



SECOND IQMULUS GEOBIGDATA WORKSHOP

Deliverable D8.6.2

Circulation:	PU: Public
Lead partner:	SINTEF
Contributing partners:	CNR-IMATI, IGN, TUDelft
Authors:	Tor Dokken, Giuseppe Patanè and Mathieu Brédif
Quality Controller:	Roderik Lindenberg
Version:	1.0
Date:	30.10.2015

©Copyright 2012-2016: The IQmulus Consortium

Consisting of

SINTEF	STIFTELSEN SINTEF, Department of Applied Mathematics, Oslo, Norway
Fraunhofer	Fraunhofer Institute for Computer Graphics Research, Darmstadt, Germany
CNR-IMATI-GE	Institute for Applied Mathematics and Information Technologies of the National Research Council (CNR-IMATI), Genova, Italy
MOSS	M.O.S.S. Computer Grafik Systeme GmbH (MOSS), Munich, Germany
HRW	HR Wallingford Ltd (HRW), Wallingford, UK
FOMI	Hungarian National Mapping and Cadastral Agency (FOMI), Institute of Geodesy, Cartography and Remote Sensing, Budapest, Hungary
UCL	University College London (UCL), Research centre for Photogrammetry, 3D Imaging and Metrology, London, UK
TU Delft	Delft University of Technology (TU Delft), Department of Geoscience and Remote Sensing, and Man-Machine Interaction Group, Delft, The Netherlands
IGN	Institut National de l'Information Géographique et Forestière (IGN), Paris, France
UBO	Université de Bretagne Occidentale (UBO), European Institute for Marine Studies, Brest, France
Ifremer	L'Institut Français de Recherche pour l'Exploitation de la Mer (Ifremer), Brest, France
Liguria	Regione Liguria, Genova, Italy

This document may not be copied, reproduced, or modified in whole or in part for any purpose without written permission from the IQmulus Consortium. In addition to such written permission to copy, reproduce, or modify this document in whole or part, an acknowledgement of the authors of the document and all applicable portions of the copyright notice must be clearly referenced.

All rights reserved.

This document may change without notice.

DOCUMENT HISTORY

Version ¹	Issue Date	Stage	Content and Changes
1.0	30.10.2015	Final	

¹ Integers correspond to submitted versions

EXECUTIVE SUMMARY

The second IQmulus workshop was organized October 1 and 2 as the GeoBigData workshop of the ISPRS² Geospatial Week 2015³. The ISPRS Geospatial Week is a new conference format for ISPRS. It will be organized every odd year. The idea of the Geospatial Week is to co-locate several Geospatial Sciences communities and scientific events: Conferences; Workshops, Exhibitions. The 2015 event included 11 events with a total of 512 participants.

Being the main ISPRS event of the year 2015, the ISPRS Geospatial Week was very well suited for the organization of the second IQmulus workshop. It allowed IQmulus to present and disseminate its research and results to the ISPRS community. 43 participants added their name to the participant list circulated. The audience addressed was wider as IQmulus was presented with posters in the exhibition area as well, and not all participants in the workshop did add their name to the participant list.

The IQmulus GeoBigData workshop included:

- Eight long presentations out of which four were from IQmulus
- Fourteen short presentations (accompanied by posters) out of which eight were from IQmulus

IQmulus contributed as well with presentations in four other workshops.

² The International Society for Photogrammetry and Remote Sensing, <http://www.isprs.org>

³ <http://www.isprs-geospatialweek2015.org/>

TABLE OF CONTENTS

Executive summary.....	2
1 Introduction.....	4
1.1 Importance of the ISPRS GeoSaptail Week FOR the IQmulus disseimantion	5
2 IQmulus Second workshop: GeoBigData	6
2.1 Program of GeoBigData Workshop	7
2.2 Papers selected for special issues and awards.....	7
2.3 GeoBigData ChaIRS and Committee.....	8
2.3.1 Keynote presentation: The State of Distributed Processing in FOSS4G.....	8
2.3.2 GeoBigData Plenary talks.....	9
2.3.3 GeoBigData'15 - Accepted Communications	11
3 Other Contributions to ISPRS Geospatial Week.....	13
3.1 SilviLaser 2015: 14th conference on Lidar Applications for Assessing and Managing Forest Ecosystems.....	13
3.2 Laser Scanning Workshop	13
3.3 GeoVIS'15 Workshop on Rendering and Cognition with IMages and Hybrid Visualizations	13
3.4 CMRT15 - City Models, Roads and Traffic 2015	14
4 GeoBigData'16 Workshop.....	14

1 INTRODUCTION

The second IQmulus workshop, the **GeoBigData'15 Workshop** (2 October 2015), was co-organized with the ISPRS working group III/5 as an event of the **ISPRS Geospatial Week 2015** (La Grande Motte, France, 28 September - 2 October 2015), and gathered researchers interested in the geospatial big data challenges, including storage, data management, processing, and rendering. The Geospatial Week is a new event on the agenda of ISPRS. The GeoBigData workshop had 43 participants recorded on the participation list circulated, out of which 15 were connected to IQmulus. The participants were a mixture of mapping authorities, research organizations and industry. The audience addressed was wider as IQmulus was presented with posters in the exhibition area as well, and not all participants in the workshop did add their name to the participant list.

In Section 1.1 we outline the importance of the ISPRS Geospatial Week as a channel for dissemination, outreach of the IQmulus results to the European geospatial community.

The IQmulus GeoBigData workshop included:

- Two plenary talks for all conference attendees
- One keynote talk
- Presentations of three papers accepted for publication in the ISPRS Annals, out of which one paper was pure IQmulus and one had IQmulus contribution.
- A first presentation of the IQmulus scalability testing
- IQmulus Processing Contest including three oral presentations of results, out of which one paper was pure IQmulus and one had IQmulus contribution.
- 14 short presentations of papers accepted for publication in ISPRS Archives. These were also presented as posters. 8 of these were from IQmulus.

The workshop is described in detail in Section 2 with links to papers, posters and presentations.

To ensure efficient use of the IQmulus resources the IQmulus consortium meeting for the second half of 2015 was organized in La Grande Motte on 28-30 September thus combining two travels into one, and saving both time and travel costs for the IQmulus personnel that had to attend both the IQmulus meeting and the GeoBigData workshop.



Figure 1. The IQmulus coordinator discussing with Angela and Daniel from FÖMI the uses of Locally Refined splines for big data originating from satellite sensors during the poster session.

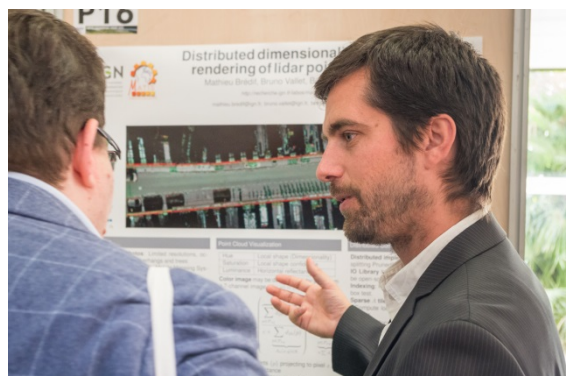


Figure 2. Mathieu from IGN explaining the urban scenario during the poster session to an ISPRS WG chair.

1.1 IMPORTANCE OF THE ISPRS GEOSPATIAL WEEK FOR THE IQMULUS DISSEMIANTION

The ISPRS Geospatial Week is a new event on the agenda of ISPRS. It will be organized every odd year. The idea of the Geospatial Week is to co-locate several Geospatial Sciences communities and scientific events: Conferences; Workshops, Exhibitions.

The goal of the Geospatial Week is to provide during a full working week a very rich and coherent scientific program around Geo-information:

- From data collection and information extraction,
- To data quality control and dissemination through services,
- With a mix of methodology-oriented and thematic-oriented events,
- That will enable communities to meet, to exchange, and cross-fertilize.

ISPRS Geospatial Week 2015 took place in La Grande Motte, France, September 28-October 2, 2015. It included 11 events with a total of 512 participants. The Geospatial Week has selected 19 high-level plenary and keynote speakers coming from all over the world. The exhibition also gave attendees the opportunity to discover the latest advances in Geospatial technology and industry.

Being the main ISPRS event of 2015, the ISPRS Geospatial Week was very well suited for the organization of the second IQmulus workshop. It allowed IQmulus to present and disseminate its research and results to the ISPRS community. The first workshop reported in D8.6.1 (in 2014) addressed the geometry processing community, and was organized back-to-back with SGP 2014⁴.

⁴ <http://www.cs.cf.ac.uk/sgp2014/>

2 IQmulus Second workshop: GeoBigData

GeoBigData'15 - Managing, Processing, and Rendering Remotely-Sensed Big Geospatial Data
1-2 October 2015, La Grande Motte – France

<http://www.isprs-geospatialweek2015.org/workshops/geobigdata/>

The earth is being observed with an increasing number of platforms (e.g., satellite constellations, planes, UAVs, ground-based vehicles) and sensors collecting masses of remotely sensed datasets, such as lidar point clouds or optical colour or multispectral images. As the pace of acquisitions, the resolutions of sensors and the demands on analytics and visualization are ever increasing, new challenges arise to deal with all the aspects of this deluge of geospatial big data.

The above paragraph set the scene for the call for contributions to the workshop. Abstract and full paper manuscripts were subject to a double-blind review process.

- Accepted full papers submitted by April 30, 2015 have been published in a volume of the ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Science.
- Accepted abstract submitted by April 30, 2015 that later were resubmitted as full papers have been published in a volume of the ISPRS Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences.

The *GeoBigData'15 Workshop*, see Section 2.1 for the program, received a total of 23 submissions from various countries in Europe, USA, North Africa, and Australia, as 6 full papers and 17 extended abstracts. After a double blind review process, 3 full papers were accepted and 18 submissions were accepted as extended abstracts. Each paper received an average of three reviews from members of the Technical Papers Committee. The selected full papers and extended abstracts appeared in a special issue of the *ISPRS Annals and Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, respectively. Selected research papers mainly address the following topics: extensions of big data frameworks to deal with geospatial big data; processing and rendering of geospatial big data; challenges in geospatial big data storage, processing and rendering; geospatial big data tools, services, and infrastructures on clouds. Full papers were presented in an oral session and submissions accepted as extended abstracts were presented both at an interactive poster session and a flash 5' talk session. Finally, the *GeoBigData'15 Workshop* has hosted one keynote talk by Rob Emanuele (Azavea, USA) on “*The State of Distributed Processing in Open Source Geospatial Software*”. For information on GeoBigData chairs and committee, see Section 2.1

The *GeoBigData'15 Workshop* has also included a special oral session for the **IQmulus Processing Contest (IQPC'15)**, reported on in D8.8.3 and Section 2.3.3.3, chaired by Marco Attene (CNR-IMATI, Italy) and Silvia Biasotti (CNR-IMATI, Italy), with three main tracks: (i) *Evaluation of 2D footprints automatically generated from urban LIDAR data*, which was organized by Dr. Linh Truong-Hong, University College Dublin, Ireland - Prof. Debra Laefer, University College Dublin, Ireland; (ii) *Water detection and classification on multi-source remote sensing and terrain data*, which was organized by Daniel Kristof (Institute of Geodesy, Cartography and Remote Sensing "FOMI" - Budapest, Hungary; and (iii) *Individual tree extraction*, which was organized by Ben Gorte, Delft University of Technology, The Netherlands.

The *GeoBigData'15 Workshop* Chairs wish to acknowledge the support of the IQmulus for choosing *GeoBigData'15* to be the event for the organization of the **IQmulus second Workshop**. We would also like to thank all of the members of the Technical Papers Committee for their work in terms of reviewing papers.

2.1 PROGRAM OF GEOBIGDATA WORKSHOP

	Thursday 1 October	Friday 2 October
8:00-9:00	Registration	Registration
9:00-9:45	GW Plenary talk See Section 2.3.2.1	GW Plenary talk See Section 2.3.2.2
9:45-10:00	Opening (colocated workshops).	Openning
10:00-10:45	Keynotes (colocated workshops).	Keynote: Rob Emanuele (Azavea), See Section 2.3.1
10:45-11:15	Coffee break	Coffee break
11:15-12:45	Sessions (colocated workshops)	Poster Session 2: Flash Presentations 5' presentations of each poster , See Section 2.2.3.2
12:45-14:00	Lunch	Lunch
14:00-15:30	Poster Session 1: Posters Joint session with ISA and GeoVIS See Section 2.2.3.2	Oral session 1 See Section 2.2.3.1
15:30-16:00	Coffee break	Coffee break
16:00-17:30	Session (colocated workshops)	Oral session 2 IQmulus Processing Contest See Section 2.2.3.3
17:30-17:45	Closing (colocated workshops)	Closing & Awards

2.2 PAPERS SELECTED FOR SPECIAL ISSUES AND AWARDS

Two papers of the workshop have been selected for the **Special Issue in the ISPRS Journal of Photogrammetry and Remote Sensing**. Authors have been invited to submit an extended version of your paper to the Geospatial Week 2015 Theme Issue of the Journal. The selected papers are

- Point Cloud Server (PCS): Point clouds in base management and processing, *Rémi Cura, Julien Perret and Nicolas Paparoditis*.
- Approximation and Analysis of Rainfall Fields for Environmental Applications, *Giuseppe Patané, Andrea Cerri, Vibeke Skytt, Simone Pittaluga, Silvia Biasotti, Tor Dokken, Michela Spagnuolo and Davide Sobrero*.

The best paper awards for *GeoBigData'15 Workshop* were as follows:

- Point Cloud Server (PCS) : Point clouds in base management and processing, *Rémi Cura, Julien Perret and Nicolas Paparoditis* (**best student paper**). [Abstract Paper Slides](#)
(Not funded by iqmulus, but Nicolas I supervising it)
- Approximation and Analysis of Rainfall Fields for Environmental Applications, *Giuseppe Patané, Andrea Cerri, Vibeke Skytt, Simone Pittaluga, Silvia Biasotti, Tor Dokken, Michela Spagnuolo and Davide Sobrero* (**best paper**). [Abstract Paper](#)

IQmulus Processing Contest track was awarded to:

- Evaluation of automatically generated 2D footprints from urban lidar data, *Linh Truong-Hong, Debra Laefer, Y. Bisheng, H. Ronggang and L. Jianping* (**best IQPC track**). [Abstract Paper](#)

2.3 GEOBIGDATA CHAIRS AND COMMITTEE

The program chairs of GeoBigData were all from IQmulus:

- Mathieu Brédif, IGN
- Guiseppe Patanè, CNR-IMATI
- Tor Dokken, SINTEF (IQmulus Coordinator)

Of the 12 person in the Program Committee 8 of the committee members were from IQmulus, while one is an previous member of IQmulus.

- Marco Attene, CNR-IMATI
- Jan Boehm, UCL
- Roderik Lindenbergh, TUDelft
- Clément Mallet, IGN
- Frank Michel, Fraunhofer IGD
- Nicolas Paparoditis, IGN (Conference Chair)
- Michela Spagnuolo, CNR-IMATI
- Andre Stumpf, earlier part of the IQmulus staff at UBO
- Bruno Vallet, IGN
- GeoBigData'15 – Keynote by Rob Emanuele (Azavea)

2.3.1 Keynote presentation: The State of Distributed Processing in FOSS4G.



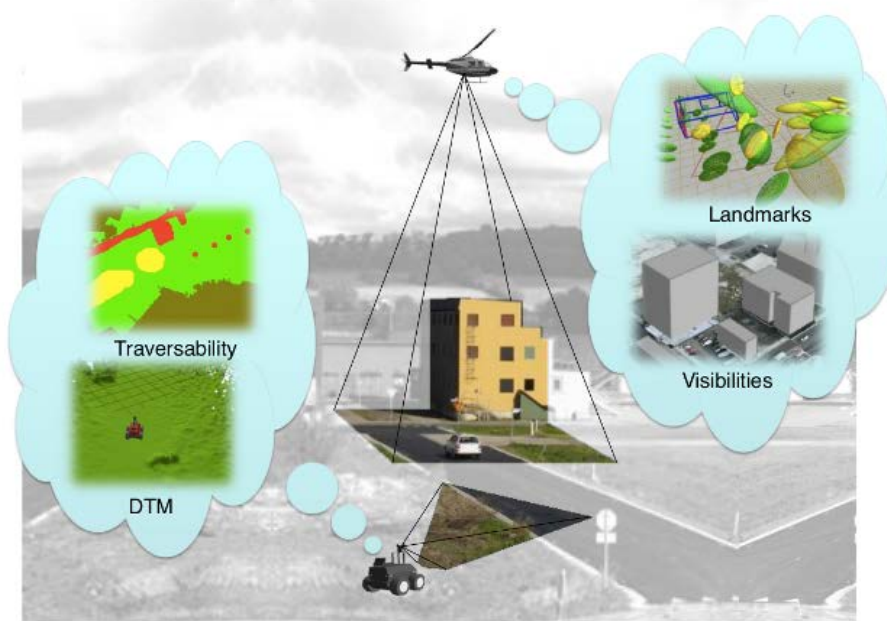
Developer on the GeoTrellis team. He graduated from Rutgers University with a Bachelor of Arts degree in Mathematics. Before joining Azavea, he worked in the field of power transmission, providing visual displays and data analysis for the largest Regional Transmission Organization in the world, as well as the field of fatigue risk management, designing software to assess and manage behavioral alertness for customers such as NASA and the FAA. His technical interests include distributed computing, machine learning, and clean code. [Slides](#)

2.3.2 GeoBigData Plenary talks

GeoBigData provided two plenary talks to Geospatial Week 2015 see Sections 2.2.1.1 and 2.2.1.2.

2.3.2.1 Simon Lacroix (Laas, France): Thursday 1 October

Building and managing maps for autonomous mobile robots



Abstract: Perceiving, representing and even understanding the environment that surrounds them is at the core of the autonomy of mobile robots. Environment representations are indeed required for any decision robots have to take, from simple obstacle avoidance motions to much more complex tasks such as cooperating to explore or patrol an area. The robotics research community has developed a whole corpus of approaches to endow mobile robots with the ability to represent their environment, using primarily the robots on-board sensors, but also various other available sources of information. The robot localization plays a central role in these developments, and has in particular lead to the development of wholesome estimation formalisms. The talk provides an overview of these methods, exhibits some links with Geographic Information Sciences, and sketches the current and future challenges in the area.

The presentation related to the IQmulus topic of intelligent data acquisition.

Bio: Simon Lacroix is a research scientist at LAAS/CNRS, where he animates the field robotics activities. He was mainly involved in planetary robotics during the 90's, and has initiated aerial robotics activities in the lab in the beginning of the 2000's. Since then, his research is focused on the deployment of teams of multiple heterogeneous autonomous robots for exploration, surveillance or intervention missions. His main interests originally concerned perception and navigation for autonomous aerial and terrestrial robots (environment perception and modeling, localisation, perception control and autonomous navigation strategies), and have evolved towards decisional processes required by the cooperation within multi-robot teams.

2.3.2.2 Elmar Eisemann (TU Delft, The Netherlands): Friday 2 October

Linking the Real and Virtual World



Abstract: Computer graphics and visualization techniques are an important element to analyze and investigate large-scale terrestrial data sets. With the acquired information reaching never-before-seen complexity, novel technical solutions are needed to support efficient visual analytics. In this talk, we will present several solutions for informative, and high-quality data visualization, ranging from out-of-core rendering, over abstraction techniques, to specialized display solutions. Furthermore, we will discuss how some of these approaches are used by the Dutch waterboards for the analysis of flooding scenarios. This latter topic is of high importance in the Netherlands and the application presents an interesting example of how technological advances positively influence decision making and can create a link between the real and virtual world.

The talk was related to IQmulus WP5 and GeoBigData visualization.

Bio: Elmar Eisemann is a professor at TU Delft heading the chair of Computer Graphics and Visualization. Before coming to Delft, he was an associated professor at Telecom ParisTech and a senior scientist leading a research group in the Cluster of Excellence (Saarland University / MPI Informatik). He was admitted as a student at the École Normale Supérieure in Paris, received his PhD from Grenoble Universities at INRIA Rhône-Alpes, and spent several research visits abroad (MIT, UIUC, and Adobe).

His interests include real-time and perceptual rendering, visualization, data representations, and GPU acceleration techniques. He coauthored the book "Real-time shadows" and participated in various committees and editorial boards of leading conferences and journals. His work received several distinction awards. In particular, he was honored with the Eurographics Young Researcher Award 2011.

2.3.3 GeoBigData'15 - Accepted Communications

GeoBigData included three types of peer reviewed contributions:

- Contributed full papers, see Section 2.2.3.1
- Contributed abstract with full paper submitted before the conference see Section 2.2.3.2
- Submissions to the IQmulus Processing Contest 2015, see Section 2.2.3.3.

2.3.3.1 Accepted papers assigned 30 minute presentations - Oral Session 1-

Communications accepted for publication in the [ISPRS Annals](#)
30' Oral presentation, including questions (Friday 14:00-15:30)

- Visualisation of Complex 3D City Models on Mobile Webrowsers using Cloud-Based Image Provisioning, *Martin Christen and Stephan Nebiker*. [Abstract](#) [Paper](#) [Slides](#)
- Point Cloud Server (PCS) : Point clouds in base management and processing, *Rémi Cura, Julien Perret and Nicolas Paparoditis*. [Abstract](#) [Paper](#) [Slides](#)
- Approximation and Analysis of Rainfall Fields for Environmental Applications, *Giuseppe Patané, Andrea Cerri, Vibeke Skytt, Simone Pittaluga, Silvia Biasotti, Tor Dokken, Michela Spagnuolo and Davide Sobrero*. [Abstract](#) [Paper](#) (IQmulus)

2.3.3.2 Accepted papers assigned Flash Presentations and Poster Sessions

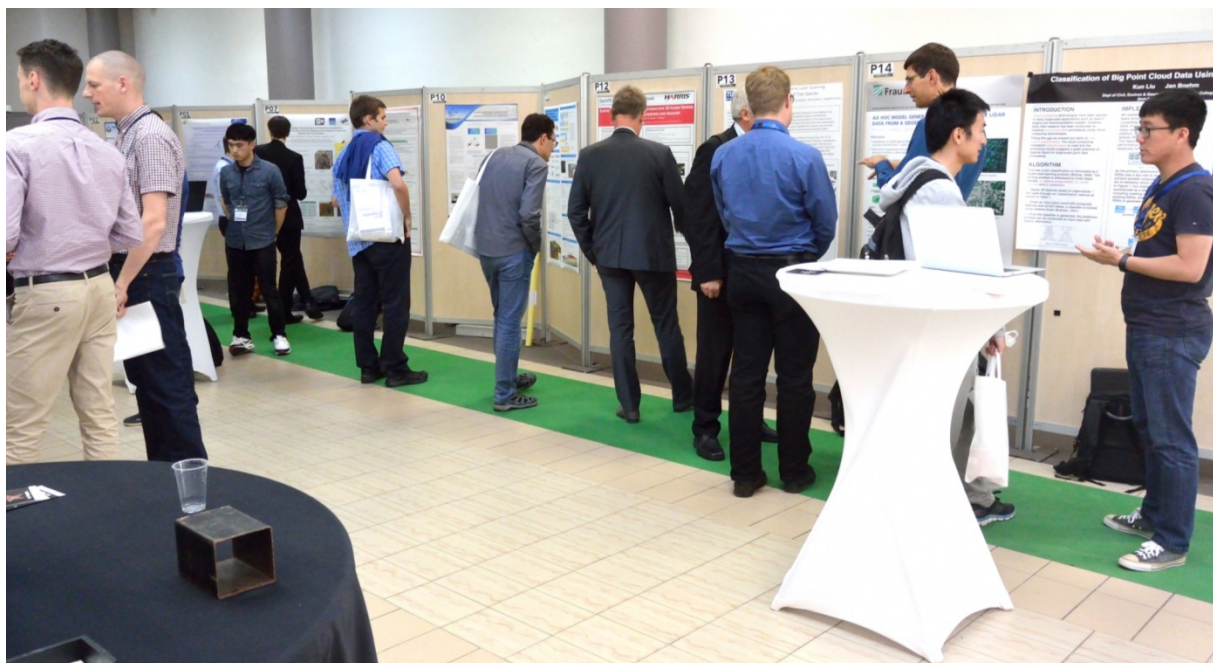
Communications accepted for publication in the [ISPRS Archives](#)

Poster Session 1 (Thursday 14:00-15:30): Poster presentation

Poster Session 2 (Friday 11:15-12:45): 5' Oral presentation

- Ad hoc model generation using multiscale LIDAR data from a geospatial database, *Marvin Gordon, Björn Borgmann, Joachim Gehring, Marcus Hebel and Michael Arens*. [Abstract](#) [Paper](#) [Slides](#) [Poster](#)
- Classification of big point cloud data using cloud computing, *Kun Liu and Jan Boehm*. [Abstract](#) [Paper](#) [Slides](#) [Poster](#) (IQmulus)
- Distributed dimensionality-based rendering of Lidar point clouds, *Mathieu Brédif, Bruno Vallet and Benjamin Ferrand*. [Abstract](#) [Paper](#) [Slides](#) [Poster](#) (IQmulus)
- Locally Refined Splines Representation for Geospatial Big Data, *Tor Dokken, Vibeke Skytt and Oliver Barrowclough*. [Abstract](#) [Paper](#) [Slides](#) [Poster](#) (IQmulus)
- Operational application of the landsat timeseries to address large area landcover understanding, *Peter Scarth, John Armston, Stuart Phinn, Robert Denham, Neil Flood, Lisa Collett, Bec Trevithick, Nick Goodwin, Fiona Watson and Dan Tindall*. [Abstract](#) [Paper](#) [Slides](#)
- NoSQL for storage and retrieval of large LiDAR data collections, *Jan Boehm and Kun Liu*. [Abstract](#) [Paper](#) [Slides](#) [Poster](#) (IQmulus)
- Towards time-series processing of VHR satellite images for surface deformation detection and measurements, *Andre Stumpf, Christophe Delacourt and Jean-Philippe Malet*. [Abstract](#) [Paper](#) [Poster](#) (IQmulus)
- Big data platform for raster, vector and graph processing, *Xavier Lopez*. [Slides](#)
- 3D octree based watertight mesh generation from ubiquitous data, *Laurent Caraffa, Bruno Vallet and Brédif Mathieu*. [Abstract](#) [Paper](#) [Poster](#) (IQmulus)

- IQmulus Scalability Testing – First Results, *Ewald Quak, Michela Spagnuolo, Holweg Daniel, Mathieu Brédif, Michel Kraemer, Binh Nguyen Thai, Jan Boehm and Norman Kiesslich*. [Slides](#) [Poster](#) (IQmulus)
- 3D web visualization of huge CityGML models, *Federico Prandi, Marco Soave, Federico Devigili and Raffaele De Amicis*. [Abstract Paper](#) [Slides](#) [Poster](#)
- Automated large scale parameter extraction of road-side trees sampled by a Laser mobile mapping system, *Roderik Lindenbergh, Dietmar Berthold, Beril Sirmacek, Monica Herrero, Jinhu Wang and Dirk Ebersbach*. [Abstract Paper](#) [Slides](#) [Poster](#) (IQmulus)
- Raster data partitioning for supporting distributed GIS processing, *Binh Nguyen and Angéla Olasz*. [Abstract Paper](#) [Slides](#) (IQmulus)
- Geoanalytics on-demand paradigm shift, *Marc Jacquin*. [Slides](#) [Poster](#)



Figur 3. From the Poster session.

2.3.3.3 Oral session 2: IQPC special session

This special session is dedicated to the [IQmulus Processing Contest 2015](#). For details see D8.8.3. The contest included three contributions.

- Tree Separation and Classification in Mobile Mapping Lidar Data, *Ben Gorte, Sander Oude Elberink, Beril Sirmacek and Jinhu Wang*. [Abstract Paper](#) [Slides](#) (IQmulus)
- Water detection and classification on multi-source remote sensing and terrain data, *Marta Belenyasi, Daniel Kristof, Angela Olasz, Karoly Bakos, Zoltan Kovacs, Boglarka Balazs and Szilard Szabo*. [Abstract Paper](#) [Slides](#) (IQmulus)
- Evaluation of automatically generated 2D footprints from urban lidar data, *Linh Truong-Hong, Debra Laefer, Y. Bisheng, H. Ronggang and L. Jianping*. [Abstract](#) , [Paper](#)

3 OTHER CONTRIBUTIONS TO ISPRS GEOSPATIAL WEEK

The general chair of ISPRS Geospatial Week was Nicolas Paparoditis from IGN (and IQmulus). The program chair was Clément Mallet from IGN (and IQmulus) that also chaired the ISA workshop.

3.1 SILVILASER 2015: 14TH CONFERENCE ON LIDAR APPLICATIONS FOR ASSESSING AND MANAGING FOREST ECOSYSTEMS

The full program of the Silvilaser is available at the link: <https://silvilaser2015.teledetection.fr/>

The Proceedings of Silvilaser can be downloaded from:

https://silvilaser2015.teledetection.fr/files/Proceedings_Silvilaser_22_09_2015_2.pdf

In Silvilaser 2015 the following presentations was made by IQmulus

- *Automatic Tree Breast Height Diameter Estimation from Laser Mobile Mapping Data in an Urban Context*, by Mónica Herrero-Huerta (University of Salamanca) and Roderik Lindenbergh (TU Delft). See pages 268-270 in the Proceedings of Silvilaser. The abstract and presentation are related to WP4 and Urban Scenario 2 of IQmulus.

3.2 LASER SCANNING WORKSHOP

The full program of 1.1 Laser Scanning Workshop is available at the link:

<http://www.cirgeo.unipd.it/laserscanning2015/index.html>

Roderik Lindenbergh, TUDelft served as one of the five chairs of the Laser Scanning Workshop, while Beril Sirmacek, TUDelft was in the program committee.

In the LASER SCANNING workshop the following presentations were made by IQmulus:

- *Automatic tree detection from laser scanning point clouds*, by Beril Sirmacek (TU Delft) and Roderik Lindenbergh (TU Delft). The presentation, poster and paper focused on WP4 and Urban Scenario 2. The paper is available on page 244-246 in https://silvilaser2015.teledetection.fr/files/Proceedings_Silvilaser_22_09_2015_2.pdf
- *Evaluating voxel enabled scalable intersections of large point Clouds*, by Jinhu Wang (TU Delft and Chinese Academy of Sciences) and Roderik Lindenbergh (TU Delft) and Massimo Menenti (TU Delft). The paper is available from: <http://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/II-3-W5/25/2015/isprsannals-II-3-W5-25-2015.pdf>

Roderik Lindenbergh was chair of the session *Registration of ALS and MLS fast forward poster presentations*.

3.3 GEOVIS'15 WORKSHOP ON RENDERING AND COGNITION WITH IMAGES AND HYBRID VISUALIZATIONS

The full program of GeoVIS'15 is available at the link: <http://www.isprs-geospatialweek2015.org/workshops/geovis/>

- Frank Michel, IGD, presented the paper *Visualization of marine sand dune displacements utilizing modern GPU Techniques*. By Thomas Gierlinger, André Brodtkorb, André Stumpf and Frank Michel. The presentation combines results from WP4 and WP5. [Abstract](#), [Paper](#)

Mathieu Brédif (IQmulus) was member of the GEOVIS program committee.

3.4 CMRT15 - CITY MODELS, ROADS AND TRAFFIC 2015

The full program of CMRT15 is available at the link: <http://www.pf.bgu.tum.de/isprs/cmrt15/>

In CMRT15 the following presentation was made by IQmulus:

- *A semi-automatic procedure for texturing of laser scanning point clouds with google streetview images*, by J. F. Lichtenauer (Laan der Vrijheid 92) and B. Sirmacek (TU Delft). The abstract and poster focused on Urban Scenario 2 of IQmulus. The paper is available via the link: <http://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-3-W3/109/2015/isprsarchives-XL-3-W3-109-2015.pdf>

4 GEOBIGDATA'16 WORKSHOP

The GeoBigData'16 Workshop will be organized within the Geometry Summit, which will take place in Berlin from June 20th to 24th; the Chairs of the Workshop are Mathieu Brédif, IGN (FR), Giuseppe Patanè, CNR-IMATI (IT), and Tor Dokken, SINTEF (NO).