

**PHOTOGRAMMETRIC NEWS:
Matti Vaaja appointed Professor of digital photogrammetry**

Text: Matti Vaaja, Marika Ahlavuo and Hannu Hyypä
Aalto University, Department of Built Environment,
Research Institute of Measuring and Modelling for the Built Environment (MeMo),
Centre of Excellence in Laser Scanning Research (CoE-LaSR)

Matti T. Vaaja (D.Sc.), born 1983, was appointed Assistant Professor for a five-year term at the Aalto University Department of Built Environment starting at the beginning of August. Previously, Finland had one other professorship in photogrammetry held by Henrik Haggrén. Vaaja started his research career in Finnish Geodetic Institute (FGI) in 2009 by making his master thesis. In the field of photogrammetry, Vaaja specialises in close-range measurement techniques, whose use he has studied in the mapping of river channel flood risk zones, roads and forests. Vaaja is also appointed as Associate Professor of laser scanning and forestry applications at Institute of Mountain Science, Shinshu University, Japan (appointed in July 2017). His doctoral thesis (2014) from Aalto University focused on mobile laser scanning and change detection studies in a riverine environment.



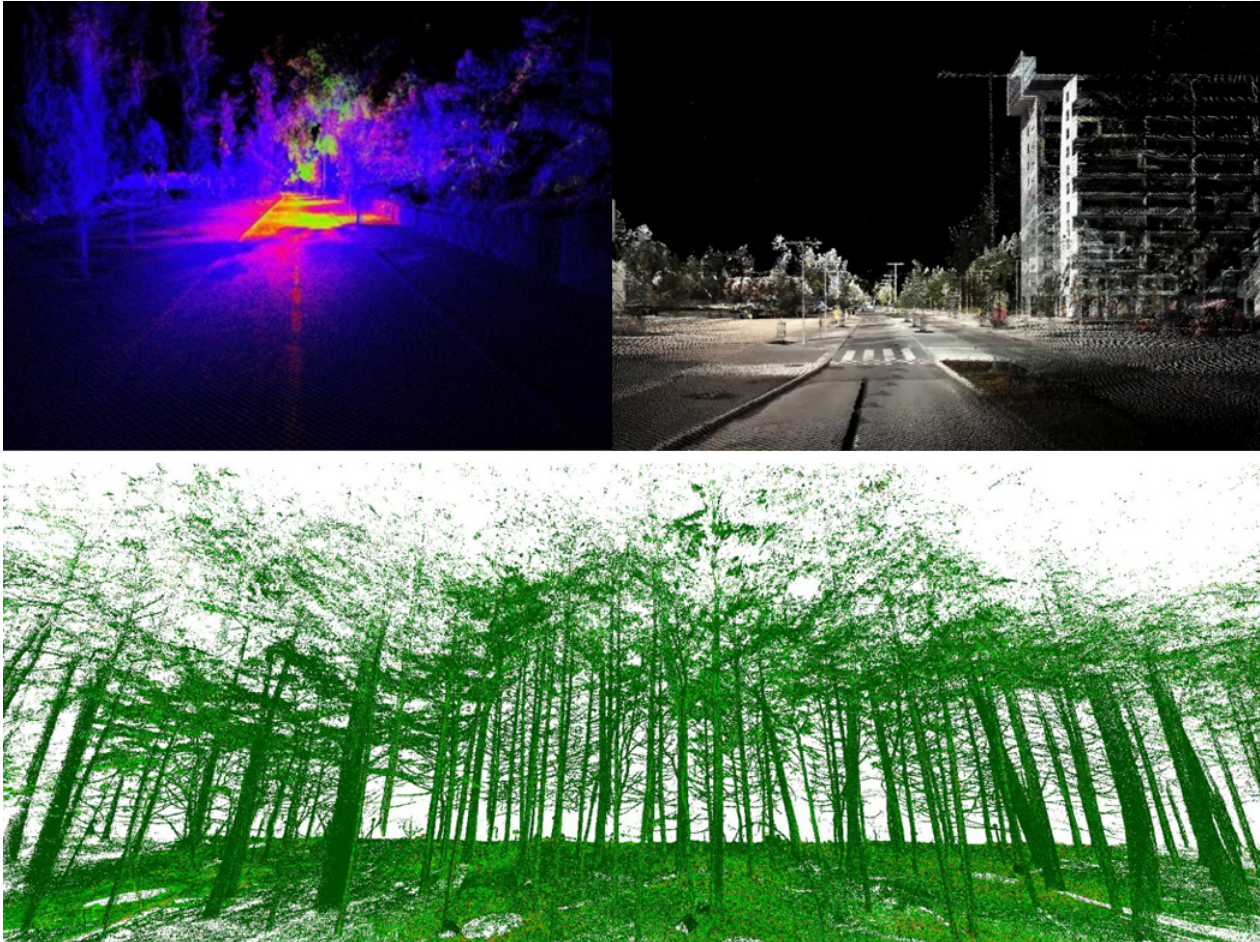
Vaaja has served in various teaching and research positions and as a postdoctoral researcher at the Research Institute of Measuring and Modelling for the Built Environment (MeMo) and the Centre of Excellence in Laser Scanning Research (CoE-LaSR) at Aalto University. Currently, he is the supervisor and advisor of five doctoral thesis in the field of photogrammetry and remote sensing. In addition, he coordinates doctoral education network 4D GEO-IT including ~80 doctoral students. During the years 2009 – 2017 he have been planning and implementing more than 100 field works using terrestrial and mobile laser scanning, terrestrial photogrammetry, UAV mapping, geodetic instruments and indoor mapping solutions. He has contributed over 60 publications in the fields of laser scanning and photogrammetry, including 30 refereed scientific publications.

Aalto University's 3D Studio the centre of activity and development

The new professor's areas of expertise are photogrammetric measuring technology and 3D point cloud models, which are used for, among other things, 3D city models, location-based applications in a 3D game engine, the interior measurement of buildings, land use and environmental planning and monitoring as well as in autonomous robotic cars. The development and testing of photogrammetric equipment as well as the computation and modelling of 3D point clouds can also be seen in the 3D Studio, which is found in the Aalto University Department of Built Environment. The 3D studio is already a national and international link between three-dimensionality and virtuality. The international network of MeMo and CoE-LaSR research groups concerning on-going projects include more than 50 partners all around the world. The

amount of national partners is ca. 100 (incl. civil engineering, surveying, cultural, and forest sectors, also largest cities).

The 3D studio also serves as an outstanding learning environment for our students, making it possible to showcase our field with concrete examples. This is the way, we got teaching and research to support one another and the next generation interested in digital photogrammetry. At present, the laser scanner and photogrammetric measurement devices are more and more integrated with mobile phones, cars and UAVs (unmanned aerial vehicles) which has opened a lot of interesting research topics. It means that geospatial 3D information could be openly available from everywhere for everyone.



Mapping of cities, forests and different route environments have been the main applications of 3D measurement technologies.

According to Vaaja, by operating in networks, digital photogrammetry can be made available to broader society. Indeed, one of his goals is to raise the profile of digital photogrammetry, making it more recognised and understood. His background in endurance sports can also be seen in his work. Vaaja was involved in modelling the race courses for the Lahti2017 FIS Nordic World Ski Championships together with the Finnish Geospatial Research Institute and Finnish Broadcasting Company (YLE). Mobile and aerial laser scanning data was used in visualising the track network, with a special focus given to audience needs. The ideas and digital track network developed together with YLE received a great deal of attention.

Photogrammetry research projects currently ongoing at Aalto University

Since 2015, Professor Vaaja has served on the Academy of Finland project STN COMBAT (technological turning point of combined 3D digitalisation and robotics). As of early 2017, Vaaja has worked in the Tekes-funded VARPU project (Virtual and Augmented Reality Content Production and Use), which conducts research on 3D measuring technology and virtual reality as well as augmented reality for industrial applications. ERDF project 3D Cultural Hub explore the possibilities of virtual 3D reconstruction for the field of cultural production. Other current projects focus on field modelling, 3D cities, digital theatre, and the digitalisation of construction and welfare. The projects are concentrated in fields that are key to the Finnish business sector.

The future and 3D challenge the development of all fields

The future of digital photogrammetry is extremely dynamic and interesting. Some of the breakthroughs will be new types of virtual cities, where the current 2D navigators and maps will be replaced by a gamified 3D city environment with accompanying services. Digitalising the maintenance of different transport channels and the possibilities offered by autonomous vehicles combined with the transformation of smart cities and regions, not to mention a revolutionising of design approaches, ensure the importance of research. Municipalities and cities are interested in autonomous vehicles and robot buses. With augmented and virtual reality, digital photogrammetry will offer a wide range of applications and breakthroughs in the fields of gaming, culture, sports and travel. Aalto University's development will also offer new, cross-sectoral opportunities, when the schools are centralised at Otaniemi as part of the university's expanding campus.