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SPOTLIGHT

SLICE3D

A New Opportunity for Researchers in Geospatial Domain?

SUMMER SCHOOL IN BEIJING

ISPRS SC and Technical Commission III

IFOV | Dr. Konrad Schindler

FORESIGHT | MOTIVATE Learning

SPECTRUM

The Official Newsletter of the ISPRS Student Consortium

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NEWSLETTER

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FROM THE BOARD

Welcome to the exciting world of geospatial science. We would like to express our gratitude to all SpeCtrum readers for your continued support. Our field is advancing rapidly, and we are crossing paths with many great disciplines such as robotics, computer science, and medicine. Just this past month Microsoft bought the company GitHub, one of the world's leading software development platforms; Hexagon acquired AutonomouStuff, one of the world's leading suppliers of integrated autonomous solutions; and Mantis Vision is collaborating with Xiaomi to bring 3D cameras to the mobile phone market. It is a tremendous opportunity to witness such growth in our field and be part of such an innovative society that is making a difference in the world.

May and June were busy months for geomatics experts around the world. In Beijing, China, the ISPRS Technical Commission III hosted their "Developments, Technologies and Applications in Remote Sensing" midterm symposium. In Riva del Garda, Italy, the ISPRS Technical Commission II held their midterm symposium titled "Towards Photogrammetry 2020". In Calgary, Canada, TECTERRA hosted NORTH51 Connect to gather and celebrate some of the most innovative minds in Canadian geospatial technology.

In this issue, we feature some of the interesting research projects in photogrammetry and remote sensing from around the world. At Curtin University in Perth, Australia, photogrammetrists are collaborating with plastic surgeons to develop engineering solutions to improve the management of burn injuries. We had the honor of interviewing Dr. Konrad Schindler from ETH Zürich who shared with us his passion of being a research scientist. An overview of the recent Gi4DM 2018: Geoinformation for Disaster Management is also provided.

Finally, we looked at the Slovenian Centre of Excellence on 3D Geodata (SLICE3D), a European Union funded project that is bringing together some of the greatest minds in geo-data modelling from Switzerland, Belgium, Italy, the Netherlands, and more.

To all the students: good luck with your studies and research!

Jacky Chow
Co-Chair, ISPRS Student Consortium

The ISPRS SC and Technical Commission III SUMMER SCHOOL IN BEIJING

By Angelica Kristina Monzon
ISPRS SC Board Member, angelicakv.monzon@gmail.com

The ISRPRS Technical Commission III (Remote Sensing and Photogrammetry) and the ISPRS Student Consortium organised a three-day Summer School event last 04 to 06 May 2018 in partnership with the Beijing University of Civil Engineering and Architecture (BUCEA). The Summer School's theme was "Innovative methods, theory and practice of earth observation and remote sensing technology for the measurement and mapping of complex urban environments." The Summer School program was packed with high-level professional lectures, academic seminars, cultural exchange and student activities.

Participants of the Beijing summer school

More than 30 students and young researchers from around the globe attended the Beijing Summer School. Participants from France, Finland and South Korea flew all the way to Beijing to join their peers from China and be part of international event. Seventeen experts from various countries, such as the United States, Britain, Japan, Turkey, Australia, Finland and China, gathered for the event to share their knowledge and expertise to the Summer School participants.

The Summer School was held in the Daxing Campus of BUCEA. The opening ceremony was hosted by Director Zhao Xiaohong, International Cooperation and Exchange Department of Beijing University of Architecture. Dr. Ahmed Shaker, Vice President of the Technical Commission III (TC III), Ms. Angelica Kristina Monzon, Newsletter Editor-in-Chief of the ISPRS Student Consortium (ISPRS SC), and Prof. Wang Su, Vice President of the University, gave opening address to the attendees.

Prof. Wang Su extended a warm welcome to the guests and participants of the summer school and expressed his sincere gratitude to the TC III and the ISPRS SC. He gave a brief introduction of the university, its development and its programs related to surveying, geoinformation technology and mapping. He encouraged the students to enjoy a fruitful academic, cultural and collaborative experience with one another during the summer school.

The activities of the summer school included a two-day series of lectures on a wide range of topics including SAR-enhanced Disaster Risk Monitoring, Remote Sensing for Forest Ecosystems, Public Health, Urban and Infrastructure mapping, image data fusion, Chinese Beidou and its Urban GNSS applications, among other equally interesting topics. After every presentation, the participants were encouraged to ask quick questions to the presenters regarding their research to clarify and further enhance their understanding on the topic. In between these sessions, the participants also had the opportunity to approach the guest speakers, professors and fellow participants during the break to have

Plenary sessions during the summer schools

Participants during the ice-breaker reception

more informal chats allowing room for relationship and collaboration to develop between the network of students and experts.

participants were treated to some local performances by the different student groups of the university.

Last but not least, the locals say that "He who has never been to the Great Wall is not a true hero!" so the participants, together with the faculty and volunteers of the summer school, went on an field trip to the Badaling section of the Great Wall of China. This site is the most well visited section of the Great Wall with a rich history from the Ming Dynasty that represents a direct link to China's Imperial past. The summer school participants were able to walk and climb along this iconic monument, passed through the towers and experienced a piece of China's history. It was truly a glimpse to the cultural and historical identity of the country.

Rest stop at the Great Wall

In every summer school, social activities that aim to promote the development of international collaboration and friendship among students are always a must. This summer school is no exception! The participants were treated to an "ice-breaker" reception on the first night, hosted by the student volunteers of BUCEA. Various food and games were prepared to help the participants get to know each other be more comfortable with building friendships with the international community. On the second day, the

Summer school participants' field trip to the Badaling section of the Great Wall of China

GI4DM 2018: Geoinformation for Disaster Management

Istanbul, Turkey

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Evaluation of major disaster effects that measure hazards is a key role for disaster management. Disaster Management can be defined as the conservation and management of resources to deal with the humanitarian needs of people after natural disasters and emergencies occur. Natural hazards and disasters may have various causes and conditions, making each unique for evaluation. Geoinformation science play a key role for natural disaster management. If you study on natural disasters such as earthquake, landslides, flood analysis, forests fires etc. and want to understand how Geoinformation science help disaster management, the Gi4DM series of conferences is an ideal avenue for learning. The first conference took place on 2005 in Delft and repeated every year in almost all parts of the world. The Congress content contains diverse titled topics, methodologies and applications of geoinformation on disaster management.

The Gi4DM Conference 2018 was held by the ISPRS Inter-Commission Working Group III/IVa in Istanbul, Turkey. It was organized successfully in 18-21 March 2018. Scientists and young professionals had the opportunity to participate for a workshop entitled "Advanced Radar Methods and their Application in Disaster Management." The Workshop provided a great opportunity to have an insight into radar fundamentals that enabled the participants to understand the advanced remote sensing approach on radar and their applications in disaster management.

The three days of conference included oral and poster sessions, ISPRS Keynote Speakers and social activities. The oral sessions included specials topics such as landslide monitoring, urban analysis, forest fire control, earthquake and geo-hazards. It also created a good opportunity for the same field researchers to discuss their problems. The oral sessions gave the students and young scholars to meet other researchers and have a knowledge exchange with regards to their research. During the oral sessions we have presented our papers, one of which is about the monitoring of landslide at highway retaining wall. Plane fitting algorithms are very efficient to detect deformations on retaining walls. Another paper is on forested landslide mapping with object based image analysis from UAV data.

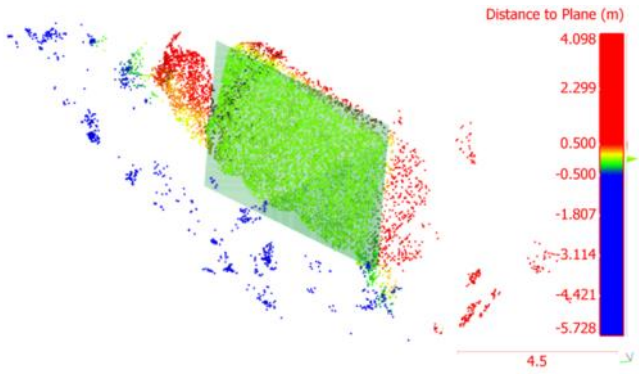

Figure 1: Plane fitting onto the retaining wall point cloud

Besides the scientific activities of the conference, participants were treated to get used to Istanbul/Turkish culture. Finally, thanks for great events and friendship (Aikaterini Karagianni, Vitaliy Yurchenko, Young-Joo Kwak, Fabiana Calò, Oriol Monserrat, Lars Ole Grottenberg, Saygın Abdikan, Nuhcan Akçit, Лхамжавын Очирхуяг). We would like to share some magnificent moments of social activities from Gi4DM.

Figure 2: Conference presentation, travel by subway for the tour of Istanbul, conference venue, delicious Turkish delights at istiklal/Taksim, and the last but the best Turkish Kebabs. (From Karagianni's scope of Gi4DM)

CLINICAL PHOTOGRAPHY, PHOTOGRAMMETRY, AND SPATIAL TECHNIQUES FOR ASSISTING THE ASSESSMENT AND MANAGEMENT OF BURN INJURIES

Petra Helmholz[1], David Belton[1], Jacky C.K. Chow[2], Helen Douglas[3], Fiona Wood[3]

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INTRODUCTION

According to a recent report from the Australian Institute of Health and Welfare, more than 5000 cases of hospitalized burn injuries were documented in Australia from 2013 to 2014. Although the numbers are low compared to other reasons for hospitalization, burn injuries are often life-threatening and result in extensive stays and numerous re-admissions. To treat the systemic effects of major burns, fluid resuscitation is often initiated. In this treatment, the amount of fluids to administer is a function of the total body surface area (TBSA) burned. The TBSA is often approximated visually using the "Rule of 9s" for adults and by referencing the Lund-Browder diagram for children. To treat the local effects, the depth of the burn needs to be classified (i.e. superficial, superficial-partial thickness, deep-partial thickness, and full thickness) based on the appearance, capillary refill, and sensation of the wound. Both the management of systemic and local effects are based on the clinician's experience and judgement, which may vary.

A strategic plan of introducing innovative technology solutions and data analysis throughout the burn injury journey will underpin the next steps to reducing the lifelong impact of burn injuries. The accurate assessment of depth of injury and objective measurements of the burn surface over time will help to assess the wound development and will make it possible to correlate those measurements with other attributes. There is a clear health and economic benefit of such an approach.

RADIOMETRIC ANALYSIS

In this project both the radiometric and geometric capabilities of modern day imaging modalities for burn injury assessment were studied. In hospitals like the Fiona Stanley Hospital, medical photographers capture RGB photos of wounds following some standard protocol to document the patient's condition. However, image analysis is rarely applied for information extraction. In the early phase of this project, light in the red, green, and blue spectrum were analyzed separately, and the blue band was found to be the most sensitive to burn wounds (Figure 1). Furthermore, it was found that by differencing images sensing different wavelengths of light and comparing

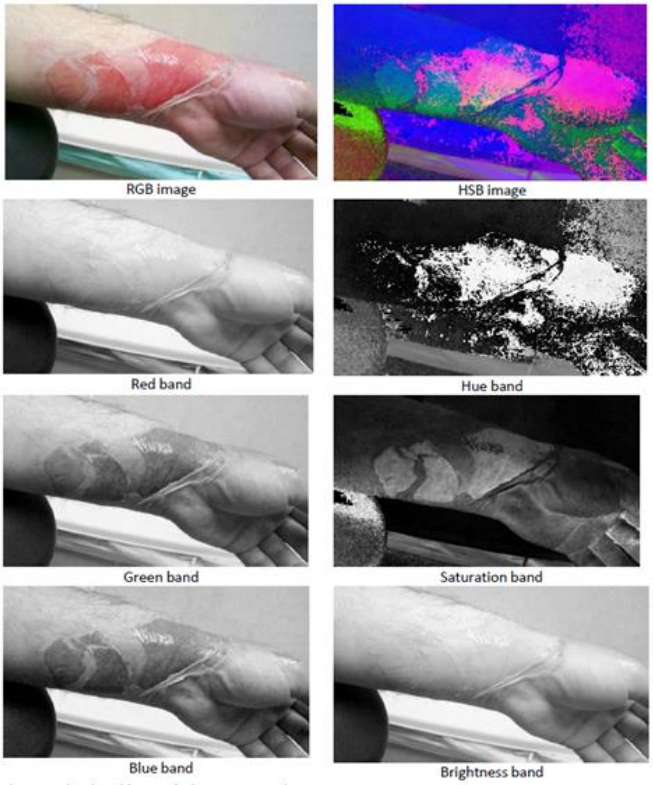

Figure 1: Original RGB image sourced from the internet, other images shown combination of spectral bands.

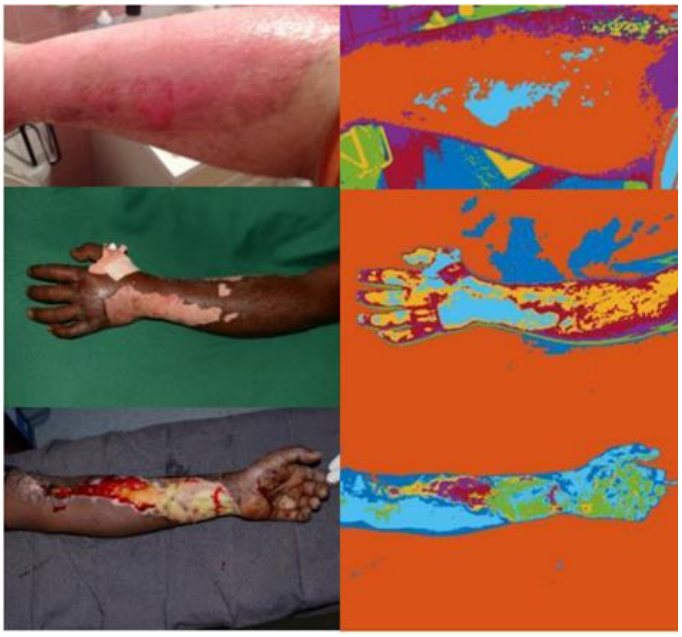

Figure 2: Original images sourced from the internet (left), clustering result (right).

them to the same image in a different colour space (i.e. the hue-saturation-brightness colour space), the separation between the appearance of injured tissue and healthy tissue in feature space are enhanced. To accommodate the possible variation of the patients' natural skin tone, an unsupervised learning algorithm (k-means clustering) was used to group tissues that have a similar appearance (Figure 2).

The overall result of this test shows that it is possible to separate between different burn areas having different depth. While there are artefacts in the image clustering results due to the image not being taken in a structured manner (calibrated or under controlled light conditions), it is important to highlight that these artefacts do not influence the overall results.

GEOMETRIC ANALYSIS

For a quantitative study of the depth and shape of the wound, structure-from-motion techniques can be applied to the clinical photographs that are already available and part of routine workflow at the hospital. Edges of the wounds can be detected and matched between two or more images to estimate the three-dimensional shape, up to an unknown scale (Figure 3). A reliable scale is usually not available and therefore metric information cannot be obtained. Alternatively, portable 3D sensors such as the Vectra H1 camera by Canfield Scientific and Skanect by Occipital can be used for image measurement at the hospital. By registering the models from two epochs using stable landmarks on the skin, the recovery of the burn injury can be quantified based on the depth, area, etc. (Figure 4).

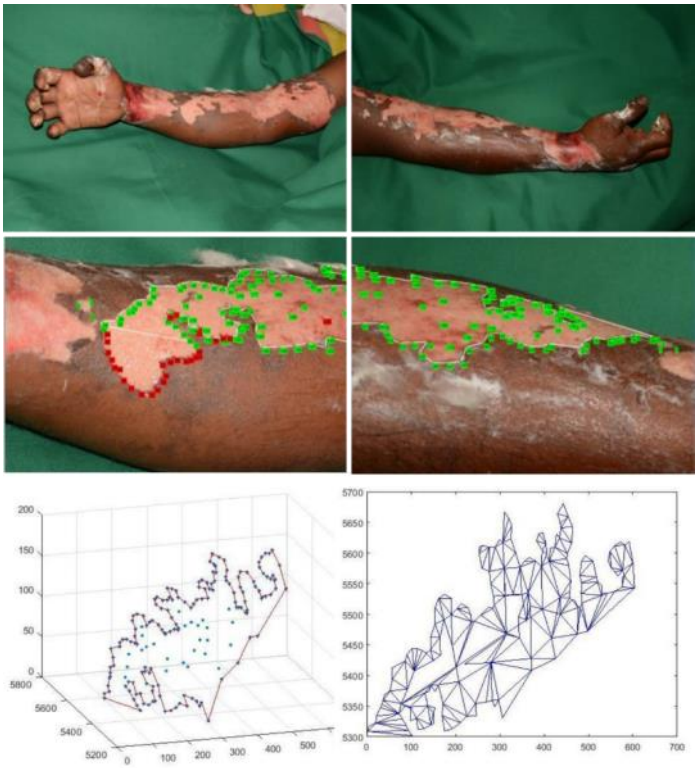

Figure 3: Original images sourced from the internet (top row), digitising results (middle row) and derived points/mesh (bottom row).

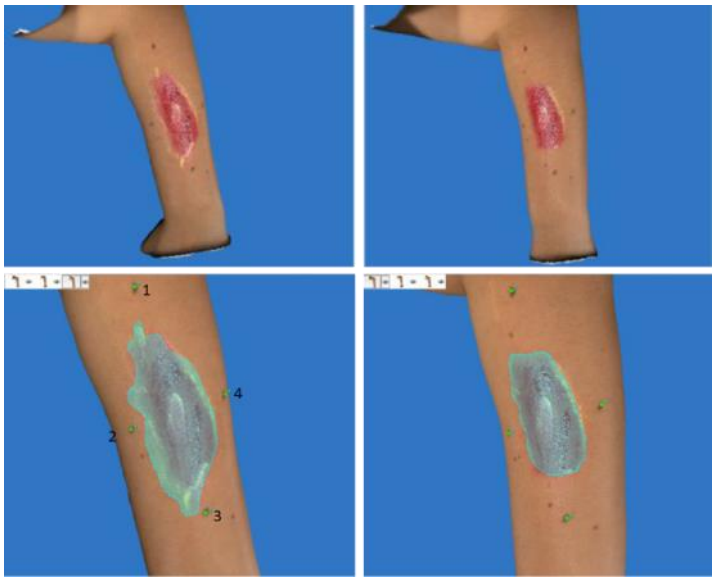

Figure 4: Simulated healing of a burn wound (top row) and selection of those areas (bottom row).

CONCLUSION

The integration of 3D imaging technology and subsequent automatic analysis will provide more accurate and objective measurements for burn assessment. Using non-invasive imaging techniques for burns management could assist clinicians in making timely decisions, thus optimising the chances of recovery and minimal scarring.

ACKNOWLEDGMENT

Thanks to Genetic Services of Western Australia (GSWA) and Gareth Baynam to have the opportunity to use the VectraH1 camera is part of this study. A special thanks to Lyn Schofield and Dylan Gration from GSWA who assist to capture the 3D models using the VectraH1 camera.

DEVELOPMENTS IN THE USE OF DRONES IN GEOSPATIAL APPLICATIONS

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Drones usage in remote sensing has been a significant innovation in the last decade across various applications. They are in some cases referred to as unmanned aerial vehicles (UAV), unmanned aerial systems (UAS), unmanned aircrafts (UA) or remotely piloted aircrafts (RPA).

Originally, the use of drones was largely limited to military operations. The United States army pioneered the trial of using radio controlled aircrafts in 1930's, that resulted to the development of the Curtiss N2C-2Drone in 1937. They started using radio-controlled aircrafts actively in the First World War, deploying over 15,000 units during the course of the war.

However, manufacturing of drones was considered expensive during that time. Therefore, to make the technology more affordable, applications in other fields were explored. As a result, it opened doors to the usage of drones in diverse fields ranging from agriculture, cultural heritage management, search and rescue missions, infrastructure inspection, natural resources management and urban planning.

The use of drones in remote sensing has comes as result of the need to have less expensive high resolution images. High-resolution satellite images are expensive and frequently have clouds which makes them hard to analyse. Additionally, conducting ground surveys to validate the results of the satellite image analysis pose some challenges in terms of its high cost. Drones also help in providing timely datasets more so over target areas in the fields of forestry, disaster management and agriculture. The person in need of the data can easily schedule when to take images, choose the right area to scan, the number of times the area will be scanned, which cannot be said of the data obtained from satellites. The relatively low cost of using drones, accessibility in terms of aerial imaging and interacting with a virtual three-dimensional world have been highlighted as reasons as to why it has attracted a variety of user.

Drone remote sensing has seen its usage in agriculture and disaster management in recent times. Infrared camera sensors mounted on drones have been used to see the spectrum of light that plants use to absorb light for photosynthesis from which farmers can get information to study the health of plants. Analysis of such images by use of software can be used to tell the specific plant type and even in which stage of life a specific crop is in. Thermal remote sensing with drones is also used to provide insight into irrigation by highlighting areas that have pooling water or insufficient soil moisture.

Figure 1: DJI quadcopter commonly used in agricultural and environmental studies © photo credit: University of Illinois at Urbana-Champaign

In the recent Kilauea volcano in Leilani, Hawaii, drones played very important roles in tracking and predicting the eruption. A group of five volunteers from the Center for Robot-Assisted Search and Rescue (CRASAR) used small unmanned aerial systems (sUAS) mounted with air quality sensors, together with advanced imaging tools and ESRI's spatial analytics and mapping to provide real-time aerial views of the eruption. This marked the first application of drone remote sensing in emergency response to a volcanic eruption and first known air quality sampling using sUAS.

Despite the growing use of drones in remotes sensing, there are various limitations and challenges. In many countries, laws and regulations that guide the use of drones are still not in place. Some countries like Uganda in Africa have put hold on the usage and importation of drones due to security threats. But some like Rwanda, Kenya have made strides by enacting laws that streamline drone usage. The Netherland have also mapped out areas designated as drone free zones with no drones allowed to fly over such areas. Drone usage in remote sensing has also been limited by the availability of Global Navigation Satellite Systems (GNSS) with most of the usage being experimental.

But overcoming such challenges promises a bright future as far as drone usage is concerned. Trials are being made to use drones to deliver good, transportation of individuals, mapping had to reach areas like mountains among others.

References:

https://interestingengineering.com/a-brief-history-of-drones-the-remote-controlled-unmanned-aerial-vehicles-uavs

L. Tang and G. Shao 2015 Drone remote sensing for forestry research and practices. Journal of forestry research. 26(4):791–797.

https://ieeexplore.ieee.org/document/8038992/?denied

I. Colomina, P. Molina 2014 Unmanned aerial systems for photogrammetry and remote sensing: A review. ISPRS Journal of Photogrammetry and Remote Sensing 92 (2014) 79–97

SLICE3D

A New Opportunity for Researchers in Geospatial Domain?

Representatives of SLICE3D Partners – meeting in Ljubljana, Slovenia.

SLICE3D (Slovenian Centre of Excellence on 3D Geodata) is a one-year project, financed in the framework of the Widening Actions under the Spreading Excellence and Widening Participation part of Horizon 2020 (Grant Agreement 763641). It is dedicated to the preparation of a scientific and innovation strategy together with the business plan for the realization of the Centre of Excellence on 3D geospatial data.

The project has been based on the creation of a long-lasting joint venture between partners from both advanced and so called low performing research and innovation EU countries. The partnership consists of leading European scientific institutions in the geospatial field (*Fondazione Bruno Kessler* from Italy, *KU Leuven* from Belgium, and *University of Twente* from the Netherlands), a geo-business SME (*Valorsiation.com* from the Netherlands) and a mapping agency (*swisstopo* from Switzerland), which join and share expertise and know-how with partner institutions in Slovenia (*University of Ljubljana* – project coordinator, *Surveying and Mapping Authority of the Republic of Slovenia*, and IT-company *XLAB*). Furthermore, the SLICE3D consortium has been actively working on networking and active involvement of other geospatial players.

The main aim of the planned Centre of Excellence is to **strengthen the research & innovation capacities** of Slovenia and the region in geospatial domain, consequently also in the other fields related to geospatial data, geospatial information and spatial decisions. SLICE3D will promote scientific excellence and innovations in particular in the following domains and disciplines: airborne and satellite imagery and point cloud processing, remote sensing and photogrammetry, 3D/4D spatial data modelling and visualization, 3D/4D geospatial big data analysis and analytics, linked geospatial data, GIS, and machine learning. The ambition is to create a Centre of Excellence that will achieve strong medium- and long-term scientific presence at the European and international level.

The focus of SLICE3D is to realize excellence through training and mobility programs, and research and

innovation (R&I) projects using cutting edge geospatial technologies, resulting in tangible results which are supplied to market players, thereby enabling them to obtain and maintain a competitive advantage. The Centre will thus be an important technology bridge for the industrial use of research results. If the idea is approved within the Widening Actions, the Centre is planned to be established in 2019/2020. This will be also opportunity for young researchers and professional in geospatial and related domains as the Centre will offer PhD and Post-doc positions. Additionally, international training and mobility programs will be offers, such as summer school, PhD workshops, etc. We are glad that a significant number of external stakeholders have already provided their commitment to contribute to the strategic planning of the SLICE3D activities and long-term cooperation, including ISPRS.

More information you can find at www.slice3d.si.

ANKA LISEC,
SLICE3D Project Coordinator

This project is funded by the European Union

SLICE3D

[1] *See http://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020*

Questions prepared by Angelica Kristina Monzon and Sheryl Rose Reyes

Dr. Konrad Schindler

Dr. Konrad Schindler is a professor at the Department of Civil, Environmental and Geomatic Engineering, Institute of Geodesy and Photogrammetry in ETH Zürich. He has completed his PhD in Computer Science in Graz University of Technology, Austria in 2003. Since then he has published numerous papers on Photogrammetry, Remote Sensing, computer vision and image interpretation; and has received several best presentation awards in various conferences, including the Marr Prize Honourable Mention from the IEEE Computer Society in 2013.

The SpeCtrum team has been quite privileged to learn from Dr. Schindler as we also hope to impart it with you, our dear readers. Enjoy!

What was your motivation in pursuing Computer Vision? What did you find most interesting in this field of research? Why is it important in our society today?
Getting into computer vision was a natural development for me. I started my research career at an institute where we did not draw a boundary between photogrammetry and computer vision (the Institute of Computer Graphics and Vision at TU Graz, then lead by Franz Leberl). And if you look at the development of our field, the big research questions of "classical" photogrammetry – camera calibration, aerotriangulation, automatic tie point measurement, etc. – had been solved. The remaining challenge was (and still is) to automate the information extraction, to create "information from imagery", as the ISPRS motto says. And for that purpose computer vision offered the right models and tools.

Besides this conceptual reason, there was of course also a less rational, more personal motivation: curiosity. I had studied, and then worked in a surveying firm, when photogrammetry was still done manually with analytical plotters. The world of computer vision was new and exciting. I was like a child in a toy store, but it was a special toy store where quite many toys that were on offer promised to be directly useful for my playground of photogrammetric image analysis.

Regarding importance for society: I suppose I don't have to convince your readers that maps and geo-information are important, and computer vision is a core component of today's photogrammetry and remote sensing systems used to create that information. Who would have thought, 10 years ago, that we would have high-resolution 3D city models in (online) consumer maps? Beyond our field, computer vision has nowadays become a mainstream technology. It is everywhere – it checks your fingerprint when you unlock your phone, it helps you focus your photographs or index your photo library. It is a key technology for autonomous vehicles that we will soon see on our roads.

> ***"I was like a child in a toy store, but it was a special toy store where quite many toys that were on offer promised to be directly useful for my playground of photogrammetric image analysis."***

Can you share with us 1 project that you particularly liked? Why? (Please briefly share details on the objective, approach, results/achieved outcome)

I guess I am a researcher at heart, my favorite projects are usually very recent ones, often even work in progress where there are still fascinating challenges ahead.

One such project is our recent work on computational super-resolution for multi-resolution satellite imagers like Sentinel-2. Multi- and hyper-spectral satellite sensors often deliver data that has varying resolution across the spectrum: e.g., Sentinel-2 records some bands at 10m GSD, but others at only 20m or even 60m. Since such data is not very practical to work with, people have looked for ways to "cleverly upsample" the lower-resolution bands, by transferring high-resolution content across bands. The normal approach is to construct some sophisticated model of how the imaging process blurs the high-resolution signal, and then estimate the missing pixel values such that this blurring leads to the observed low-resolution images. This is a conceptually and numerically tricky task. We found that, for a given multi-resolution sensor, we can in fact use deep machine learning to generate the high-resolution images from their lower-resolution counterparts – effectively, we replace the attempt to model all the intricate effects of the imaging process by a beefed-up form of statistical regression. I found it really remarkable that with this supposedly "naïve" approach we could enhance Sentinel-2 images for any location around the world that we tried. Those who are interested can find more information here: https://arxiv.org/abs/1803.04271

> *To innovate in an engineering discipline, get yourself in a position where you can create technology, not only use it.*

You have also several works on object-tracking. Can you tell us more about object-tracking and how it is used in the everyday lives of people today?

Object tracking broadly refers to analyzing image sequences or videos of dynamic scenes, and finding out "what went where". So it is yet another form of computer vision (or photogrammetry ☺), where we want to measure how things move around over time. Perhaps the most obvious application is again in robotics and autonomous driving: an autonomously moving vehicle must of course know how other vehicles, pedestrians, etc. move through its surroundings, so that it can make predictions about their future positions and avoid hitting them. But tracking is also used in many other fields, for instance in biology to analyze the behavior of animals, but also in video surveillance.

For students and young researchers interested to pursue these research tracks, what skills and disciplines would they need to develop?

My advice for young people who want to become researchers in our field is to study the basics well: familiarize yourself with a wide range of mathematical tools, make sure you have a good understanding of statistics and signal processing, gain experience in physical and mathematical modelling, acquire decent programming skills. To innovate in an engineering discipline, get yourself in a position where you can create technology, not only use it. The same, by the way, applies for those who go into practical engineering: if you want to solve the hard assignments, not just plod through run-of-the-mill projects; then you must be able to analyze problems outside of your "technical comfort zone", to design solutions that you cannot look up in a textbook, and sometimes to make your own tools.

What developments do you anticipate in the field of photogrammetry, object tracking and computer vision in the next 5 years? How do you see yourself playing a role in these developments and how do student organizations like the ISPRS SC also help further the advancements of these fields?

I am not a clairvoyant, I don't know what will happen. The field is moving at a frantic pace, it is more difficult than ever to make predictions. But let's try.

In photogrammetry, I believe that geometric modelling and image understanding will increasingly be integrated into tightly coupled data analysis systems. I also perceive a renewed interest in automatically extracting higher-level representations – parametric surface models, semantic object descriptions, etc. The past 10 years can perhaps be described as the "decade of the point cloud", with laser scanning, dense image matching, etc. we can create almost arbitrarily large and dense point clouds. But who needs point clouds? They are not a particularly suitable or efficient representation for anything (except perhaps visualization), and arguably they do not fulfil the needs of many users all that well. The long-term vision to automatically produce CAD-like, structured, object-level annotated geodata has proved to be much harder to achieve than originally anticipated, but that does not mean we should stop trying. I certainly will keep trying.

Regarding computational methods: although the current hype is clearly exaggerated, I do believe that machine learning – it is now back in fashion to call it "artificial intelligence" – will continue to play an important role. The "unreasonable effectiveness of data" remains strong: we must accept that in many cases we do not have accurate and precise mechanistic models of the world, and when that is the case then gathering statistics over large datasets is a more effective way to make reasonably accurate predictions.

With regard to application fields, I am pretty sure that we will see the gradual advent of autonomous vehicles, in which image metrology and image understanding play an important part. Also other robots will use cameras and range scanners as main sensors for their perception – let's see what comes next after vacuum-cleaners and lawn mowers. In general, computer vision will probably pervade our daily life even more, simply because there are so many mobile computing devices with built-in cameras. E.g., to make use of the range sensors and multi-camera setups increasingly available in mobile phones. Some are also predicting a big future for virtual and augmented reality glasses, which also rely on imaging technology. Although I am not yet sure what the "killer application" could be that creates a mass market for these devices.

Photogrammetry could become important in the digitization of the construction business. Building information management (BIM) effectively means that every part of a building or construction project should have a digital twin, so we need measurement technology for fast, accurate and complete documentation and surveying. I believe that photogrammetric techniques will play an key role there. Remote sensing seems to become more and more important in agriculture. But also earth observation for the environmental sciences is in a better position than ever with initiatives such as ESA's Copernicus program. To really unlock the potential of the newly available satellite observations we need better, and (almost) fully automatic, information extraction, because the data volumes are too high to process manually. Information extraction from remote sensing data, in particular environmentally relevant data like forest change, crop yields, etc. are certainly a field in which I will also stay active.

> *if you want to solve the hard assignments, not just plod through run-of-the-mill projects; then you must be able to analyze problems outside of your "technical comfort zone", to design solutions that you cannot look up in a textbook, and sometimes to make your own tools.*

To define what the student consortium can do is your job ☺ I guess the main contribution of such an organization is networking and raising awareness. Organize summer schools or student workshops. Help with visits to academic labs and internships in companies. And prod ISPRS as a whole to emphasize data science and computer vision. It is good for such an organization if the young people remind the others of their needs and priorities and do not let the old ones set the agenda alone.

GRSS-YP & ISPRS Student Consortium SS 2018

UAV Photogrammetry and Machine Learning Applications – Emerging Trends and Challenges for Earth Observation

This is the fourth edition of the event so called "IEEE/GRSS-Young Professionals & ISPRS WG V/5 and SC Summer School", which will be held on **October 29 - November 1** in Campo Grande, MS, **Brazil**, with the theme: **UAV Photogrammetry and Machine Learning Applications: Emerging Trends and Challenges for Earth Observation**.

Remote Sensing and Photogrammetry make it possible to map and monitor natural resources through orbital images or through images collected with UAV. They also support precision agriculture, what leads to a greater productive efficiency, and reduce the need on use of pesticides. In this sense, it becomes of great importance to acknowledge what exists in the most recent researches (state of the art) both in the technological aspect and in the methods/techniques of Photogrammetry, Remote Sensing and Machine Learning. The event has the support of ISPRS (International Society for Photogrammetry and Remote Sensing) and IEEE GRSS (Geoscience & Remote Sensing Society).

The event will be organized in two blocks. The first, lasting one day, follows the model of GRSS Young Professionals. It is intended to guide the careers of young professionals who have been graduated up to 15 years and consists of lectures and interactive sessions delivered and moderated by prominent professionals active in business, education/research institutions and academia.

The second block, lasting three days, will follow the model of the ISPRS Summer School, aiming to transmit technical/scientific knowledge on the selected topic. In this block, presentations will be performed by three renowned speakers with great technical and scientific experience in the field: **Dr. Farid Melgani** (University of Trento), **Dr. Franz Rottensteiner** (Leibniz University Hannover) and **Dra. Anette Eltner** (TU Dresden).

The following topics will be addressed: **UAV Photogrammetry, Generative classifiers and Artificial Neural Networks.**

Further details are available in **https://grss-isprs.ufms.br/en/about/**.

OPENSTREETMAP MAPATHON

by ISPRS Working Group IV/4

Born in 2004, OpenStreetMap (OSM) is nowadays the largest, most complete, most detailed and most up-to-date geospatial database of the world, which is entirely created by volunteers. Currently there are more than 4 million contributors registered to the project. The open license of OSM data allows for a variety of applications, such as update of official cartography, disaster management, routing and navigation, games and leisure, etc. The mapathon will first introduce the OSM project and then show participants the simplest among the available OSM editors, i.e. the iD editor. A step-by-step mapping exercise for beginners will follow, focusing on a humanitarian mapping task proposed by the Humanitarian OpenStreetMap Team (HOT), which 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). After the mapathon, participants will have acquired the basic notions on the OSM projects (philosophy, license, data model, available tools and ways to contribute data, etc.) and will be able to execute basic mapping tasks in OSM using the iD editor. The mapathon is open to any participants; no specific or technical background is required.

DATE AND TIME:
1 October 2018
3:30 pm – 5:00 pm

LOCATION:
TU Delft Aula Conference Centre
5 Mekelweg, 2628 CC Delft
Netherlands

Registration:

- Registration for the workshops is free for those attending the Symposium. However, there are a limited number of seats available. Please register for the workshops that interest you. Registration will be on a first come first served basis.
- To register please, visit *https://www.eventbrite.com.au/e/workshop-3-openstreetmap-mapathon-tickets-45923794305.*

Reference:
http://www.isprs.org/tc4-symposium2018/workshops.html

MOTIVATE LEARNING

Making Opportunities to Initiate Valuable Alliance through Experiential Learning

Sirindhorn Center for Geo-Informatics (SCGI) is established under the cooperation between the Ministry of Science and Technology of Thailand by Geo-Informatics and Space Technology Development Agency (Public Organization) : GISTDA, and Wuhan University by State Key Laboratory of Information Engineering Surveying, Mapping and Remote Sensing : LIESMARS, the People's Republic of China.

The ISPRS Student Consortium (ISPRS SC) is the official representation of the youth to ISPRS and collaborates with Working Group V/5 – Promotion of the Profession to the Youth for its activities. Geo-informatics and Space Technology Development Agency (GISTDA) is Thailand's public organization leading the country's activities in space technology and geo-informatics applications. In addition, GISTDA is currently the secretariat for the recently established ASEAN Research and Training Center for Space Technology and Applications (ARTSA), which aims to provide services in education and training, knowledge sharing and enhancement, and awareness raising in geo-informatics. MOTIVATE Learning project is a collaboration among the ISPRS SC, GISTDA Thailand and ARTSA that aims to build the capabilities of students and young professionals in the fields of remote sensing, photogrammetry and spatial information sciences. MOTIVATE Learning is comprised of two programs: (1) ISPRS SC Summer School + Hackathon and (2) The Spatial Exchange Program. The ISPRS SC Summer School follows the conventional design of the summer schools, with the addition of the 2-day hackathon as a challenging activity after the lectures, practical sessions and break-out sessions, which aims to encourage participants to conceptualize ideas and create applications that can address real world problems. The Spatial Exchange Program is a 10-day exchange program for students and young professionals, in which the participants will be guided by a visiting researcher and will be hosted in Space Krenovation Park, GISTDA at Chon Buri, Thailand. Participants will choose an area of interest and a research question to work with and to write the corresponding manuscript in solving the research question during the program.

MOTIVATE Learning is a collaborative project among the ISPRS SC, GISTDA Thailand and ARTSA that aims to build the capabilities of

students and young professionals in the fields of remote sensing, photogrammetry and spatial information sciences. As the first project on educational and capacity building, this initiative also marks the beginning of the ISPRS SC's collaboration and partnership with various regional and global organizations, in promoting activities for the youth for their professional development and exploring the possibilities of nurturing future leaders in the profession.

Motivate, as defined by Oxford Dictionary, means "to provide (someone) with a reason for doing something." Students and young professionals are often challenged in finding purpose for a long-term career and in establishing a network of colleagues and mentors outside their universities or organizations. Students often encounter the questions about pursuing a postgraduate degree, and difficulties in finding opportunities to learn outside their universities at a minimum cost, and obstacles in identifying the careers that may suit them best. MOTIVATE Learning aims to help students and young professionals by providing an opportunity to learn by experience, through collaboration with peers and mentors.

MOTIVATE Learning will be a platform of collaboration among students, young professionals, experts, professors and the industry to provide a bigger perspective of the profession as well as to establish relationships within the scientific community and the industry. Furthermore, MOTIVATE Learning believes in investing in knowledge through educational campaigns and capacity building efforts. The ISPRS SC continues to identify the possibilities of re-designing and adding flexibility to one of its major activities, the summer school, by introducing new methods of learning and encouraging more interaction among the participants, lecturers, industry experts and other individuals providing knowledge and assistance to this specific activity.

Please visit *http://sc.isprs.org/events/motivate.html* for more information. Final deadline for submission of applications is on July 15, 2018.

08 AUGUST 2018

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	**20**	**21**	22	23	24	25
26	**27**	**28**	**29**	**30**	**31**	

09 SEPTEMBER 2018

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	**3**	**4**	**5**	**6**	**7**	8
9	**10**	**11**	**12**	**13**	**14**	**15**
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

10 OCTOBER 2018

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	**15**	**16**	**17**	**18**	**19**	20
21	22	23	24	25	26	27
28	29	30	31			

UPCOMING EVENTS 2018

19-20 Aug 2018
PRRS 2018 10th IAPR Workshop on Pattern Recognition in Remote Sensing
Site: Beijing CHINA
Contact: Jie Shan & Uwe Stilla jshan@purdue.edu; stilla@tum.de
Website: http://www.pf.bgu.tum.de/isprs/prrs18

27 Aug - 02 Sep 2018
ISPRS WG IV/4 FOSS4G 2018 Academic Track
Site: Dares- Salaam, TANZANIA
Contact: Maria A. Brovelli maria.brovelli@polimi.it
Website: http://2018.foss4g.org/

03-05 Sep 2018
ISPRS WG IV/1 International Conference on Geomatic and Geospatial Technology 2018
Site: Kuala Lumpur, MALAYSIA
Contact: Alias Abdul Rahman alias@utm.my
Website: http://www.geoinfo.utm.my/ggt2018

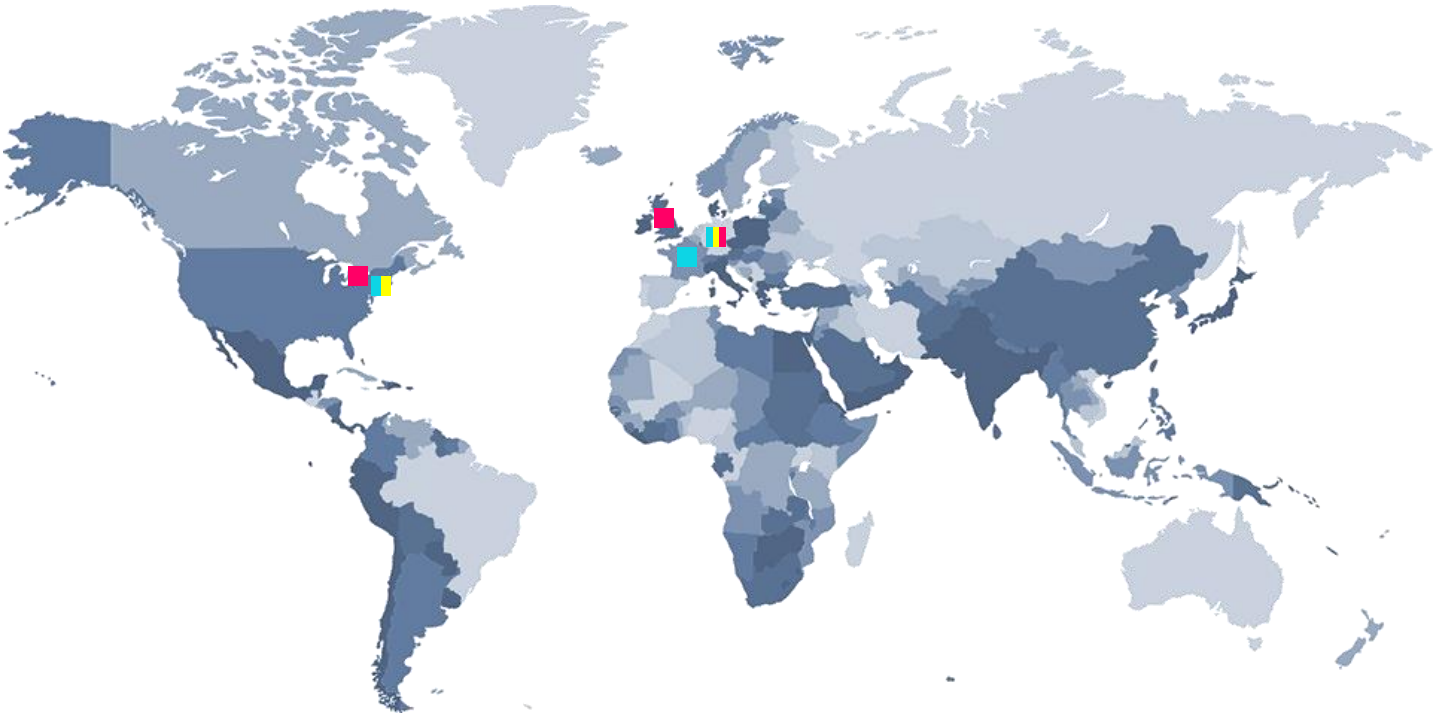
04-07 Sep 2018
Eurasian GIS 2018
Site: Baku,AZERBEIJAN
Contact: eurasiangis2018@selcuk.edu.tr
Website: http://eurasiangis2018.selcuk.edu.tr/

05-Sep 2018
ISPRS WG II/1-6 3DV 2018 International Conference on 3D Vision
Site: Verona,ITALY
Contact: Andrea Fusiello andrea.fusiello@uniud.it
Website: http://3dv18.uniud.it/

10-14 Sep 2018
15th International Circumpolar Remote Sensing Symposium
Site: Potsdam, GERMANY
Contact: Guido Grosse guido.grosse@awi.de
Website: https://alaska.usgs.gov/science/geography/CRSS2018/index.php

12-16 Sep 2018
ISPRS TC III CHCD2018 The International Symposium on Cultural Heritage Conservation and Digitization
Site: Tsinghua University, CHINA
Contact: Xianru ZHANG zhangxianru@thid.cn
Website: http://www.chcds.org/

15-19 Oct 2018
ACRS 2018 39th Asian Conference on Remote Sensing
Site: Kuala Lumpur, MALAYSIA
Contact: Kamaruzzaman Wahid acrs2018@remotesensing.gov.my
Website: http://acrs2018.mrsa.gov.my/



PhD fellowships and scholarships

- Two (2) PhD student positions in Earth, Biological and Social Sciences, Institut de Physique du Globe de Paris, France
  Deadline: 21st September 2018
  http://www.ipgp.fr/fr/etn-saltgiant.
- PhD fellowship in stream/river biogeochemistry and river corridor hydrogeology, University of Connecticut, Storrs, CT, United States
  Deadline: 30th September 2018
  https://www.joshswaterjobs.com/jobs/8786
- DLR-DAAD Research Fellowships in the fields of Space, Aeronautics, Energy and Transportation Research in Germany
  Deadline: Until filled (Starts in September 2018)
  https://www.daad.de/deutschland/stipendium/datenbank/en/15370-dlr-daad-research-fellowships-in-the-fields-of-space-aeronautics-energy-and-transportation-research/
- DAAD PhD Scholarship in Germany 2019/2020
  Deadline: Various
  https://www.daad.de/deutschland/stipendium/datenbank/en/21148-scholarship-database/?daad=1&detail=50076777&origin=89&page=1&q=&status=&subjectGrps=

Masters scholarships

- Masters fellowship in stream/river biogeochemistry and river corridor hydrogeology, University of Connecticut, Storrs, CT, United States
  Deadline: 30th September 2018
  https://www.joshswaterjobs.com/jobs/8786
- DAAD Master scholarship to study Photogrammetry and Geoinformatics at Stuttgart University of Applied Sciences in Germany
  Deadline: 15th October 2018
  https://www.daad.de/deutschland/stipendium/datenbank/en/21148-scholarship-database/?daad=1&detail=50076777&origin=89&page=1&q=&status=&subjectGrps=

Job opportunities

- Postdoc in Geophysics at the Geophysics Section in the Department of Geosciences, Alfred-Wegener Institute, Bremerhaven, Germany.
  Deadline: 15th August 2018
  http://www.earthworks-jobs.com/geoscience/awi18061.html
- Hydrologist/Water resources specialist, Mott MacDonald, Cambridge, United Kingdom.
  Deadline: 3rd September 2018
  https://www.joshswaterjobs.com/jobs/8793
- Remote Sensing Analyst, Cloud to street, New York, United states
  Deadline: Applications will be reviewed on a rolling basis throughout the summer of 2018 with the intent to start the right candidate as soon as possible.
  https://www.joshswaterjobs.com/jobs/8824

ISPRS MIDTERM SYMPOSIA 2018

	I	II	III	IV	V
	ISPRS TC I Sensor Systems *"Innovative Sensing - From Sensors to Methods and Applications"*	ISPRS TC I I Photogrammetry *"Towards Photogrammetry 2020"*	ISPRS TC I II Remote Sensing *"Developments, Technologies and Applications in Remote Sensing"*	ISPRS TC I V Spatial Information Science *"3D Spatial Information Science - The Engine of Change"*	ISPRS TC V Education and Outreach *"Geospatial technology – Pixel to People"*
PLACE	Karlsruhe, Germany	Riva del Garda, Italy	Beijing, China	Delft, The Netherlands	Dehradun, India
TERM	October 9-12	June 4-7	May 7-10	October 1-5	November 20-23
APPLICATION DEADLINE	July 31, 2018	March 19, 2018	March 19, 2018	July 31, 2018	Sept 30, 2018

ACKNOWLEDGEMENT

We'd like to thank all the authors, contributors, and the coordinators of the featured articles in this issue who generously gave their time and shared their experiences for the enrichment of our community. We would also like to appreciate the hosts, organizers and the volunteers of the TC III & ISPRS SC Summer School in Beijing for a successful conduct of the student activities. Lastly, thank you to the Board Members and the Newsletter team for the continuous hard work on every issue of this publication!

Mabuhay!

Please visit our ISPRS SC web page **sc.isprs.org** where you will find more information about Student Consortium, our previous Newsletter issues, SC activities, photo galleries from previous Summer Schools, interesting links etc.