THE OFFICIAL NEWSLETTER OF THE ISPRS STUDENT CONSORTIUM

SPECTRUM

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Application of Close Range Remote Sensing for Forestry

3DForEcoTech COST ACTION CA20118

INTERNATIONAL SUMMER SCHOOL: MODERN SURVEYING TECHNIQUES FOR CULTURAL HERITAGE DOCUMENTATION

YOUTH PRESENTATION FORUM (ISPRS GSW 23)

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Dear ISPRS SC Members and Readers,

Greetings on behalf of all the members of ISPRS SC Board of Directors (BODs), elected for the term of 2022-2026.

A very warm welcome to the new version of the official Newsletter of ISPRS SC- "SPECTRUM". My sincere apologies to our amazing readers for publishing this edition quite late! It took a while for the newsletter publication as we moved abreast with other ISPRS SC activities. Nevertheless, we are back again and we thank you all for your continued support.

Going back to the history, ISPRS SC officially started its journey in 2004, while the Newsletter has been providing exciting news, events and research in the fields of Photogrammetry, Remote Sensing, Spatial Information Science and allied fields since 2007. Since then, lots of changes have occurred in these domains, be it in terms of data acquisition methods, technologies adopted for data analysis, research orientation or availability of computational resources; the open source community is growing stronger, AI is being applied to all research domains, including geospatial technologies and now ChatGPT has become the talk of the town. It is becoming even more important to stay up-to-date and connect with like-minded people. In this regard, we now have a new and secure website with updated contents. Our social media platforms (Facebook, Instagram, LinkedIn and Twitter) are active again and we hope their content is providing you useful updates. While we give continuity to the existing remarkable events like summer schools, webinars and newsletter, we are also planning some new interesting events/initiatives in the near future.

Also, do not forget to check your email for the membership renewal, which should just take you a few minutes to complete.

We now have four new volunteers on-board: Saicharan is volunteering for the general communication and virtual activities, Daryl and Sileola in the Design Team and Efthymios in the Proofreading team. Happy to have them with us!

Likewise, I would like to take this opportunity to thank the former ISPRS SC BOD for their success tenure amid the COVID-19 unusual scenarios and extended tenure of 6 years. Kudos to you all for your contributions in shaping ISPRS SC strongly!

ISPRS SC will continue to serve as the podium for networking, skill-building and research sharing among students and young professionals. We are just an email (with innovative ideas) away for collaboration and cooperation. Your feedback and comments are always appreciated and will help us improve our service.

Lastly, I am grateful to all the authors for providing us with their articles to successfully come up with this newsletter. Let me give a big applause to our editorial team and BODs involved in the publication!

As more physical events are happening these days, we hope to meet and interact with many of you in the coming future. By the way, there is a Youth Presentation Forum that ISPRS SC is hosting in the ISPRS Geospatial Week 2023 happening on September 02-07, 2023 in Cairo. What about meeting there!

All the best!

LAXMI THAPA
President, ISPRS SC

Join the ISPRS Student Consortium today!

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ANOTHER PROOFREADER WANTED!

We would like to inform you that the ISPRS SC is still looking for another proofreader to join our team and work closely with our new recruit Efthymios. We are accepting applications from individuals who are interested in the position and have excellent proofreading skills.

As a proofreader for ISPRS SC, you will play a crucial role in ensuring the accuracy and consistency of our publications and communications. You will work closely with our board of directors and other team members to review and edit various materials, including newsletters, reports, and social media posts. This is a volunteer position, and we welcome applicants from all backgrounds and levels of experience.

If you are interested in becoming our proofreader, please send your resume and a brief cover letter outlining your qualifications and why you are interested in the position to **sc.isprs@gmail.com.** We look forward to hearing from you.

Best regards,
ISPRS SC Board of Directors

New Volunteers just joined our team!

Dear ISPRS SC community,

We are thrilled to introduce three new volunteers who will be joining the team as proofreaders and graphical designers. These individuals were selected from a pool of talented applicants who demonstrated a strong passion for the field of photogrammetry and remote sensing, and a desire to contribute to the ISPRS SC community.

Efthymios, our new proofreader, is a freelancer urban planner with a background in GeoInformatics. He brings with him previous experience as an academic and article writer across Europe, the United States of America, and the United Kingdom. In addition to his proofreading skills, Efthymios is also a management expert with experience in coaching young athletes.

Efthymios - Spyridon Georjiu
Proofreader

Sileola, our new graphic designer, has a wealth of experience in both computer science and remote sensing and GIS. With over 15 years of experience in graphic design using CorelDraw and other tools, Sileola also runs a printing business that specializes in large format banners. With his skills in graphic design, we are excited to see the creative designs he will bring to the ISPRS SC community.

Finally, Daryl, our new design team member, is currently a graduate student in Geodetic Engineering at the University of the Philippines. She has previously volunteered for conferences and is currently the Vice President for Publicity of her organization. We've been amazed by her past graphical creations and video editing skills - we couldn't let her go! With her passion for creative work, Daryl is eager to contribute to the ISPRS SC team by creating high-quality publicity materials.

Sileola Charles Asunbiaro
Graphic designer

Daryl Ann Cabuyadao
Graphic designer

In conclusion, we are thrilled to announce that Saicharan will be joining (again!) the Consortium as a volunteer leader, serving as a technical helper and all-rounder. Saicharan attended the leadership and mentorship program run by the former board of directors, and we have always believed in his potential. We are confident that his expertise and dedication will be a valuable asset to the Consortium.

We are excited to have these four new volunteers join us and look forward to the valuable contributions they will make to the ISPRS SC community. Please join us in welcoming them!

Best regards,

SUNRISE SUMMER SCHOOL

SEASHORE AND UNDERWATER DOCUMENTATION OF ARCHAEOLOGICAL HERITAGE PALIMPSESTS AND ENVIRONMENT

The SUNRISE summer school was carried out in cooperation between ISPRS (International Society for Photogrammetry and Remote Sensing) and SIFET (Italian Society of Photogrammetry and Topography) and involved international students and professional surveyors with different backgrounds (e.g., archaeologists, architects, engineers, etc.) for the documentation of an archaeological site and the surrounding environment with several geomatics techniques. The main objective was to provide the participants with a general overview of the state of the art of the different geomatics techniques that can be used for the documentation of both the Cultural Heritage (emerged and submerged) and the environment in which it is located, constituting the coastal heritage.

The site on which students worked during the summer school was the Archaeological Park of Kamarina (Sicily – Italy), which hosts different archaeological remains (both emerged and submerged) and is located in a stunning and thriving natural and historical environment. Kamarina has an ancient history, dating back to around 600 BC, a period in which the Syracusan Greeks settled in this small town to create a colony. Some activities were also carried out in the area of Santa Croce Camera in order to survey the Mezzagnone Building, a Latin Cross Building dated back to the IV-IX cent. A.D. used in the past as a thermal bath.

The summer school activities involved participants with interactive lectures by recognized researchers and Professors, fieldwork activities, and data processing and interpretation. Participants were divided into working groups on the basis of their background; each group worked on a specific topic during the week of the summer school starting from the data acquisition and processing, toward their use for different purposes. On the last day of the fieldwork, each group presented reports on the activities carried out during the summer school. The works of the participants will be compiled into a single report that will be published online by the organizers and will be freely available to the public in order to disseminate the results obtained by the summer school.

The lectures **presented different geomatics techniques** and their deployment in the field, but a specific focus was also given on their **contribution to the field of coastal heritage documentation** and how the derived metric products can be effectively used for its study, management, safeguard and dissemination. After a general overview on the possibilities offered by digital documentation approaches and their limitations, several specific techniques was briefly reviewed starting from traditional topographic techniques (such as **GNSS and Total Station**), moving towards **terrestrial, aerial, and underwater photogrammetry,** and also **range-based techniques such as Terrestrial Laser scanning.** Finally, different issues connected with the management and interpretation of 3D data were tackled and discussed. All the instruments used in the field were provided by the organizers' institutions.

BUCEA SUMMER SCHOOL

Yameng Shen (BUCEA)

I am very grateful for having had the opportunity to participate in the summer school where I had the opportunity for in-depth study of the field and I got to know many professors with outstanding skill together with like-minded classmates.

Nowadays, we are all facing multiple challenges and threats like rapid population growth, traffic pollution, climate change, sea level rise and social upheavals. Obviously, we are in the midst of multiple crises. Therefore, there has been an increasing attention to genealogies of urban resilience and the capability of urban systems to adapt to changing conditions. Through the professor's explanation, I realize that urban resilience has conventionally been defined as the "measurable ability of any urban system, with its inhabitants, to maintain continuity through all shocks and stresses, while positively adapting and transforming towards sustainability". After watching Professor Luca Maria Francesco's speech, I realized the necessity of building resilient cities in contemporary times, because the actions of any one country or region will affect the whole world and cause threats to cities. Combined with Professor Li Mengyixin's explanation, I realize that in the process of transition from industrial society to post-industrial society, the post-industrial landscape has brought changes to the resilient urban system. We should make more use of green space as the infrastructure of human activity until not strictly distinguishing between man-made space and green space.

Finally, I would like to express my gratitude to all the participants of this summer school, thanks the teachers for their wonderful presentations, and the students for creating a good learning atmosphere.

Christina Erato Zymvragou (Greece)

My name is Christina Erato Zymvragou and I am a PhD student at Aristotle University of Thessaloniki. I got passionate about the idea of learning more about civil engineering and architecture from this summer school. All of the courses were very interesting, I got to learn so much about environment pollution and urban problems. I intend to continue learning around those topics in order to gain the most knowledge to be able to really help and make a difference.

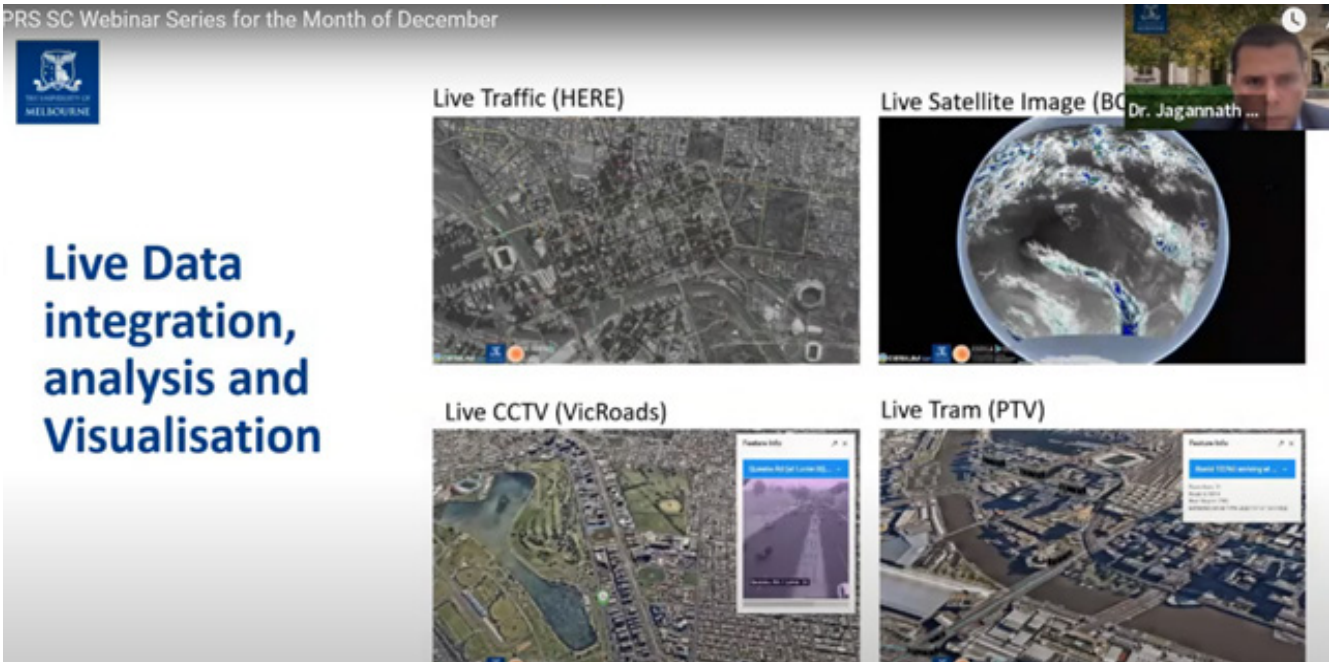
I'm already thinking of attending a webinar in September about air quality monitoring and I would love to learn more about using remote sensing and spatial information science.

In this summer school, I also found interesting how robots are in our everyday life, such as those machines that we use as toys to play with for entertainment, educational or medical purposes like exoskeletons or physical rehabilitation.

Thank you for the inspiration.

Thank you.

UPDATES ON THE LATEST ACTIVITIES OF ISPRS STUDENT CONSORTIUM



ISPRS Student Consortium (ISPRS SC) organized its latest ISPRS SC Webinar on the 7th December, 2022. Dr Jagannath Aryal (PhD in Optimisation and Systems Modelling), who is working as a Senior Lecturer in the Department of Infrastructure Engineering at University of Melbourne, joined us as speaker for this webinar, the last of our 2022 series. The title of the talk was **"Earth Observation and Digital Transformation: an outlook from Infrastructure Engineering"** and he highlighted the recent developments of earth observation data and platforms, the practices, and their wider applications with a focus on digital infrastructure engineering. In addition, he also presented case studies illustrating how techniques for accurate and precise data capture, object recognition and interpretation are used in digital city design to integrate new information in cities digital models. The webinar was followed by a Q/A session where Dr. Aryal addressed the questions raised by the attendees. The presentation was insightful in providing information about ongoing research on using earth observation and digital transformation techniques in the context of cities digital models.

Dr. Jagannath Aryal
PhD in Optimisation and Systems Modelling
Speaker

MONITORING AIR QUALITY IN THE NCR, PHILIPPINES THROUGH PROJECT AIRMOVE

Engr. Roseanne Ramos, an assistant professor in the University of the Philippines (Department of Geodetic Engineering) and Project Leader of Project AiRMoVE, discussed the methods for monitoring air quality using remote sensing and GIS in the National Capital Region (NCR), Philippines. She gave a brief overview of the project and explained the project's goals and objectives clearly. In order for the participants to have an idea on the importance of air quality monitoring, she showed how air pollution is one of the rising concerns in the country, along with the process and limitations of traditional air quality monitoring. Additionally, Engr. Ramos presented some case studies in the local setting that utilizes geographical data and satellite imagery for air quality monitoring to give an example on how remote sensing and GIS can be used for air quality monitoring. Through the use of remote sensing and GIS techniques, pollutant concentrations can be mapped and estimated using modeling techniques, which can be used consequently to determine hotspots or hazardous areas due to high pollutant concentrations. Finally, she presented the current and future researches of Project AiRMoVE and its efforts on modeling and mapping air quality concentrations in NCR using remote sensing and GIS. Overall, Engr. Ramos was able to convey the capabilities of remote sensing and GIS for air quality monitoring, and how researchers, scientists, and agencies can utilize them for the protection of the environment and public health.

Engr. Roseanne Ramos
Project Leader, AiRMoVE
Speaker

Close-range forest mapping: is laser scanning worth it?

For the past two decades, laser scanning or lidar has seen immense development in terms of technology and accessibility. While it has seen various applications in architecture, construction, archaeology, and other domains, it has only recently gained traction in forestry. Indeed, using a terrestrial laser scanner (TLS) or aerial lidar to map our forests is a logical solution in our digital age.

Especially for below-canopy close-range mapping, the advent of laser scanning technology has been met with much enthusiasm. The potential of mapping forest structures and features in great detail and reasonably automatic manner opens many possibilities of applications. Scientific papers and research projects were conducted to investigate its use for real - world demands, such as national forest inventories. Dedicated organizations such as the 3DForEcoTech COST Action funded by the European Union gather multiple people working with lidar for these purposes. So much so that some publications would argue that the TLS is the "gold standard" regarding precision and quality in close-range forest mapping.

As people who have worked with a TLS would know, the technology has the potential to generate millions of precise points in a matter of minutes. Nevertheless, can the TLS' absolute power be used to map our forests? In many forest-related applications, the requirement for precision is not as strict as may be encountered in other sectors such as architecture or construction, let alone metrology. A few centimeters of precision is usually enough, and rarely requires a sub-centimetric result. The TLS also has a somewhat limited mobility when it comes to mapping complex and heterogeneous forest environments.

Most importantly, a TLS costs a lot and may not be a suitable solution in many cases due to budgetary constraints. An idea therefore arose; it may be possible to use low-cost alternatives (in our case, we chose spherical photogrammetry) to perform the same tasks as a TLS within the context of close-range forest mapping. This hypothesis is not without precedent; we know this is possible in other situations, mainly in urban settings. A forest setting is however much more challenging, so it would be interesting to see how this method fares.

In our research, we investigated the use of spherical photogrammetry (using 360-degree cameras) to replace TLS. We are fully aware that spherical cameras cannot in any sense outperform the quality of TLS; however, the question we are curious to answer is not whether we can use it to match TLS, but instead if we can use a sensor that is up to 100 times cheaper to get what we need in close-range forest mapping. To do this, we tried walking around the forest with our spherical cameras and creating a point cloud . We then extracted one of the most crucial tree parameters, the diameter at breast height, from the point cloud.
We observed an average error of around 3 cm compared to TLS. This result is quite promising, considering that data acquisition only required us to walk around in 5-7 minutes for each 50 x 50 meters forest plot.

Of course, the method still needs to be perfect; notably, the requirement for absolute orientation still means that additional time is required to put out targets around the forest, which may or may not be a satisfactory operation.

A close up view of a tree mapped using spherical photogrammetry in a Swiss forest.

Nevertheless, these results look promising. The applicability access is planning a further investigation. This method is the best. In the longer term, our research will be combined with an existing database of 3D techniques to form a point cloud benchmark for close-range forest mapping, thus enabling researchers to compare it against TLS and other methods such as mobile laser scanners or traditional close-range photogrammetry. However, it remains an exciting venue for facilitating and accelerating the mapping of our forests. This task inevitably will help us understand it more and enable us to manage them better in the future.

Example of the point cloud of a tree obtained using (a) TLS, (b) close-range photogrammetry and (c) spherical photogrammetry.

Author

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Usage of Terrestrial Laser Scanning at forest plot level

My research investigates forest structures, which are very crucial for the forest ecosystem and their relevance to the ecological indicators. The detailed structure of the forest can be reconstructed with laser scanning technology. This technology provides highly accurate data with all the minute structural information. However, the scan positions are equally crucial regarding accuracy and precision.

My current focus is to investigate all the algorithms for point cloud processing that address the detection of trees at the plot level and overcome the occlusion effect in the plot. While scanning the plot, it is difficult to detect all the trees due to various factors, such as tree density in the plot; if the density in the plot is very high, then

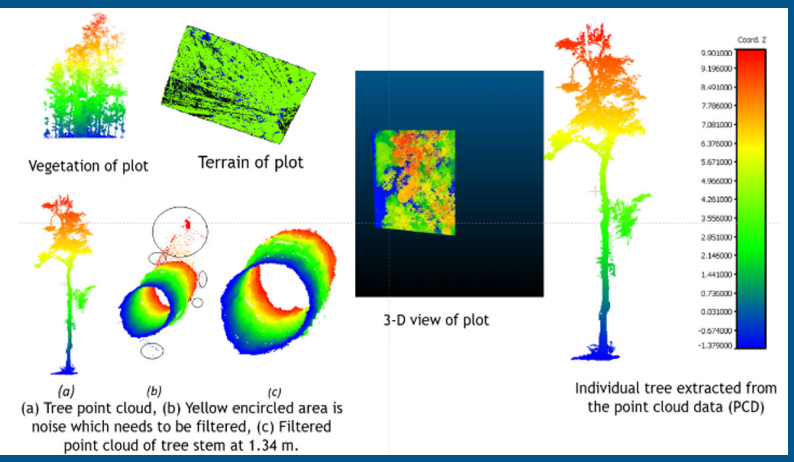
the rate of tree detection is poor, whereas if the tree density is low, the tree detection rate will be high. However, it also depends on the scan positions in the plot. I am trying to find the best possible scan positions to minimize the plot's occlusion effect and develop an algorithm for a 100 % tree detection rate in the forest at the plot level. Furthermore, my research objective is to investigate tree parameters such as diameter at breast height (DBH), tree height, stem volume, and biomass of individual trees at the plot level.

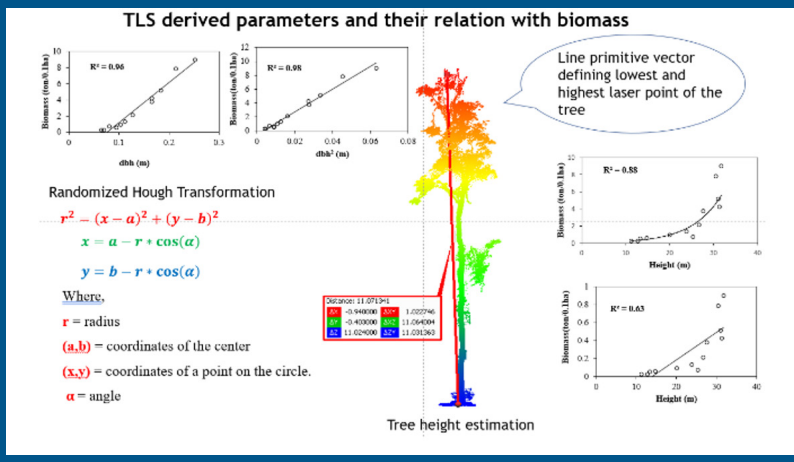
I am also trying to bridge the gap between lidar technology and ecological indicators. How does lidar benefit from assessing ecological indicators' importance in forest ecosystems? There are various ecological indicators present in the forest ecosystem that help to maintain the ecological balance in the forest. LiDAR technology can be an asset for the same. Since it is an active sensor, it does not depend on daylight. This helps to build detailed structural information about the forest. There are some areas in the forest where human encroachment is prohibited in the core areas of the forest. This technology can give information about those unexplored areas with prediction analysis and modeling. So, I am working to establish information on applications of LiDAR technology to establish an ecosystem balance in the forest.

I have also worked on a novel approach for forest allometric equation modeling with Random Sample Consensus (RANSAC) shape detection using a Terrestrial Laser Scanner (TLS) (Singh, Kushwaha, Nandy, & Padalia, 2022). In this research, I have attempted to model allometric equations using the RANSAC algorithm and TLS point cloud to estimate stem volume. We have mainly considered the structure of the trees. The parameters, such as tree height and DBH, correlate highly with the stem volume. The TLS-modelled allometric equations are not dependent on the tree species, and we have checked the accuracy with the species-specific volumetric equation by

the National Forest Institute in India. We have got very high accuracy. We have checked this methodology on 13 plots; however, the methodology has more potential to replace the species-specific volumetric equations.

I used Random Sample Consensus (RANSAC) and Randomized Hough Transform (RHT) algorithm to estimate stem volume (Singh, Kushwaha, Nandy, & Padalia, 2022). The RANSAC and RHT algorithms are well known for estimating the radius of the tree stem. We have done a comparative analysis of RANSAC and RHT to estimate stem volume. Since TLS gives the structural information of a tree, such as its circumference and height. The biomass of a tree is highly correlated with the DBH and height. So, I have used this information for the estimation of the biomass of a single tree. There is a glimpse of a few research outputs, as shown below along with field pictures.





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Singh, Arunima, Kushwaha, S. K. P., Nandy, S., & Padalia, H. (2022). An approach for tree volume estimation using RANSAC and RHT algorithms from TLS dataset. Applied Geomatics, 785–794. https://doi.org/10.1007/s12518-022-00471-x

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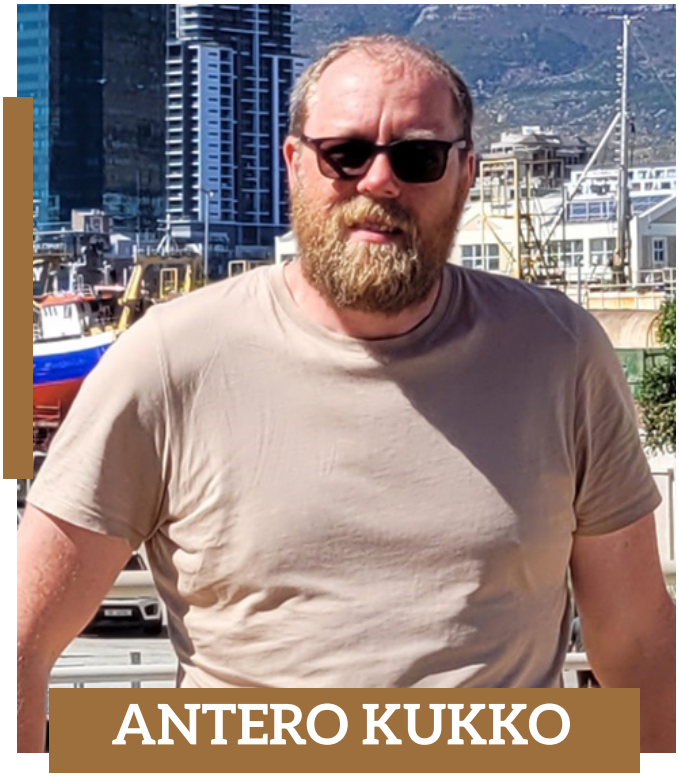


ANTERO KUKKO

Full Name: Antero Kukko
@KukkoAntero

Current Position - Director
Affiliation:
Autonomous Mapping and Driving group, Department of Remote Sensing and Photogrammetry, Finnish geospatial Research Institute FGI, Finland

Research Interests and Expertise:
Development of multispectral laser scanning and related automation, localization, and data processes in applications for digitalization of forestry, urban and natural environments.

Professor in mobile mapping technologies, leader of Autonomous Mapping and Driving research group, acting Director of the Department of Remote Sensing and Photogrammetry in FGI, adjunct professor in the Department of Built Environment in Aalto University, Finland. Doctoral degree from Aalto University in photogrammetry on the development of mobile laser scanning systems.

Can you briefly tell us about your research interests?

As a student at the Helsinki University of Technology, I was offered an opportunity to work with one of the first projects funded by the European Union related to the use of laser scanning in forest studies. It was fascinating to see forests in 3D for the first time! This has led me to study the use of laser scanning technologies for over 20 years. Today we are working towards automation in forest harvesters with real-time tree detection and operator guidance systems to decrease negative impacts on the forest environment and help sustainable forest use. Simultaneously, we study individual tree level forest inventory and phenology technologies to increase our understanding and improve the management of forest growth, diversity of ecosystems and detection of functional traits for tree communities and response to environmental stresses like drought and pests.

Who or what inspired you to become a scientist in this research field?

I never planned to be a scientist in the first place, but by getting involved in cool tech used in a field of national importance I was able to foster my curiosity and innovation, learning and sense of purpose. I think professor Henrik Haggrén, who was the head of Photogrammetry and Remote Sensing at Helsinki University of technology (now Aalto University), has acted as a role model for me both as a scientist and human being, and he was the inspiration for learning the art. I also owe a lot to Professor Juha Hyyppä as he has provided an invigorating research environment and freedom of exploration at FGI.

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

I think the most important project/endeavor I have been involved in was the Center of Excellence in Laser Scanning Research grant, funded by the academy of Finland for the years 2014-2019, which provided a platform for wide collaboration with several research entities in Finland and international communities around various aspects of laser scanning technology, forestry, urban environment and fluvial geomorphology – all ecosystems humans interact with across the globe. During that time, we were able to demonstrate the use of mobile laser scanning and the first steps of multispectral scanning for forest reconstruction, which opened the path towards the automated methodologies and machine guidance, autonomous drones and advanced data processes that we work with today. However, it was also quite an adventure spending three months in Antarctica just this winter scanning the continental and shelf ice surfaces with a long endurance drone system and chasing ICESat-2 ground tracks across the ice for a snow albedo study!

Multispectral laser scanning data of an urban scene provides an advanced perspective to the interaction and impact of human activity on natural ecosystems and a tool to mitigate the challenges related to urbanization and ecosystem conservation. (Image: Antero Kukko)

The CoE-LaSR brought advances in technology, for example, new electronics for laser scanning, new laser scanning methods and systems, and new developments of the backpack laser scanner for mobile surveying. The CoE-LaSR researchers also developed and tested mini-UAV laser scanning methods based on autonomic operation. The CoE-LaSR also participated in the advancement of precision forestry, and virtualizing and modelling the built environment.

These new research and surveying methods together with more accurate forestry data have a significant financial impact. In Finland the savings brought by the new precision forestry technology can be up to several hundred million euros. The CoE-LaSR has significantly progressed the forest industry's Efficient Wood Supply 2025 vision that aims to increase the efficiency of the wood value chain by 30%.

Why is it important to monitor forests through close range remote sensing?

The forest ecosystem - terrain, hydrology, trees, ground vegetation, fungus, birds, animals, and insects - form a complex network of dependencies in sustenance, shelter and proliferation. We use forests in many ways as a source for food, raw materials, and recreation, among the others. Close range remote sensing allows us to record and study phenomena and the impact of human activity on these ecosystems with robust methodologies. This helps us in making informed decisions towards sustainable use and conservation of the forested ecosystems. The close range detection permits high precision and thus the analysis of the effects of certain feedbacks that have not been available before. Detection of miniscule and even macro scale changes reliably require tools and methods to compensate for multimodal and multitemporal variations in the data. This is crucial in detecting the early signs of impact of a particular effect. Automation and advanced data processes help us to have wide area generalizations of the state of forests and other natural ecosystems globally.

How have the technologies helped in faster and reliable data acquisition?

Twenty years back it was possible to measure a tree with a caliber for stem diameter and a hypsometer for the height with a significant subjective uncertainty. Any more detailed analysis required to cut down the tree. A lot of effort was required for canopy structure description, not to speak about any wider area structural models. Close range technologies, imagery and laser scanning, allow us to perform nondestructive surveys, detection and modeling. Digital documentation allows us to reconstruct whole ecosystems at a certain point of time in 3D and with a lot of semantic information captured in the laser and image data. This allows us to pervasively analyze the structure of single trees and stands, and with multitemporal data to detect changes over time. Though, there are still a lot of necessities to solve and possibilities to explore technologically and computationally to improve and to establish robust and accessible methods.

What do you consider your greatest achievement? Can you tell us a challenge that you faced in your career, how you overcame it and what you learnt from the experience?

Mountain forest survey with a dual-wavelength backpack laser scanning for modeling and assessing forest fire risk in Xures national park, Galicia, Spain. (Image: Lino Orion)

I believe my greatest achievement has been to be able to contribute to the field of science with my ideas and solutions, not any single technological or methodological approach. Though, some may find the backpack mobile mapping and forestry one of the most significant achievements. Also, technological solutions towards multispectral laser scanning are something I highly value. The hard part is to convince the others, but I have been fortunate to have been part of a team with great support and collaboration to achieve the goals together!

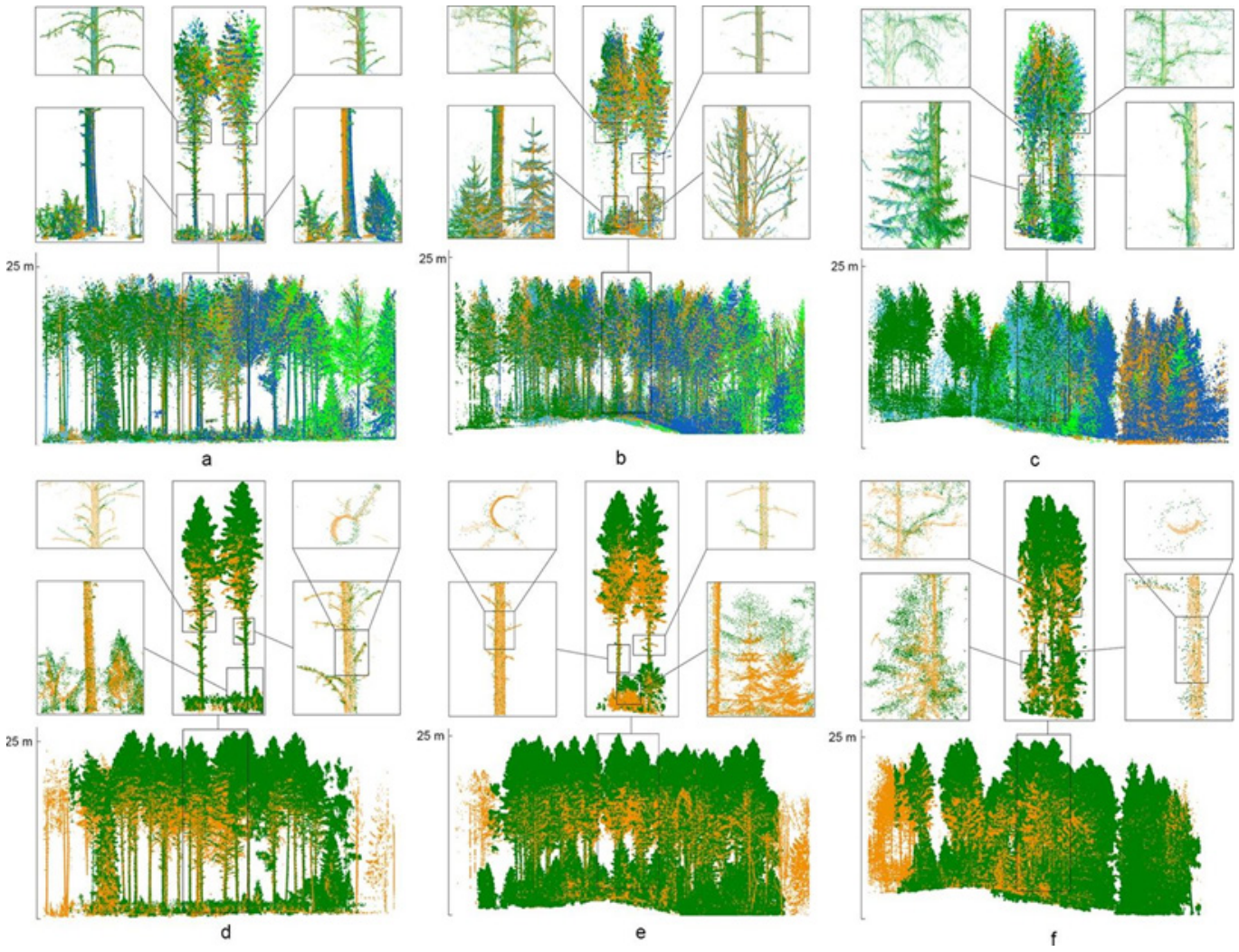
The greatest challenge in my career relates to starting a family, and subsequently building a house and finalizing PhD at the same time. It was a struggle, but with love, support and understanding the work community I have overcome this challenging period. I have learnt to be grateful foreach wonderful day I may live, and to be gracious and supportive towards others. You may never know what struggles they are experiencing in their lives.

What can you say about the current trends in scientific research related to achieving a healthy forest Ecosystem?

With the research using the latest geospatial technologies, modeling of ecosystems and simulation with adaptive learning we can study ecosystems more comprehensively. Digital approaches and modeling allow reconstruction of particular environments, study of changes and analysis of feedback to a certain interference or input. Geospatial technologies permit location based analysis of networks of dependencies and models including not only vegetation, but terrain, hydrology, wind, precipitation, sunlight, and embedding information about animal behavior with the temporal dimension.

What do you think are the possible contributions of international organizations like the ISPRS Student Consortium in Forest Remote Sensing?

I have always seen the most value in bringing young minds together to provide a platform for the exchange of ideas, but also bringing peoples and cultures closer to each other to reflect views and build the sense of unity of humankind. Encouraging such platforms and meetings, facilitating collaboration, learning and seeing others' challenges can widen our perception of the precious world we live in.



An illustration of the UAV-TLS registration results in three forest density categories. Sub-figures (a) and (d) correspond to an easy, (b) and (e) to a medium, and (c) and (f) to a difficult visibility category plot. (a)–(c) show the TLS point clouds, which were matched pair-wise to the UAV point cloud, i.e., not to each other, as a merged point cloud. (d)–(f) show TLS point clouds and the UAV point cloud as merged point clouds. Each color in the figures corresponds to one of the TLS scans and in (d)–(f) the UAV point cloud is shown in green. (See Pohjavirta et al., 2022, "Automated registration of wide-baseline point clouds in forests using discrete overlap search", Forest Ecosystems, 9, DOI: 100080.)

What is your advice to the youth in contributing to the Forest Remote Sensing?

Forest ecosystems are a crucial part of our living on this Planet. The diversity and complexity of dependencies and feedback loops take a lot from us to tackle the challenges we face. Increasing our understanding on these system using innovations and technologies with persistence, heart and young minds is vital for our existence. Excel in what you do, reach out and serve the society you live in together with friends and colleagues from around the world.

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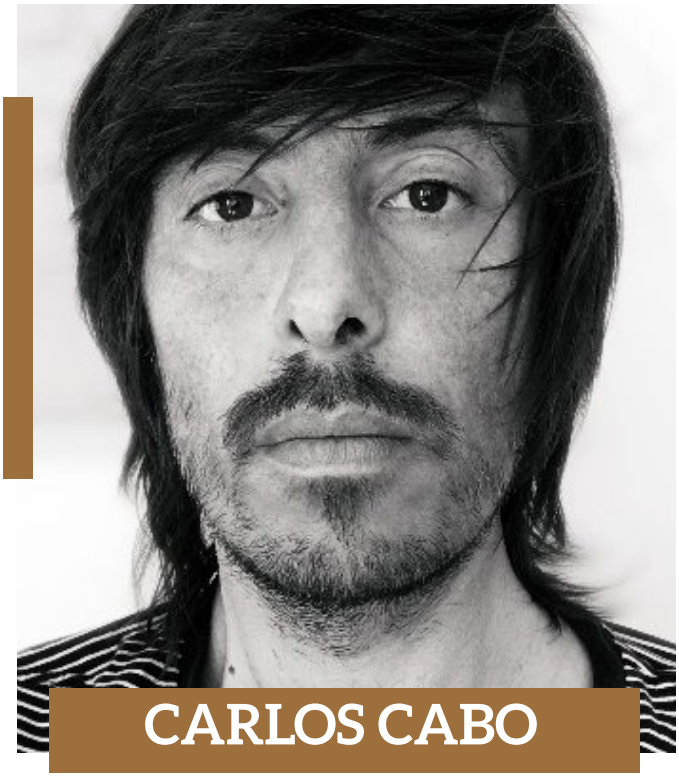

CARLOS CABO

Full Name: Carlos Cabo

Current Position - Research Fellow
Affiliation:
University of Oviedo (Spain)

Research Interests and Expertise:
Close-range point clouds

Can you briefly tell us about your research interests?

My research focus is Geomatics. My main interests are related to close-range point clouds and the development of algorithms to automatically extract information from them, mostly for detecting, classifying and measuring specific objects or features. This topic may seem quite broad, and that is because it is cross cutting to many applied research fields. In this sense, we have developed specific algorithms in projects related to Industrial and Civil Engineering, Forestry, Geology, or Environmental Sciences.

In the past years our research group has paid special focus to the development and implementation of algorithms that automate forest monitoring from ground-based point clouds. We do that from two different perspectives: (i) as an analogy to traditional forest monitoring, so our algorithms detect trees in a forested plot and estimate parameters like stem diameters or tree heights, and (ii) exploring further uses of the point clouds that go beyond what can be done/measured with traditional fieldwork. Right now for example we are classifying the 3D distribution of different vegetation classes in the context of wildfire risk estimations.

Who or what inspired you to become a scientist in this research field?

I started to work on forest monitoring just by chance some eight years ago. I was already working on developing algorithms for automating tasks with point clouds. We had developed some tools for detecting pole-like structures in mobile mapping point clouds for urban inventory. One day, someone came to our office and said that we could use the same principles for forest monitoring and that there was clearly an increasing demand for such algorithms/solutions, so we started a new line that soon became the main one.

As for who inspired me, I have had the privilege of working very closely with great scientists, like Prof. Celestino Ordoñez, from the University of Oviedo, in Spain, or Prof. Stefan Doerr and Dr. Cristina

Santin from Swansea University (UK). Also, I had the opportunity to travel a bit and do some long research visits, in which I could work with very inspiring scientists, like Prof. Antero Kukko, Prof. Harri Hakinen and Prof. Juha Hyypaa, from FGI (Finland), or Dr. Andy Hudak, from US Forest Service. Also, in the past few years, I had the opportunity to join 3DForEcoTech, an EU-funded collaborative project (COST Action) about the use of close-range technologies for forest inventory and monitoring. There, I had the opportunity of working with a fantastic team, coordinated by Dr. Martin Mokros, and many lead researchers from different countries and institutions that I deeply admire, and I do not name here, just to avoid a long list of names.

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

We have recently finished some interesting projects, but there is a one-year project that we just got granted and I think will be especially exciting. It is an ISPRS Scientific Initiative (2023) entitled 'Benchmarking of publicly available software solutions for close-range point cloud processing of forest ecosystems'. I lead this project with Prof. Xinlian Liang, and the rest of the research team is composed of the core group of the COST Action 3DForEcoTech that I mentioned in the previous answer. The overall goal is to compile a list of all the software solutions that are publicly available for forest mensuration and monitoring. Once we have that, we want to evaluate and compare the performance of those software solutions. This will bring an essential overview of what is available 'out there' to the whole research community that works on close-range technologies for forest inventory and monitoring. With this we hope to avoid duplication of future research (so us researchers don't try something that has been tried already) and, also, to identify operational and/or research needs and gaps to direct further research efforts.

Personally, this is a great opportunity to build a rigorous overview of the state of the art of my main research topic.

Why is it important to monitor forests through close range remote sensing?

New close-range technologies bring new opportunities to forest mensuration and monitoring.

Although we must take into account that most of the currently available close-range technologies were not specifically developed for their use in forestry, they of course have their limitations but, without questioning, their use brings many new perspectives and opportunities.

It is not only that we can automate some forest inventory tasks, it is also that we can easily create very dense, accurate and realistic 3D models of very complex forest structures, from which we are, at the moment, extracting just a fraction of the potential information that is really in them. In this sense, even if with the current processing methods we are not able yet to extract/exploit all the potential of these datasets, we can store the data we collect nowadays and revisit it in the future with new methods and tools. This, of course, can be also done with multitemporal data.

How have the technologies helped in faster and reliable data acquisition?

I think that here, the evolution of mobile mapping has changed the game; at least for some specific uses, like forest inventory at plot level. Specifically, new-generation hand-held scanners allow measuring plots of several thousands of square meters in a matter of minutes, minimizing some of the issues of other technologies, like occlusions, cumbersome setups, or endless measuring sessions. It is also true that these technologies have some drawbacks (of course), and they are not suitable for some uses (like hand held devices not being suitable yet for very precise single-tree structure models), but for some very demanded uses, I think they are the (very near) future.

What do you consider your greatest achievement? Can you tell us a challenge that you faced in your career, how you overcame it and what you learnt from the experience?

To me, my greatest achievement is being able to keep working on challenging and interesting projects with top-level researchers around me.

On the 'productive side', we are just about to release a free standalone software for automatic forest inventory from ground-based point clouds (3DFIN). We have been working on that for a long while now, and we are very happy with the results.

As for challenges, I had to face a lot of them, mostly related to lack of stability at work. This is of course nothing new/different to what happens to many researchers, especially in some countries like mine (Spain) where getting a permanent position is really difficult.

What can you say about the current trends in scientific research related to achieving a healthy forest Ecosystem?

I know that what we are doing within the forest monitoring community can help to understand and observe key forest ecosystem aspects. Moreover, now, with some new close-range technologies, it is possible to generate non-destructive measurements and estimations that were not feasible with 'traditional' fieldwork, or, at least it was too time/resources-intensive.

What do you think are the possible contributions of international organizations like the ISPRS Student Consortium in Forest Remote Sensing?

The contribution is clear to me: new keen researchers! I think it is very important to have a good research network, and that is something that is often difficult to get by early career researchers unless they are part of very international teams. Organizations like the ISPRS Student Consortium have a key role in that respect.

What is your advice to the youth in contributing to the Forest Remote Sensing?

Think outside the box! Try to develop or adapt new methods and technologies to this field. Also, try to stay connected to other researchers and up to date on what is coming out in terms of articles, software, technologies, etc.

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SRUTHI M. KRISHNA MOORTHY

Full Name: Sruthi M. Krishna Moorthy
@sruthiMoorthy

Current Position - Postdoctoral Researcher
Affiliation:
Ghent University

Research Interests and Expertise:
Terrestrial laser scanning (TLS) for measuring and monitoring tropical forest structure, Developing machine learning algorithms for processing TLS data.

I am currently a postdoctoral researcher affiliated to Ghent University, Belgium but will soon be joining Oxford University as a Junior Research Fellow. I have a PhD in Bioscience Engineering from Ghent University, Belgium, a Masters in Artificial Intelligence from KULeuven, Belgium and a Bachelors in Computer Science from Anna University, Chennai. My main research focus has been on using terrestrial laser scanning to study the forest structural changes. Between Feb 2021 and Dec 2022, I worked as postdoctoral researcher at University of Maryland, College Park, working on using GEDI lidar data to study the impact of climate change on forests.

Can you briefly tell us about your research interests?

My main research interest is understanding how climate change impacts our tropical forests using novel remote sensing technologies. Tropical forests are undergoing large-scale structural changes. In addition, a large proportion of those changes can be attributed to climate change.

Secondly, intact tropical forests are a significant carbon sink, capturing a substantial proportion of global annual anthropogenic CO2 emissions. Any change in low forest structure has an impact on its functioning. Therefore it is critical to measure it as accurately as possible. Recent advances in close-range remote sensing technologies like terrestrial laser scanning (TLS). For instance, they have enabled us to measure forest structure accurately.

Thirdly, It's my primary interest to use this technology to measure and monitor the changes in forest structure in fine detail due to the changing climate. For instance, one of the primary focuses of my research has been lianas, woody climbing plants. Lianas compete vigorously with trees and are known to decrease tree growth and increase tree mortality. There is growing evidence that lianas are increasing in abundance, which can, in turn, be detrimental to our forest's carbon storage capacity. Previous studies have been limited to mainly studying liana's impact on tree diameter growth and mortality. Measuring height or other tree structural parameters in the field was difficult.

Who or what inspired you to become a scientist in this research field?

Firstly, I have to present that I am an accidental scientist. I was off to start my career as a software developer soon after my Bachelor's degree in Computer science in India.

I felt limited by the specific job description a few months into my job. There are significant points about the need for more freedom and exploring my ideas. I started my business life in science with my Master's in Artificial Intelligence (AI) from KU Leuven. During my master's, I became familiar with a wide range of application areas, where my programming skills and AI knowledge.

While looking for other exciting application areas to work on, I found an excellent opportunity to do a PhD with Prof. Hans Verbeeck on his ERC TREE CLIMBERS project. The opening mind to study the significance of lianas in tropical forest structures using 3D data from terrestrial laser scanning (TLS) systems.

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

If I have to pick one specific project, it will be the framework to quantify the impact of lianas on tree's ground carbon on Barro Colorado Island (BCI) in Panama. The lianas are woody climbing plants that use trees as structural support to get to the top of the canopy. Since they rely on trees structurally. The host lianas need to bear the mechanical load exerted by them.

We collected data using a high-resolution terrestrial laser scanner from a four-ha area of the forest on BCI. We then manually segmented all the individual trees from the plot-level 3D data, which me sitting for multiple months in front of the computer. We estimated the height, crown structural parameters, and volume (then converted to carbon content) of all the large segmented trees. This analysis revealed that trees with lianas on them store significantly less carbon than liana-free trees. Therefore, the project's overall goal was to test the hypothesis that lianas affect not only tree diameter growth but also other structural aspects of a tree, thereby substantially impacting forest carbon storage more than previously estimated.

We have strong evidence for increasing liana abundance across Neotropics exacerbated by changing climate. This is a significant finding as previous studies would have estimated the same carbon content for the trees of the same diameter irrespective of their liana load. The results of this research are timely, considering the current focus on locking up carbon in forests as a nature-based climate solution. This work is currently being prepared for publication.

The main reason I enjoyed this project a lot was that this work was something other than what I had planned to do. This idea came out of my observations in the field during a field trip in the last phase of my PhD. And my promoters fully supported me in experimenting.

In the end, this work was the one with the most significant outcome. This keeps reminding me of the absolute joy of doing research.

Why is it important to monitor forests through close range remote sensing?

First, close-range remote sensing technologies are a real boon in measuring and monitoring our forests. What they are limited in spatial coverage, they make up for it in the details.

One of the main advantages of using this technology to monitor forests is that it can help minimize observer bias, especially when field data are collected by different lead or field personnel, sometimes resulting in slightly different field protocols across additional years. This would result in incomparable datasets or make the comparison conclusions unreliable. Information derived from close-range remote sensing technologies can be free from such bias if used appropriately.

Because of this, traditional field data on forest structures include only the diameter (and sometimes tree height) of big trees (>= 10 cm). While the field personnel can mainly only collect limited data from the forest, data from close-range remote sensing technologies like TLS can be used to derive plenty of information than initially intended, thus potentially driving multiple parallel research lines via international collaboration.

While data from satellite sensors are essential for global analysis to understand forest processes and their response to climate change locally, we still rely heavily on field data. Accurate local-level information is also essential for the calibration and validation of satellite missions aimed at monitoring our forests at the global level.

Besides, with the advancements in artificial intelligence and deep learning, the level of detailed information. We can obtain these close-range sensors, and their accuracy is bound to increase, enabling us to monitor our forests at varying scales.

How have the technologies helped in faster and reliable data acquisition?

Initially, I was curious to know if close-range remote sensing technologies help in faster data acquisition. It depends really on the sensor and the type of platform it is operated from. But they help in getting reliable data. I will be mainly talking.

While we may acquire data faster from the field depending on the type of sensor and the platform, we are still waiting to get the information we want from the data more quickly. For instance, it took me two months to collect TLS data from a four-ha area, whereas a laser scanner operated from a drone could have acquired data within a few minutes from the exact location, of course, at the cost of accuracy. However, we still need a few more months of data processing to obtain helpful information (at the tree level) from the data.

But the information (e.g., tree height, crown area, volume, etc.) obtained is more reliable than field data for multiple reasons. For instance, when an error is made while measuring tree diameter or height in the field, it is usually impossible/impractical to go back and count. But since the raw data is available, anybody can always go back and correct any errors made while obtaining the information.

In conclusion, with advancements being made in developing methods for deriving useful information from these sensors, we can also validate the reproducibility of the results obtained using the data.

What do you consider your greatest achievement? Can you tell us a challenge that you faced in your career, how you overcame it and what you learnt from the experience?

Firstly, The topic I chose for my doctoral thesis was on using terrestrial laser scanning to study lianas. When I started to work on this topic, the whole TLS community was (and is still) primarily focused on trees. It made sense as trees, which are bigger and have a more structured growth pattern than lianas, were complicated to study using TLS.

Because navigating this domain as a newbie, convincing myself, and finding my place in the community was challenging. But in the end, my most outstanding achievement was the determination I had to follow my passion against all odds.

While this was mostly a technical challenge, the real challenge in my career is finding a tenure-track position in this field. This is especially hard for early-career women scientists like me, who have taken a long maternity break.

Finally, I wish all governments gave equal maternity and paternity breaks to minimize this imbalance. Such imbalance disproportionately impacts women's careers when competing for project grants, fellowships, etc., which eventually plays a significant role in securing tenure.

What can you say about the current trends in scientific research related to achieving a healthy forest Ecosystem?

First of all, there are multiple definitions of a healthy forest. But one of the crucial parameters is the forest's resilience and ability to regenerate following a disturbance, whether artificial or natural. And the forests that respond well are mostly the ones with species richness and structural and functional diversity.

Considering the importance of monitoring our forest's functioning, the calls for remotely sensing the functional and structural traits, trait diversity, and the change in the composition of these traits over time have been on the rise.

Because the current and upcoming satellite missions make unprecedented lidar and spectroscopic data available to the scientific community, a better understanding of these traits at finer spatial scales using close-range remote sensing is the need of the hour.

What do you think are the possible contributions of international organizations like the ISPRS Student Consortium in Forest Remote Sensing?

Besides providing ample learning opportunities via summer schools, etc. International organizations like ISPRS SC provide excellent networking opportunities for the youth. Such platforms open the channel for international collaboration, which are critical for youth aspiring to pursue a career in any field, not just forest remote sensing.

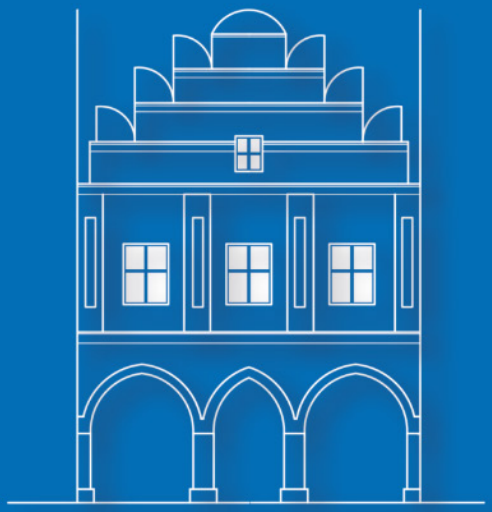
What is your advice to the youth in contributing to the Forest Remote Sensing?

Currently, many forest remote sensing datasets are available, and many tools are available to process these datasets. However, using the tools/methods developed by others to process the datasets is not always easy. Therefore, what mostly happens is that we create a method/tool of our own, resulting in redundancy.

My advice would be to take your time to explore what is out there and be bold in contacting/collaborating with the owners of the tools and data. This will help advance the field rather than having multiple talented people working on something redundant just because they need to make the one available work.

Moreover, another piece of advice would be to prioritize science communication. We immerse ourselves in publishing our work in scientific journals and presenting at top conferences. We often need to remember the people outside this scientific community who deserve to know about our research and findings.

After all, it is their tax money that funds our work. Most importantly, enjoy what you do, be creative, and not be afraid to think outside the box.



International Summer School
Modern Surveying Techniques for Cultural Heritage Documentation

17 .9. – 23.9. 2023
Telč, Czech Republic

INTERNATIONAL SUMMER SCHOOL: MODERN SURVEYING TECHNIQUES FOR CULTURAL HERITAGE DOCUMENTATION

The Working group V/6 under Commission V of ISPRS invites participation in an international summer school on surveying techniques for cultural heritage documentation. The summer school is open to students and professionals in the fields of architecture, civil engineering, and geomatics who are focused on documentation, preservation, and restoration of cultural heritage.

During the summer school, the students will learn innovative surveying and modelling techniques applicable in cultural heritage documentation. The emphasis will be on practical sessions in modern photogrammetry and laser scanning. Besides that, there will be lectures on modelling, current trends in cultural heritage and architecture, facility management, etc.

The summer school will take place from 17th to 23rd September 2023 in a beautiful town Tel?, Czech Republic. The town is listed in the UNESCO list of World Heritage sites. The place itself is worth visiting from a cultural point of view. At the same time, it offers great working facilities. Apart from the official programme, joint visits of historical monuments, walks through the historical centre, or relaxation in one of the cafés whilst enjoying the cosy atmosphere of the town promises for widening professional and social networks.

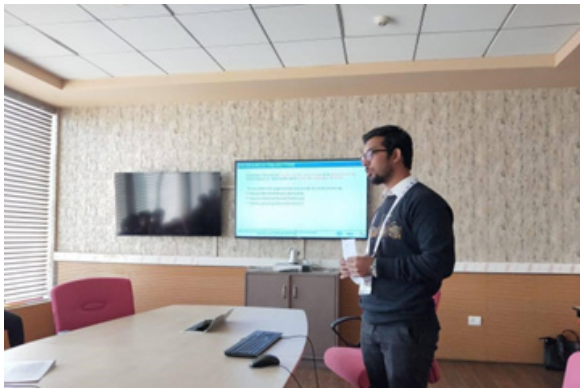
The price for the summer school is 990 EUR and it includes lectures and practical sessions, accommodation, meals, transportation from Prague to Telc, and transportation back to Prague.

Participants shall bring their own laptop and a camera, and other equipment will be provided. If you are interested, register yourself by sending an email with a CV and a motivational letter to info@phedcs.com. The number of places is limited!

For details visit the summer school website: https://www.phedcs.com/iss2023/

FACULTY OF CIVIL ENGINEERING
CTU IN PRAGUE

PHEDCS



YOUTH PRESENTATION FORUM

The ISPRS Student Consortium (ISPRS SC) is the official representation of the students and the youth to ISPRS. One of its aims is to provide a platform for the exchange of information and to organize student-specific events and other activities that integrate students and the youth more effectively into ISPRS activities.

ISPRS SC organizes a forum where students and young researchers attending the Geospatial Week 2023 can give a presentation about their research. We particularly encourage local and regional students to participate and provide the attendees with an overview of the geospatial and/or remote sensing research undertaken in Egypt and other African Regions, although presentations throughout the globe are welcomed.

The objective of this forum is to provide a platform for communication, networking and exchange of research ideas among students and young professionals while promoting ISPRS SC and its activities. Moreover, as one of the ISPRS SC targets of 2023 is to expand our sphere of influence in Africa through Student Chapters and collaborations, this event will be an opportunity for us to connect with people and organizations that might become our next African partners.

Importantly, the best paper nominated from this forum will be eligible to compete for the ISPRS Student Consortium Excellence Award.

Themes of the event

We welcome papers from students and young researchers submitting their research in all the areas using RS, GIS and Photogrammetry technologies in addition to the following themes:

GIS and Remote Sensing (RS) For a Sustainable Future.
Applications of Machine Learning in Geospatial Technologies.
Use of Open Source Tools/Technologies in GIS and Remote Sensing.
Crowdsourcing and Citizen Science in Geospatial Sector.
GIS Education and Outreach Activities.

Featuring Forum Report in ISPRS SC Newsletter

We accept both the abstracts and full papers that have been submitted by following ISPRS guidelines. After the forum, authors of the selected papers will be invited to submit an article detailing their research to the "Spectrum" (ISPRS SC Newsletter), in its Spotlight section. We will also feature the summary of this event in the Spectrum.

3DForEcoTech COST ACTION CA20118

Three-dimensional Forest Ecosystem Monitoring and Better Understanding by Terrestrial-based Technologies

Forests are vital ecosystems that provide essential ecological, social, and economic functions. Today these ecosystems are facing high pressures due to climate change, leading to disastrous events caused by various disturbances like wind throw, wildfires or insect infestations. To face these challenges, it is crucial to increase the resilience of forest ecosystems. This can be implemented by using approaches such as close-to-nature forestry. The resulting complex forests require more demanding inventory, management, and monitoring due to their challenging evaluation and characterization. Research on forest structure, dynamics, morphology, and complexity make it crucial to understand forest changes and adapt management strategies.

Novel terrestrial-based data acquisition technologies are increasingly important in facing these challenges. These technologies include high-end terrestrial or mobile laser scanning and low-cost consumer devices like smartphone lidar sensors or 3D reconstruction from terrestrial photos made with handheld cameras or mobile phones. These technologies have recently experienced rapid development, allowing for observing and monitoring complex forests in high spatial and temporal resolution far beyond the possibilities a few years ago. This allows researchers and practitioners to monitor forests in 3D down to the scale of individual leaves and twigs with a high temporal repetition rate. This will deepen our understanding of forest ecosystems and aid in developing solutions.

Research groups across the EU and beyond are testing such technologies or developing processing algorithms for precision forestry and forest ecology. The aim of 3DForEcoTech COST Action project is to connect these research groups and establish a strong network of scientists and stakeholders, including practitioners and sensor manufacturers. The networked groups are intended to synchronize their knowledge and profit from interdisciplinarity. The network will develop protocols for data acquisition, processing, and data fusion for forest inventory and ecological applications and will establish open-data and open-source algorithm databases. The project will catalyze updates of these novel technologies in the fields of forestry and forest ecology, as well as generate protocols on how to easily and effectively use them for a broad audience. This involves sustainable dissemination of the project's outputs and the education of students and early-career scientists.

3DForEcoTech COST Action is funded by COST (European Cooperation in Science & Technology). COST is a framework that supports transnational research networks in various scientific fields. COST actions aim to facilitate collaboration and knowledge sharing between researchers across Europe and beyond by funding networking activities such as meetings, workshops, training schools, and short-term scientific missions. Additionally, COST actions promote the participation of early-career scientists and encourage the involvement of industry, policymakers, and civil society stakeholders in research activities.

The 3DForEcoTech COST Action started in autumn 2021 and is currently in its second year. The number of participants is constantly growing. In March 2023, the network had more than 300 researchers from more than 50 countries. Participants are involved in six working groups where the focus is on data collection, data fusion, point cloud processing, precision forestry, forest ecology and communication.

The project's main activities are meetings, workshops, training schools, hackathons, short-term scientific missions and virtual mobilities. We also have a possibility to support scientists to attend scientific conferences.

In the first year, we organized a kick-off meeting together with a workshop in Prague (Fig. 1). All presentations are available on our YouTube channel.

Then, we organized and co-organized four summer schools in Helsinki, Lisbon, Tartu and Innsbruck (Fig. 2). All teaching materials are freely available on our website under results. We have also created a github page to keep updated about the latest algorithm developments

Interest in forest research goes far beyond the boundaries of our project and creates opportunities for collaboration with other COST actions working on forest-related topics. To benefit from these additional networks, one highlight in the second year of the COST action is the interdisciplinary summer school forest ecosystems together with two COST Actions focusing on multi-taxon forest biodiversity (BOTTOMS-UP) and forest modeling (PROCLIAS). The summer school will be in Ljubljana in July this year. All the teaching materials, data, and workflows will be freely shared after the summer school.

We are also planning working group meetings in the Czech Republic, Denmark, Netherlands, Poland, Spain, Switzerland and Ireland. The planned activities include algorithm benchmarking, hackathons, microhabitat measurement, eddy covariance, allometry and much more.

We will shortly be publishing an open call for Short Term Scientific Missions on our website and social media with opportunities for early-career researchers to gain direct experience through funded placements. In addition we have four available grants for researchers from ITC countries to attend Silvilaser 2023.

If you want to stay up to date on our project, events and related opportunities, feel free to follow our social media channels on Twitter, LinkedIn or Facebook.

Acknowledgement

This article is based upon work from COST Action 3DForEcoTech, CA20118, supported by COST (European Cooperation in Science and Technology).

Funded by the European Union

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

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UPCOMING EVENTS

10-12 May 2023

ICGE22: International Conference on Geomatics Education – Challenges and Prospect

Hong Kong, China

https://www.polyu.edu.hk/lsgi/icge22/en/

17-19 May 2023

JURSE 2023: Joint Urban Remote Sensing Event 2023

Heraklion, Crete, Greece

http://jurse2023.org/

24-25 May 2023

GeoAdvances 2023: 8th International Conference on Geoinformation Advances

Istanbul, Türkiye

http://www.geoadvances.web.tr/

24-26 May 2023

The 12th International Conference on Mobile Mapping Technology

Padua, Italy

https://www.cirgeo.unipd.it/mmt/

07-09 Jun 2023

RAST 2023: 10th International Conference on Recent Advances in Air and Space Technologies

Istanbul, Turkiye

http://www.rast.org.tr/

13-14 Jun 2023

The 6th Intercontinental Geoinformation Days (IGD)

Baku, Azerbaijan

https://igd.mersin.edu.tr/

15-16 Jun 2023

"PHEDCS 2023, ALMATY": Geoeducation for Mining, Architecture, and Civil Engineering

Almaty, Kazakhstan

https://www.phedcs.com/phedcs-2023-almaty/ future-sensing-technologies?SSO=1

18 Jun 2023

PCV23: Photogrammetric Computer Vision 2023 Workshop

Vancouver, Canada

https://photogrammetric-cv-workshop.github.io/

19 Jun 2023

Image Matching: Local Features & Beyond CVPR 2023 Workshop

Vancouver, Canada

https://image-matching-workshop.github.io/

25-30 Jun 2023

CIPA 2023 Symposium

Florence, Italy

https://www.cipa2023florence.org/home

26 Jun - 02 Jul 2023

Academic Track of FOSS4G (Free and Open Source Software for Geospatial) 2023

Prizren, Kosovo

https://2023.foss4g.org/

03-06 Jul 2023

42nd EARSeL Symposium 2023

Bucharest, Romania

https://bucharest23.earsel.org/

11-14 Jul 2023

13th International Symposium on Digital Earth

Athens, Greece

https://pcoconvin.eventsair.com/isde23

UPCOMING EVENTS

11-20 Jul 2023
IUGG General Assembly 2023
Berlin, German
http://www.iugg2023berlin.org/

16-21 Jul 2023
IGARSS 2023
Pasadena, USA
https://2023.ieeeigarss.org/

16-20 Jul 2023
SaGES: Surveying and Geomatics Educators Society 2023 Conference
Calgary, Canada
https://wpsites.ucalgary.ca/sages2023/

20-24 Aug 2023
SPIE Optics + Photonics 2023
San Diego, California, USA
https://spie.org/op_isprs

02-07 Sep 2023
ISPRS Geospatial Week 2023
Cairo, Egypt
http://www.gsw2023.com/

12-14 Sep 2023
3DGeoInfo 2023
Munich, Germany
https://www.3dgeoinfo.org/3dgeoinfo/

17-23 Sep 2023
International Summer School 2023: "Modern Surveying Techniques for Cultural Heritage Documentation"
Telč, Czech Republic
https://www.phedcs.com/iss2023/

SCHOLARSHIPS *AND* OPPORTUNITIES

MSc

Eagle Graduate Program (M.Sc.)

The Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences

University of Wurburg, Germany

Deadline: 15 May 2023

http://eagle-science.org/apply/

M.Sc. Global Change Ecology

University of Bayreuth, Germany

Deadline: 15 June 2023

http://www.global-change-ecology.de/

PostDoc

Postdoctoral Research Fellow (GIScience/GeoAI)

Urban Analytics Lab

National University of Singapore, Singapore

Deadline: until filled

https://ual.sg/opportunities/ads/2023-postdoc-geoai/

PhD

PhD Graduate Research Assistantship

Wildlife Ecology

Oklahoma State University, United States

Deadline: 15 May 2023

https://agristok.net/2023/03/15/phd-graduate-research-assistantship-in-wildlife-

Jobs

Director, Climate and Ecosystem Sciences Division

Lawrence Berkeley National Laboratory

Bay Area, California, United States

Deadline: 26 May 2023

https://jobs.lbl.gov/jobs/director-climate-and-ecosystem-sciences-division-5671

Announcement of doctoral level study positions - Department of Civil Engineering and Geoinformatics Engineering

Technological University of Cyprus

Cyprus

Deadline: 26 May 2023

https://www.cut.ac.cy/studies/phd/PhD+vacant+positions/Civil+Engineering+and+Geomatics/

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.

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Stay safe, everyone!


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