ISPRS SC Summer School in Wroclaw: Geospatial technologies for natural environment management and monitoring

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The second Summer School of ISPRS for this year was hosted by Wroclaw University of Science and Technology (WUST) in Poland from 26th to 30th August 2019. It was jointly organized by WUST, Forest Research Institute, and ISPRS, with the support of the ISPRS Student Consortium.

This five-day summer school along with a conference covered several lectures, hands-on training, oral/poster presentations, technical visits, social activities, and a guided city tour. Through this well-prepared program, ISPRS Summer School has once again fulfilled its mission to bring young researchers/students together in an engaging and friendly atmosphere for establishing a platform for networking and collaboration as well as fruitful scientific discussion. The lectures covered a wide variety of research areas such as natural resource characterization, 3D spatial city information modelling, urban energy simulations, forest monitoring and management from earth observation satellites to LiDAR. Furthermore, the hands-on training included different implementations of remote sensing/GIS data analysis through commercial software (ENVI, FME) as well as open-source programming language (R programming language)

One day before the summer school began, the attendees of the summer school joined the get-together party on August 25 to get to know each other and for an energized start.

The following day, the summer school was opened by Dr. Pawel Boguslawski through his warm welcoming talk where he shared some practical information about the summer school and introduced the first lecturer, Prof. Jörg Bendorf from TU Bergakademie Freiberg, Germany. Prof. Bendorf gave his lecture titled "Geostatistics for natural resource characterization" where he focused on the statistical analytics such as normal and exploration statistics for mining and geological applications in terms of earth observation data.

Figure 1: The first day of the Summer School

After the coffee break, the first hands-on training was carried out by Sylwester Kulik & Piotr Koszelak from TaxusIT about the practical use of mobile technologies for forest monitoring. In this activity, the summer school attendees collected field survey data (points, line etc.) though the mobile devices and processed these collected data in the computer lab through an online platform provided by TaxusIT. After lunch, the first technical visit was held at the "Wroclaw Centre for Networking and Supercomputing (WCSS)" where the supercomputing facilities of the WUST were introduced to the attendees. Information about the GPU-based data processing and the storage of big data was also provided. At the end of the day, we visited the Wroclaw Fountain Light and Music Show where we enjoyed the sunset and the fascinating dance of water with colorful lights.

On the second day of the conference, there were two different lectures, one hands-on training and one social event. The first lecture, titled "Urban energy simulations for climate protection", was given by Prof. Volker Coors from HfT Stuttgart (Hochschule für Technik Stuttgart). In this lecture, Prof. Coors provided important details about CityGML, CAD-BIM integration and 3D-DLM (3D Digitales Landschaftsmodell) in particular with the practices in German cities. Following the first lecture and coffee break, the second lecture of the day titled "3D Spatial City Information Modelling" was given by Dr. Eng. Stanisław Biernat from SHH. After the lunch, the hands-on training about "ETL Processing using FME" was carried out by Adrian Baranowski from SHH. Once the lectures and hands-on training ended, we joined the BBQ Party on the ship and enjoyed the Odra River trip. This social event increased the engagement and friendship among the summer school participants.
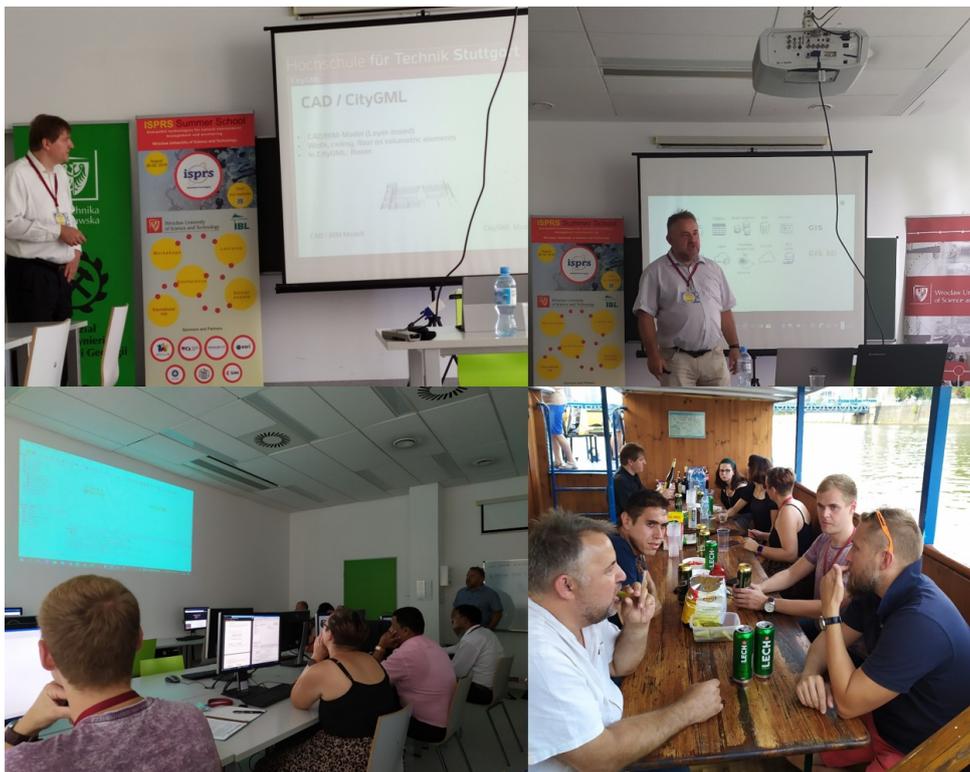

Figure 2: The second day of the Summer School

The third day of the summer school began with an educational trip to the Seismological Observatory and Geodynamic Laboratory of Polish Academy of Sciences in Ksiaz Castle in Walbrzych. We visited the underground Geodynamic Laboratory at Ksiaz. During this trip, Prof. Jurand Wojewoda from the Department of Structural Geology & Geological Mapping of Wroclaw University demonstrated to us the geological maps of the region and provided us the technical and historical background of the excavations underground.

Figure 3: The third day of the Summer School

After this education trip, we turned back to the Geocentrum (building L-1) of WUST where the summer school and the conference took place. We also had our lunch. Following the lunch, the poster session was started. There were four posters presented in this session. The first poster titled "Very high resolution change detection- a comparison of four techniques for monitoring riverbank change" was presented by Rebecca Collins from University of Worcester, UK. Following Rebecca's presentation, the second poster titled "Spatial Gap-filling of ESA CCI Satellite-Derived soil moisture based linear Geostatistics" was presented by Ricardo M Llamas from University of Delaware, USA. The third poster presentation titled "Floodplain delineation based on analysis of digital elevation model, soil maps and occurrence of quaternary formation" was made by Alexandra Kozlowska from Wroclaw University of Science and Technology. The last poster presentation titled "Polarimetric SAR and LightGBM for Crop Classification" was done by Mustafa Ustuner from Yildiz Technical University, Turkey. At the end of every poster presentation, there was a Q&A session to discuss further about the research. Mustafa attended this summer school on behalf of ISPRS Student Consortium and did his presentation about the recent activities as well as updates of ISPRS SC. This presentation covered the travel grants, membership, ISPRS Congress 2020, newsletter, summer schools, and webinars as well as how to get involved in the activities of ISPRS SC. At the end of the presentation, we discussed some issues about the SC membership as well as how to be a candidate organizer for upcoming ISPRS summer schools. Following my presentation, Dr. Pawel Boguslawski introduced the Technical Commission IV, Working group IV/1: Multi-dimensional Modelling and presented the activities of Working group IV/1 where he serves as the one of the co-chair along with Dr. Umit Isıkdag, Turkey. After the session ended, we walked approximately 15 minutes to reach the place where we started the "GIS City Game". It was a geocaching activity using mobile devices (Google Maps) to find the hidden objects. That was super exciting and challenging at the same time. We enjoyed it a lot.

The fourth day of the summer school was started with the lecture titled "Remote sensing data analysis in ENVI" by Michał Domański from ESRI Poland. He demonstrated the functionalities of ENVI as well as provided some introductory information about remote sensing in his lecture as some technical terms needed to be explained before the hands-on training. After the lecture, we had the coffee break. Following the coffee break, we got to the computer lab for the hands-on training of the remote sensing data analysis through ENVI software. In this training, we performed spectral analysis, image visualization and supervised/unsupervised image classification on optical images. We also got a cookbook from ESRI Poland for this training. The session for oral presentation was started after lunch, where six presentations were successfully completed in a wide range of topics from cultural heritage documentation to ground water analysis.

Figure 4: The fourth day of the Summer School

The last day of the summer school was started with the lecture titled "Forest Monitoring and Management" by Dr hab. Eng. Krzyszof Sterenczak from Forest Research Institute. Dr. Sterenczak demonstrated the interesting implementations of remote sensing data for forest areas such as tree species classification, single tree modelling, and tree height estimation. He also provided some technical information about the projects completed by his research group (Forest Research Institute, Department of Geomatic). After the lecture, we had the coffee break. Following the coffee break, we got to the computer lab for the hands-on training titled "Open Software and programming in R" given by Dr. Bartlomiej Kraszewski from Forest Research Institute. This training was consisted of two parts. In the first part, we learned the basics of R programming on RStudio. In the second part, we processed the LiDAR data in terms of tree type (species) classification using machine learning algorithm (random forest) and also visualized the trees based on different data characteristics. The data was specifically prepared for this training by Forest Research Institute. At the end of the training, we received our certificate of participation and get to the meeting point for the guided city tour.

This five-day summer school in Wroclaw satisfied more than our expectations in terms of scientific and social activities. What was more amazing was the great hospitality of Polish friends as well as the unbelievably quick forming of friendship among summer school participants. The organization was perfect and those guys made it: Special thanks go to Dr. Pawel Boguslawski, Anna Kopeć, Dariusz Głąbicki, Gabriela Wojciechowska and Dr. Wajs Jaroslaw. Furthermore we would also like to thank to all participants and lecturers who made this summer school a great and memorable experience.
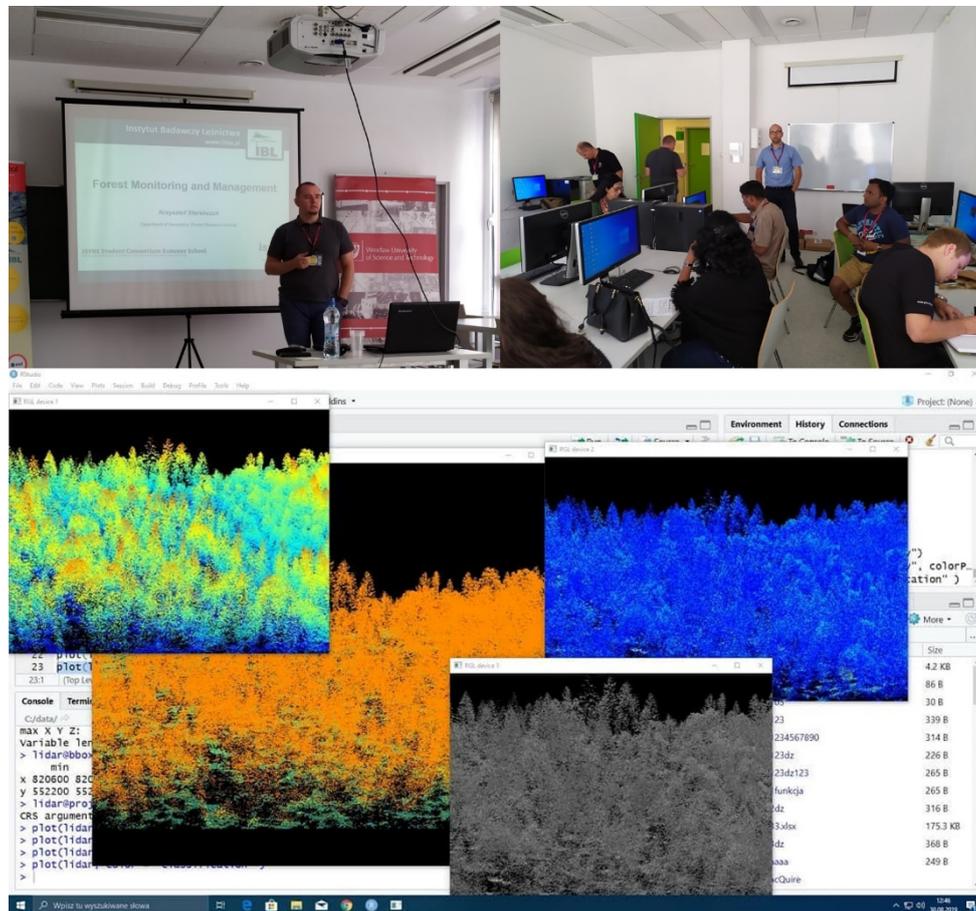

Figure 5: The last day of the Summer School

We also thank ISPRS for organizing this summer school and strongly encourage any student studying in the field of photogrammetry and remote sensing to attend ISPRS Summer School, to enjoy the kind of experience we had and meet other people working in the area. Thank you so much!