



THE OFFICIAL NEWSLETTER OF THE ISPRS STUDENT CONSORTIUM

# SPECTRUM

VOL. NO. 15 ISSUE NO. 1 | AUGUST 2021

*Photo Courtesy: Dr. Pinki Mondal*

HYDROGEN INFRASTRUCTURE FOR  
**SUSTAINABLE FUTURE OF TRANSPORTATION**

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Prof. Laurence Smith

SATELLITES FOR SUSTAINABLE DEVELOPMENT GOALS: **FOCUS ON THE FORESTS**

**Earth Observation Data  
becomes Mainstream**

Special Feature on  
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GEOSPATIAL TECHNOLOGIES FOR THE CONSERVATION AND PROMOTION OF CULTURAL HERITAGE IN SUPPORT OF THE  
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Dear ISPRS SC Newsletter readers,

We appreciate those who have been helping others during this difficult time due to the pandemic situation and I applaud those who are still fighting and have not given up. We all stand together so stay rock solid.

We are very pleased to present to you this issue on “Geoinformation of sustainable development”. In this issue, we focused on presenting the research articles contributing towards sustainable development using remote sensing and GIS.

We are very lucky to have an interview with Dr. Laurence Smith, a professor from Brown University, who shared with us his projects and works and gave inspiration to many young scientists.

We have various exciting projects and research in our spotlight section. The first article is by Dr. Tri Dev Acharya about the project “Hydrogen Infrastructure for Sustainable Future of Transportation” by the Institute of Transportation Studies, UC Davis.

The second article is “A reporting framework for Sustainable Development Goal 15: Multi-scale monitoring of forest degradation using MODIS, Landsat and Sentinel data” published in Remote Sensing of Environment by Asst. Prof Pinki Mondal of the University of Delaware.

The third article is about “Geospatial technologies for the conservation and promotion of cultural heritage in support of the UN sustainable development goals” by Dr. Wen Xiao.

The fourth article is by Dr. Blaske Thomas, where he focused on how earth observation data has become mainstream in this modern era.

We are very excited to feature the White Elephant Club and Virtual Summer school on the Smart City by Beijing University of Civil Engineering and Architecture (BUCEA) in the special feature section. The experience of Saicharan Vasala (mentee of Leadership program) on the Geomixer event is also worth a read.

On behalf of the Board of Directors and the Newsletter Team, we would like to sincerely thank all the contributors and valuable readers of the SpeCtrum. Also, don't miss out on the upcoming activities and latest opportunities section.

We hope that this issue will be useful to that pursuing research in the domain of sustainable developments using geoinformatics. Wish you the best for your research success, and we hope to see you all healthy and fit after the pandemic.

Cheers for the best days ahead!!!



**S.K.P.Kushwaha**

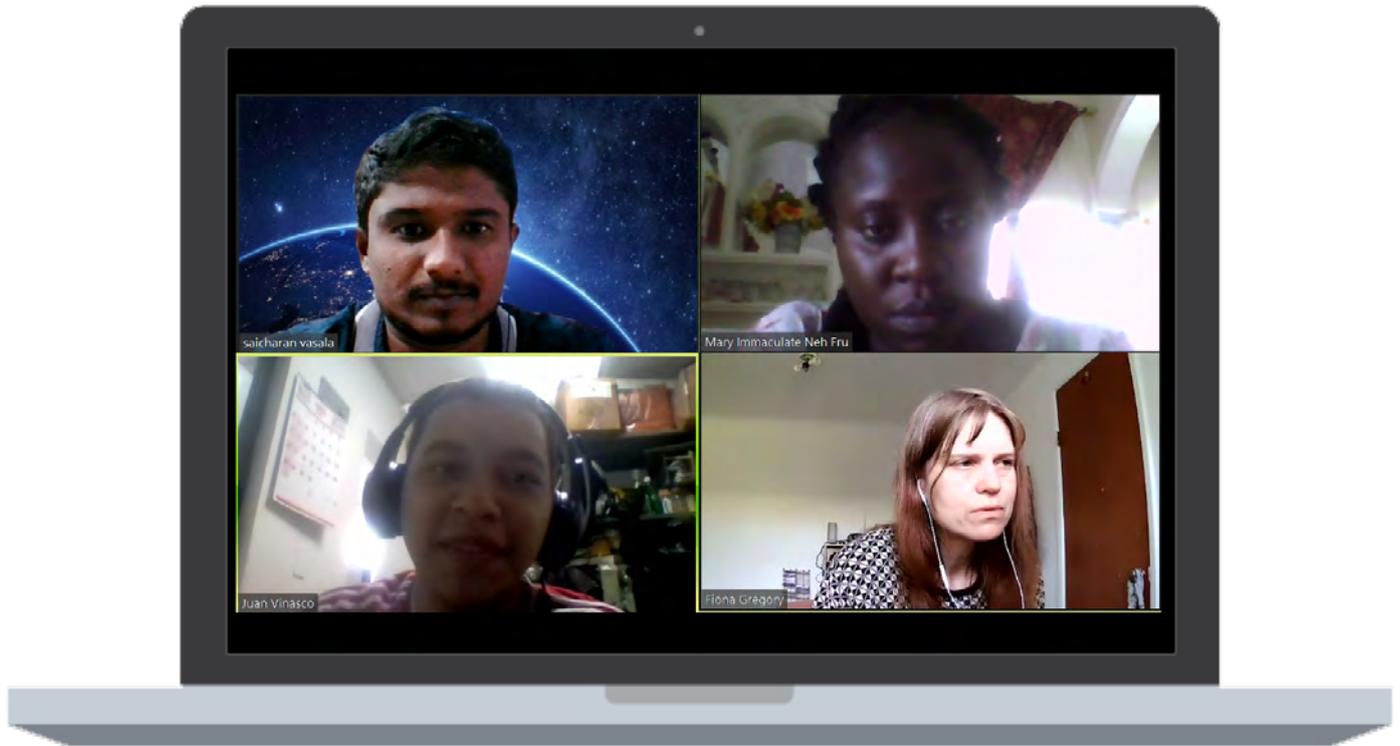


**Nimisha Wagle**

# GEOMIXER



*My Experience*  
by  
Vasala Saicharan



## About GEOMIXER

It is always good to meet new people, learn from their experiences, and exchange thoughts professionally and personally. It was a boon to have this #GeoMixer during this unprecedented time of COVID, where we missed being in conferences and workshops to share our work and meet people. I'm glad that, at least virtually, we got a chance to meet remote sensing professionals because of the virtual networking event GeoMixer.

Since its initiation in January, I've attended 5 of the 6 GeoMixers. I'm glad that it helped me connect #remotesensing experts from all over the world, learn about their work, share my work, improve my communication skills, and have fun talks. Who knows, I may also meet potential collaborators through this event. Moreover, it is a stress buster for people like us as we are busy with our work the whole day.

## *My story*

In the opening session of the current #GeoMixer, which is hosted by @SistersofSAR(SOS), we got an opportunity to learn about hosting organizational activities (how they are helping remote sensing society) as well as upcoming events, workshops, & summer schools in the world of #remotesensing.

In my first breakout room, out of 4 breakout rooms, I got the chance to meet eminent professor Dr Armin Gruen and working professional Geetika Chauhan. Dr Armin Gruen started the conversation and introduced himself and his current research on coral reef identification and habitat mapping using UAVs & machine learning. I already knew about Professor Armin, as I met him at last year's ISPRS SC Virtual Rooms sessions, and I was glad to learn about his current works during this meet. Geetika, who works on water level mapping in India, has a keen interest

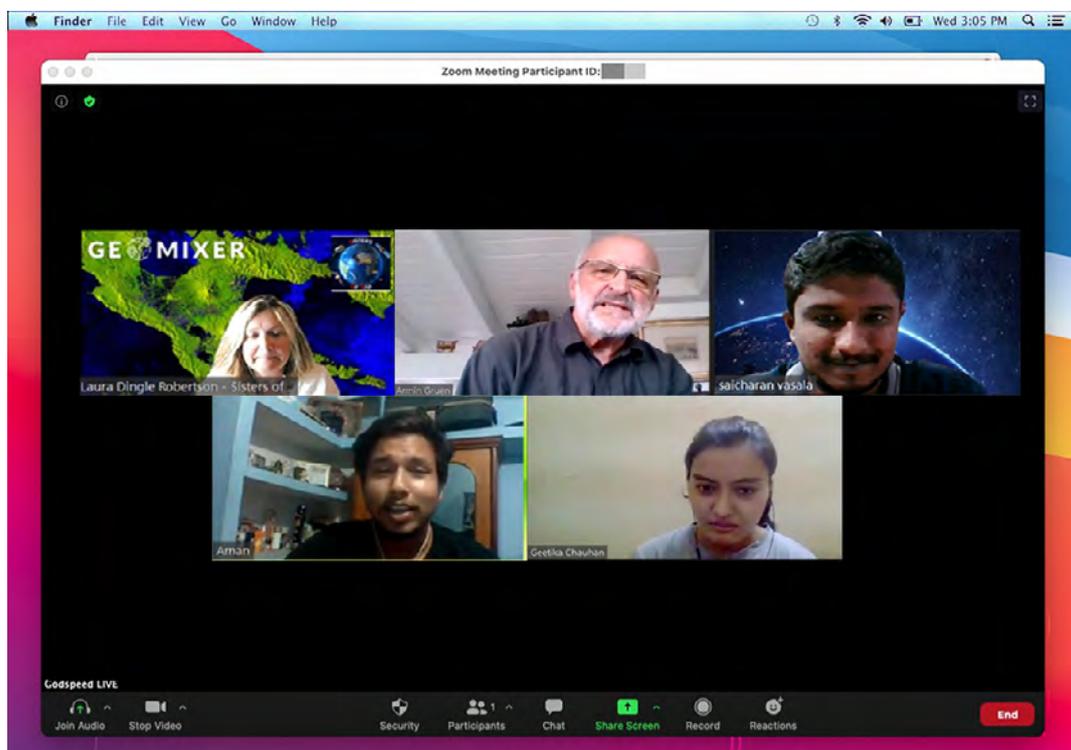
in coral reef mapping, so she asked more about it from Prof. Armin. I enjoyed the conversation and shared about myself and my PhD work.

In my 2<sup>nd</sup> breakout room, I met Prof. Armin and Geetika again and the new one Isaxon, because of a glitch in Zoom. I continued to talk with Armin and Geetika; this time, we learned from Prof. Armin about work-life balance and the importance of working in interdisciplinary fields. He mentioned a quote, "Work hard and play hard", while talking about work-life balance. I really thank you, Prof. Armin, for your passion in helping younger minds shape their careers.

In the 3<sup>rd</sup> breakout room, I met Fiona Gregory from Canada, who works on Land Cover classifications; Juan Vinasco from Colombia, who is working on spatio-temporal enhancement; and Mary Immaculate Neh Fru from Cameroon, who is working on gemstone exploration from hyperspectral data. Unfortunately, while we were sharing our works, we ran out of time, and I hope we will meet once again to learn more about each other in the next #GeoMixer.

In the 4<sup>th</sup> breakout room session, I met my friends Laura and Aman. I met both of them during the March #GeoMixer. I was delighted that we remembered each other with a firm talk of 12 minutes about past GeoMixer events. I think credit goes to #GeoMixer for this reunion. Laura Dingle Robertson is a Canadian scientist at the Agriculture and Agri-Food Organization Canada and is actively helping #SAR society with the SistersofSAR Twitter handle, while Aman KC is a government surveyor from Nepal. As we already know about each other's work, we discussed general topics like Covid, lockdown conditions, vaccines, and professional topics like open data, NISAR Mission, SAR learning resources.

In this June's #GeoMixer, I met 8 friends from around the world, learned new things, and enjoyed the conversations. Overall, I met around 25 new people from my remote sensing community through this series of geomixer events. It is really a joy to know the other participants' innovative works in the remote sensing field and how they are helping society with their research. There is no age limit to join in this event; the only requirement is being a part of the remote sensing family. I met persons from all age groups, like Emirates Professors, Scientists, Fellow PhD candidates, Industry professionals, Masters and Bachelors students, during these events. Everyone has an equal chance at this event, with no bias of age, gender & nationality. In the end, everyone benefited from this event, as they got an opportunity to share their work, get valuable suggestions to improve their work, learn from peers, and get motivated by eminent professors and scientists and explore different applications of remote sensing.



I would like to thank the #GeoMixer organizing committee for this initiative and for conducting this event every month despite their busy schedule and bringing it to us without taking a single penny for registration. More power to them, as they are providing an incredible platform for remote sensing professional networking, which eventually benefits the remote sensing community.

# 2021 ISPRS VIRTUAL SUMMER SCHOOL ON SMART CITY

## 2021 Virtual Summer School

### Background

The summer school is jointly organized by ISPRS Technical Commission III on remote sensing (ISPRS TC III), Beijing University of Civil Engineering and Architecture (BUCEA), and ISPRS Student Consortium (ISPRS SC), aims to promote the multi-cultural, multi-disciplinary and multi-level communication among students and young technicians from different countries and regions. Experts from ISPRS and international universities will be invited to give lectures on innovative practical and methodological knowledge and skills on smarter construction, management, and sustainable development plan of cities. In addition to the regular courses, cultural practice activities, introduction of ISPRS Student Consortium and policy on studying in BUCEA will also be arranged, to provide the participants potential opportunities to widen their professional networks.



### Registration

This event is free to attend. To participate this event, please complete the registration form and send it back to buceaiss@hotmail.com by 5 July 2021. The further details including the invitation CODE and the certification will be shared by the organizer through the email. The organizers will review the applications and send the notification of acceptance to those who meet the requirements.

### Venue

This online event will use ZOOM system for communication. Participants need to prepare the ZOOM system before the event.

## Agenda

Note: the time in the agenda is Beijing Time (UTC+8) . 8 hours ahead of GMT.

Monday, 19 July 2021	
Members: Prof. Jie JIANG, President of ISPRS Technical Commission on Remote Sensing	
WELCOME ADDRESSES	
14:30-15:00	Prof. Aijun LI, Vice President, BUCEA Prof. Jie JIANG, President, ISPRS Technical Commission on Remote Sensing Dr. Cheryl Rose Reyes, President, ISPRS Student Consortium
LECTURE 1	
15:00-16:00	Disaster Risk Management via Remote Sensing and Other Supporting Techniques - from an operational point of view... Prof. Orhan Altan, Honorary Member of ISPRS, Turkey
LECTURE 2	
16:00-17:00	Dynamics in Engineering Dr. Junbo Jia, Member of Norwegian Academy of Technological Sciences, Norway
LECTURE 3	
20:00-21:00	Digital Twins for Livable and Safe Cities Prof. Siir Zlatanov, President of ISPRS TC on Spatial Information Science, Australia
LECTURE 4	
21:00-22:00	Sensing and detecting small-scale events from geosocial media data aiding situational awareness in smart cities Dr. Shaohou XU, BUCEA, China
Tuesday, 20 July 2021	
Members: Prof. Zhenqiang LI, Vice Chair, International Development Research Institute, BUCEA	
LECTURE 5	
15:00-17:00	Nanofabrication and development Muhammad Ramzan, Professor, Bahria University, Pakistan
LECTURE 6	
18:00-20:00	Challenges for Infrastructure Development Projects Dr. Yi Su, Maryland, USA
LECTURE 7	
20:00-22:00	Innovations in Construction Stormwater Management Dr. Michael A. Piner, Auburn University, USA
Wednesday, 21 July 2021	
Members: Dr. Zhongsheng DAI, Deputy Director of International Education Center, BUCEA	
LECTURE 8	
15:00-17:00	Advanced Robotics and Industrialized Building Systems Dr. Xiaohou Shen, BUCEA, China
LECTURE 9	
20:00-22:00	Decoding CAD, BIM, VDC, DPD, and DT framework: Will one fit all, or all be in one? Dr. Hongtao Deng, Central Washington University, USA
Thursday, 22 July 2021	
Members: Dr. Jie JIANG, Deputy Director of International Education Center, BUCEA	
LECTURE 10	
15:00-17:00	Urban sensors and sensing for urban and infrastructure mapping Prof. Hannehaare Fure, Norwegian University of Science and Technology, Norway
LECTURE 11	
20:00-21:00	Introduction of ISPRS Student Consortium Cheryl Rose Reyes, President, ISPRS Student Consortium
LECTURE 12	
21:00-22:00	Policy to Support the Foreign Students Studying in BUCEA Prof. Yao CHEN, BUCEA, China
Friday, 23 July 2021	
Members: Prof. Jie JIANG, Vice Chair, International Development Research Institute, BUCEA	
15:00-17:00	GROUP DISCUSSION & CLOSING CEREMONY

## Contact information

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The Virtual Summer school was held from 19-23 July 2021, without registration fee. It was jointly organized by ISPRS Technical Commission III on Remote Sensing (ISPRS TC III), Beijing University of Civil Engineering and Architecture (BUCEA), and ISPRS Student Consortium (ISPRS SC). It aimed to promote multicultural, multi-disciplinary and multi-level communication among students and young technicians from different countries and regions.

Twelve lectures were delivered by experts and professors from ISPRS and international universities, covering multi-discipline topics on surveying engineering, environmental engineering, construction engineering, and mechanical engineering, describing the innovative research and practical skills for smart cities. In addition to the regular courses and cultural practice activities, an introduction of the ISPRS Student Consortium and policy on studying in BUCEA were also arranged to provide the participants with opportunities to widen their professional networks.

More information is available at <https://bit.ly/3cEXTxS>.

A more detailed report about this summer school will be published in the next newsletter issue.

# Hydrogen Infrastructure for SUSTAINABLE FUTURE OF TRANSPORTATION

Hydrogen (H<sub>2</sub>) is the first element in the periodic table. It is an abundant gas that can be stored densely in its liquid form and used as fuel for industry, transportation, and utilities with zero emissions. H<sub>2</sub> holds a key role in achieving deep decarbonization, energy transition, and sustainable economic growth, thus supporting the UN's Sustainable Development Goals (SDGs). It will be a key to responsible fossil fuel consumption (SDG 12), clean energy (SDG 7), fewer emissions (SDG 13), clean air (SDG 11), and innovation to industry and infrastructure (SDG 9).

Globally, transportation is responsible for 24% of direct emission from fuel combustion, with road vehicles accounting for nearly three-quarters. Emissions from trucks and buses have risen by around 2.6% annually since 2000 [1]. In 2017, the Hydrogen Council reported a pathway for the global low carbon energy transition with hydrogen estimating H<sub>2</sub> could power a global fleet of more than 400 million cars, 15 to 20 million trucks, and around 5 million buses, which constitute on average 20 to 25% of their respective transportation segments [2].

As a progressive state for climate policies, California has been strongly pushing initiatives with a target on vehicle sales, recharging, and H<sub>2</sub> refuelling

stations to make it a major market for zero-emission vehicles (ZEVs) [3,4]. Despite various support, the H<sub>2</sub> market has been stuck in a “chicken-egg problem”. Manufacturers and energy companies are waiting for the “second-mover advantage” while customers are in “wait and see mode” and, thus, are hesitant to make the switch. The target can only be achieved if one of these can be catalyzed to scale. Identifying the optimum number of hydrogen stations, their size, and locations in consideration of current and future demand could assist investors in the deployment of these refuelling stations.

To facilitate the deployment of H<sub>2</sub> infrastructure, the Hydrogen Study Team at UC Davis is working on developing a spatial model of light- and heavy-duty vehicle travel within California to explore refuelling station requirements. The model works in three steps: estimating the demand for hydrogen fuel based on the shortest distance travel pattern of current vehicle stock, finding optimal number and size of stations within the driving range covering the maximum demand and performing suitability analysis using various geospatial data for the station deployment on the ground. The inputs of the model are shown in Figure 1.

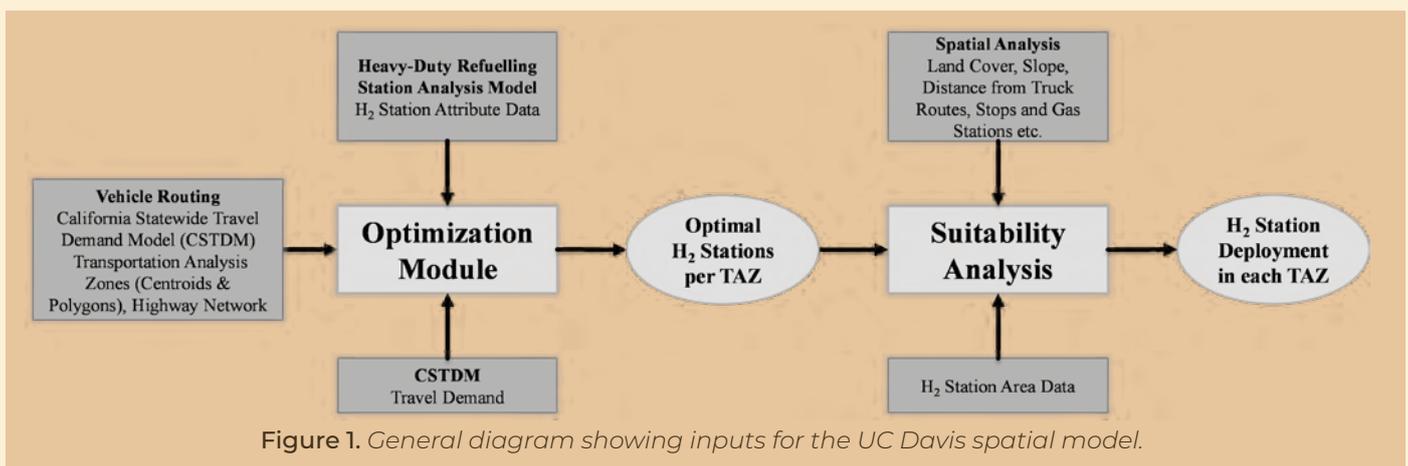
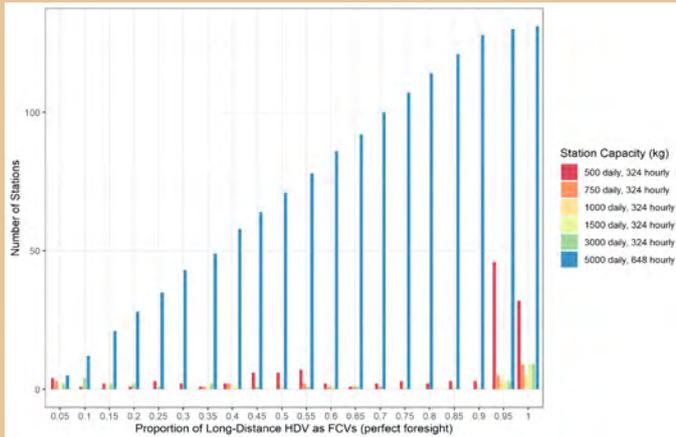


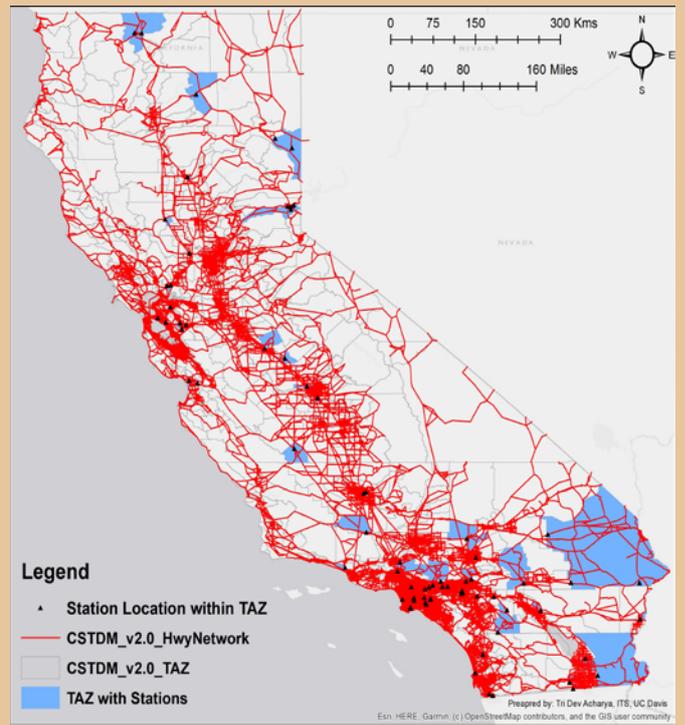
Figure 1. General diagram showing inputs for the UC Davis spatial model.

To date, the model development has focused on long-distance heavy-duty vehicles. The study conducted a first-order estimation of types of refuelling station locations, and how these heavy-duty vehicles will travel and choose where to refuel. The location and size of stations have been estimated in a series of runs using this model. The resulting hydrogen demand can then be used as inputs in other models, such as hydrogen supply models that are also being developed at UC Davis.

The spatial model is still in development and is currently being expanded to include more vehicle categories (such as medium-duty trucks and light-duty vehicles, as well as electric vehicles, with tracking for electric and hydrogen infrastructure). The study will also be updated and enhanced to project endogenously (i.e., based on other variables within the model) the numbers of vehicles, travel patterns, and locations of refuelling stations. The modelling tool could also be used to evaluate the geographic distribution of



**Figure 2.** An early result for hydrogen refuelling station deployment: (a) Station capacity as technology adoption increases, and (b) Locations of stations for 50% of long-distance heavy-duty trucking demand.



truck pollutant emissions, geofencing strategies, and regional air quality impacts, by incorporating emissions-sensitive area information into the model. This work will assist state agencies in prioritizing a combination of programs and investments for ZEVs and infrastructures to align with the likely future transportation system (particularly in terms of fuel demands) in the state.

## About the Author



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Tri Dev Acharya is currently a postdoctoral researcher in the Energy Futures | Sustainable Freight at the Institute of Transportation Studies (ITS), University of California, Davis. He is involved in the UC Davis Hydrogen Study Group which is studying future hydrogen system design, scale-up, and optimization within California. His responsibilities are collecting and building a geo-spatial database and performing various spatial analyses such as location-allocation and suitability analysis for the deployment of both hydrogen production and refuelling infrastructure for heavy-duty and light-duty vehicles.

Before UC Davis, he received his BE degree in Geomatics from Kathmandu University, Nepal, in 2011, and his Combined MS and a PhD degree from the Department of Civil Engineering at Kangwon National University, Korea, in 2018. He worked as a postdoctoral researcher in Korea and China focusing on geospatial data preparation, modelling, and simulation of land cover, surface water, disaster, and transportation.

Besides research, Tri Dev is also very active in mentoring first-generation and early career professionals through his [#Mentor4Nepal Initiative](#). The goal of this initiative is to help recent graduates and early career professionals focus on enhancing their skill set and provide support for a research project and a collaborative publication. His [profile](#) was recently featured on UC Davis Engineering an Inclusive Future.

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- Office of Governor Edmund G. Brown Jr. Governor Brown Takes Action to Increase Zero-Emission Vehicles, Fund New Climate Investments Available online: <https://www.ca.gov/archive/gov39/2018/01/26/governor-brown-takes-action-to-increase-zero-emission-vehicles-fund-new-climate-investments/index.html> (accessed on May 25, 2021).
- EXECUTIVE ORDER N-79-20 Available online: <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf> (accessed on May 22, 2021).



# SATELLITES FOR SUSTAINABLE DEVELOPMENT GOALS: FOCUS ON THE FORESTS

The Sustainable Development Goal (SDG) indicator 15.1.1 is “Forest area as a proportion of total land area” that will help achieve SDG 15: “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”. Forest ‘area’ can provide useful information for long-term monitoring, especially in landscapes with a high rate of deforestation – a process where forest is converted to non-forest. Forest degradation is more dominant in many landscapes across South Asia, where

there is a reduction in the ecological capacities provided by forests over time. Despite advancements in the field of geospatial technologies, capturing forest degradation has remained elusive.

In our paper titled “A reporting framework for Sustainable Development Goal 15: Multi-scale monitoring of forest degradation using MODIS, Landsat and Sentinel data” published in the journal *Remote Sensing of Environment* (volume 237, doi: 10.1016/j.rse.2019.111592), we recommend considering multiple spatial scales while reporting forest condition

for SDG 15.1 monitoring purposes. We provide a systematic reporting framework for policy-makers that will not only consider overall national-level vegetation trends in the context of climate variability, but will also document the status of forest degradation within critical protected area landscapes. To do this, we first calculate trends in LP-DAAC's MODIS data for Normalized Difference Vegetation Index (NDVI) during 2000-2016 and combine that with the Climate Hazards Group InfraRed Rainfall with Station (CHIRPS) rainfall trends over the same time-period. By combining these two datasets, we derive an annual Rain-Use Efficiency (RUE) dataset with a spatial resolution of 1 km. RUE is the ratio between the annual sum of vegetation productivity and the annual rainfall (i.e. NDVI per unit rainfall). We then evaluate three sensor/band combinations, leveraging Landsat and Sentinel satellite data, Random Forest algorithm and the Google Earth Engine platform, to investigate forest cover status at a finer spatial scale. We illustrate

this approach broadly in south Asia, along with two test case regions – one in India, and the other in Sri Lanka. Since we use freely available global satellite data, this framework can be implemented in other regions as well. We have made the data generated through this work freely available at <https://www.centralindia-datacollab.org/>.

We find that certain regions might be experiencing finer-scale degradation processes that cannot be captured by a broad-brush approach involving coarse-scale satellite data. Our main conclusion is that the policy-makers should not rely on reporting the overall vegetation trend at the national level, such as 'greening' or 'browning', and should consider a multi-scale approach for accurately reporting forest conditions. We present evidence that considering only a 'broad-brush' approach might be misleading, thus severely limiting the achievement of SDG targets.

*Dr. Pinki Mondal leads the "Earth observation for Sustainable Ecosystem and Livelihood" (EASEL) research group at the University of Delaware (UD). She is an Assistant Professor in the Department of Geography and Spatial Sciences with a joint appointment in the Department of Plant and Soil Sciences. She is a Resident Faculty at the UD Data Science Institute and is an affiliate to the Delaware Environmental Institute (DENIN), the Water Science and Policy Program, and the Center for Food Systems and Sustainability (CENFOODS). Dr. Mondal is a geospatial data scientist specializing in remote sensing and Geographic Information Science (GIS) and has over fifteen years of experience in environmental remote sensing in Asia, Africa, and North America. Dr. Mondal received her PhD in Land Change Science from the University of Florida. She has worked at the University of Massachusetts – Amherst as a Postdoctoral Research Associate, and at Columbia University in the City of New York, first as a Postdoctoral Research Scientist and later as a Senior Research Associate.*

## ABOUT THE AUTHOR



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# Earth Observation Data <sup>becomes</sup> mainstream

Earth observation (EO) data – including satellite-borne, airborne, or drone-based imagery – have become indispensable for the monitoring of the environment. EO supports tackling the ‘grand challenges’ at global spatial scales, such as for global change and climate variability technology but also for retail or insurance. Like a microscope, it opens research avenues for observing processes occurring over a wide range of spatial and temporal scales - from abrupt changes such as earthquakes to decadal shifts such as the growth and shrinkage of ice sheets. Particularly, satellite data became a success story and empowered individuals, businesses, and society. Until a few years ago, the term remote sensing mainly stood for a digital raster world view while the GIS community was inclined to the vector world. “Earth Observation” is more inclusive and encompasses various means of data acquisition from satellites, aircrafts, drones, to in situ measurements.

## Serving international programmes and treaties

Regularly collected remote sensing and in-situ measurements are crucial sources for up-to-date knowledge about physical and human-related processes, if adequately exploited, and are the two key technological elements of the Global EO System of Systems (GEOSS). However, directly generating knowledge about spatio-temporal patterns of human activities or natural processes is still a challenge, even with access to this expanding body of data. Directly observed can be specific physical aspects of entities as traces of evidence. These serve as proxies to monitor and assess the goals and targets of major international frameworks such as the United Nations Sustainable Development Goals (SDGs), the Sendai Framework for Disaster Risk Reduction, the Paris Agreement on Climate Change, or the New Urban agenda. Indirect cues derived from remotely sensed data can provide evidence that serves a multitude of domains, including the domains of public health, human settlement observation, and the entire human-environment nexus as addressed by the SDGs and Group on Earth Observations (GEO)/Committee on Earth Observation Satellites (CEOS) ‘Earth Observations in Service of the 2030 Agenda’.

## Paradigm shift:

### From downloads and desktops to cloud-based infrastructure

In recent years, technological developments from other areas have been transferred to the remote sensing world, producing a somewhat revolutionary effect across the spectrum of activities in routine applications and science. Data cube concepts and data cube technologies have recently gained popularity even though they were developed in domains outside EO data. Next to online download portals, such as the USGS Earth Explorer and the Copernicus Sentinel Hub, analytically-oriented solutions such as Google Earth Engine (GEE) or EarthServer are now used by professional communities. This change is directly linked to the provision of

free or at least inexpensive data associated with the launch of new EO satellites and access to government data. It becomes even more clear that data as such are useless and need to be turned into information. The quest for evidence-based decisions comes along with developments in spatial data science and EO-based information science. Virtually all domains of policy and business decisions request insights from spatial analytics. The most evident examples include environmental management, climate change mitigation, and public health.

## Earth Observation Science Education

Today the rapid growth of data science, the consumerization of GIS and remote sensing, and the continued spread of online cartographic tools are prompting a more holistic Earth Observation Science and interdisciplinary educational programmes. One answer to this quest is the Copernicus European Master in Digital Earth, an Erasmus Mundus Joint Master Degree Programme between three Universities in Austria, France and the Czech Republic:

<https://www.master-cde.eu/>

### References:

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Thomas Blaschke is a professor at the University of Salzburg and vice-president of the Society for Geoinformatics, GeoIT, and Navigation. His research interests include methodological issues of the integration of GIS and Earth observation with aspects of participation and human-environment interaction. He is author or editor of 17 books, recipient of several academic prizes and awards including the Christian-Doppler Prize, and is an elected corresponding member of the Austrian Academy of Sciences. He also serves in several international organizations such as the ESA Advisory committee for Earth Observation and the ISPRS Int. Policy advisory committee.

# GEOSPATIAL TECHNOLOGIES FOR THE CONSERVATION AND PROMOTION OF CULTURAL HERITAGE IN SUPPORT OF THE UN SUSTAINABLE DEVELOPMENT GOALS

Cultural Heritage (CH), despite being of great historical and social value to humanity, is often at risk from natural and anthropogenic threats. CH conservation and promotion remains a huge challenge for both developed and developing countries due to a lack of resources, non-recognition of its value by local people or authorities, human activities, etc. As a result, it is included in the United Nations' Sustainable Development Goals (SDGs) 11 and 8. SDG 11.4 emphasizes the protection and safeguarding of heritage, and SDG 8.9 aims to promote sustainable tourism that creates jobs and promotes local culture and products.

Funded by the UK Engineering and Physical Sciences Research Council, the Newcastle University's research project 'Disaster Risk Reduction of Heritage Structures in Nepal' has developed an online geo-crowdsourcing system, named Share Our Cultural Heritage (SOCH) (Dhonju et al., 2018)(<https://soch.ncl.ac.uk/>), which aims for large-scale CH documentation and sharing. Supported by web and mobile GIS, CH data such as textual stories, locations, and images

can be acquired via portable devices. These data are georeferenced and visualised online via web-mapping. Using photogrammetric modelling, acquired images are used to reconstruct heritage structures or artefacts into 3D digital models, which are then visualized on the SOCH web to enable public interaction, such as point annotation. This fully automatic end-to-end system incubates an online virtual community to encourage public engagement, raise awareness, and stimulate CH ownership. It also provides valuable resources for CH exploitation, management, education, and monitoring over time (Figure 1). It has been recently used to support heritage data crowdsourcing and annotation, via a mobile app, for the Hadrian's Wall Community Archaeology Project (WallCAP) at Newcastle University, funded by The UK National Lottery Heritage Fund.

The SOCH system has demonstrated the possible contributions of geospatial technologies, such as photogrammetry, web GIS, and geo-crowdsourcing for the conservation and promotion of CH and hence for the related UN SDGs. Moreover, following the UNESCO initiative to introduce CH

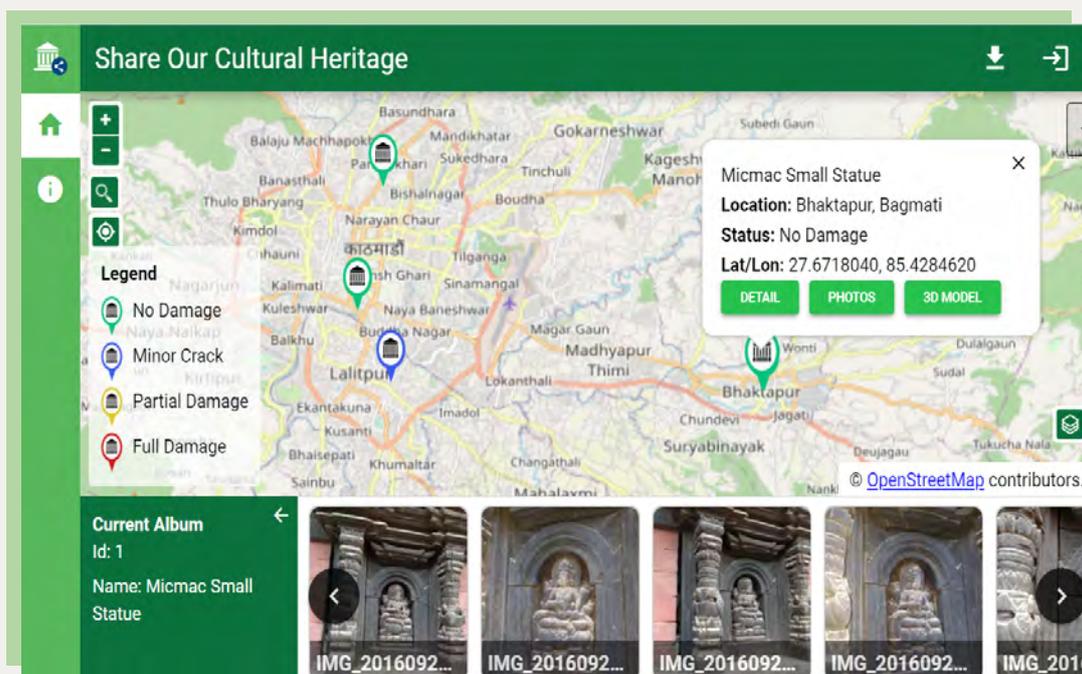


Figure 1. Share Our Cultural Heritage (SOCH) online system (left) and visualisation of 3D model (next page)



into the sustainable development agenda and related ICOMOS action plan, we have defined the concept of Sustainable Cultural Heritage as the 'protection, safeguarding, and promotion of the tangible (e.g. historic places, monuments, artefacts) and intangible (e.g. customs, practices, crafts, artistic expressions and values, traditions or living expressions) cultural heritage in a manner that does not diminish the socio-economic-environmental processes necessary to maintain human equity, diversity, and prosperity'. Sustainable CH is therefore considered as a significant component of sustainable development that incorporates both the protection and safeguarding of tangible and intangible CH, as well as the promotion of tourism that generates jobs and promotes local products. (Xiao et al., 2018).

The work has been cited as an example of good practises in the recent report from UN's Economic and Social Commission for Asia and the Pacific (ESCAP): 'Geospatial Practices for Sustainable Development in Asia and the Pacific 2020: A Compendium'.



## ABOUT THE AUTHOR

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Wen Xiao has been a Lecturer and then a University Research Fellow at Newcastle University. His research interests lie in the integration of artificial intelligence, computer vision and robotics, with photogrammetry, laser scanning and remote sensing, applied to the built and natural environments. He received his B.S. from Wuhan University, China, his M.Sc. degree from ITC, University of Twente, The Netherlands, and his Ph.D. degree from IGN, Université Paris-EST, France (2015). He is currently a Council Member of UK Remote Sensing and Photogrammetry Society (RSPSoc) and a topic editor of the Remote Sensing journal.

## References

- Dhonju, H.K., Xiao, W., Mills, J.P. and Sarhosis, V., 2018. Share Our Cultural Heritage (SOCH): worldwide 3D heritage reconstruction and visualization via web and mobile GIS. *ISPRS International Journal of Geo-Information*, 7(9), p.360.
- Xiao, W., Mills, J., Guidi, G., Rodriguez-González, P., Barsanti, S.G. and González-Aguilera, D., 2018. Geoinformatics for the conservation and promotion of cultural heritage in support of the UN Sustainable Development Goals. *ISPRS Journal of Photogrammetry and Remote Sensing*, 142, pp.389-406.

**I** MPORTANT  
**F** OCUSED  
**O** UTSTANDING  
**V** ALUABLE

**Full Name**

Prof. Laurence C. Smith  
laurence\_smith@brown.edu  
<https://northernchange.brown.edu/>

**Current Position**

Professor of Environmental Studies  
John Atwater and Diana Nelson University

**Affiliation**

Brown University

**Research Interests and Expertise:**

Geospatial remote sensing,  
computational modeling



Laurence C. Smith is the John Atwater and Diana Nelson University Professor of Environmental Studies and Professor of Earth, Environmental, and Planetary Sciences at Brown University. Previously, he was Professor of Geography at UCLA where he served as Department Chair from 2013-2017. His research interests include the Arctic, water resources, and satellite remote sensing technologies. He has published over 100 peer-reviewed journal articles, essays, and books including in the journals Science, Nature, and PNAS, and won more than \$9M in research funding from the National Science Foundation and NASA. In 2006-2007 he was named a Guggenheim Fellow by the John S. Guggenheim Foundation and in 2007 and 2014 his work appeared prominently in 4th and 5th Assessment Reports of the United Nations' Intergovernmental Panel on Climate Change (IPCC). He has assisted the National Academy of Sciences with a major report on abrupt climate changes, NASA with a new satellite mission to monitor global water resources, and the World Economic Forum with issues of Arctic development. In 2015, he was elected Fellow of the American Geophysical Union (AGU). He frequently gives keynote speeches and in 2012, 2014, 2016 was an invited speaker at the World Economic Forum in Davos.

**Can you briefly tell us about your research interests? Who or what inspired you to become a scientist in this research field?**

My research interests surround remote sensing of water resources, ice sheets, and Arctic/sub-Arctic regions. I have always been interested in both satellite remote sensing and northern environments, starting with my Ph.D. field work in a remote corner of Alaska conducting some of the earliest research mapping glacier melting and estimating river discharge using ERS-1 SAR imagery.

**Among the research projects you have conducted, can you share with us a specific project that you liked the most?**

I like all of our projects so it's hard to pick just one. Our research on the melting Greenland ice sheet has captured much public excitement and is directly relevant to climate change and sea level rise. In brief, it seeks to use remote sensing and field expeditions to validate climate model projections of ice sheet runoff - which are the only tool we have to predict future sea levels. The work is interesting because it pairs high-resolution mapping of supraglacial stream/river networks with traditional hydrological modeling, which has not traditionally been done for ice surfaces. Obviously, the field work is very dramatic and exciting as well. Some links to media coverage and papers from this research are:

■ **THE NEW YORK TIMES** (front page print/online editions, multimedia)

Online edition “Greenland is melting away” (October 27, 2015)

<http://www.nytimes.com/interactive/2015/10/27/world/greenland-is-melting-away.html>

Related piece “A Drone’s Vantage Point of a Melting Greenland”

<http://www.nytimes.com/2015/10/28/insider/a-drones-vantage-point-of-a-melting-greenland.html>

Print Edition: “A Close-Up Look at Greenland, Melting Away”

(front page, The New York Times, October 28, 2015)

■ **THE NEW YORKER** “Greenland is Melting” by Elizabeth Kolbert (October 24, 2016)

(print and online editions)

<https://www.newyorker.com/magazine/2016/10/24/greenland-is-melting>

■ **THE NEW YORK TIMES** (front page online edition, multimedia, print edition)

Online edition “As Greenland Melts, Where is the Water Going?” (December 05, 2017)

<https://www.nytimes.com/interactive/2017/12/05/climate/greenland-ice-melting.html>

■ **NASA** “What a glacial river reveals about the Greenland Ice Sheet”

(by Roberto Molar Candanosa, 5 April 2021)

<https://www.nasa.gov/feature/goddard/2021/what-a-glacial-river-reveals-about-the-greenland-ice-sheet>

Outreach video here:

<https://www.youtube.com/watch?v=3twOCNP1Gdg&t=11s>

■ Looking ahead, I am very excited about the launch of the NASA/CNES/CSA/UKSA Surface Water and Ocean Topography (SWOT) mission, which I have been involved with since inception and will be launched in late 2022. For more see:

<https://swot.jpl.nasa.gov/>

Finally, I am interested in the interactions of rivers and society, across a range of historical and spatial scales. These include geospatial studies like work on political borders with an undergraduate researcher and my recent book RIVERS OF POWER, which explores the deep dependence of humans upon rivers from prehistory to the satellite era:

■ **RIVERS of POWER**

[www.riversofpower.org](http://www.riversofpower.org)

■ **NASA** “When Rivers are Borders” (by Adam Voiland, 27 May 2020)

<https://earthobservatory.nasa.gov/images/147238/when-rivers-are-borders>

■ **FINANCIAL TIMES** “Rivers of Power – A timely reminder of the life-giving force of water”

(BOOK REVIEW by Victor Mallet, 12 May 2020)

<https://www.ft.com/content/9d5fc18e-887a-11ea-9dcb-fe6871f4145a>

**WALL STREET JOURNAL** " 'Rivers of Power Review: The Force That Flows'"

(BOOK REVIEW by Gerard Helferich, 5 June 2020)

<https://www.wsj.com/articles/rivers-of-power-review-the-force-that-flows-11591396511>

**NEW STATESMAN** "Laurence C. Smith's Rivers of Power: how water shapes our world"

(BOOK REVIEW by Mark Cocker, 17 July 2020)

<https://www.newstatesman.com/culture/books/2020/07/laurence-c-smith-s-rivers-power-how-water-shapes-our-world>

■ **What inspired you to work in this field? What do you consider your greatest achievement? Can you tell us a challenge that you faced in your career and what did you learn?**

I have always been captivated by northern environments -- they are a special and magical place, and undergoing rapid, extraordinary changes. My greatest achievements and challenges surround mentoring graduate students, which I consider the greatest privilege and reward of my job. I have learned much from my students and I hope they have learned a bit from me as well.

■ **What can you say about the current trends in scientific research related to achieving Sustainable Development Goals (SDGs)? What do you think are the key roles of Earth sciences in achieving UN SDGs?**

I would like to see tighter coupling between advanced Earth Science and the UN SDGs. At the present time, the latest science is not always incorporated in the policy process. That is changing as AGU and EGU, for example, increasingly encourage cross-overs with policy, but I would like to see it happening faster.

■ **What do you think are the possible contributions of international organizations like the ISPRS Student Consortium in sustainable development? What is your advice to the youth in contributing to the SDGs?**

Find ways to connect your science to the SDGs while still pursuing fundamental scientific knowledge. It's a tricky balance, but it can be done.

“

*Find ways to connect your **science to the SDGs** while still pursuing **fundamental scientific knowledge.*** ”

# FOSS4G-ASIA 2021

OCTOBER 1 & 2, 2021 | DHULIKHEL - NEPAL

## FOSS4G IN THE ERA OF ARTIFICIAL INTELLIGENCE, IOT FOR LAND MANAGEMENT AND SUSE DEVELOPMENT

### PROGRAM AND TOPICS

- Urban Dynamics, Smart Cities, Food Green City
- Archaeological Cultural Heritages and Preservations
- Land Governance, Land Use Planning and Management
- Land Information System and Cadastral
- Land Valuation and Land Development
- Agriculture (rural and urban) and Food Security
- Disaster Management and Mitigation
- Forestry and Biodiversity
- Spatial Data Infrastructure and Geo Ethics and Geo Governance
- Spatial planning and Decision Support system
- Community Building and Citizen Participation
- Teaching Spatial Information Science using FOSS4G
- Spatial Analysis for Gender Policy Lobbying
- FOSS4G Philosophy, Goals and Challenges

**FOSS4G-Asia 2021** conference is an international conference for Free and Open Source Software for Geospatial Community. FOSS4G-Asia 2021 aims to support the global agenda of sustainable development goals including land management and contribute to Artificial Intelligence and IOT by bringing researchers, professionals, private developers, students, and all the stakeholders from worldwide in general and Asia in specific together in one platform. "FOSS4G-Asia 2021" will be hosted at Kathmandu University.

### REGISTRATION OPENING SOON!!!

Pre-Conference event: **30<sup>th</sup> September 2021**

Technical Sessions: **1<sup>st</sup> and 2<sup>nd</sup> October 2021**

Please visit <https://www.foss4g-asia.org/2020/> for more information.



# EarthEngine @SG

sg  
geo  
fest

6-17 September 2021  
Singapore Geospatial Festival

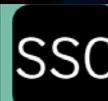
connects Google Earth Engine users from academia, industry, public sector and non-governmental organisations in Singapore and beyond.



Asian School of the Environment

NUS Centre for Nature-based Climate Solutions Faculty of Science

Imperial College London



Register  <https://bit.ly/earthenginesg>



Google Earth Engine (EE) is a powerful cloud-based platform used to process remotely sensed satellite imagery and conduct large-scale land cover mapping on-the-fly. The applications of EE are numerous and cover a range of topics such as urban expansion, deforestation, and mapping of hazards, just to name a few. The user community in Singapore has grown over time and we would like to bring the community together through a one-day virtual symposium.

We are excited to host **EarthEngine@SG** during the SG Geospatial Festival and allow this event to be a platform for connecting with users of EE from academia, industry as well as public sectors and non-governmental organisations.

The one-day virtual event happening on **13 September 2021, 11AM - 4PM (UTC+8)** via Zoom includes a keynote talk, parallel talks on different topics, a networking breakout session and hands-on EE workshops.

This would be followed up by another event in March 2022, which is tentatively scheduled to be an in-person event. We would offer the opportunity to users to present lightning talks about their work using EE as well as networking opportunities for future collaborations among participants.

Register here: <https://bit.ly/earthenginesg>



2021 IEEE GRSS & ISPRS SC



Young Professionals & Summer School  
IEEE/GRSS Brazil Chapter

IT IS VIRTUAL!  
IT IS FREE!

<http://grss-isprs.udesc.br/>

Biweekly activities  
Webinars, Round tables, and  
Tutorials including hands-on

from August 12th to December 16th

Graduate students can register in Special Topics and obtain 3 (three) ECTS  
Activities in both Portuguese and English

Supported by:



Organized by:



Co-Organized by:



The IEEE GRSS Young Professionals (YP) & ISPRS Student Consortium (SC) Summer School (SS) are events organized jointly in Brazil and supported by the two main international organizations in the field of remote sensing: IEEE Geoscience and Remote Sensing Society and International Society for Photogrammetry and Remote Sensing.

This year, the 7th edition of the IEEE/GRSS-YP and the ISPRS/SC-SS shall occur in the city of **Chapeco** during the last week of August. However, due to current pandemic restrictions (COVID19), this event shall also happen virtually. The event will be organized by the Santa Catarina State University (UNESC) and the Communitarian University of Chapecó Region (UNOCHAPECO).



FOUNDED: 18 JULY 2004  
ISTANBUL, TURKEY

The **White Elephants Club (WEC)** was founded during the 60th birthday party of Professor Armin Gruen, held at Yildiz Hisai Club, Istanbul, Turkey on the 18th of July 2004 in conjunction with the XXth ISPRS Congress.

The philosophy behind the idea is that “Elephants” (those who try to obtain food by working hard) should defend and maintain a prosperous and happy community in the field of photogrammetry, remote sensing and spatial information sciences against “Crocodiles” (those who try to get food without working hard). In Asia, the White Elephant symbolizes a rare and noble person with highly motivated spirits and honor.

The White Elephants Club is a group of previous and current senior officers of ISPRS as well as persons with long standing and very close relations to ISPRS who have reached a level of personal development which makes them comparable to white elephants.

The aims of the White Elephants Club are to continue friendship among the members, to share commemorative events of the members, to support the missions and goals of ISPRS, and to communicate and encourage young generations to grow into potential “elephants” through their activities

The activities of the White Elephant Club include:

- Transfer of technology by initiating and organizing seminars, tutorials and workshops
- Initiating, coordinating and supporting projects by bringing together users, sponsors and experts as science and technology brokers
- Bridging the gap between generations and fostering events to support young scientists and students
- Initiating and supporting e-learning activities with focus on integration of high-tech elements in teaching and training processes
- Maintaining a sense of tradition and understanding of development within ISPRS by contributing actively to the collection of notes and reports about the history of photogrammetry, remote sensing and GIS

Meetings and parties are convened on special occasions such as the 60th birthday and other happy events of the members, in conjunction with ISPRS Congresses, symposia, ACRS conferences, and other related meetings. In the current pandemic, with the related restrictions, the White Elephant Club encourages and supports the preparation and conduct of virtual rooms to keep the connection between different groups of our community alive.

# The Management of the Club

Prof. em. Dr. Gottfried Konecny, University of Hannover, Germany  
**HONORARY PRESIDENT**

Prof. em. Dr. Armin Gruen, ETH Zurich, Switzerland  
**PRESIDENT**

Prof. em. Dr. Shunji Murai, University of Tokyo, Japan  
**SECRETARY GENERAL**

The Honorary President is a symbol of a “White Elephant” to retain the philosophy of the Club. The President represents the Club and convenes the meetings. The Secretary General corresponds with the Members and arranges the meetings in coordination with the President. Currently, the Club counts 34 Members from 18 countries.

## Main activities

## of the White Elephants Club

### WHITE ELEPHANTS SESSION

Tutorials called “**White Elephants Session**” (1.5 hours) have been conducted during ISPRS as well as ACRS (Asian Conference on Remote Sensing) and other events with the following contents:

How to write a Thesis: Armin Gruen

How to write a Project Proposal: Gottfried Konecny / Ian Dowman / John Trinder / Orhan Altan / Kohei Cho

How to give Presentations: Shunji Murai

How to write a Paper: Ian Dowman

### ISPRS EVENTS

#### ISPRS events

Com. VI Symposium Tokyo 2006

ISPRS Congress Beijing 2008

Com. VI Symposium Wuhan 2014

ISPRS Congress Prague 2016

### ACRS EVENTS

#### ACRS events

Ulaanbator 2006, Kuala Lumpur 2007, Colombo 2008, Beijing 2009, Hanoi 2010, Taipei 2011, Pataya 2012, Bali 2013, Napitaw 2014, Manila 2015, Colombo 2016, Delhi 2017, Kuala Lumpur 2018, Deajeon 2019

### ISPRS SC VIRTUAL ROOMS

#### Wuhan University: WEC Event 2009

#### WEC Symposium Guilin 2019

#### GEO SIBERIA: Novosibirsk, Russia 2010

In April 2020 the WEC supported the ISPRS Student Consortium by providing speakers for their platform “**ISPRS SC Virtual Rooms**”. Under the title “The Wisdom of the White Elephants” there were contributions from Orhan Altan, Ian Dowman, Armin Gruen, Gottfried Konecny, Shunji Murai, Charles Toth and John Trinder.

### SPECIAL EVENTS

On 17 June 2020 a very special event was celebrated: The 90th birthday of Prof. Gottfried Konecny (Previous ISPRS President). Under the title “A Life for Photogrammetry and Remote Sensing” a Virtual (Zoom) Room was organized jointly by the WEC and the ISPRS Student Consortium, to honor Prof. Konecny’s life-long achievements and his relentless services to ISPRS. A rich program featured presentations from colleagues, former students, and even some pieces of music and songs.

An audience of about 150 people listened to the following program:

Virtual Room Host	Sheryl Rose Reyes (President ISPRS Student Consortium)
Session Chairs	Armin Gruen (WEC President) and Christian Heipke (ISPRS President)
Christian Heipke	From Draftsman to Professor emeritus – 75 Years of Involvement in Photogrammetry
Armin Gruen	Of Elephants and Crocodiles – The Crossing of Lifelines
Shunji Murai	Lessons from Gottfried in my Life
Larry Fritz	Over 50 Years in ISPRS – The Ambassador of our Profession
Deren Li	Gottfried in China - his Role in the Development of the Chinese Photogrammetry and Remote Sensing
Lena Halounova	Gottfried and his Scientific Cooperations
Laurent Polidori	From Laussedat to Learning Machines: What can we learn from History?
Jan-Dirk Wegner	Quo Vadis Photogrammetry?

Greetings/best wishes of guests of the session  
Gottfried Konecny A Reply

In addition, a Special Issue of the Journal “Geo-spatial Information Science”, Vol. 24, Issue 1, 2021 (Gottfried Konecny; 90 Years of Age and Decades of Scientific Connections. Guest Editors Christian Heipke and Li Deren) was published in honor of Prof. Konecny.

Access: <https://www.tandfonline.com/toc/tgsi20/24/1>

As the most recent activity the WEC is co-organizing the Geomixer event of the ISPRS SC in order to further enhance communication between the different groups of our community.



A poster used for the previously held Geomixer



*WEC Members with partners and friends at a tour on the Li River, Guilin, China, 17 November 2019. Excursion on occasion of the ISPRS White Elephant Seminar, ICGBD International Conference on Geomatics in the Big Data Era*



*WEC Members with partners and friends at the ISPRS Centennial Celebrations, Vienna, Austria, 3 July 2010*

## PHD Scholarships & Fellowships

- ▶ **6 PhD positions (m/f/d) and 1 PostDoc position (m/f/d) within the framework of a DFG-funded Research Training Group (RTG)**  
The University of Ulm (UUm) and the Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)  
Deadline: 30 Jul 2021 | [Link here](#)
- ▶ **PhD and Postdoctoral positions in Climate extremes research, data science and Earth System Modelling**  
ETH Zurich, Switzerland  
Deadline: 31 Jul 2021 | [Link here](#)
- ▶ **PhD position in Sustainable peatland management by mapping, monitoring and modelling the Carbon cycle**  
ETH Zurich, Switzerland  
Deadline: 16 Aug 2021 | [Link here](#)
- ▶ **PhD fellowship in UAV based remote sensing for agriculture research**  
Agriculture Victoria and the La Trobe University, Australia  
Deadline: 31 Jul 2021 | [Link here](#)
- ▶ **PhD candidate with the focus on the drivers of glacial lake outburst floods in Norway**  
Norwegian University of Science and Technology, Norway  
Deadline: 09 Aug 2021 | [Link here](#)

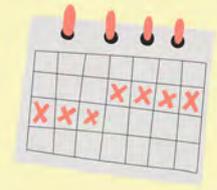
## PostDoc Opportunities

- ▶ **2 PostDoc positions - GFZ Discovery Fellowships 2021**  
Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Germany  
Deadline: 25 Aug 2021 | [Link here](#)
- ▶ **Scientist (Postdoc) in Earth Science**  
SRON - Netherlands Institute of Earth Science Utrecht, Netherland  
Deadline: 15 Aug 2021 | [Link here](#)
- ▶ **PostDoc in Artificial Intelligence for Forest Assessment (80%-100%)**  
Swiss Federal Institute for Forest, Snow and Landscape Research WSL Birmensdorf, Switzerland  
[Link here](#)
- ▶ **Postdoctoral position for Atlantis project**  
Basque Centre for Climate Change (BC3), Leioa, Spain  
Deadline: 06 Sep 2021 | [Link here](#)
- ▶ **Postdoctoral researcher, remote sensing of arctic ecosystems**  
University of Helsinki, Finland  
Deadline: 15 Aug 2021 | [Link here](#)

## Job Opportunities

- ▶ **Internal Research Fellow in Artificial Intelligence (AI) and Hybrid Computing for Earth Observation**  
European Space Agency, ESRIN, Frascati, Italy  
Deadline: 23 Jul 2021 | [Link here](#)
- ▶ **Researcher for the investigation of remote sensing as a tool for the detection of soil moisture and related parameters**  
Bundesanstalt Fur Gewasserkunde, Koblenz, Germany  
Deadline: 22 Jul 2021 | [Link here](#)
- ▶ **Research Associate specialising in Geosciences, Agricultural Sciences or Geoinformatics (or comparable), with a focus on data management and-analysis, IT infrastructures and software tools for product development**  
Bundesanstalt Fur Gewasserkunde, Koblenz, Germany  
Deadline: 22 Jul 2021 | [Link here](#)
- ▶ **Radar Remote Sensing Scientist**  
Cloud to Street Company, Brooklyn, NY office, USA | [Link here](#)
- ▶ **Assistant Professor in Hydroinformatics**  
Mohammed VI Polytechnic University, Benguerir, Morocco | [Link here](#)
- ▶ **Lecturer/ Assistant Professor**  
Maynooth University, Ireland  
Deadline: 01 Aug 2021 | [Link here](#)
- ▶ **Lecturer in Environment and Sustainability**  
The Open University, United Kingdom Milton Keynes, England  
Deadline: 02 Aug 2021 | [Link here](#)
- ▶ **Rights Lab Research Associate/Fellow in Earth Observation and Geospatial Data Science**  
University of Nottingham, University Park, NG7 2RD Nottingham  
Deadline: 28 Jul 2021 | [Link here](#)





28 Aug  
to  
01 Sep

**28th CIPA Symposium | Great Learning & Digital Emotion**

Hybrid format (online + offline)  
Beijing, China | <http://www.cipa2021.org/>

06 - 09  
Sep

**20th Anniversary International Scientific and Technical Conference**

FROM IMAGERY TO DIGITAL REALITY: Earth Remote Sensing and Photogrammetry  
Irkutsk, Russia | <https://conf.racurs.ru/conf2020/eng/>

15 - 17  
Sep

**ISPRS TC IV “Smart Data, Smart Cities” 2021**

Hybrid Conference  
Stuttgart, Germany | <http://www.udms.net/>

27 Sep  
to  
02 Oct

**FOSS4G 2021 Academic Track**

Virtual Conference Online  
Buenos Aires, Argentina | <https://2021.foss4g.org/>

28 Aug  
to  
01 Sep

**DESIS User Workshop: Imaging Spectrometer Space Mission, Calibration and Validation, Applications, Methods**

Virtual Event | Germany | <https://desis2021.welcome-manager.de/>

05 - 06  
Oct

**International Conference Geospatial Asia-Europe 2021**

Marrakesh, Morocco | <https://www.geoinfo.utm.my/gae2021/>

11 - 14  
Oct

**3D GeoInfo 2021: The 16th 3D GeoInfo Conference in conjunction with 3D Cadastres**

Virtual Conference  
New York City, USA | <https://3dgeoinfo2021.github.io/>

20 - 22  
Oct

**CRTEAN | TeanGeo 2021: 3rd International Conference & Exhibition Advanced Geospatial Science & Technology**

Tunis, Tunisia | <http://www.teangeo.org/>

27 - 29  
Oct

**SCA'21: The 6th International Conference on Smart City Applications**

Safranbolu, Turkey | <http://www.medi-ast.org/SCA2021/>

**OTHER EVENTS**

07 - 09 Sep

**Commercial UAV Expo America** | Las Vegas Valley, US  
<https://www.expouav.com/conference-program/>

20 - 22 Oct

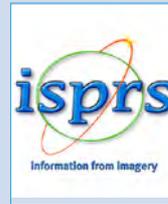
**Geospatial World Forum 2021** | Amsterdam, The Netherlands  
<https://geospatialworldforum.org/>

07 - 09 Dec

**GeoSmart India 2021** | Hyderabad, India  
<https://geosmartindia.net>

AUG  
SEP  
OCT  
NOV  
DEC  
2021

**UPCOMING EVENTS**



Please visit our ISPRS SC web page

[sc.isprs.org](https://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.

On behalf of the **ISPRS SC Board of Directors**, the Newsletter team would like to thank all the contributors of the featured articles in this issue who shared their knowledge and research experiences with us. We would also like to acknowledge all the participants who attended the ISPRS Virtual Summer School on Smart City, which was jointly organized by the ISPRS Technical Commission III on Remote Sensing (ISPRS TC III), Beijing University of Civil Engineering and Architecture (BUCEA), and ISPRS Student Consortium (ISPRS SC).

**ACKNOWLEDGEMENT**

Let us continue to support and care for each other during the COVID-19 pandemic

*Stay safe, everyone!*

**SPECTRUM**