesy and Geoinformation Science at Technische Universität Berlin. In his PhD thesis "Spatio-Semantic Modelling of Indoor Environments for Indoor Navigation", Dr. Nagel presented a framework for the representation of indoor spaces addressing indoor navigation challenges such as context-aware path planning, localization, tracking and guidance. Concepts of this research work were adopted for the OGC IndoorGML standard. Since 2008, he is vice chair of the CityGML Standards Working Group at OGC and co-editor of the CityGML and IndoorGML standards. Dr. Nagel is a core developer and head of the steering group of the open source CityGML database solution 3D City Database.

Rod Thompson

3D Cadastres: 30 years back, 30 years ahead

In the early 1980's, Rod Thompson was presented with a challenge. The Department of Mapping and Surveying was in the process of capturing the cadastral maps for the state of Queensland in digital form. The challenge was what to do with the data – how and where to store it, and how to make it accessible. He implemented a 2D+t solution using a relational database, which at the time was counter to conventional wisdom, but is now considered "best practice". This began an interest he still has in the storage and representation of spatial data, leading to a PhD, and continuing research in the field. He is active in the 3D Cadastral research community through Delft University of Technology and the University of Southern Queensland. He is author (or co-author) of large number of publications, of which 25 are associated with the storage of Cadastral data.

THURSDAY 4 OCTOBER 11:00 – 12:30: RUIZHI CHEN AND ANTONIO JARA

Ruizhi Chen

Smartphone positioning and 3D Mapping Indoors

Dr. Ruizhi Chen is currently the Director of the State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing, Wuhan University. He used to work an Endowed Chair and Professor in Texas A&M University Corpus Christ, U.S. and Head & Professor of the Department of Navigation and Positioning at the Finnish Geodetic Institute, Finland. He has published two books: Geospatial Computing in Mobile Devices and Ubiquitous Positioning and Mobile Location-Based Services in Smart Phones. He is an author/co-author of more than 170 scientific papers and 5 book chapters. His research results have been selected twice as cover stories in "GPS Worlds". His Ph.D. students have received 7 international student paper awards, including 3 times of student-wining papers in the Institute of Navigation for 2010, 2012 and 2013. Dr. Chen is the general chair of the IEEE conferences "Ubiquitous Positioning, Indoor Navigation and Location-based Services" Editor-in-Chief the Journal of Global Positioning Systems and associate editor of the Journal of Navigation. Dr. Chen was the President of the International Association of Chinese Professionals in Global Positioning Systems (2008) and board member of the Nordic Institute of Navigation (2009-2012). Dr. Chen's research interests include smartphone positioning indoors/outdoors, context awareness and satellite navigation.

Antonio Jara

Smart Destinations: challenges and opportunities to create sustainable smart cities in the data economy

Antonio J. Jara (CEO), founder of HOP Ubiquitous S.L. (www.hopu.eu), vice-chair of the IEEE Communications Society Internet of Things Technical Committee, and adjoint scientifique in the University of Applied Sciences Western Switzerland. He did his PhD (Cum Laude) at the University of Murcia (UMU), Spain. These PhD results present a novel way to connect objects to Internet-enabled platforms in an easy, secure and scalable way. He also carried out a MBA and entrepreneurship formation in the ENAE business school and UCAM (2012). He received entrepreneurship awards from ENAE (sponsored by SabadellCAM financial services), emprendeGo (sponsored by Spanish government), IPSO Alliance Award (Sponsored by Google) for its disruptive innovation in the IoT, selected and mentored by the acceleration program FABULOUS (part of the FIWARE EU project). Antonio Jara as part of HOP Ubiquitous is focused on the Smart Cities market with solutions for citizens engagements, tourism, active participation, physical web and environmental monitoring (air quality sensors) in projects such as ENIAC SAFESENS, interoperability / pilots (SmartSDK, Synchronicity, Organicity, BeinCPPS) and also in several actions related to security/privacy (INPUT and FORTIKA). Antonio Jara has also participated in over 100 international events about Internet of Things as Speaker, over 100 international publications / papers (~2700 citations and impact factor h=28), he holds several patents in the IoT domain and finally he has advised in the IoT domain to companies such as Microsoft and Fujitsu.

Fieldtrips

Sweco: Monitoring tilting Old Church Delft

Monday 1 October 2018, 13:30 - 17:00
Max 25 participants
Registration fee: € 25,00

Meeting point:
Lobby TU Delft Aula Congress Centre. Transportation will be arranged. Departure time: 13:30

The tower of the Oude Kerk was built at the end of the 13th century on a subdued part of the canal. Already during construction, the tower collapsed, after which the builders have finished the tower as much as possible. The tilt is currently almost 3 m at the tip of the tower.
The municipality of Delft is the manager of the tower and has been commissioned by TNO and Deltares to conduct research into the stability of the tower. This has shown that the tower can remain in motion for centuries, with the inclination increasing even further. Sweco has been carrying out measurements since 2001 to monitor the tilt.
During the construction of the railway tunnel in Delft, at 140 m distance, the tower fell outside the area that was monitored by the contractor. That is why the monitoring of the inclined position has been intensified by the use of continuous measuring systems. With sensors, Sweco measures the inclination and setting of the tower every ten minutes with high accuracy, to signal changes in the dislocation movement early and thus inform the municipality about the condition of the tower.

Rijkswaterstaat, Maeslantkering Datalab

Wednesday 3 October 2018, 8:30 - 12:30
Max 35 participants
Registration fee: € 25,00

Meeting point:
Lobby TU Delft Aula Congress Centre. Transportation will be arranged. Departure time: 8:30

The Maeslantkering is a storm surge barrier on the Nieuwe Waterweg, Netherlands, controlled by a supercomputer. It closes if the city of Rotterdam is threatened by floods and is part of the Delta Works. It is one of largest moving structures on Earth, rivalling the Green Bank Telescope in the United States and the Bagger 288 excavator in Germany.
On 10 May 1997, after six years of construction, Queen Beatrix opened the Maeslantkering. The Maeslantkering is expected to be closed once every ten years due to a storm surge. The barrier is closed for testing once a year, usually in the end of September or the beginning of October, just before the beginning of the storm season mid-October. The software that drives it is written in C++ and consists of 200,000 lines of code for the operational system and 250,000 lines of code for the simulation systems. The barrier is designed to withstand a storm that has an occurrence of only once in 10,000 years.

The program consists of a guided tour at Maeslantkering and a presentation on the Maeslantkering and Datalab.

High-accuracy 3D mapping of the complete railway corridor

Thursday 4 October 2018, 14:00 - 17:00
Max 25 participants
Registration fee: € 25,00

Meeting point:
L obby TU Delft Aula Congress Centre. Transportation will be arranged. Departure time: 13:30

With the Rila technology a digital twin of the railinfrastructure can be produced efficiently.
Capturing of the data is possible without disturbing the existing train operation. Instead of that, the existing train operation is used.
The dataset produced brings the railway to the desktop of rail professionals, giving them the opportunity to engineer and manage the rail assets in the most efficient way.
During the excursion the operation op Rila in passenger service will be demonstrated. The technology used and results will be further explained and presented.

Municipality Delft, Spoorzone/3D Cadastre

Tuesday 2 October 2018, Tuesday, 9:00-12:00
Max 25 participants
Registration fee: € 25,00

Meeting point:
Lobby TU Delft Aula Congress Centre. Transportation will be arranged. Departure time: 08:45

We will take you to the heart of the Delft Railway Area project (“Spoorzone Delft”), the new building of the combined railway station/municipal offices of the city of Delft. TU Delft and the Dutch Cadastre carried out a pilot in 2016 in which the 3D map of the new building was registered with the Cadastre. Never before had a three dimensional map been legally registered. The building ownership is with three different proprietors and covers a relatively small surface. This made the structure uniquely suitable for the pilot. During the excursion a presentation will be given about the pilot, followed by a tour of the municipal offices and the new railway station, including the underground bicycle park for 5000 bicycles and the railway platforms in the tunnel.

Municipality Rotterdam: 3D-SDI/ SmartCity Rotterdam experience

Wednesday 3 October 2018, 14:00 - 17:30
Max 20 participants
Registration fee: € 25,00
Please bring your passport

Meeting point:
Lobby TU Delft Aula Congress Centre. Transportation will be arranged. Departure time: 13:15

We are happy to welcome you in our modern and innovative city; Rotterdam. During this afternoon we will discuss themes like 3D city modelling, Smart Cities and the merger of geo-information and business intelligence. We will show results, present our vision but will also facilitate discussions, answer questions and we are also curious to learn from your experiences! We will provide an informative but informal setting on the 35th floor of our office located in “the Rotterdam”; with 160.000 m2 the largest building in the Netherlands. From here you will have a fantastic panoramic view of the city.

Note: This program will elaborate on the presentation of Joris Goos during the planar program of Geo-Delft entitled: Digital City Rotterdam: new technologies, smart collaborations (Scheduled on Monday morning 1st of October)

MONDAY 1 OCTOBER – FRIDAY 5 OCTOBER

Organising Committee

Hussein M. Abdulmuttalib Dubai Municipality, Deira, Dubai UAE
Giorgio Agugiaro Austrian Institute of Technology, Vienna, Austria
Thomas Blaschke University of Salzburg, Salzburg, Austria
Pawel Boguslawski Wroclaw University of Science and Technology, Wroclaw, Poland
Martin Breunig Karlsruhe Institute of Technology, Karlsruhe, Germany
Maria Antonia Brovelli Politecnico di Milano, Milan, Italy
Sidonie Christophe IGN-France, Paris, France
Arzu Coltekin University of Zurich, Zurich, Switzerland
Mahmoud R. Delavar University of Tehran, Tehran, Iran
Mulhim Al Doori American University, Dubai, UAE
Suzana Dragicevic Simon Fraser University, Burnaby, Canada
Eric Guilbert Université Laval, Québec, Canada
James Haworth University College London, London, United Kingdom
Guoman Huang Chinese Academy of Surveying and Mapping, Beijing, China
Umit Isikdag Mimar Sinan Fine Arts University Istanbul, Istanbul, Turkey
Mikhail Kanevski University of Lausanne, Lausanne, Switzerland
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
Klaus Komp EFTAS Remote Sensing, Transfer of Technology, Muenster, Germany
Bart De Lathouwer Open Geospatial Consortium, Kontich, Belgium
Heather Leason OSM, Qatar
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
George Percivall Open Geospatial Consortium, Maryland, USA
Michael Peter University of Twente, Enschede, The Netherlands
Chris Pettit University of New South Wales, Sydney, Australia
George Sithole University of Cape Town, Cape Town, South Africa
Sisi Zlatanova University of New South Wales, Sydney, Australia

LINKS TO THE OPEN AND ON-LINE PROCEEDINGS

The ISPRS TC IV 'Spatial Information sciences' Symposium (1 – 5 October 2018):
- https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/IV-4/
- https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-4/

Full programme ISPRS

MONDAY 1 OCTOBER

SESSION 1 **PLENARY/KEYNOTE 9:00 – 10:30** **AUDITORIUM**
OPENING / BEST OF NL SESSION
Chair: Peter van Oosterom

- **Welcome by ISPRS president**
  Christian Heipke
- **New Dimensions, Better Information**
  Dorine Burmanje
- **Digital City Rotterdam: new technologies, smart collaborations**
  Joris Goos
- **One world to live in**
  Robert Voûte
- **Geocraft, geo information accessible for everyone**
  Geo kids

COFFEE BREAK **10:30 – 11:00** **FOYER**

SESSION 2/1 **11:00 – 12:30** **COLLEGEZAAL A**
COLLABORATIVE CROWDSOURCED CLOUD MAPPING (WG4)
Chair: Maria A Brovelli

- **Enhanced classification model for multispectral observations from the earth**
  Ivan E. Villalon-Turrubiates
- **UAV photogrammetry for feature extraction and mapping of corrugated industrial rooftops**
  Karun Reuel Dayal and Inder Mohan Chauhan
- **A grass root oriented urban planning approach to uplift the socio-economic facet of a city using 2D and 3D GIS: case study on Mehmedabad City, India**
  Saurabh Gupta, Chiranjay Shah, Devshri Shah, Prithvi Deore, Sayantan Majumdar, Abhisek Maiti, Shashwat Shukla, Jignesh Mehta and Mansi Shah
- **Time-related quality dimensions of urban remotely sensed big data**
  Zsófia Kugler, György Szabó, Hussein Abdulmuttalib, Guoman Huang, Árpád Barsi and Carlo Batini
- **Validation of the global high-resolution globeland30 land cover map in Europe using land cover field survey database – LUCAS**
  Gorica Bratic, Monia Elisa Molinari and Maria Antonia Brovelli

SESSION 2/2 **11:00 – 12:30** **FRANS VAN HASSELT**
SPATIAL DATA ANALYSIS, STATISTICS AND UNCERTAINTY MODELLING (WG3)
Chair: Gerard Heuvelink

- **Keynote: Quality assessment of geospatial big data without traditional reference data**
  John Shi
- **Definition of contour lines interpolation optimal methods for e-Goverment solutions**
  Alexey Noskov and Alexander Zipf
- **Quality assessment of an extended interferometric radar data processing approach**
  Winhard Tampubolon
- **Prototype of national digital elevation model in Indonesia**
  Danang Budi Susetyo, Yustisi Ardhitasari Lumban Gaol and Ibnu Sofian

LUNCH **12:30 – 13:30** **FOYER**

SESSION 3/1 **13:30 – 15:00** **COLLEGEZAAL A**
WORKSHOP: CAPACITY BUILDING ISPRS CHALLENGE (WG4)
Theme: Capacity Building for High Resolution Land Cover Intercomparison and Validation.
The workshop focuses on the presentation of the training/educational material about the intercomparison/validation of global Land Cover maps developed within the ISPRS Capacity Building Initiative. The dataset used in the training is GlobeLand30. Desktop, web and mobile collaborative geospatial applications are presented in the workshop. The training material is immediately reusable, being based on Freeware or Free and Open Source Software (FOSS) and being released under a Creative Commons Attribution 3.0 License (CC BY 3.0). The workshop is open to any participants; no specific or technical background is required.

SESSION 3/2 13:30 – 15:00 **FRANS VAN HASSELT**

GEOSPATIAL BIG DATA AND URBAN STUDIES (ICWG III/IVB AND WG4)

Chair: Hussein Mohammed Abdulmuttalib

- **Migration of digital cartography to CityGML; a web-based tool for supporting simple ETL procedures**
  Francesco Pirotti and Francesca Fissore
- **Visualization on fossil-fuel carbon dioxide (CO2) emissions from buildings in Tokyo metropolis**
  Richao Cong, Makoto Saito, Akihiko Ito, Ryuichi Hirata and Shamil Maksyutov
- **Dynamical prediction technique for Geosimulation using multispectral remote sensing data**
  Ivan E. Villalon-Turrubiates
- **A semantic graph database for BIM-GIS integrated information model for an intelligent urban mobility web application**
  Abdel-Hadi Hor, Gunho Sohn, Pio Claudio, Afnan Ahmad and Mojgan Jadidi
- **Analysis of the floating car data of Turin public transportation system: first results**
  Roberta Ravanelli and Mattia Crespi

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 4/1 15:30 – 17:00 **COLLEGEZAAL A**

WORKSHOP: MAPATHON (WG4)

Theme: OpenStreetMap mapathon.

A step-by-step mapping exercise for beginners, focusing on a humanitarian mapping task proposed by the Humanitarian OpenStreetMap Team (HOT). HOT coordinates humanitarian mapping in the aftermath of disasters and in prevention of humanitarian crises all over the world. A web-based tool created by HOT, the Tasking Manager, will be used during the mapathon. Participants are required to bring their own laptop with wi-fi connection enabled. No specific software will be used during the mapathon; only a browser is required (suggested browsers: Firefox and Chrome).

SESSION 4/2 15:30 – 17:00 **FRANS VAN HASSELT**

GLOBAL MAPPING: UPDATING VERIFICATION AND INTEROPERABILITY (ICWG IV/III)

Session Chair: Hao WU

- **Quadtree spatial index method with inclusion relations for the incremental updating of vector land cover database**
  Xiaoguang Zhou and Hongsong Wang A
- **Comparison of geometric correction schemes for geostationary ocean Color imager slots without GCPs**
  Jonghwan Son, Han-Gyeoul Kim and Taejung Kim
- **Automated road breaching to enhance extraction of natural drainage networks from elevation models through deep learning**
  Larry Stanislawski, Tyler Brockmeyer and Ethan Shavers
- **Remote sensing analytical geospatial operations directly in the web browser**
  Joan Masó, Alaitz Zabala, Ivette Serral and Xavier Pons
- **Implementing SIFT and Bi-triangular plane transformation for integrating digital terrain models**
  Ido Massad, Sagi Dalyot and Yerach Doytsher

SESSION 5/1 9:00 – 10:30 **COLLEGEZAAL A**

SPATIAL DATA ANALYSIS, STATISTICS AND UNCERTAINTY MODELLING (WG3)

Session Chair: John Si

- **Keynote: Uncertainty propagation in spatial modelling**
  Gerard Heuvelink
- **New insights into solar wind implanted volatiles for lunar regolith characterization: a simulation based approach**
  Shashwat Shukla, Sayantan Majumdar, Abhisek Maiti and Shashi Kumar
- **Integration of multiple collected polygons with a raster-based approach**
  Volker Walter
- **Identification of similarities and prediction of unknown features in an urban street network**
  Udo Feuerhake, Oskar Wage, Monika Sester, Nicolas Tempelmeier and Elena Demidova

SESSION 5/2 9:00 – 10:30 **FRANS VAN HASSELT**

COLLABORATIVE CROWDSOURCED CLOUD MAPPING (WG4)

Session Chair: Bert Veneendaal

- **Deep learning study of extracting navigation area from cad blueprints**
  Lei Niu, Yiquan Song, Jie Su and Hongmin Zhang A
- **The picture pile tool for rapid image assessment: a demonstration using hurricane Matthew**
  Olha Danylo, Inian Moorthy, Tobias Sturn, Linda See, Juan Carlos Laso Bayas, Dahlia Domian, Dilek Fraisl, Cristiano Giovando, Blake Girardot, Ravi Kapur, Pierre Philippe Matthieu and Steffen Fritz
- **Solution to fleet size of dockless bike-sharing station based on matrix analysis**
  Yong Zhai, Jin Liu, Juan Du and Jie Chen
- **Preliminary analysis and comparison of the potential of VGI available in social media for emergency response and municipal management**
  Cidália C. Fonte, Joaquim Patriarca, Jacinto Estima, José Paulo Almeida and Alberto Cardoso
- **User geolocated content analysis for urban studies: investigating mobility perception and hubs using Twitter**
  Monia Elisa Molinari, Daniele Oxoli, Candan Eylül Kilsedar and Maria Antonia Brovelli

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 6/1 11:00 – 12:30 **COLLEGEZAAL A**

SDI: INTERNET OF THINGS AND SPATIAL DECISION SUPPORT (WG6)

Session Chair: Marguerite Madden

- **Sponsor presentation: IoT support for decision making, using 3D city models**
  Jan Blaauboer, Bentley Systems
- **Research on geometric change detection algorithm for vector surface feature set**
  Lining Zhu, Chengming Li, Li Liu, Jianming Shen, Lina Yang and Zhendong Liu
- **A machine learning approach to occupant number prediction for indoor spaces**
  Umit Isikdag, Kemal Şahin and Sergen Cansiz
- **Urban traffic flow analysis based on deep learning car detection from CCTV image series**
  Maria Valasia Peppa, Daniel Bell, Tom Komar and Wen Xiao

SESSION 6/2 11:00 – 12:30 **FRANS VAN HASSELT**

GEOCOMPUTATION AND GEOSIMULATION (WG8)

Session Chair: James Haworth

- **On a knowledge-based approach to the classification of mobile laser scanning point clouds**
  Mathias Lemmens
- **An agent-based model to represent the space-time propagation of forest-fire smoke**
  Alex Smith and Suzana Dragicevic
- **Influence of word-of-mouth communication on large-scale evacuation after a severe earthquake**
  Toshihiro Osaragi and Takuya Tsuchiya
- **The comparison of drainage network extraction between square and hexagonal grid-based DEM**
  Lu Wang and Tinghua Ai

- **Streams do work: measuring the work of low-order streams on the landscape using point clouds**
  Ethan Shavers and Lawrence Stanislawski

LUNCH 13:30 – 15:00 **FOYER**
POSTER PRESENTATIONS

SESSION 7 13:30 – 15:00 **AUDITORIUM**
PLENARY SESSION
Session Chairs: Mila Koeva / Jantien Stoter

- **Use cases of 3D City Information Models**
  Claus Nagel
- **3D Cadastres: 30 years back, 30 years ahead**
  Rod Thompson
- **Announcement: 3D Singapore 2019 - Singapore Land Authority (SLA) and National University of Singapore (NUS),**
  Victor Khoo
- **3D Cadastres Best paper Award**

COFFEE BREAK 15:00 – 15:45 **FOYER**

SESSION 8/1 15:45 – 17:15 **COLLEGEZAAL A**
SPATIAL DATA ANALYSIS, STATISTICS AND UNCERTAINTY MODELLING (WG3)
Session Chair: Mahmoud Reza Delavar

- **Identification of low accuracy regions in land cover maps using uncertainty measures and classification confidence**
  Cidália C. Fonte and Luísa M. S. Gonçalves
- **Approaches to distinguish 'real' changes from 'unreal' changes based on multi-temporal 2D building footprint data**
  Martin Schorcht, Robert Hecht and Gotthard Meinel
- **Development and comparison of uncertainty measures in the framework of a data classification**
  Jochen Schiewe
- **Play-based hydrocarbon exploration under spatial uncertainty using evidential theory**
  Sahand Seraj and Mahmoud Reza Delavar
- **Achieving the state of research pertaining to GIS applications for cultural heritage by a systematic literature review**
  Patricia Ferreira Lopes

SESSION 8/2 15:45 – 17:15 **FRANS VAN HASSELT**
SDI: INTERNET OF THINGS AND SPATIAL DECISION SUPPORT (WG6)
Session Chair: Giuseppina Vacca

- **Sponsor presentation: Respond Effectively. Pix4D for Public Safety**
  Florian Muehlschlegel, Pix4D
- **NMStream: a scalable event-driven ETL framework for processing heterogeneous streaming data**
  Fei Xiao, Chengming Li, Zheng Wu, Jianming Shen, Lining Zhu and Yinghao Wu
  GIS and fuzzy AHP based area selection for electric vehicle charging stations
  Dogus Guler and Tahsin Yomralioglu
- **Operational near real time rice area mapping using multi-temporal sentinel-1 SAR observations**
  Jayantrao Mohite, Suryakant Sawant, Abhinav Kumar, Mehul Prajapati, Subhadra Varma Pusapati, Dineshkumar Singh and Srinivasu Pappula

SESSION 9/1 9:00 – 10:30 **COLLEGEZAAL A**
THEME SESSION 1: VIRTUAL & AUGMENTED REALITY: TECHNOLOGY, DESIGN & HUMAN FACTORS
In this double-session, we (ISPRS Working Group IV/9) explore the current state of the art in technology, design and human factors knowledge on virtual and augmented reality systems through presentations and moderated discussions. The main objective of the session is to identify the research gaps and discuss the solutions to existing problems.

SESSION 9/2 9:00 – 10:30 **FRANS VAN HASSELT**
GEO- DATA MANAGEMENT (WG7)
Session Chair: Martin Breunig Workshop: Virtual and Augmented reality (WG9)

- **Clustering and indexing historic vessel movement data with space filling curves**
  Martijn Meijers
- **Trajectory compression with constraints of road networks**
  Ling Zhang
- **Efficient and practical handling of spatio-temporal data based on time-dependent net components**
  Paul Vincent Kuper
- **A 6-dimensional Hilbert approach for indexing full waveform lidar data in a distributed computing environment**
  Anh Vu Vo
- **Supporting wide user-base in raster analysis - Geocubes finland**
  Lassi Lehto

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 10/1 11:00 – 12:30 **COLLEGEZAAL A**
WORKSHOP: VIRTUAL AND AUGMENTED REALITY (WG9)
Theme session 2: Virtual & Augmented Reality: Technology, Design & Human Factors
In this double-session, we (ISPRS Working Group IV/9) explore the current state of the art in technology, design and human factors knowledge on virtual and augmented reality systems through presentations and moderated discussions. The main objective of the session is to identify the research gaps and discuss the solutions to existing problems.

SESSION 10/2 11:00 – 12:30 **FRANS VAN HASSELT**
GEO-DATA MANAGEMENT (WG7)
Session Chair: Mulhim Al Doori

- **Management of large indoor point clouds: an initial exploration**
  Haicheng Liu, Peter van Oosterom, Martijn Meijers and Edward Verbree
- **A geospatial analysis framework for fine scale urban infrastructure networks**
  Qingyuan Ji, Stuart Barr, Phil James and David Fairbairn
- **Towards an intelligent platform for big 3D geospatial data management**
  Nima Mazroob Semnani, Paul Vincent Kuper, Martin Breunig and Mulhim Al-Doori
- **Integrating GIS and BIM to support the management of large building stocks**
  Giuseppina Vacca, Emanuela Quaquero, Davide Pili and Mauro Brandolini
- **A restful API for the extended What3Words encoding**
  Wen Jiang and Emmanuel Stefanakis

LUNCH 12:30 – 13:30 **FOYER**

SESSION 11/1 13:30 – 15:00 **COLLEGEZAAL A**
MULTI-DIMENSIONAL MODELLING (WG1)
Session Chair: Pawel Boguslawski

- **Building Generalization using Deep Learning**
  Monika Sester, Yu Feng and Frank Thiemann
- **On volume data reduction for lidar datasets**
  Kazimierz Becek and Pawel Boguslawski

- **Indoor mesh classification for BIM**
  Lavinia Stefania Runceanu and Norbert Haala
- **Multilevel semantic modelling of urban building space based on the geometric characteristics in 3D environment**
  Xuan Sun
- **Three-Dimensional Data Modelling for Underground Utility Network Mapping**
  Jingya Yan, Siow Wei Jaw, Rob Van Son, Kean Huat Soon and Gerhard Schrotte

SESSION 11/2 **13:30 – 15:00** **FRANS VAN HASSELT**

COLLABORATIVE CROWDSOURCED CLOUD MAPPING (WG4)
Session Chair: Marco Minghini

- **Classification of building function using available sources of VGI**
  Cidália C. Fonte, Marco Minghini, See Linda, Antoniou Vyron and Patriarca Joaquim
- **Land use classification from combined use of remote sensing and social sensing data**
  Adindha Surya Anugraha and Hone-Jay Chu
- **Improved classification of satellite imagery using spatial feature maps extracted from social media**
  Artem Leichter, Dennis Wittich, Franz Rottensteiner, Martin Werner and Monika Sester
- **Open source software and open educational material on Land Cover maps intercomparison and validation**
  Maria Antonia Brovelli, Marco Minghini, Monia Elisa Molinari, Candan Eylül Kilsedar, Hao Wu, Xinyan Zheng, Jun Chen and Peng Shu
- **Integration of human participatory sensing and archives of remote sensing observations for field level crop phenology estimation**
  Suryakant Sawant, Jayant Mohite and Srinivasu Pappula

COFFEE BREAK **15:00 – 15:30** **FOYER**

SESSION 12/1 **15:30 – 17:00** **COLLEGEZAAL A**

INDOOR/ OUTDOOR SEAMLESS MODELLING, LBS AND MOBILITY (WG5)
Session Chair: Zhizhong Kang

- **An evaluation framework for benchmarking indoor modelling methods**
  Kourosh Khoshelham, Ha Tran, Lucia Díaz-Vilariño, Michael Peter, Zhizhong Kang and Debaditya Acharya
- **Geometrical network model generation using point cloud data for indoor navigation**
  Masafumi Nakagawa and Riku Nozaki
- **Indoor semantic segmentation from RGB-D images by integrating fully convolutional network with higher-order markov random field**
  Juntao Yang and Zhizhong Kang
- **Towards automatic reconstruction of indoor scenes from incomplete point clouds: door and window detection and regularization**
  M. Previtali, Lucia Díaz-Vilariño and Marco Scaioni
- **Room shapes and functional uses predicted from sparse data**
  Youness Dehbi, Nazrin Gojayeva, Anna Pickert, Jan-Henrik Haunert and Lutz Plümer

SESSION 12/2 **15:30 – 17:00** **FRANS VAN HASSELT**

SPATIAL DATA ANALYSIS, STATISTICS AND UNCERTAINTY MODELLING (WG3)
Session Chair: Cidalia Fonte

- **Historical SDI, thematic maps and analysis of a complex network of medieval towers (13th-15th century) in the Moorish strip**
  Patricia Ferreira-Lopes and Juan Francisco Rozalem
- **Exploring geospatial variation in diabetes-related primary health care service utilisation and potentially preventable hospitalisations in Western Australia**
  Bert Veenendaal, Richard Varhol, Alex Xiao, Colleen Koh, Bella Mai, Yudan Liu and Saleem Ashty
- **Analysis of UAV image quality using edge analysis**
  Pyung-Chae Lim and Taejung Kim
- **Enrichment and population of a geospatial ontology for semantic information extraction**
  Margarita Kokla, Vagelis Papadias and Eleni Tomai
- **Information content analysis from very high resolution optical space imagery for updating spatial database**
  Mehmet Alkan

SESSION 13/1 **9:00 – 10:30** **COLLEGEZAAL A**

ADVANCED GEOSPATIAL APPLICATIONS FOR SMART CITIES AND REGIONS (WG10)
Session Chair: Mila N. Koeva

- **Network modelling and semantic 3d city models: testing the maturity of the utility network ADE for CityGML with a water network test case**
  Isaac Boates, Giorgio Agugiaro and Alexandru Nichersu
- **A computationally cheap trick to detect shadow in a voxel model**
  Ben Gorte, Kaixuan Zhou, Corne van der Sande and Cornelis Valk
- **Development of UAV air roads by using 3D grid system**
  Junhee Youn, Dusik Kim, Tae-Hoon Kim, Jung Hee Yoo and Bong Jun Lee
- **Research and practice on spatio-temporal big data cloud platform of the belt and road initiative**
  Zhaoting Ma, Chengming Li, Zheng Wu and Pengda Wu
- **Robust features for Leg Detection in 2D Laser Range Data**
  Dalin Li, Lin Li, Mengjie Zhou and Xinkai Zuo

SESSION 13/2 **9:00 – 10:30** **FRANS VAN HASSELT**

GEOVISUALIZATION, AUGMENTED AND VIRTUAL REALITY (WG9)
Session Chair: Arzu Coltekin

- **3D urban geovisualization: in situ augmented and mixed reality experiments**
  Alexandre Devaux, Charlotte Hoarau, Mathieu Brédif and Sidonie Christophe
- **Landform perception accuracy in shaded relief maps: a replication study confirms that NNW lighting is better than NW against the relief inversion effect**
  Arzu Çöltekin, Victoria Rautenbach, Serena Coetzee and Tebogo Mokwena
- **Cheap and immersive virtual reality: application in cartography**
  Lukáš Herman, Ondřej Kvarda and Zdeněk Stachoň
- **A multi-component system for data acquisition and visualization in the geosciences based on UAVs, augmented and virtual reality**
  Sergio Bernardes, Marguerite Madden, Andrew Knight, Nicholas Neel, Nicholas Morgan, Kevin Cameron and John Knox
- **Extending indoor open street mapping environments to navigable 3D CityGML building models: emergency response assessment**
  Fodil Fadli, Najeeba Kutty, Zhiyong Wang, Sisi Zlatanova, Lamine Mahdjoubi, Pawel Boguslawski and Vadim Zverovich

COFFEE BREAK **10:30 – 11:00** **FOYER**

SESSION 14 **11:00 – 12:30** **AUDITORIUM**

PLENARY KEYNOTE SESSION
Session Chair: Volker Coors

- **Smart Destinations: Challenges and opportunities to create sustainable smart cities in the data economy**
  Antonio Jara
- **Smartphone Positioning and 3D Mapping Indoors**
  Ruizhi Chen

LUNCH **12:30 - 13:30** **FOYER**

SESSION 15/1 **13:30 – 15:00** **COLLEGEZAAL A**

ADVANCED GEOSPATIAL APPLICATIONS FOR SMART CITIES AND REGIONS (WG10)
Session Chair:Giorgio Agugiaro

- **Change detection from point clouds to support indoor 3D cadastre**
  Shayan Nikoohemat, Mila Koeva, Sander Oude Elberink and Chrit Lemmen
- **Web based 3D visualisation of time-varying air quality information**
  Umit Isikdag and Kemal Şahin

- **Urban microclimate improvement using ENVI-MET climate model**
  Efi Chatzinikolaou, Christos Chalkias and Efi Dimopoulou
- **C-AQM: A crowdsourced air quality monitoring system**
  M. Eulàlia Parés Calaf and Francisco Vázquez-Gallego
- **Microclimate analysis of different urban forms in cold climates and the effect of thermal comfort**
  Dogan Dursun and Merve Yavas

SESSION 15/2 **13:30 – 15:00** **FRANS VAN HASSELT**

GEOVISUALIZATION, AUGMENTED AND VIRTUAL REALITY (WG9)
Session Chair: Chris Pettit

- **Implementing augmented reality sandbox in Geodesign: a future for Geodesign**
  Aida Afrooz, Hrishikesh Ballal and Christopher Pettit
- **Evaluating route learning performance of older and younger adults in differently-designed virtual environments: a task-differential analysis**
  Ismini Eleni Lokka and Arzu Çöltekin
- **Geogame on the peat: designing effective game play in Geogames app for haze mitigation**
  Trias Aditya and Dany Laksono
- **Towards "tourism for all" - improving maps for persons with reduced mobility**
  Joanna Nowak Da Costa and Conrad Bielski
- **Effective cartographic methods for assisting tactics choice and indoor deployments during building fires - a case study to aid the Dutch fire brigade**
  Tom van der Meer, Edward Verbree and Peter van Oosterom

COFFEE BREAK **15:00 – 15:30** **FOYER**

SESSION 16/1 **15:30 – 17:00** **COLLEGEZAAL A**

ADVANCED GEOSPATIAL APPLICATIONS FOR SMART CITIES AND REGIONS (WG10)
Session Chair: Francesco Pirotti

- **Travel time estimation using spatio-temporal index based on Cassandra**
  Zheng Wu, Chengming Li, Yinghao Wu, Fei Xiao, Lining Zhu and Jianming Shen
- **Accessibility assessment of emergency vehicles in Tokyo metropolitan area after a large earthquake**
  Maki Kishimoto and Toshihiro Osaragi
- **Geospatial data for energy efficiency and low carbon cities - overview, experiences and new perspectives**
  Anna Nowacka and Fabio Remondino
- **Linking interactive optimization for urban planning with a semantic 3D city model**
  Nils Schüler, Giorgio Agugiaro, Sébastien Cajot and François Maréchal
- **First steps towards linking semantic 3D city modelling and multi-domain co-simulation for energy modelling at urban scale**
  Edmund Widl, Giorgio Agugiaro and Pablo Puerto

SESSION 16/2 **15:30 – 17:00** **FRANS VAN HASSELT**

ONTOLOGIES, SEMANTICS AND KNOWLEDGE REPRESENTATION FOR GEOSPATIAL INFORMATION (WG2)
Session Chair: Margarita Kokla

- **The Maasai of Southern Kenya Domain Model of Land Use**
  Mina Karamesouti, Carl Schultz, Malumbo Chipofya, Sahib Jan, Cristhian Eduardo Murcia Galeano, Angela Schwering and Christian Timm
- **Enrichment and Population of a Geospatial Ontology for Semantic Information Extraction**
  Margarita Kokla, Vagelis Papadias and Eleni Tomai
- **Semantic Linking Spatial RDF Data to The Web Data Sources**
  Deniztan Ulutas Karakol, Gulten Kara, Cemre Yilmaz and Cetin Comert
- **A proposal to use Semantic Web Technologies for improved road network information exchange**
  Michael G. Niestroj, David A. McMeekin, Petra Helmholz and Michael Kuhn
- **High-Level-Of-Detail Semantic 3D GIS for Risk and Damage Representation of Architectural Heritage**
  Elisabetta Colucci, Francesca Matrone, Francesca Noardo, Antonia Spanò and Andrea Lingua

SESSION 17/1 **9:00 – 10:30** **COLLEGEZAAL A**

OPEN GEOSPATIAL STANDARDS
OGC-SDSC-ISPRS
Session Chair: Bart de Lathouwer

- **The use of OGC-standards in a 3D production environment**
  Rob van Welsenaere (Avineon)
- **From space geodetics to applied geomatics**
  Esteban Aguilera (Sensar)
- **Interoperable visualization of 3D city models using OGC's standard 3d portrayal service**
  Athanasios Koukofikis, Volker Coors and Ralf Gutbell
- **Improvements in automated derivation of OWL ontologies from geospatial UML models**
  Knut Jetlund
- **I3S Scene Layers, Streaming Large Heterogeneous 3D Datasets**
  Seán William Morrish

SESSION 17/2 **9:00 – 10:30** **FRANS VAN HASSELT**

Indoor/Outdoor Seamless Modelling, LBS and Mobility (WG5)
Session Chair: Lucía Díaz Vilariño

- **An extraction approach of the top-bounded space formed by buildings for pedestrian navigation**
  Jinjin Yan, Abdoulaye Diakité and Sisi Zlatanova
- **Indoor space routing graphs: visibility, encoding, encryption and attenuation**
  George Sithole
- **Indoor route planning under hexagon network considering multi-constrains**
  Weicai Wang, Tinghua Ai and Chongya Gong
- **Scan planning and route optimization for control of execution of as-designed BIM**
  Lucía Díaz-Vilariño, Ernesto Frías, Jesus Balado Frias and Higinio Gonzalez-Jorge
- **The global optimal placement of BLE beacon for localization based on indoor map**
  Ruan Ling, Ling Zhang and Yi Long

COFFEE BREAK **10:30 – 11:00** **FOYER**

SESSION 18/1 **11:00 – 12:30** **COLLEGEZAAL A**

MULTI-DIMENSIONAL MODELLING (WG1)
Session Chair: Eric Guilbert

- **Detection and Evaluation of Topological Consistency in CityGML Datasets**
  Anna Katarina Giovanella, Patrick Erik Bradley and Sven Wursthorn
- **Towards generating semantically-rich IndoorGML data from Architectural plans**
  Srishti Srivastava, Nishith Maheshwari and K S Rajan
- **Modeling cities for 3DGIS purposes**
  Elaine Gomes Vieira de Jesus, Arivaldo Leão de Amorim, Natalie Johanna Groetelaars and Vivian de Oliveira Fernandes
- **Thalweg detection for river network cartography in forest from high-resolution lidar data**
  Eric Guilbert, Sylvain Jutras and Thierry Badard
- **Data integration of different domains in geo-information management: a railway infrastructure case study**
  Manuela Corongiu, Grazia Tucci, Enzo Santoro and Olympia Kourounioti

SESSION 18/2 **11:00 – 12:30** **FRANS VAN HASSELT**

INDOOR/ OUTDOOR SEAMLESS MODELLING, LBS AND MOBILITY (WG5)
Session Chair: Sagi Dalyot

Using the combined LADM-IndoorGML model to support building evacuation
Abdullah Alattas, Peter Van Oosterom van Oosterom, Sisi Zlatanova, Dick Hoeneveld and Edward Verbree

- **From point clouds to 3D Isovists in indoor environments**
  Lucía Díaz-Vilariño, Luis Miguel González-Desantos, Edward Verbree, Gina Michailidou and Sisi Zlatanova
- **Image-based method for the pairwise registration of mobile laser scanning point clouds**
  Antria Christodoulou and Peter van Oosterom
- **High accurate pointwise (geo-)referencing of a K-TLS based multi-sensor-system**
  Jens Hartmann, Philipp Trusheim, Hamza Alkhatib, Jens-André Paffenholz, Dmitri Diener and Ingo Neumann
- **Design and implementation of dynamic update system for geographical names and addresses**
  Yang Liu, Wei Sun, Chengming Li, Xiaoli Liu and Chiyu Fang

LUNCH 12:30 – 13:30 **FOYER**

SESSION 19/1 13:30 – 15:00 **COLLEGEZAAL A**

MULTI-DIMENSIONAL MODELLING (WG1)
Session Chair: Umit Isikdag

- **Open Agent based Runoff and Erosion Simulation (OARES): A Generic Cross Platform Tool for Spatio-Temporal Watershed Monitoring using Climate Forecast System Reanalysis Weather Data**
  Sayantan Majumdar, Shashwat Shukla and Abhisek Maiti
- **Towards a scale dependent framework for creating vario-scale maps**
  Martijn Meijers, Peter van Oosterom, Radan Šuba and Dongliang Peng
- **Object-core oriented data modelling for tracking behaviours of urban heat islands**
  Rui Zhu, Éric Guilbert and Man-Sing Wong
- **Comparing stereo image matching performance by multi-dimensional search windows**
  Sooahm Rhee, Soohyeon Kim, Hee-Ran Ahn and Taejung Kim

SESSION 19/2 13:30 – 15:00 **FRANS VAN HASSELT**

ONTOLOGIES, SEMANTICS AND KNOWLEDGE REPRESENTATION FOR GEOSPATIAL INFORMATION (WG2)
Session Chair: Mir Abolfazl Mostafavi

- **Bootstrapped CNNs for Building Segmentation on RGB-D Aerial Imagery**
  Clint Sebastian, Bas Boom, Thijs van Lankveld, Egor Bondarev and Peter H.N. de With
- **Critical review of the integration of BIM to semantic web technology**
  Bjørn Arild Godager
- **Towards an Ontology for the Structuration of Remote Sensing Operations Shared by Different Processing Chains**
  Gilles-Antoine Nys, Jean-Paul Kasprzyk, Pierre Hallot and Roland Billen
- **Analysis of Heavy Rain from Typhoon Number 3 (2017) Using X-Band Multiparameter Radar Data, Kyushu, Japan**
  Masahiro Nishio and Masatoshi Mori
- **Overview of standards towards road asset information exchange**
  Michael G. Niestroj, David A. McMeekin and Petra Helmholz

COFFEE BREAK 15:00 – 15:45 **FOYER**

SESSION 20 15:45 – 16:30 **AUDITORIUM**

ISPRS SCIENTIFIC INITIATIVE AWARDS
Best paper award – Smart Data Smart Cities

CLOSING

POSTER PRESENTATIONS

- **WG1**
  Object boundaries regularization using the dynamic polyline compression algorithm
  Omer Saud Azeez, Bahareh Kalantar, Husam Abdulrasool H. Al-Najjar, Alfian Abdul Halin, Naonori Ueda and Shattri Mansor
- **WG1**
  Multigrid cell shape evaluation in DTM filtering from mobile lidar point clouds
  Luis Gézero and Carlos Antunes
- **WG3**
  Quantitative assessment of social vulnerability for landslide disaster risk reduction using GIS approach (case study : Cilacap regency, province of Central Java, Indonesia)
  Arwan Putra Wijaya and Jung-Hong Hong
- **WG3**
  Building classification of VHR airborne stereo images using fully convolutional networks and free training samples
  Yizi Chen, Weixiao Gao, Elyta Widyaningrum, Mingxue Zheng and Kaixuan Zhou
- **WG4**
  Indoor positioning using WLAN fingerprint matching and path assessment with retroactive adjustment on mobile devices
  Eros Gulo, Gunho Sohn and Afnan Ahmad
- **WG5**
  The path from BIM to a 3D indoor framework - a requirement analysis
  Liu Liu, Bofeng Li, Sisi Zlatanova and Hua Liu
- **WG5**
  3D geospatial indoor navigation for disaster risk reduction and response in urban environment
  Tarun Ghawana, Mitko Aleksandrov and Sisi Zlatanova
- **WG7**
  Coastal mapping of Jinu-do with UAV in Nakdong river Esturay, Korea
  Chang Ill Yoo, Yoo Sang Oh and Yeon Jung Choi
- **WG8**
  Design and implementation of real-time log analysis system of map world platform
  Hongping Zhang, Wei Huang and Jing Yang
- **WG8**
  Efficient and accurate fusion of massive vector data on 3D terrain
  Zhendong Liu, Chengming Li, Zhanjie Zhao, Dong Zhang, Fei Wang and Ying Wang
- **WG10**
  A new hierarchical clustering approach for sparse mobile phone trajectories
  Weixi Wang, Zhaoliang Luan, Biao He, Xiaoming Li, Dejing Zhang, Zhendong Huang and Wei Tu
- **ICWG III/IVb and WG 4**
  Estimating hourly PM2.5 concentrations from Himawari-8 AOD over Hubei province
  Jiangping Chen and Xiao Huang
- **ICWG III/IVb and WG 4**
  Exploration on quantifying carbon dioxide (CO2) emission from road traffic in megacity
  Richao Cong, Makoto Saito, Ryuichi Hirata, Akihiko Ito and Shamil Maksyutov
- **ICWG IV/III**
  Geospatial database updating system with WMS and direct connection method
  Bekir Yuksel and Altan Yilmaz

3D GeoInfo

MONDAY 1 OCTOBER AND TUESDAY 2 OCTOBER

Organising Committee

Jantien Stoter (co-chair) Delft University of Technology, the Netherlands
Mila Koeva (co-chair) University of Twente, the Netherlands
Giorgio Agugiaro Delft University of Technology, the Netherlands
Ken Arroyo Ohori Delft University of Technology, the Netherlands
Anna Labetski Delft University of Technology, the Netherlands
Stelios Vitalis Delft University of Technology, the Netherlands

LINKS TO THE OPEN AND ON-LINE PROCEEDINGS

The 13th International 3D GeoInfo Conference (1 – 2 October 2018):

- https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/IV-4-W6/
- https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-4-W10/

Full Programme 3D GeoInfo

MONDAY 1 OCTOBER

SESSION 1 **9:00 – 10:30** **AUDITORIUM**

OPENING / BEST OF NL SESSION
Chair: Peter van Oosterom

- **Welcome by ISPRS president**
  Christian Heipke
- **New Dimensions, Better Information**
  Dorine Burmanje
- **Digital City Rotterdam: new technologies, smart collaborations**
  Joris Goos
- **One world to live in**
  Robert Voûte
- **Geocraft, geo information accessible for everyone**
  Geo kids

COFFEE BREAK **10:30 – 11:00** **FOYER**

SESSION 2 **11:00 – 12:30** **SENAATZAAL**

VISUALISATION & DISSEMINATION
Session Chair: Stelios Vitalis, 3D Geoinformation, Delft University of Technology

- **Communicating Multilevel Evacuation Context Using Situated Augmented reality**
  Ian Lochhead and Nick Hedley
- **An Augmented Viewshed Analysis of Complex 3- dimensional Environments**
  Chen Shechter, Yarin Puor and Sagi Dalyot
- **Optimized Organization and Adaptive Visualization of Complicated Mountain Disaster 3D Scenes for Diverse Terminals**
  Yunhoa Zhang, Jun Zhu, Qing Zhu, Weilian Li, Junxiao Zhang, Mingwei Liu, Yun Li and Bin Feng
- **Combined Visual Exploration Of 2D Ground Radar And 3D Point Cloud Data for Road Environments**
  Johannes Wolf, Sören Discher, Leon Masopust, Sebastian Schulz, Rico Richter and Jürgen Döllner
- **Visualisation of BIM Through Hololens**
  Panagiotis Karydakis
- **CityGML Restful Web Service: Automatic Retrieval of CityGML Data Based on Their Semantics. Principles, Guidelines and Bldg Conceptual design**
  Ioannis Pispidikis and Efi Dimopoulou
- **A 3D Tilling Scheme for Web Based Management Of 3D Spatial Data Using Only Open Source Components and Open Formats**
  Ziya Usta, Muhammet Emre Yıldırım and Çetin Cömert

LUNCH **12:30 – 13:30** **FOYER**

SESSION 3 **13:30 – 15:00** **SENAATZAAL**

ACQUISITION & RECONSTRUCTION
Session Chair: Liangliang Nan, 3D Geoinformation, Delft University of Technology

- **Enhancing the Resolution of Urban Digital Terrain Models Using Mobile Mapping Systems**
  Yu Feng, Claus Brenner and Monika Sester
- **Assessing the Accuracy and Precision of Imperfect Point Clouds For 3D Indoor Mapping and Modelling**
  Jorge Chen, Keith Clarke and Omar Mora
- **A Photogrammetry-based Structure from Motion Algorithm Using Robust Iterative Bundle Adjustment Techniques**
  Styliani Verykokou and Charalabos Ioannidis
- **A Sliding Window Method for Detecting Corners of Openings from Terrestrial LiDAR Data**
  Jiaqiang Li, Biao Xiong, Filip Biljecki and Gerhard Schrotter
- **Automatic 3D Reconstruction of Buildings Roof Tops in Densely Urbanized Areas**
  Maria Gkeli and Charalabos Ioannidis

- **Modelling Trees for Virtual Singapore: From Data Acquisition to CityGML Models**
  Like Gobeawan, Ervine Shengwei Lin, Abhishek Tandon, Alex Thiam Koon Yee, Victor Hock Soon Khoo, Sandy Shen Ni Teo, Su Yi, Chi Wan Calvin Lim, Sum Thai Wong, Daniel J Wise, Peng Cheng, Soo Chin Liew, Xiaojing Huang, Qihua Li, Lip Seng Teo, Gyula Szabolcs Fekete and Marton Polo
- **Integration of Tree Database Derived from Satellite Imagery and LiDAR Point Cloud Data**
  Soo Chin Liew, Xiaojing Huang, Ervine Shengwei Lin, Chenghua Shi, Alex Thiam Koon Yee and Abhishek Tandon

COFFEE BREAK 15:00 – 15:30 **FOYER**

SESSION 4 15:30 – 16:55 **SENAATZAAL**

EUROSDR/VOLTA SESSION: NMCAS I (3D GEOINFORMATION FOR NATIONAL AND CADASTRAL MAPPING AGENCIES I)
Session Chair: Francesca Noardo, 3D Geoinformation, Delft University of Technology

- **Automated Reconstruction Of 3D Buildings in Historic City Centres from LIDAR Data And 2D Building Footprints**
  Jens Ingensand, Marion Nappez, Timothée Produit and Thibaud Chassin
- **How Can 3D GIS Be Used to Better Store, Integrate and Communicate Results of Environmental Impact Assessments?**
  Monika Swiderska and Claire Ellul
- **User Requirements Gathering for A National 3D Mapping Product in The United Kingdom**
  Kelvin Wong and Claire Ellul
- **Automated Building Detection in Dense Point Cloud and Update of Open Source Data Bases**
  Eria Aroni and Charalambos Ioannidis
- **Combining Methodological Tools for The Optimum 3D Modelling of NTUA Campus**
  Ioannis Pispidikis, Eva Tsiliakou, Dimitrios Kitsakis, Katerina Athanasiou, Eftychia Kalogianni, Tassos Labropoulos and Efi Dimopoulou
- **What Is the Need for Building Parts? - A Comparison of CityGML, INSPIRE Building and A Swedish Building Standard**
  Helen Eriksson, Lars Harrie and Jesper Paasch
- **An Applicative Approach for Spatial Relationships Determination Of 3D Volumetric Parcels In 3D Cadastral Systems**
  Ruba Jaljolie, Yerach Doytsher, Kirsikka Riekkinen and Sagi Dalyot
- **Challenges with Obstacle Data for Manned and Unmanned Aviation Alexandre Petrovsky, Malik Doole, Joost Ellerbroek, Jacco Hoekstra and Filippo Tomasello**

SHORT BREAK 16:55 – 17:00 **FOYER**

SESSION 4+ 17:00 – 18:00 **SENAATZAAL**

EUROSDR/VOLTA SESSION: NMCAS II (3D GEOINFORMATION FOR NATIONAL AND CADASTRAL MAPPING AGENCIES II)
Session Chair: Jantien Stoter, 3D Geoinformation, Delft University of Technology

- **Testing the Impact Of 2D Generalisation On 3D City Models – Exploring Analysis Options with An Off-the-shelf Software Package**
  Estibaliz Muñumer Herrero, Claire Ellul and Jeremy Morley
- **Investigating the State-of-play Of GeoBIM Across Europe**
  Claire Ellul, Jantien Stoter, Lars Harrie, Masoome Shariat, Avril Behan and Maria Pla
- **Testbed for Supporting Lifecycle 3D Geodata and BIM-data**
  Lars Harrie, Helen Eriksson, Thomas Lithén, Perola Olsson, Jing Sun, Örjan Falk and Väino Tarandi
- **Stand Alone Presentation - Satellite, Airborne And Close Range Photogrammetry in Heracles Project**
  Gabriele Murchio and Cecilia Sciarretta
- **Development and Applications of a Nationwide Object Oriented 3D Data Set**
  Vincent van Altena, Tom Commandeur and Marc Post

SESSION 5– 8:00 – 9:00 **SENAATZAAL**

MODELLING I
Session Chair: Kavisha Kumar, 3D Geoinformation, Delft University of Technology

- **Floor Plans in CityGML**
  Amol Konde, Helga Tauscher, Filip Biljecki and James Crawford
- **Exploring Schema Matching to Compare Geospatial Standards: Application to Underground Utility Networks**
  Jacynthe Pouliot, Suzie Larrivée, Claire Ellul and Alaa Boudhaim
- **A Proposal for An Improved Transportation Model in CityGML**
  Anna Labetski, Stefan van Gerwen, Guus Tamminga, Hugo Ledoux and Jantien Stoter
- **Extension and Contextualisation for Linked Semantic 3D Geodata Claudine Métral and Gilles Falquet**

SHORT BREAK 9:00 – 9:05 **FOYER**

SESSION 5 9:05 – 10:30 **SENAATZAAL**

APPLICATIONS I (GENERAL & HERITAGE)
Session Chair: Mila Koeva, ITC, University of Twente

- **The Rotterdam 3D City Model, from innovation to implementation**
  Jane Hermans- van Ree
- **New Approaches to Data Visualisation, Automated Object Recognition and Urban Management Based on Laser Scanning and Photo Panoramas**
  Katerina Mekhlis
- **A Framework for Reliable Three-dimensional Underground Utility Mapping for Urban Planning**
  Rob van Son, Siow Wei Jaw, Jingya Yan, Victor Khoo, Richard Loo, Sandy Teo and Gerhard Schrotter
- **3D City Models and Pedestrian Flow Data Analysis System for Shopping Street Revitalization**
  Eri Kawanago, Koutarou Ishizaki, Nobuaki Nagai and Yuji Yoshimura
- **BIM-GIS Oriented Intelligent Knowledge Discovery**
  Hamid Kiavarz, Mojgan Jadidi, Abbas Rajabifard and Gunho Sohn
- **Increasing Awareness for Urban Cultural Heritage Based On 3D Narrative System**
  Benshuo Wang, Gamze Z. Dane and Bauke de Vries
- **The Urban Heritage Characterization Using 3D Geographic Information Systems. The System of Medium-sized Cities in Andalusia.**
  Daniel Navas-Carrillo, Blanca Del Espino Hidalgo, Francisco Javier Navarro de Pablos and María Teresa Pérez Cano
- **Globe Based 3D GIS Solutions for Virtual Heritage**
  Andrea Scianna and Marcello La Guardia

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 6 11:00 – 12:30 **SENAATZAAL**

APPLICATIONS II (ENVIRONMENT)
Session Chair: Giorgio Agugiaro, 3D Geoinformation, Delft University of Technology

- **The Influence of Levels of Detail (LOD0-2) And Buffer Sizes on Parameter Effectiveness for Fine Dust Distribution Modelling**
  Marc-Oliver Löwner and Yahya Ghassoun
- **Visible Routes In 3D Dense City Using Reinforcement Learning**
  Oren Gal and Yerach Doytsher
- **Integration of Semantic 3D City Models And 3D Mesh Models for Accuracy Improvements of Solar Potential Analyses**
  Bruno Willenborg, Martin Pültz and Thomas H. Kolbe
- **Dynamic 3D Visualization of Floods: Case of The Netherlands**
  Kavisha Kumar, Hugo Ledoux and Jantien Stoter
- **Tunnelling-induced Ground Settlement Risk Assessment Based on The Integration of BIM with 3D Geospatial Modelling Tools**
  Stylianos Providakis, Christopher Rogers and David Chapman
- **A Usability Evaluation of A 3D Map Display for Pedestrian Navigation**
  Trias Aditya, Dany Laksono, Heri Sutanta, Nur Izzahuddin and Febrian Fitryanik Susanta

- **Asbestos Roof Detection in RGB Aerial Imagery**
  Sven Briels
- **Urban Heat Island Micro-mapping Via 3D City Model**
  Uznir Ujang, Suhaibah Azri, M. Zahir, Alias Abdul Rahman and Tan Liat Choon

LUNCH 12:30 – 13:30 **FOYER**

SESSION 7 13:30 – 15:00 **AUDITORIUM**

PLENARY SESSION
Session Chairs: Mila Koeva / Jantien Stoter

- **Use cases of 3D City Information Models**
  Claus Nagel
- **3D Cadastres: 30 years back, 30 years ahead**
  Rod Thompson
- **Announcement: 3D Singapore 2019 - Singapore Land Authority (SLA) and National University of Singapore (NUS),**
  Victor Khoo
- **3D Cadastres Best paper Award**

COFFEE BREAK 15:00 – 15:30 **FOYER**

SESSION 8 15:30 – 16:55 **SENAATZAAL**

PROCESSING
Session Chair: Ravi Peters, 3D Geoinformation, Delft University of Technology

- **Topological 3D Elevation Data Interpolation of ASTER GDEM Based On Continuous Deformation**
  Ali Jamali and Francesc Antón Castro
- **A Sweep-plane Algorithm for The Simplification Of 3D Building Models in The Application Scenario of Wind Simulations**
  Raul Piepereit, Martina Deininger, Martin Kada, Margitta Pries and Ursula Voß
- **Shape Based Classification of Seismic Building Structural Types**
  Raphael Sulzer, Pirouz Nourian, Michele Palmieri and Jan van Gemert
- **Contextual Classification Of 3D Textured Meshes for Urban Scene Interpretation**
  Weixiao Gao, Malgorzata Jarzabek-Rychard, Hugo Ledoux, Thijs van Lankveld, Jantien Stoter and Martin Kada
- **Prediction Based Workload Performance Evaluation for Disaster Management Spatial Database**
  Nanna Suryana, Muhamad Syaifur Rokman and Fandy Setio Utomo
- **Segmentation Of 3D Photogrammetric Point Cloud For 3D Building Modelling**
  Emre Özdemir and Fabio Remondino
- **Creating A Simplified Large Scale 3D Model in PostGIS For Noise-calculations, Based on Lidar And Cadastral Data**
  Tom van Tilburg
- **Extracting Building Footprints from Airborne Lidar Data**
  Chris Lucas

SHORT BREAK 16:55 – 17:00 **FOYER**

SESSION 8+ 17:00 – 18:00 **SENAATZAAL**

MODELLING II
Session Chair: Ken Arroyo Ohori, 3D Geoinformation, Delft University of Technology

- **A Framework for The Representation of Two Versions of A 3D City Model In 4D Space**
  Stelios Vitalis, Ken Arroyo Ohori and Jantien Stoter
- **UrbanCo2Fab: Comprehension of Concurrent Viewpoints of Urban Fabric Based On GIT**
  John Samuel, Sylvie Servigne and Gilles Gesquière
- **Investigating Interoperability Capabilities Between IFC And CityGML LOD 4 - Retaining Semantic Information**
  George Floros, Claire Ellul and Efi Dimopoulou
- **Combining Urban Metabolism Methods and Semantic 3D City Models**
  Ihab Hijazi, Vanessa Ebert, Andreas Donaubauer and Thomas Kolbe
- **Cell Complexes Topological Links for Buildings in CityGML**
  Syahiirah Salleh, Uznir Ujang, Suhaibah Azri and Tan Liat Choon

3D Cadastres

TUESDAY 2 OCTOBER – THURSDAY 4 OCTOBER

Program Committee

Peter van Oosterom (Chair), Delft University of Technology, the Netherlands
Alias Abdul-Rahman Universiti Teknologi Malaysia
Trias Aditya Gadjah Mada University, Indonesia
Ali Aien University of Melbourne, Australia
Abdullah Alattas Delft University of Technology, the Netherlands
Alaa Ashmawy American University in Dubai, UAE
Helena Aström Boss Federal Office of Topography, Switzerland
Lars Bodum Aalborg University, Denmark
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François Brochu Laval University, Canada
Jarosław Bydłosz AGH University of Science & Technology, Poland
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Yakup Emre Coruhlu Karadeniz Technical University, Turkey
Sagi Dalyot Israel Institute of Technology, Israel
Efi Dimopoulou National Technical University of Athens, Greece
Neeraj Dixit Survey and Land Registration Bureau, Kingdom of Bahrain
Yerach Doytsher Israel Institute of Technology, Israel
Fatih Döner Gümüşhane University, Turkey
José-Paulo Duarte de Almeida University of Coimbra, Portugal
Paul Egesborg Surveyor General Branch, Natural Resources Canada
Elikkos Elia Department of Lands and Surveys, Cyprus
Corné van Elzakker University of Twente, the Netherlands
Diego Erba Ministry of Urban Development and Housing, Ecuador
Claire Galpin International Group of French Land Surveyors, France
Marc Gervais Laval University, Canada
Tarun Ghawana Integrated Spatial Analytics Consultants, India
Charisse Griffith–Charles University of the West Indies, Trinidad and Tobago
Trent Gulliver Land Information New Zealand
RenZhong Guo Urban Planning, Land and Resources Commission of Shenzhen Municipality, China
Hervé Halbout International Group of French Land Surveyors, France
João Paulo Fonseca Hespanha de Oliveira University of Aveiro, Portugal
Thea Hilhorst World Bank, USA
Mike Horhammer Oracle Corporation, USA
Umit Isikdag Mimar Sinan Fine Arts University, Turkey
Gyula Iván Institute of Geodesy, Cartography & Remote Sensing, Hungary
Karel Janecka University of West Bohemia, Czech Republic
Lorenz Jenni Agencia de Implementación / BSF Swissphoto, Switzerland
Saeid Mohsen Kalantari Soltanieh The University of Melbourne, Australia
Eftychia Kalogianni Delft University of Technology, the Netherlands
Abdullah Kara Yildiz Technical University, Turkey
Sudarshan Karki Queensland Government, Australia
Gili Kirschner Survey of Israel
Dimitris Kitsakis National Technical University of Athens, Greece
Mila Koeva University of Twente, the Netherlands
Thomas Kolbe Technical University of Munich, Germany
Youngho Lee Shingu University, Korea
Christiaan Lemmen Kadaster, the Netherlands
Mateus Magarotto CICS.NOVA Interdisciplinary Centre of Social Science, Portugal
Tarja Myllymäki National Land Survey of Finland, Finland
Gerhard Navratil Vienna University of Technology, Austria
Peter van Oosterom (Chair) Delft University of Technology, the Netherlands
Jesper Paasch Lantmateriet, Sweden
Jenny Paulsson Royal Institute of Technology, Sweden
Hendrik Ploeger VU Amsterdam & Delft University of Technology, the Netherlands
Jacynthe Pouliot Laval University, Canada

Stella Psomadaki Fugro, the Netherlands
Abbas Rajabifard University of Melbourne, Australia
Siva Ravada Oracle Corporation, USA
Miodrag Roić University of Zagreb, Croatia
Francis Roy Laval University, Canada
Gerda Schennach Bundesamt für Eich- und Vermessungswesen, Austria
Markus Seifert Bayerische Vermessungsverwaltung, Germany
Davood Shojaei University of Melbourne, Australia
David Siriba University of Nairobi, Kenya
Kean Huat Soon Singapore Land Authority, Singapore
Jantien Stoter Delft University of Technology & Kadaster, the Netherlands
Erik Stubkjær Aalborg University, Denmark
Michael Sutherland University of the West Indies, Trinidad and Tobago
Yoav Tal Survey of Israel
Rod Thompson Queensland Government, Australia
Athina Trakas Open Geospatial Consortium, Germany
Amalia Velasco Spanish Directorate General for Cadastre, Spain
Nikola Vučić University of Zagreb, Croatia
Okan Yildiz Karadeniz Technical University, Turkey
Shen Ying Wuhan University, China
Sisi Zlatanova University of New South Wales, Australia

LINK TO THE OPEN AND ON-LINE PROCEEDINGS

The 6th International FIG Workshop on 3D Cadastres (2 – 4 October 2018):
- http://www.gdmc.nl/3DCadastres/workshop2018/programme/

Full Programme 3D Cadastres

TUESDAY 2 OCTOBER

SESSION 7 **PLENARY 13:30 – 15:00** **AUDITORIUM**

PLENARY SESSION
Session Chairs: Mila Koeva / Jantien Stoter

- **Use cases of 3D City Information Models**
  Claus Nagel
- **3D Cadastres: 30 years back, 30 years ahead**
  Rod Thompson
- **Announcement: 3D Singapore 2019 - Singapore Land Authority (SLA) and National University of Singapore (NUS),**
  Victor Khoo
- **3D Cadastres Best paper Award**

SESSION 8 **15:45 – 17:15** **COLLEGEZAAL D**

3D DATA ACQUISITION AND PROCESS MODELS
Session chair: Efi Dimopoulou

- **Designing a 3D Cadastral System Demonstrator: A Case Study**
  Matthew Smart and Russell Priebbenow
- **LADM-based Crowdsourced 3D Cadastral Surveying – Potential and Perspectives**
  Maria Gkeli, Chryssy Potsiou and Charalabos Ioannidis
- **Processes in Cadastre: Process Model for Serbian 3D Cadastre**
  Dubravka Sladić, Aleksandra Radulović and Miro Govedarica
- **Initial 3D Cadastre Registration in the Republic of Croatia by Cadastral Resurvey**
  Mario Mađer, Nikola Vučić, Saša Vranić and Miodrag Roić
- **Conversion of 2D Analogue Cadastral Boundary Plans into 3D Digital Information – problems and challenges illustrated by a Swedish case**
  Karolina Larsson, Jesper Paasch and Jenny Paulsson

WEDNESDAY 3 OCTOBER

SESSION 9 9:00 – 10:30 **COLLEGEZAAL D**

INFRASTRUCTURE AND UTILITIES 3D LEGAL SPACES

Session chair: Rod Thompson

- **Towards 3D Utility Network Cadastre: Extended Serbian LADM Country Profile**
  Aleksandra Radulović, Dubravka Sladić, Miro Govedarica, Aleksandar Ristić and Dušan Jovanović
- **Layer approach to ownership in 3D cadastre – a subway case**
  Marcin Karabin, Dimitrios Kitsakis, Mila Koeva, Gerhard Navratil, Jesper Paasch, Jenny Paulsson, Nikola Vučić, Karel Janečka and Anka Lisec
- **Arial power line 3D cadaster**
  Rigoberto Moreno Vázquez and Diego Erba
- **Implementation of the 3D Cadastre in Israel**
  Rachel Adi, Anna Shnaidman and Shimon Barazani
- **Investigating 3D spatial unit's as basis for refined 3D spatial profiles in the context of LADM revision**
  Eftychia Kalogianni, Efi Dimopoulou, Rod Thompson, Christiaan Lemmen and Peter van Oosterom

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 10 11:00 – 12:30 **COLLEGEZAAL D**

LEGAL SPACES, 3D BUILDINGS AND INDOOR

Session chair: Alias Abdul Rahman

- **A BIM-Driven Approach to Managing Common Properties within Multi-Owned Developments**
  Behnam Atazadeh, Abbas Rajabifard, Mohsen Kalantari and Jihye Shin
- **Co-ownership shares in condominium – A comparison across jurisdictions and standards**
  Volkan Çağdaş, Erik Stubkjær, Walter Timo de Vries, Cornelius van der Merwe, Jesper Paasch, Jenny Paulsson, Nadja Schwery, Hendrik Ploeger, Ümit Işıkdağ and Abdullah Kara
- **A framework for assessing cadastral data as a source for 3D indoor modelling**
  Jernej Tekavec and Anka Lisec
- **Developing a database for the LADM-IndoorGML model**
  Abdullah Alattas, Peter van Oosterom, Sisi Zlatanova, Abdoulaye A. Diakité and Jinjin Yan
- **INTERLIS 3 developments with 3D data types and better constraint support for 3D Cadastres**
  Michael Germann, Jürg Lüthy and Peter van Oosterom

LUNCH 12:30 – 13:30 **FOYER**

SESSION 11 13:30 – 15:00 **COLLEGEZAAL D**

3D LIFECYCLE: SPATIAL PLANNING – LAND ADMINISTRATION

Session chair: Jesper Paasch

- **Determining the "true" environmental impact of Public Law Restrictions**
  Dimitrios Kitsakis and Efi Dimopoulou
- **Exploring 3D Cadastres in India: Evaluating the Potential for Land Planning, Development and Management in Delhi**
  Tarun Ghawana, Rohan Bennett, Jaap Zevenbergen, Pradeep Khandelwal and Subu Rahman
- **Designing Open Spatial Information Infrastructure To Support 3D Urban Planning In Jakarta Smart City**
  Agung Indrajit, Hendrik Ploeger Bastian van Loenen and Peter van Oosterom
- **3D Cadastres for Complex Extra-Legal and Informal Situations**
  Charisse Griffith-Charles and Michael Sutherland
- **Contextualising Ontologies with Image, Number and Rationality**
  Kean Huat Soon

COFFEE BREAK 15:00 – 15:30 **FOYER**

SESSION 12 15:30 – 17:30 **COLLEGEZAAL D**

DEVELOPMENTS IN VARIOUS COUNTRIES

Session chair: Karel Janecka

- **Developing Serbian 3D Cadastre System - Challenges and Directions**
  Nenad Višnjevac, Rajica Mihajlović, Mladen Šoškić, Željko Cvijetinović, Stevan Marošan and Branislav Bajat
- **The application model of 3D cadastre in practical registration for real estate**
  Jiyi Zhang, Gang Li, Youzhi Liu, Pengcheng Yin, Jinyu Yu and Zhifeng Shi
- **An uniform real-estate registration model for China**
  Shen Ying, Renzhong Guo, Lin Li, Naibin Chen and Yizhen Jia
- **Design and Determine 3D Cadastral Systems: A Case Study of Turkey**
  Hicret Gursoy Surmeneli and Mehmet Alkan
- **Moving Towards a Fully Operational 3D Digital Cadastre: Victoria, Australia**
  Davood Shojaei, Hamed Olfat, Abbas Rajabifard, Mohsen Kalantari and Mark Briffa
- **Towards LADM Victoria country profile – modelling the spatial information**
  Mohsen Kalantari and Eftychia Kalogianni

THURSDAY 4 OCTOBER

SESSION 13 9:00 – 10:30 **COLLEGEZAAL D**

3D AND 4D MODEL VISUALIZATION

Session chair: Mohsen Kalantari

- **Digital Cartographic Model of 3D Cadastre: An Initial Design and Implementation**
  Chen Wang and Chang-bin Yu
- **From Floor Plans to Condominium Rights Through an Augmented Reality Approach**
  Gerhard Navratil, Marco Schwai, Stefan Vollnhofer, Philip Konturek and Ioannis Giannopoulos
- **Usability testing of a web-based 3D Cadastral visualization system**
  Barbara Cemellini, Rod Thompson, Peter van Oosterom and Marian de Vries
- **3D Data for Better Property Value Estimation in the context of LADM Valuation Information Model**
  Abdullah Kara, Peter van Oosterom Volkan Çağdaş, Ümit Işıkdağ and Christiaan Lemmen
- **Modeling Legal Land Object for water bodies in the context of n-dimensional cadastre**
  Ramiro Alberdi and Diego Erba

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 14 11:00 – 12:30 **AUDITORIUM**

PLENARY KEYNOTE SESSION

Session Chair: Volker Coors

- **Smart Destinations: Challenges and opportunities to create sustainable smart cities in the data economy**
  Antonio Jara
- **Smartphone Positioning and 3D Mapping Indoors**
  Ruizhi Chen

Smart Data Smart Cities

THURSDAY 4 OCTOBER AND FRIDAY 5 OCTOBER

Program committee

Volker Coors (Chair), HFT Stuttgart, University of Applied Sciences , Germany
Claire Ellul, University College London, UK
Robert Laurini, INSA Lyon, France
Massimo Rumor, University of Padua, Italy
Sisi Zlatanova, University of New South Wales, Sydney, Australia
Preston Rodrigues, HFT Stuttgart, University of Applied Sciences, Germany

LINKS TO THE OPEN AND ON-LINE PROCEEDINGS

The 3rd International Conference on Smart Data and Smart Cities (4 – 5 October 2018):

- https://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/IV-4-W7/
- https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLII-4-W11/

Full programme SDSC

THURSDAY 4 OCTOBER

SESSION 13 9:00 – 10:30 **SENAATZAAL**

OPENING + 3D
Session Chair: Robert Laurini

- **Defining Semantic Levels of Details of Indoor Maps**
  Jorge Chen
- **Modelling Below-and Above-Ground Utility Network Features with the CityGML Utility Network ADE: Experiences from Rotterdam**
  Xander den Duijn, Giorgio Agugiaro and Sisi Zlatanova
- **Linking 3D Building Models, Maps, and Sensor Data in a Web-based Visualization System to monitor Energy-Related Data**
  Rosanny Sihombing and Volker Coors

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 14 11:00 – 12:30 **AUDITORIUM**

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LUNCH 12:30 – 13:30 **FOYER**

SESSION 15/1 13:30 – 15:00 **COMMISSIEKAMER 3**

SUSTAINABLE MOBILITY
Session Chair: Dimos Pantazis

- **Identifying the Pedestrian Movement Behaviour using the Object Detection Methods and Land-use Agglomeration Analysis**
  Somsiri Siewwuttanagul, Yukuo Hayashida and Takuro Inohae
- **Inferring Routing Preferences of Bicyclists from Sparse Sets of Trajectories**
  Johannes Oehrlein, Alina Förster, David Schunck, Youness Dehbi, Ribana Roscher and Jan-Henrik Haunert
- **Exploring Similarities and Variations of Human Mobility Patterns in the City of London**
  Patrizia Sulis and Ed Manley
- **An Analysis to investigate Spatial Cognitive Factors which Influence Cycling Patterns in Johannesburg**
  Thembani Moyo, Walter Musakwa and Baleseng T Mokoena

SESSION 15/2 13:30 – 15:00 **SENAATZAAL**

DASHBOARDS/WEBGIS
Session Chair: Alias Rahman

- **City Profile: Using Smart Data to Creative Digital urban Science**
  Yaxue Ma, Gang Li, Hui Xie and Hudan Zhang
- **Geo-Visualisation and Visual Analytics for Smart Cities: A Survey**
  Shubhi Harbola and Volker Coors
- **Smart City WebGIS Applications: Proof of Work Concept for High-Level Quality-of-Service Assurance**
  Alexey Noskov
- **Mobility Atlas Booklet: An Urban dashboard Design and Implementation**
  Lorenzo Gabrielli, Maria Teresa Rossi, Salvatore Rinzivillo, Daniele Fadda and Fosca Giannotti

COFFEE BREAK 15:00 – 15:30 **FOYER**

SESSION 16 15:30 – 17:00 **SENAATZAAL**

TRANSPORT

Session Chair: Preston Rodrigues

Adaptive Traffic Light Cycle Time Controller Using Microcontrollers and Crowdscource Data of Google APIs for Developing Countries
Sumit Mishra, Devanjan Bhattacharya, Ankit Gupta and Vaibhav Singh

Short Term Urban Traffic Forecasting using Deep Learning
Guido Albertengo and Waqar Hassan

The CO.TR.I.S System: Towards a Smarter Coastal Transport Network for Smart Islands
Vassilios Moussas, Dimos Pantazis and Panagiotis Stratakis

A method to Define the Spatial Stations Location in a Carsharing System in São Paulo - Brazil
Mariana Lage, Claudia Machado, Fernando Berssaneti and José Alberto Quintanilha

FRIDAY 5 OCTOBER

SESSION 17 9:00 – 10:30 **COLLEGEZAAL A**

ISPRS, OGC JOINT SESSION

Session Chair: Bart De Lathouwer

The use of OGC- Standards in a 3D Production Enviroment
Rob van Welsenaere (avineon)

From Space Geodetics to Applied Geomatics
Esteban Aguilera (Sensar)

Interoperable Visualization of 3D City Models using OGC's Standard 3D Portrayal Service
Ralf Gutbell, Volker Coors and Athanasios Koukofikis

Improvements in Automated Derivationof OWL Ontologies from Geospatial UML Models
Knut Jetlund

COFFEE BREAK 10:30 – 11:00 **FOYER**

SESSION 18/1 11:00 – 12:30 **COMMISSIEKAMER 3**

CITIZEN ENGAGEMENT AND PARTICIPATION

Session Chair: Claire Ellul

A Smart Valley in South Catalonia? The Techno-Symbolic Reconstruction of Tarragona City
Josep Puigbo

Computing Feedback for Citizens' proposals in participative Urban Planning
Jens Dambruch

Hot or Not – Identifying Emotional "Hot Spots" in the City
Lara Kohn, Habiburrahman Dastageeri, Thomas Bäumer, Susanne Moulin, Patrick Müller and Volker Coors

A Decision Support Tool on Derelict Buildings for Urban Regeneration
Ivan Blecic, Arnaldo Cecchini, Loredana Tedeschi, Maurizio Minchilli and Giuseppe A. Trunfio

SESSION 18/2 11:00 – 12:30 **SENAATZAAL**

SENSORS

Session Chair: Giorgio Agugiaro

Multi-Agent Learning Framework for Environment Redundancy Identification for Mobile Sensors in an IOT Context
David Martínez, Eduardo Mojica-Nava, Kym Watson and Thomas Usländer

Anultrasonic Sensor for Human Presence Detection to Assist Rescue Work in Large Buildings
Tom van Groeningen, Hans Driessen, Jakob Söhl and Robert Voûte

Integration and Visualization of Heterogeneous Sensor Data and Geospatial information
Thunyathep Santhanavanich, Sven Schneider, Preston Rodrigues and Volker Coors

LUNCH 12:30 – 13:30 **FOYER**

SESSION 19 13:30 – 15:00 **SENAATZAAL**

URBAN DECISION MAKING

Session Chair: Robert Laurini

A Novel Model and Tool for Energy Renovation Planning in French Residential Buildings and Districts
Kahina Amokrane-Ferka and Amira Ben Hamida

Capturing the Sounds of an Urban Greenspace
Ewan Klein, Simon Chapple, Joachim Fainberg, Cat Magill, Martin Parker, Charles Raab and Jonathan Silvertown

Designing precints in the Densifying City – The Role of Planning Support Systems
Ori Gudes, Stephen Glackin and Chris Pettit

Interactive Spatial Web-Applications as New Means of Support for Urban Decision-Making Processes
Ernst Gebetsroither-Geringer, Romana Stollnberger and Jan Peters-Anders

COFFEE BREAK 15:00 – 15:30 **FOYER**

AWARDS SESSION ISPRS AND SDSC AND CLOSING SESSION

Notes