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Geoinformatics

ISPRS SC ACTIVITIES: YEAR IN REVIEW

IMPORTANT FOCUSED OUTSTANDING VALUABLE: DR. MUKI HAKLAY

CITIZEN SCIENCE IN DISASTER MANAGEMENT

ISPRS STUDENT CONSORTIUM   isprs

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NEWSLETTER

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FROM THE BOARD

Dear ISPRS SC Members,

Merry Christmas and a Happy New Year to everyone! As we close 2018 the ISPRS SC brings you a Backsight of the summer schools in Malaysia and Brazil held during the last quarter of the year and a quick peek at the conclusion of Making Opportunities to Initiate Valuable Alliance through Experiential Learning (MOTIVATE Learning).

And we excitedly welcome 2019 with articles featuring citizen science. In the IFOV, we have interviewed Professor Muki Haklay to talk to us about participatory GIS and research. Articles on citizen science in disaster risk management and geoinformatics are featured on Spotlights. Don't miss out on information on upcoming events and opportunities in the Foresight, Into The Horizon and Opportunities section. We'd love to see more of you on one the upcoming activities of the ISPRS SC.

The team is continuously encouraged with the sustained interest and participation of students, young professionals and experts in the Student Consortium led activities with much hope to improve and cater more to your needs. I'd like to take this opportunity to express my gratitude to the ISPRS community for allowing me to serve as a board member and be part of the Newsletter team for the past two years. This will be my last contribution to the Newsletter as I move on a different journey. I have learned much from this experience and I also made great friendships along the way – a truly memorable journey. It has been my privilege to have served you all. As a parting request, please continue giving your all-out support to the team this 2019! They are truly a hard working bunch. :)

With love and gratitude, now signing off,

Angelica Monzon
Editor-in-Chief

MOTIVATE

MAKING OPPORUNITIES TO INITIATE VALUABLE ALLIANCE THROUGH EXPERIENTIAL

LEARNING

By: Dirga Sumantri and Sheryl Rose Reyes

The group photo of the participants for the Summer School + Hackathon.

The ISPRS Student Consortium in collaboration with Geo-Informatics and Space Development Agency (GISTDA) and ASEAN Research Training Center for Space Technology and Application (ARTSA) organized a two-part programme, the ISPRS SC Summer School + Hackhaton and The Spatial Exchange Program. The eventwas held on 6 -20 August 2018 at Space Krenovation Park, GISTDA, Chon Buri, Thailand. The event title is MOTIVATE Learning: Making Opportunities to Initiate Valuable Alliance through Experiential Learning, an ISPRS SC activity organized through the ISPRS Education and Capacity BUilding Initiatives 2018 and provides a learning through experience for the participants.

This is not a typical summer school where students sit in the class and listen to the lecturers. The courses were an elaborate learning experience and a reflection on one's capabilities, in order to address research issues related to the student's technical and academic experiences. The participants were expected to understand the context of their chosen issues related to sustainability and were encouraged to propose

solutions to the problems by utilizing their expertise in GIS and remote sensing.

On the first day, we went around Space Krenovation Park and we were welcomed by GISTDA and ARTSA staff, and also ISPRS SC Chair, Sheryl Rose Reyes. In the morning, we reached Cosmo Cafe to share breakfast with other participants before the start of the lectures in the auditorium. We were impressed by the beautiful gardens, fountain and ground satellite receivers at the park. The first day was spent with introduction, registration and getting to know other participants, event staff, and the invited lecturers.

On the next day, we were introduced to the applications of drones. The lecturer, Dr. Kitsanai, explained how UAVs can be useful for many applications. We were exposed with the different applications of UAVs, equipped with Artificial Intelligence for forest monitoring, conservation, and wildlife monitoring. We did a hands-on session where everyone tried to be a drone pilot and tested the equipment by taking selfies and images of the park. The ice breaker session was also a challenge involving drone technology and we were

(Left) Visiting some of GISTDA's facilities related to space applications; (Right) During the ice breaker session where two participants were attempting to help their drone reach the target!

assisted by students from Burapha University. We tried to execute the drone point-to-point with simple coding.

On the third day, we were introduced with the applications of remote sensing using a platform for processing big data. Engr. Jose Don De Alban from the National University of Singapore delivered a comprehensive lecture about the synergistic approach to mapping using remote sensing and GIS. We explored Google Earth Engine (GEE) as the platform for running batches of remote sensing data through cloud computing. The lecture gave us a new insight about the future challenges in data processing.

The Hackathon session was held in the last two days and we were divided into four groups. The Hackathon was supervised by Dr.Peeraphon and

Dr. Kulsawad and each group was asked to make a proposal about different issues. The main challenge for the participants was to design a comprehensive solution in a very limited time. We were expected to carry out critical thinking when we observe the issues being addressed.

Aside from the lectures, we also went on a field trip. We went to Space Inspirium, GISTDA's in-house science museum, and visited the ground receiving station of Thailand,, including Taichote. We also spent the afternoon in Pattaya beach and an evening of shopping in the nearby night market. The place displayed the nightlife of Thailand. We enjoyed a seafood dinner near the beach and spent our money for buying souvenirs.

The second week, we continued for The Spatial Exchange Program. We said our farewells to our

Group presentation of the Hackathon results.

Brainstorming with the mentors.

friends from the summer school and welcomed new participants for this second part of the event. From the start of the program, we were divided in groups based on our selected topics and we were assigned one mentor and two co-mentors for each group. We had different topics such as GI for Environmental Monitoring, Geo Big Data, new trend of GI technology and synergistic use of remote sensing and GIS. Each group discussed their topic with intense supervision from their mentors.

Our mentors were professors and experts in remote sensing and GIS. They were Mr. Khaled from United Nations Operational Satellite Application (UNOSAT), Dr Kanoksri from Hydro and Agro Informatics Institute (HAII), Dr Kanchana from Mahidol University, and Dr Krisanai from Burapha University. In the forum group discussion, the mentors gave us insights from their research

experiences. The session opened our minds because we were shown how sophisticated and reliable are the RS and GIS technologies.

During this event, we were encouraged to undertake intensive research, develop methodologies for our chosen research topic and to present our preliminary results. Some participants who are more experienced in using the software needed for the research, they actively contributed to the outputs. For some students who are new and are still familiarizing with the software, they were more involved in developing and writing the research paper. The participants learnt how to deal with group projects and to work with people with different personalities and coming from different cultures. We did not only gain additional knowledge and capabilities but also learnt so much about teamwork.

One of the groups presenting their work for The Spatial Exchange Program.

" *The summer school was an eye opener for a young student like me that there are a lot of applications of Photogrammetry, Remote Sensing, and Spatial Information Sciences with the recent advances and state of the art technology. MOTIVATE Summer School is an event that gives great opportunities to connect with the participants from different perspectives, learn from them, make new relationships, and strengthen the existing ones. The summer school was fun and challenging at the same time because it was filled with intensive lectures and practical sessions. Being able to meet new people from different countries, learning information from hearing their presentations and researches, and being able to converse with the researchers from different Universities were the best part of it.* "

Hex Franca
Bicol University College of Engineering, Philippines

" *The greatest advantages of summer school learning are that it can promote communication among different countries and increase the knowledge. We have fun, exchange knowledge and corporations.* "

Shwesin Koko, Mahidol University, Thailand

39ᵗʰ ACRS
& ISPRS SUMMER SCHOOOL 2018

Written by Charles Jjuuko

Big Geoscience Data Ecosystem:
THEORY, PROCESSING & APPLICATION

Photo from Farizun Amirod Saad

Geoscience and Digital Earth Centre (INSTeG), Research Institute for Sustainability and Environment (RISE), Universiti Teknologi Malaysia (UTM) in collaboration with International Society of Photogrammetry and Remote Sensing Student Consortium (ISPRS SC) organized the ISPRS SC Summer School in conjunction with the 39th Asian Conference on Remote Sensing (ACRS 2018) in Kuala Lumpur. The summer school was held at Menara Razak of UTM Kuala Lumpur campus from October 20th to 24th, 2018 with the theme of "Big GeoSensing Data Ecosystem: Theory, Processing & Application".

This international event aims to provide an opportunity for students and young researchers to get into lectures from various eminent experts within the field of remote sensing, photogrammetry and geospatial information sciences. Participants are expected to gain knowledge from a series of lecture, practical sessions and excursion at a minimum cost. Besides that, it is an international platform of collaboration among students, young researchers, experts and the industry to provide a bigger perspective of the profession as well as to establish relationships within the scientific community and the industry.

Opening speech was delivered by Prof. Kohei Cho, the General Secretary Asian Association on Remote Sensing (AARS) and he welcomed all the participants to the programme and highlighted the importance of the programme. He also emphasized that students shall get enrolled to the ISPRS Student Consortium and become a part of ISPRS SC activities.

In the first day, the welcome party dinner was set at the D'Saji KL Titiwangsa, Kuala Lumpur. The dinner was purposely to expose and introduce participants about Malaysian's culture through the cultural show where different ethnic performances were performed. Participants also got moments to get acquainted among them and also organizing team.

LECTURES on the topic related to big geosensing data ecosystem were delivered by prominent professors and were accompanied by practical sessions from industries. The list of speakers and excursion activities are listed below:

Lecture 1: Big Geo-Data: Challenges and Future
Prof. Sr. Dr. Mazlan Hashim, Universiti Teknologi Malaysia

This lecture discussed about the concept of geodata, including its background, types, present status and application in line with SDG goals. It is also covered issues, challenges and future direction of the big geodata.

Lecture 2: Big Geo-Data in Earth Observation
Mr Alex Tan, DigitalGlobe

This lecture were given by industry which provide geospatial information on high-resolution global satellite images. It explained about the data acquisition covering all elements using high resolution satellite images. Also, he highlighted the workflow of the date obtained from host until user and analysis pattern.

Lecture 3: User-generated Big Geo-Data: Terrestrial Laser Scanning
Assoc. Prof. Dr. Zulkepli Majid, Universiti Teknologi Malaysia

This lecture described about the concept of terrestrial laser

scanning (TLS) including data acquisition, data processing, applications and issue related. At the end of this lecture, students were able to use TLS when it is needed.

Lecture 4: Big Geo-Data in Smart City: 3D GeoSpatial Information
Prof Dr. Tee-Ann Toe, National Chiao Tung University

This lecture discussed about 3D geospatial data using LIDAR data. At the end of the lecture, hands on activity were carried out where each student need to process the given data to generate 3D modelling and visualization.

Lecture 5: Big Geo-Data in Disaster Management
Dr. Khamarrul Azahari Razak, Universiti Teknologi Malaysia

This lecture discussed about the disaster risk management in the context of global framework covering national commitment and local

agenda. It were also discussed about the current status, challenges and future direction of the disaster management. Speaker also shared his experienced towards awareness program and risk reduction to disaster area.

Lecture 6: Tools for Big Geo-Data Analytics
Dr. Martin Isenburg, rapidlasso GmbH

This lecture was focused more on hands practice using LAStools software using LIDAR data. Students were exposed on the processing of the data using given software and data provided by the speaker.

Practical: Terrestrial Laser Scanning
Mr Lim Chor Seng, GPS Lands (M) Sdn. Bhd.

This lecture were conducted by Mr Lim Chor Seng from GPS Lands (M) Sdn. Bhd. He explained about the current technology and advantages using new technology. Next, a field data collection using terrestrial laser scanning were demonstrated. Finally, a processing were applied using Riegl.

Excursion 1: KL Forest Eco Park
Tour guide: Mrs. Mariatul Qiptiyah Binti Md Sah

The participants visited KL Forest Eco Park, Kuala Lumpur since it is a popular ecotourism destination and serves as a natural green lung for the surrounding metropolitan area. Also, it provide a 200m canopy walk, with a wonderful aerial view of the treetops and the city beyond.

Next, the participants were taken to KL Tower since it was located at the area of KL Forest Eco Park. The participants experienced sky deck (421m above ground level) and sky box (300m above ground level) to enjoy the panoramic view of Kuala Lumpur.

Excursion 2: Forestry

Department Peninsular Malaysia (JPSM), Kuala Lumpur.
Tuan Haji Wan, Department of GIS, JPSM

The participants were listened to forest management through GIS system, landuse changes pattern and historical development of the system maintained by JPSM.

The program was attended by 20 participants from different countries from different background which are Philippines, Thailand, Indonesia, India, Taiwan, Uganda, Pakistan, Libya and Malaysia.

At the end of the program, the participants filled in the feedback form in order to get the valuable insight to improve the program. Majority of the participants were satisfied with the program since 95% of participants agreed that overall assessment of the summer school were excellent and achieved the objectives of the program. Besides that, 95% of the participants were also satisfied with the organizer, food serving, value and accommodation of the program. However, the participants took some added value such as by adding more practical session, and using the good labs, computer and data. Many participant suggested that the summer school should provide longer duration and given more time prior to practical session. From the feedback it is clear that all the participants were satisfied and the program was highly useful for them.

IEEE/GRSS-Young Professionals & ISPRS Working Group V/5 and Student Consortium Summer School 2018

Dr. Jose Mercato
Federal University of Mato Grosso do Sul (UFMS)

The IEEE/GRSS-Young Professionals & ISPRS Working Group V/5 and Student Consortium Summer School was held at Multiuso Auditorium of the Mato Grosso do Sul Federal University, Campo Grande city, Mato Grosso do Sul State, Brazil from October 29 to November 1, 2018 (https://grss-isprs.ufms.br/en/). The local organizers were Dr. José Marcato Junior (UFMS), Dr. Hemerson Pistori (UCDB), Dr. Edson Takashi Matsubara (UFMS) and Dr. Amaury Antônio de Castro Junior (UFMS). The organizing committee were composed by Dr. José Marcato Junior (UFMS), Dr. Hemerson Pistori (UCDB), Dr. Veraldo Liesenberg (UDESC), Dr. Raul Queiroz Feitosa (PUC-Rio/UERJ), Dr. Edson Aparecido Mitishita (UFPR), Dr. Antonio Maria Garcia Tommaselli (UNESP/FCT), Dra. Alessandra Gomes (CRA/INPE), Dra. Vanessa Jordão Marcato Fernandes (UFGD) and Dr. Jefersson A. dos Santos (UFMG). Figure 1 presents the event logo, including all the supporters. A Facebook page was created (*https://www.facebook.com/groups/193181211582257/*). All the lectures were recorded and two of them were broadcast live (*https://youtu.be/lOGZf9nfNLI*).

Mato Grosso do Sul is a state on the midwest of Brazil, known because of the Pantanal, it is also characterized by other types of biome, Cerrado (Brazilian Savanah) and Mata Alântica (Atlantic Forest), becoming this place very rich in animal, plant and water biodiversity. Agriculture and Pasture are the strong economy and the increasing population and demands for food. Campo Grande, the capital city, is called "Cidade Morena" by the citizien because of the soil color and also called "Cidade dos Ipês" (City of Ipes) being one of the most (arborizadas) city of the country. Still with strong presence of the environment in the Capital, it is possible to observe macaws, toucans and several species of birds, capybaras, and others species of animals in different places and green spaces at the city.

Remote Sensing and Photogrammetry make it possible to map and to monitor 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.

Location Map of the Mato Grosso do Sul State and its Capital – Campo Grande

UAV Photogrammetry and Machine Learning Applications: Emerging Trends and Challenges for Earth Observation, was the theme for this year edition of The IEEE/GRSS-Young Professionals & ISPRS Working Group V/5 and Student Consortium Summer School. As the name suggest, the both societies, ISPRS (International Society for Photogrammetry and Remote Sensing) and IEEE GRSS (Geoscience & Remote Sensing Society) participate and support this event. One hundred twenty (120) participants were registered, including graduations and undergraduations students, researchers, professionals from different academics universities (publics and privates), governmental institutions and companies.

The programming was divided in two parts. The first block corresponded the first day and followed the model of GRSS Young Professionals. It is intended to guide the careers of young professionals consists of lectures and interactive sessions delivered and moderated by prominent professionals active in business, education/research institutions and academia. Lectures about University and Private Initiative Partnership: Success cases by Dr. Antonio M. G. Tommaselli – Unesp, University and Private Initiative Partnership: Success cases in the space sector by Dr.Cleber de Oliveira – Visiona, Intellectual property/Patents by Arianni Oliveira Menezes NIT / S-INOVA / UCDB, UAV Volumetry: Case studies and market by Reinaldo Colares – HorusGeo, Remote Sensing Applied to Deforestation Monitoring by Dra. Alessandra Gomes – CRA/ INPE), Market demands in the context of Precision Agriculture by Prof. Dr. Fábio Baio – UFMS, Scientific and Social High Impact publications by Prof. Dr. Lênio

Soares Galvão – INPE, Earth monitoring using orbital imagery by Prof. Dr. Britaldo Soares Filho – UFMG and a Panel (Roundtable) Case Study in Precision Agriculture by Eng. Paulo Henrique Amorim da Silva – GeoAgri, Prof. Dr Hemerson Pistori – UCDB and Prof. Dr Lúcio Jorge – Embrapa, filled the first day.

Opening Ceremony – First Day

The second block, last three days, followed the model of the ISPRS Summer School, with the technical/scientific knowledge on the selected topics. Machine Learning I and II applied to Remote Sensing Imagery and Photogrammetry applied to environmental studies were 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 Dr. Anette Eltner (TU Dresden).

Souvenirs and plaque of acknowledgment were delivered to the speakers.

Dr. Franz Rottensteiner and Dr. Anette Eltner conducted hands-on activities in computer laboratory.

Hands on activities in laboratory

Poster presentations were made during the days of the second block. There were forty (40) studies in themes about: UAV and orbital imagery orientation, Sivitensor systems: design, calibration and evaluation, Microwave and Hyperspectral Remote Sensing; DSM and DTM generation; Time series analysis of remote sensing data; Remote sensing applied to environmental studies, Image related a video coding, analysis, filtering and restoration; registration, segmentation; Motion Detection and Tracking; Shape representation and matching; Surface Reconstruction and Representation; Projective Geometry and Computer Vision; Texture and Color in Computer Vision; Feature extraction;

Feature Matching, Inference and Recognition; Deep Learning; Pattern Recognition in Computer Vision; Architectural models for Computer Vision; Design methods for systems of Vision; Real-time Computer Vision and Visual Inspection and Robotics.
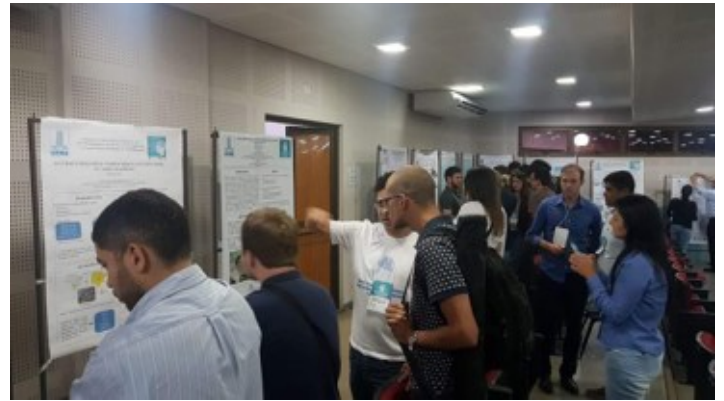
Poster Presentation

At the lunch time breaks, we explored places with traditional food and locals, an opportunity to know something about the culture and the city. The traditional barbecue, pintado fishes, carreteiro rice (rice with pieces of beef jerky), mandioca (cassava), farofa, feijoada (black beans with pieces of pork, like bacon) different types of salads, were very appreciated. After the lectures, at night, we had meetings "social events". A time to socialize, in a relaxed way talk with others participants or/and lectures, to have a good networking. All the places that we went, were really good and show peculiarity of the citizens and the sightseeing of Campo Grande.

Social events and lunch

On last day, Dr. Veraldo Liesenberg from UDESC showed about the Brazil chapter of the IEEE GRSS and then the closed ceremony was conducted. With great satisfaction, happiness and grateful, we acknowledgment the societies IEEE GRSS and ISPRS, also the Universidade Federal de Mato Grosso do Sul (UFMS) and Universidade Católica Dom Bosco (UCDB), our partnerships for all the support and financial for the achievement of this important event. Images from all the event participants are showed below. And more pictures are presented in Facebook webpage (*https://www.facebook.com/groups/193181211582257).*

Participants and organizers

TOWARDS **PHOTOGRAMMETRY** 2020
ISPRS **Technical Commission II** Midterm Symposium 2018
Riva del Garda, Italy

Written by Emre Özdemir, 3D Optical Metrology, Bruno Kessler Foundation (FBK), Trento, Italy (eozdemir@fbk.eu)

▼

When it is needed to make measurements on an object without touching it, photogrammetry is accepted as one of the most useful technique in literature. This is not only for the high accuracy it provides, but also for making measurements on the photographs. Being interested in new trends in photogrammetry, ISPRS Technical Commission II symposiums provides excellent environments for not only learning the trends, but also meeting with the scientists in a social atmosphere, too.

ISPRS Technical Commission II (Photogrammetry) focuses, on geometric, radiometric and multi-temporal aspects of image and range-based 3D surveying and modeling. To be more specific, the Commission II deals with image and point cloud processing, feature extraction, scene understanding, sensor and data fusion, sensor characterization, machine learning for geospatial data analysis and big data techniques. Applications are in the fields of mapping, industry, heritage, space, underwater and environment.

Having the strapline "Towards Photogrammetry 2020", the symposium is organized with the aim of presenting current and future developments in photogrammetry field. For this reason, it is not a surprise that machine learning was the dominant topic, as expected, among others including structure from motion, bundle block adjustment, image processing, segmentation and classification.

Before the symposium there were four different tutorials on calibration techniques for different camera setups, deep learning for geospatial data, acquisition and characterization of scenes, and global (image) network orientation. These tutorials were well organized, well attended and beneficial for the participants. Every day, before the parallel sessions, there were plenary ones with high valuable keynote speeches from pioneers in their fields.

Six of 213 contributions were awarded for the best young author, the best poster and the best paper awards. All of the contributions presented during the symposium (115 oral presentations in 32 technical sessions, 98 posters presented in 4 poster sessions) have been published in the ISPRS Annals and Archives, and publicly available.

The symposium was providing an atmosphere for the attenders to share their proceedings with well-balanced sessions. Moreover, there were well-organized welcome party, coffee breaks, lunches and dinner organizations to help people socialize with each other.

The ISPRS SC Meeting and Technical Commission V Symposium Student Session and Council Meeting

Angelica Kristina Monzon & Kingsly Ashish
ISPRS SC Board Member, angelicakv.monzon@gmail.com

The ISPRS SC, represented by board members Angelica Monzon and Kingsly Ashish, attended this year's TC V Symposium entitled chaired the Student Session in the Technical Commission V Symposium. As an introduction to the student session, Angelica Monzon presented an overview of the Student Consortium, its activities and roles within ISPRS to encourage the students and young professionals in the audience to sign-up as members and get involved.

Spatial Exchange Programme in which the audience of the Students Session were quite interested to learn more.

The Student Session itself hosted three student presenters, namely: Measuring Growth Conditions of Salad Plants using Sensors: A High School Project, presented by Laxmi Thapa from University of Munster/ New University of Lisbon; Comparative Study of Tree Counting Algorithms in Dense and Sparse Vegetative Regions presented by

(Left) The students during Q&A; (Right) Laxmi Thapa presenting her study

Additionally, outputs from Making Opportunities to Initiate Valuable Allieance Experiential Learning (MOTIVATE Learning) were co-presented by Kingsly Ashish and Abdul Rahaman. As one of participants of MOTIVATE Learning, Abdul shared his experience in collaborating with other fellow students and experts to come up with notable mini projects as their outputs. He briefly introduced the projects developed by the students from the Hackathon and the

Sameer Khan from HNB Garhwal University, and; Design and Development of Trendy Insight Application Software for Location based Social Media Trending presented by Shibi Kumar from Lovely Professional University. Students were given 10 minutes to deliver their presentations and 2 minutes for question and answer. All presenters have conducted interesting studies that encouraged a lively interaction from the audience during the Q&A.

Sameer Khan (left) and Shibi Kumar (right) presenting their studies

(Left to Right) Chair and Co-Chair Angelica Monzon and K. Shiva Reddy, together with ISPRS SC board member Kingsly Ashish and MOTIVATE Learning participant Abdul Rahaman
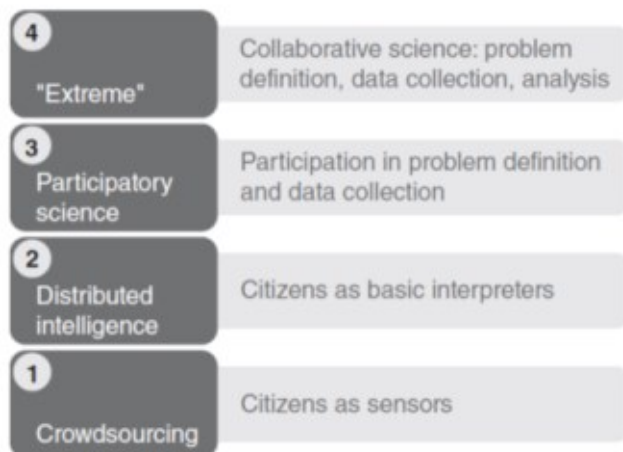
The Student Session was a great experience to learn more about the different researches carried out by students and also a good way to interact with other young researchers. We were grateful for the TC V midterm symposium organizers for hosting the session and allowing students to share their work and experience.

THE ROLE OF
CITIZEN SCIENCE
IN DISASTER RISK MANAGEMENT

Dr. RAJENDRAN Queen Suraajini, Research fellow at School of Civil and Environmental Engineering,
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The natural hazards have become frequent and common occurrence that reduces the resilience of loss of life and economy, cities, infrastructure, and buildings to these hazards. It is impossible to prevent these hazards. In the past, disaster risk management have followed a broad scale, top-down approaches (Paul et al., 2018). Recent disaster recovery events have seen increase in collaboration of public with scientific research. The recovery emergency events the data needs to be updated frequently in real time to increase the recovery speed. This is where the Citizen Science approach enter the scene. The rapid development and spread of communication technologies such as smartphones, social media, internet and open data demonstrated their potential to share information instantaneously from the affected areas. The disaster risk management is now changing to bottom-up, participatory community-based multidirectional, decentralized, diverse, and inclusive approach for real-time information for risk management (Paul et al., 2018).

Participation levels in citizen science (Haklay, Francis, & Whitaker, 2008)

Citizen Science is defined as the participation of the general public in the research design, data collection and interpretation process together with scientists (Louv & Fitzpatrick, 2012). The four levels of participation in Citizen Science are 1) Crowdsourcing, 2) Distributed Intelligence, 3) Participatory science, and 4) 'Extreme Citizen Science' (Haklay, Francis, & Whitaker, 2008). Citizen Science gained attention by scientists from different disciplines such as biology, environmental monitoring, mapping natural disaster for relief and recovery process and galaxies classification to understand the problems better (Kocaman, Anbaroglu, Gokceoglu, & Altan, 2018). Citizen Science cannot only be used for recovery process but also for analysis and interpretation (Haworth, Bruce, Whittaker, & Read, 2018).In addition to these, Citizen Science enhances the knowledge of community in terms of understanding the potential disaster that could affect the area. Citizen Science also helps to assess the resilience of infrastructure to disasters in detail and in real-time. For example, NASA is actively engaged in Citizen Science to introduce innovative methods to integrate science with several sources of data collected by community and for verification of satellite data to the ground data called groundtruthing. With the data collected from public, a complete picture of disaster management and mitigation could be achieved. In a NASA project named Communities and Areas at Intensive Risk for Hampton Roads, Virginia, Citizen Science was employed to monitor landslides and extent of floods successfully (UNEP).

The disaster risk management is divided into three phases namely 1) pre-disaster phase, 2) during-disaster phase, and 3) post-disaster phase. The contributions needed in pre-disaster phase are capacity building, early-warning system and planning, in during-disaster phase

are identification and application of evacuation and emergency plans, data collection and provision of aids, 3) post-disaster phase are assessment of damage, estimation of loss and assessment of effects in a long-term. In disaster management potential areas of application of Citizen Science are 1) Health and safety, 2) Population Dynamics, 3) Equity and Justice, 4) Community Capacity, 4) Cultural Impacts, 5) Economy, 6) Institutions/Governance, 7) National Security, 8) Extreme events, and 9) Resource supply (Kocaman et al., 2018). Onencan, Meesters, and Van de Walle (2018) developed a framework to implement Citizen Science in disaster management based on analysing different failures and successes of Citizen Science project in natural hazards which were implemented at different scales with different groups of non-scientists around the world. The framework was designed to be implemented for several sets of natural hazards and situations. In another study a social science framework was developed by (Marchezini et al., 2018) to determine on a methodology to link Citizen Science and early warning systems. A methodology to relate GIS risk mapping and Citizen Science for earth Observation project was developed by Onencan et al. (2018). Their approach considered the challenges such as data quality, data interoperability, citizen-motivation, and participation. The methodology also includes the major requirements from SENDAI framework. Citizen Science empowers community to prepare themselves for the potential disasters. Citizen

Science combined with Geospatial technologies, Volunteered Geographic Information (VGI) have an important role for disaster risk management and community resilience. When citizens are involved they learn about their communities and answers to questions such as 1) what are the risks a community is exposed to and the information needed to make decisions, 2) the impacts of particular disasters and data needed to reduce the risk and to integrate science into their everyday lives (Haworth et al., 2018).

Full potential of Citizen Science in disaster risk management has not been exploited much. In order to implement Citizen Science, the non-scientists role and purposes need to be clearly defined according to the skillsets of people involved. (Kocaman et al., 2018). Despite several advantages, there are challenges to Citizen Science. One of issues is that not all the countries are willing to share information owing to security reasons. Other issues are categorized into 1) technical, 2) Data quality, 3) Management, 4) Education, 6) Legal and 7) Motivation (Kocaman et al., 2018).

Haklay, M., Francis, L., & Whitaker, C. (2008). Citizens tackle noise pollution. *GIS Professional* (August I).

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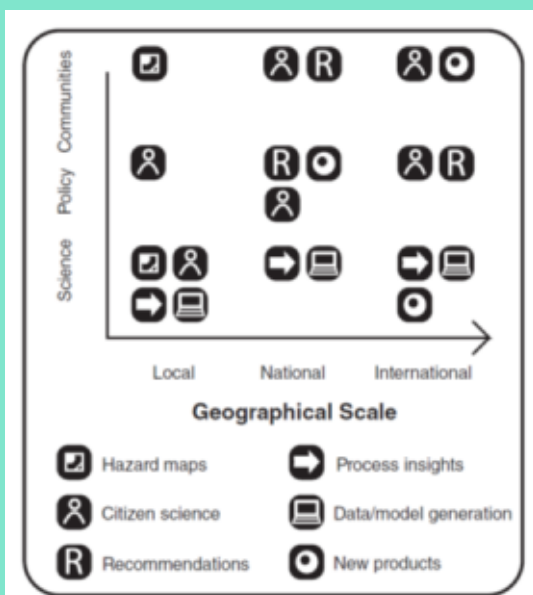
Potential application areas of citizen science for communities, policy and science at different scales to reduce risk and build resilience (Paul et al., 2018)

CITSCI & GEOINFORMATICS

Sultan Kocaman
ISPRS WG V/3 Chair
Hacettepe University, Department of Geomatics Engineering
Ankara, Turkey

Citizen Science (CitSci) can simply be defined as the volunteer contributions to scientific processes at various levels (e.g. data collection, interpretation, analysis, quality control, hypothesis generation and testing, etc.)[1]. The Oxford English Dictionary recently defined citizen science as: "scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions."[2]. Although historically amateurs have served to science and been seen very credible, the scientific works have mainly been carried out by professional scientists starting from the end of 19th century [3]. With the CitSci, the amateurs have started to contribute scientific projects increasingly, also thanks to the availability of online educational resources and the development of information, communication and geospatial technologies.

CitSci is a rapidly emerging research field and has the power to transform societies, for example by serving the United Nations' (UN) Sustainable Development Goals (aka 2030 goals). The 17 Goals have been accepted on September 25th 2015 at the Summit to end poverty, protect the planet and ensure prosperity for all as part of a new sustainable development agenda. The main aims of the 2030 Goals are mobilizing the efforts in all countries to end all forms of poverty, fight inequalities and tackle climate change.

Regional and international CitSci associations are being established especially since 2012 to allow researchers from different disciplines and citizen scientists to meet each other and understand the requirements and needs from both sides. The Citizen Science Association (2012), the European Citizen Science Association (2013), Australian Citizen Science Association (2018), Citizen Science Asia (2018), and other local networks (Citizen Science Center Zurich, 2018; Zentrum für Citizen Science, 2018) are among these organizations. ISPRS has also founded a working group under TC V, WG V/3 "Promotion of Regional Collaboration in Citizen Science and Geospatial Technology" at the XXIII ISPRS Congress in 2016, which has organized several international scientific events until now.

The geoinformation science also benefits significantly from the geodata collected by volunteers, as can be seen from the widely used Open Street Map project. The process of map making is not only dominated by professionals anymore, and these efforts have been referred to as VGI, neogeography, geographic citizen science, crowdsourced geographic information, mashup, participatory sensing, web mapping, etc.[4]. The most commonly used term, VGI, describes the user-generated content related to geographic information and involves crowdsourcing. VGI can also be intertwined with CitSci projects when complies with the ten principles of citizen science defined by ECSA. The principles briefly emphasize:

- CitSci projects generate new scientific knowledge.
- Active participation and profit of both professional scientists and citizen scientists are required in CitSci projects.
- Citizen scientists may participate in multiple stages of the scientific process.
- Citizen scientists receive feedback and proper acknowledgements from the project.
- CitSci is a research approach like any other with certain limitations.
- CitSci projects are open access and open data by nature.
- CitSci programmes are evaluated for their quality and impact.
- CitSci projects consider legal and ethical issues.

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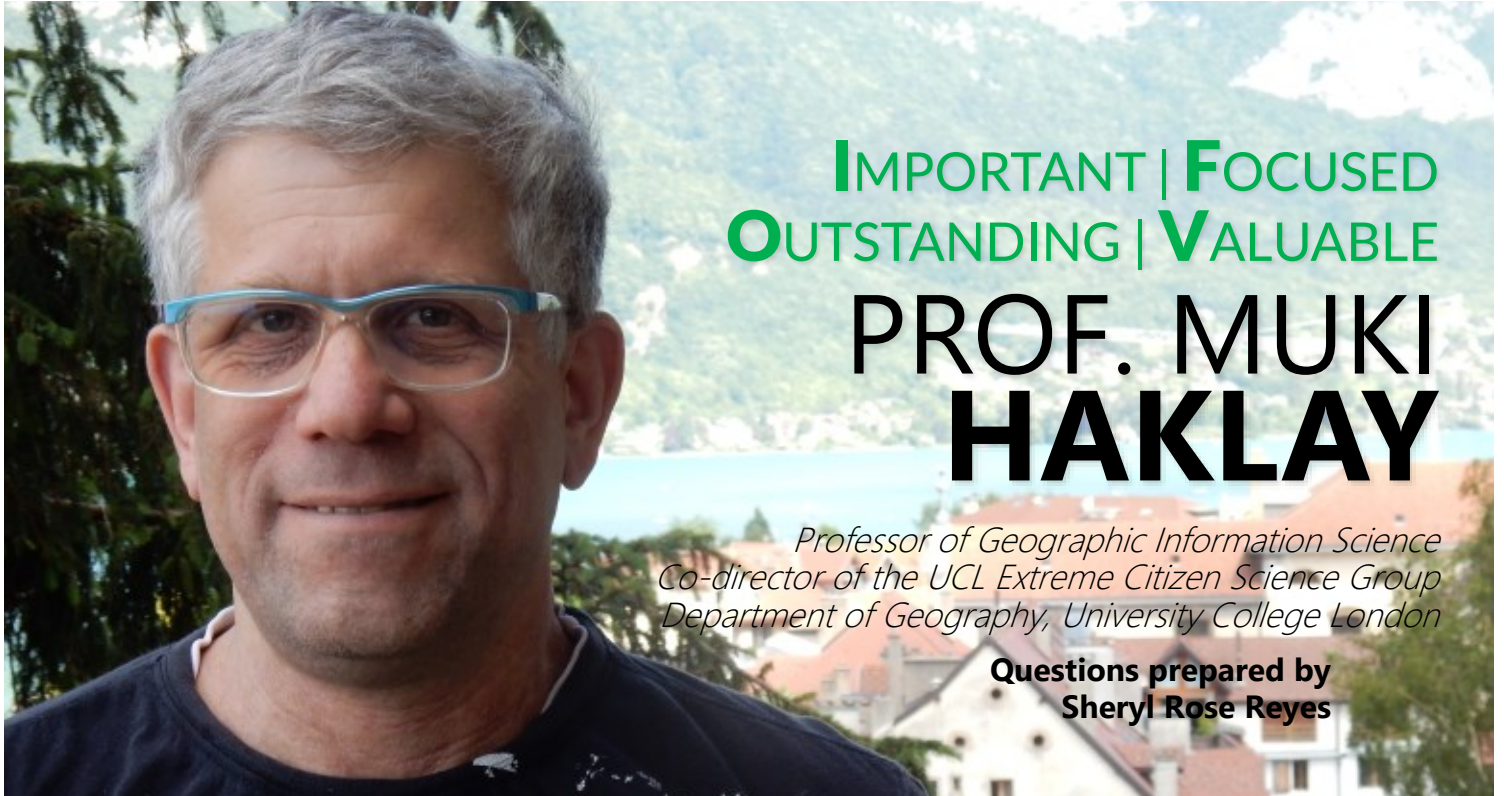
IMPORTANT | FOCUSED OUTSTANDING | VALUABLE

PROF. MUKI HAKLAY

Professor of Geographic Information Science
Co-director of the UCL Extreme Citizen Science Group
Department of Geography, University College London

**Questions prepared by
Sheryl Rose Reyes**

Can briefly introduce what is citizen science? Can you also introduce some of the projects you are currently working on and which among these projects you find most interesting?

Here is what I've said in a reference paper about citizen science and Earth Observation (Haklay et al. 2018): "Citizen Science, or the participation of non-professional scientists in a scientific project, has a long history – in many ways, the modern scientific revolution is thanks to the effort of citizen scientists. Like science itself, citizen science is influenced by technological and societal advances, such as the rapid increase in levels of education during the latter part of the 20th century, or the very recent growth of the bi-directional social web (Web 2.0), cloud services and smartphones. These transitions have ushered in, over the past decade, a rapid growth in the involvement of many millions of people in data collection and analysis of information as part of scientific projects."

In terms of projects that I'm currently working on include development of data collection and visualisation for people with little or no literacy, in a project called ECSAnVis which is funded by the European Research Council, and in the final stages of a large scale project that promotes citizen science and DIY science to the public and policy makers across Europe. The project, Doing It Together Science (DITOs)

> *The challenges of developing participatory GIS are, indeed, the multiple issues of people's ability to read and understand maps and geographic information, understanding how to use computers to browse environmental information and maps, understanding and making sense of the environmental information that public authorities hold*

has been promoting the active involvement of citizens in Citizen Science by organising more than 600 innovative events across Europe. There are also small projects that are very important to me, such as working with the local community near UCL on environmental issues that are important to them, such as air pollution from construction projects that are happening in the area.

How did you begin your work in citizen science? Can you name some of the challenges that you encountered in the development and use of participatory GIS? Can you also elaborate on the Human – Computer Interaction?

About 20 years ago, during my PhD research, I've started working on participatory GIS and sharing environmental information with members of the public, while also inviting them to contribute information and insights based on their local knowledge. I was aware of the development of efforts such as Global Community Monitor (which started around the same time) and that allowed communities to monitor air pollution from chemical factories, and I was considering how I can integrate this citizen science (in the sense of Alan Irwin 1995 book) in my work. I finally started carrying out activities that include citizen science around 2007 with noise, and pedestrian counting as the first clear examples.

The challenges of developing participatory GIS are, indeed, the multiple issues of people's ability to read and understand maps and geographic information, understanding how to use computers to browse environmental information and maps, understanding and making sense of the environmental information that public authorities hold, and so on. Even more important are the issues of creating trusting relationships with participants and agreeing how the

> *We need to ensure that we have a more inclusive way of actively engaging people from all walks of life and making sure that their point of view is well represented*

outcome of the participatory process will be used in a way that is useful for both the researchers and the participants, listening carefully to their interests and to their needs. There are also technical challenges, such as making sure that the hardware and software are inclusive and allow the participants to engage with the process meaningfully and not get frustrated or feel that this is "not for them". This is where my interest in Human-Computer Interaction came from – a wish to understand how people use environmental information that is stored in computers, and then figuring out how to make the data collection, management, and visualisation useful for people without high levels of technical literacy.

Given the differences in the capabilities of the participants of your research related to citizen science, how do you develop sound methodologies and minimize bias? Can you also give us an example on how you reach out to stakeholders who may have hesitations in participating in your research?

When I'm considering bias, I mostly think about the inclusiveness of those that are involved in creating the information – we have frequently getting information that is created by well-to-do, male, white, urban, and very well educated individuals. We need to ensure that we have a more inclusive way of actively engaging people from all walks of life and making sure that their point of view is well represented (and yes, that also matter in deciding which species to observe, or what amenities to map).

More generally, all data is biased, from data that come from Earth Observation to digitised maps – we just need to understand how these biases are influencing our analysis and take it into account.

Regarding the reaching out to participants, here is what we wrote in the Haklay & Francis 2017 paper "Before the process starts, there is a need to understand the local conditions and to ensure that contact has been made with all interested members of the community. If the process is facilitated by an external actor, this person will need to ensure that, in the initial meeting in which the first and second stages happen, the meeting is inclusive and represents all the groups and people within the study area. The initial meeting should happen near or in the area in which the study takes place, and at a time that ensures a high level of participation." – I would recommend ethnographic approaches in which you need to get familiarise with the local area and build trust with the people that you work with. Sometimes that will require specific meetings with individuals, and spending time with them to understand their concerns. Some people will need assurance about how their data is going to be used, and therefore my approach was that the data

is not something that is own by the community and not by researchers, and need their consent to be used.

What do you think is the impact of citizen science in the scientific community? What do you think is the contribution of citizen science in addressing important issues in the society?

Citizen science opens new ways to work together with a wide range of participants and be more attuned to societal concerns and issues. There are many highly important contributions from citizen science – from providing new skills and abilities to scientists on how to communicate their work to the wider world, and to learn how to work with different groups in society. Citizen science also provides information that is very difficult to obtain otherwise – such as the state of biodiversity over very large areas, or the condition of water sources across a city, and so on. There are now a growing understanding that citizen science is critical for environmental management and policy, as well as areas such as public health.

> *My personal experience is that working on co-created citizen science and participatory mapping is immensely satisfying – you are doing research where societal needs are an integral part of what you do. You can see the impact of your research – not only in publishing papers, but in the relationships with the people that are working with you, and in learning about the places that you work in.*

What's your encouragement for students and young researchers wanting to pursue research on citizen science and participatory mapping? Do you have any advice in engaging the civil society and stakeholders to take part in scientific research?

My personal experience is that working on co-created citizen science and participatory mapping is immensely satisfying – you are doing research where societal needs are an integral part of what you do. You can see the impact of your research – not only in publishing papers, but in the relationships with the people that are working with you, and in learning about the places that you work in.

Civil society organisations and other people that are involved in research can find suitable academic partners who are happy to collaborate and can benefit from the knowledge and resources in universities and research institutes.

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INVITATION TO PARTICIPATE

ISPRS Geospatial Week **2019**
10-14 JUNE, 2019 | ENSCHEDE, THE NETHERLANDS

By George Vosselman, Geospatial Week Director

It is my pleasure to invite you to participate in the Geospatial Week 2019, which will take place at the campus of the University of Twente in Enschede, the Netherlands from 10 to 14 June 2019.

Over 30 working groups have expressed their interest to jointly convene their workshops at the Geospatial Week 2019. As a result, we are proud to host the following 13 workshops:

▪International Conference on Unmanned Aerial Vehicles in Geomatics (UAV-g)

▪Laser scanning

▪International Symposium on Spatial Data Quality (ISSDQ)

▪Indoor 3D

▪Advanced Geospatial Applications for Smart Cities and Regions (SmartGeoApps)

▪Semantic Scene Analysis and 3D Reconstruction from Images and Image Sequences (Semantics3D)

▪International Workshop on Advances in SAR: Constellations, Signal processing, and Applications (SarCon)

▪Workshop on Collaborative Crowdsourced Cloud Mapping and Geospatial Big Data (C3M&GBD)

▪Joint European Calibration and Orientation Workshop and Workshop on Multi-sensor Systems for 3D Mapping and Navigation (EuroCOW-M3DMaN)

▪Hyperspectral Sensing meets Machine Learning and Pattern Analysis (HyperMLPA)

▪International Workshop on Image and Data Fusion (IWIDF)

▪Workshop on Planetary Remote Sensing and Mapping (PRSM)

▪Workshop on Cryosphere and Hydrosphere for Global Change

Studies (CHGCS)

Many of these workshops are the next edition in well-established series of workshops convened in the past. The workshops will provide excellent opportunities to present and discuss the latest developments in the ISPRS fields of sensors, photogrammetry, remote sensing, and spatial information sciences.

On the Sunday before the workshops we will organise a number of tutorials. These can be of particular interest to MSc and PhD students looking for an introduction to the latest developments on various topics in the field of the ISPRS.

The venue of the Geospatial Week will be the heart of the green campus of the University of Twente. Next to large modern lecture rooms and ample space for the exhibition and poster sessions inside the building, the direct environment also offers great possibilities for demonstrations of outdoor mapping systems, including UAV flights on a nearby field.

Participants will be able to register for any number of days and join any of the workshops offered on those days. Of course, strongly reduced registration rates will apply for MSc and PhD students. Also of interest may be the travel awards which will be made available through the ISPRS Foundation. Registration and paper submission will both be handled through ConfTool, which has now been adopted as the standard for all ISPRS events. Next to the programme booklet, we will also offer the conference app Conference4me to access the whole Geospatial Week programme on your phone.

For further information on the dates and terms of references of the workshops, paper submission, registration, travel, and accommodation, please check:

http://www.gsw2019.org/

Nice, France, 14th - 20th June, 2020
Host : Société Française de Photogrammétrie
et Télédétection (SFPT)
Congress Director : Nicolas Paparoditis
Institut national de l'information géographique
et forestière (IGN)
www.isprs2020-nice.com

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2019 International Symposium on Remote Sensing

April 17-19, 2019

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No. 30, Sec. 3, Xinsheng South Road,
Taipei, Taiwan

01 JANUARY 2019

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03 MARCH 2019

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UPCOMING EVENTS 2019

06-08 Feb 2019
11th EARSeL Imaging Spectroscopy Workshop
SITE: Brno, CZECH REPUBLIC
CONTACT: Lucie Homolová
            earsel2019@czechglobe.cz

06-08 Feb 2019
ISPRS WG II/8: 8th International Workshop - 3D ARCH
3D Virtual Reconstruction and Visualization of Complex Architectures
SITE: Bergamo, ITALY
CONTACT: Francesco Fassi
            +39 02 2399 6532
            francesco.fassi@polimi.it

10-13 Feb 2019
ISPRS IC WG III/IVb: International Geoinformatics Conference 2019
SITE: Riyadh, SAUDI ARABIA
CONTACT: Ali Abdullah Aldosari
            +966114678798
            adosari@KSU.EDU.SA

18-20 Feb 2019
ISPRS WG III/10: International Workshop on Earth Observations for Agricultural Monitoring
Followed by
21-22 Feb 2019
Tutorial on Advances in Remote Sensing for Agriculture
SITE: New Delhi, INDIA
CONTACT: Shibendu Shankar Ray
            + 91 11 2584 3224
            +91 11 2584 3225 shibendu.ncfc@nic.in;
            shibendu.ray@gmail.com

12-14 Mar 2019
ISPRS WG III/10 & III/2: ISPRS Technical Commission III WG III/2, 10 Joint Workshop
Multidisciplinary Remote Sensing for Environmental Monitoring
SITE: Kyoto, JAPAN
CONTACT: JUNICHI SUSAKI
            +81-3-5722-7653
            +81-3-6412-2593
            MAIRTU1698@PASCO.CO.JP;
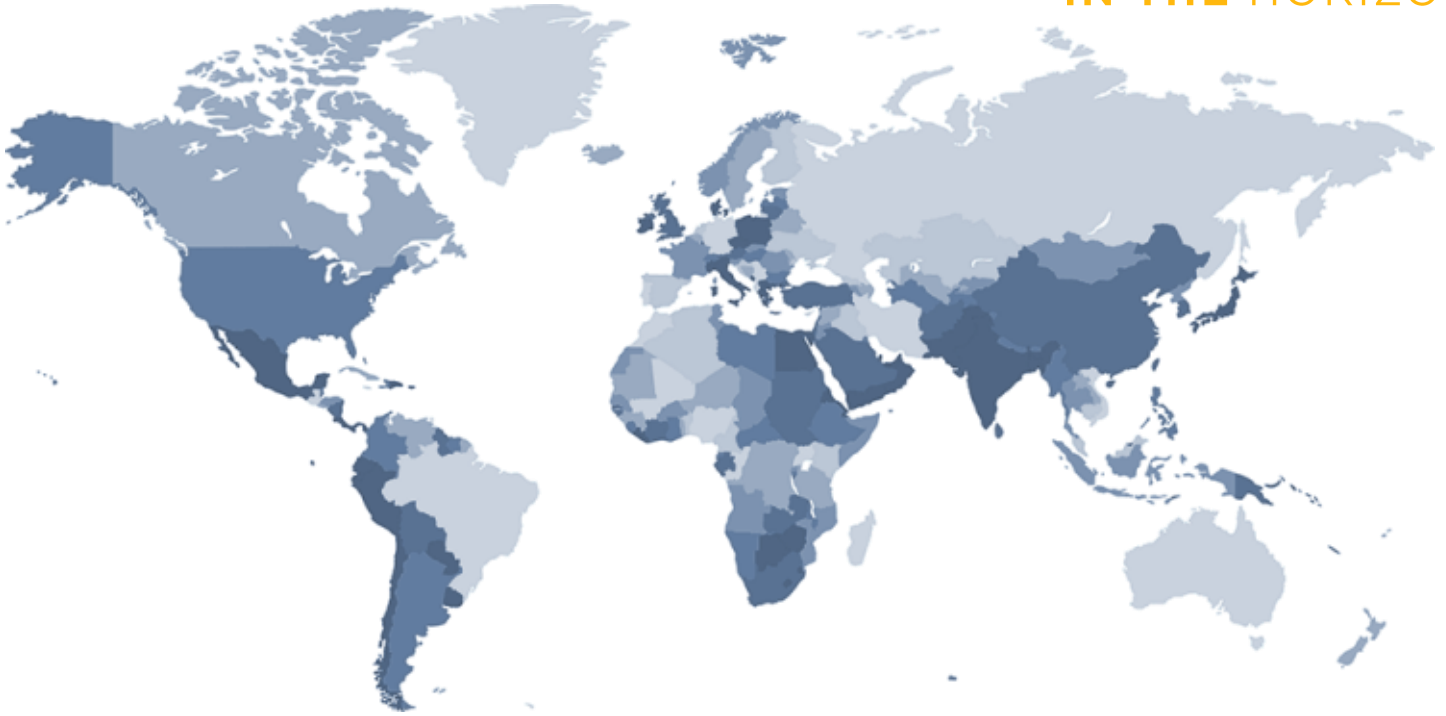   SUSAKI.JUNICHI.3R@KYOTO-U.AC.JP

18-21 Mar 2019
RSCy2019: Seventh International Conference On Remote Sensing and Geo-Information of the Environment
SITE: Paphos, CYPRUS

PhD opportunities

- PhD opportunities in various disciplines at the Utah Water Research Laboratory, Utah State University, USA
  Deadline: 1st January 2019
  https://findajob.agu.org/job/8005860/graduate-research-opportunities-at-utah-state-university/

- PhD in Hydrology and Remote Sensing, University of Wisconsin-Madison, USA
  Deadline: 15th January 2019
  https://findajob.agu.org/job/8005838/phd-level-research-assistantships-in-hydrology-and-remote-sensing-university-of-wisconsin-madison/

- Ph.D. Assistantships in Geospatial Analytics at North Carolina State University, USA
  Deadline: 1st February 2019
  https://findajob.agu.org/job/8005827/ph-d-assistantships-in-geospatial-analytics-at-nc-state-university/

- PhD in river ecosystem ecology, Valett lab; Div. of Biol. Sciences, University of Montana, Missoula, USA
  Deadline: 31st January 2019
  https://freshwater-science.org/job-posting/phd-opportunity-river-ecosystem-ecology-valett-lab-div-biol-sciences-university-montana

- Ph.D. Assistantship in Seasonality from Space at the Center for Geospatial Analytics of North Carolina State University, USA
  Deadline: Until filled
  https://findajob.agu.org/job/8005828/ph-d-assistantship-in-seasonality-from-space-at-nc-state/?LinkSource=SimilarJobPlatform

- Two PhD positions in Question-based Analysis of Geographic Information with Semantic Queries at Utrecht University, The Netherlands
  Deadline: 9th December 2018
  https://freshwater-science.org/job-posting/phd-opportunity-river-ecosystem-ecology-valett-lab-div-biol-sciences-university-montana

- PhD opportunity in Geodynamics at Department of Earth Sciences, Syracuse University, New York, USA
  Deadline: 4th January 2019
  http://earthsciences.syr.edu/academics/g-program.html

Masters scholarships

- MS opportunities in computational earth system and ocean science at the University of Texas Rio Grande Valley, USA
  Deadline: 17th January 2019
  https://www.utrgv.edu/graduate/for-future-students/graduate-programs/program-requirements/ocean-coastal-and-earth-sciences-ms/index.htm

- M.Sc. opportunity in northern hydrometeorology at University of Northern British Columbia, Canada
  Deadline: 17th January 2019
  https://findajob.agu.org/job/8007194/m-sc-position/

Job opportunities and postdoc fellowships

- Postdoctoral fellowship: hydrological modeling of the great lakes basin - university of michigan, CIGLR, USA
  Deadline: 11/30/2018
  http://careers.umich.edu/job_detail/163997/postdoctoral_fellowship_hydrological_modeling_of_the_great_lakes_basin

- Postdoctoral Research Scholar at the Appalachian State University's Research Institute for Environment, Energy and Economics, North Carolina, USA
  Deadline: 7th January 2019
  https://appstate.peopleadmin.com/postings/20685

- Postdoc position in image analysis at the IPK Gatersleben, Germany
  Deadline: 6th January 2019
  http://www.earthworks-jobs.com/plant/ipk18121.html

- Postdoc Opportunity at the University of Liege, Belgium
  Deadline: 28th February 2019
  http://www.earthworks-jobs.com/rsgis/arup18092.html

ACKNOWLEDGEMENT

The ISPRS SC board and the Newsletter team extend their deepest gratitude to everyone from all across the globe who contributed to the activities of the organization for 2018! You all made it possible for the ISPRS SC to reach out to more students and young researchers and to learn more about our profession!

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.