



6<sup>th</sup> Workshop of

LICIA

<http://licia-lab.org>

September 29th–30th, 2016

Laboratoire d'Informatique de Grenoble  
Bâtiment IMAG

700 avenue Centrale, 38401 Saint-Martin-d'Hères, France

Grenoble

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Scientific Program

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# Program at a glance

– Thursday, September 29th, 2016 –

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10h00	Welcome coffee
10h30	<b>WG1:</b> Software Engineering Session (IMAG Room 404) <i>Advances in Software Architecture Recovery</i> by Prof. Dr. Ingrid Nunes (UFRGS)
10h30	<b>WG2:</b> Wireless Net. & Drone Apps. Session (IMAG Room 442) <i>Research on Cloud-Robotics using Unmanned Aerial Vehicles and Wireless Sensor Networks</i> by Prof. Dr. Edison Pignaton (UFRGS)
10h30	<b>WG3:</b> Web Science Session (IMAG Room 482) <i>Applications of sentiment analysis</i> by Prof. Dr. Karin Becker (UFRGS)
12h00	Lunch-break
13h30	<i>The role of CAPES/Brafitec for funding LICIA thesis with Cofecub scholarships</i> by Prof. Dr. Claudio Geyer (UFRGS) and Prof. Dr. Lucas Schnorr (UFRGS)
14h00	<b>Keynote B</b> <i>Rendering the inside of the human body</i> by Prof. Dr. Marcelo Walter (UFRGS)
15h00	Theme-based Coffee-break • Working Groups & Follow-up Discussions
16h00	Tour time: the fresh IMAG Building & the Campus
20h00	Dinner in the Vercors

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– Friday, September 30th, 2016 –

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09h30	<b>Opening</b> <ul style="list-style-type: none"><li>• Summary of LICIA activities</li><li>• LICIA Perspectives and Roadmap</li><li>• INRIA, CNRS, UGA, UFRGS</li></ul>
10h30	Coffee-break
11h00	<b>Keynote A</b> <i>Visual Data Analysis of Unstructured and Big Data</i> by Prof. Dr. João Comba (UFRGS)
12h00	Lunch-break
13h30	<i>Brazil/France Funding Opportunities: CAPES/Cofecub, STIC-AmSud, Europe H2020.</i> by Prof. Dr. Philippe Olivier Alexandre Navaux (UFRGS)
14h00	<b>Keynote C</b> <i>Network Function Virtualization: Research Challenges, Recent Advances and Opportunities for Collaboration</i> by Prof. Dr. Luciano Gasparly (UFRGS)
15h00	Coffee-break
15h30	Closure
20h00	Dinner

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## Joint Workshops

The LICIA workshop will be preceded and succeeded by two workshops. On September 28th (Wednesday), the ExaSE INRIA/UFRGS Associated Team organize its third year workshop. On October 3-4th (next monday and tuesday), the AimWest CNRS/UFRGS Associated Team will also take place. See each project's website for the updated agenda.

- ExaSE INRIA/UFRGS Associated Team – <https://team.inria.fr/exase/>
- AimWest CNRS/UFRGS Associated Team – <http://aim-west.imag.fr/project-meetings/>

# Keynotes

## **Keynote A:** *Visual Data Analysis of Unstructured and Big Data*

by **Prof. Dr. João Luiz Dihl Comba**

**Abstract:** Data acquisition has never been so broad, diverse, and accessible. Social networking, urban and government data, computer-based gadgets and many others generate immense amounts of raw and most often unstructured data. The combined use of data analysis algorithms with visualization techniques has been enabling the extraction of interesting insights over this data. In addition to the several challenges involved in this analysis, this data is often big and requires efficient algorithms and data structures. In this keynote I will present several examples of research projects developed at UFRGS that describe visualization designs and analysis algorithms for different types of data. In addition, I will describe our recent efforts in designing efficient data structures and algorithms to support the visual analysis of big data.

**Bio:** Prof. Dr. João Luiz Dihl Comba is an Associate Professor at the “Instituto de Informática”, UFRGS, Brazil since 2002, where he leads research activities, teaches undergraduate and graduate courses, and is advisor for Ph.D, M.Sc. and B.Sc. students. Dr. Comba has a Ph.D. in Computer Science from Stanford University, 2000, a M.Sc. in Systems Engineering and Computation from COPPE-UFRJ, 1991 and a B.Sc. in Computer Science from UFRGS, Universidade Federal do Rio Grande do Sul, 1987. His current research is on Visual Data Analysis, with emphasis on the following topics: visualization, visual analytics, geometric algorithms, spatial data structures, parallel computation and graphics hardware. He is co-chair of the Visualization Corner column of the journal Computing In Science & Engineering, and co-chair of tutorials for the 2016 IEEE Visualization conference.

## **Keynote B:** *Rendering the inside of the human body*

by **Prof. Dr. Marcelo Walter**

**Abstract:** While improved visual realism is known to enhance training effectiveness in virtual surgery simulators, the advances on realistic rendering for these simulators is slower than similar simulations for man-made scenes. One of the main reasons for this is that in vivo data is hard to gather and process. In this talk, we will present the analysis of videolaparoscopy data to compute the Bidirectional Reflectance Distribution Function (BRDF) of living organs as an input to physically based rendering algorithms. From the interplay between light and organic matter recorded in video images, we defined a process capable of establishing the BRDF for inside-the-body organic surfaces. We present a case study around the liver with patient-specific rendering under global illumination. Results show that despite the limited range of motion allowed within the body, the computed BRDF presents a high-coverage of the sampled regions and produce plausible renderings.

**Bio:** Marcelo Walter is a faculty member at the Federal University of Rio Grande do Sul (UFRGS), in Brazil. He received his Ph.D. in Computer Science from the University of British Columbia in 1999. His research interests include modeling of natural phenomena in general and computer graphics applications in Medicine and the creative industries.

## **Keynote C:** *Network Function Virtualization: Research Challenges, Recent Advances and Opportunities for Collaboration*

by **Prof. Dr. Luciano Paschoal Gasparly**

**Abstract:** Network Function Virtualization (NFV) is an emerging paradigm that has opened a large window of opportunities for resource usage optimization in enterprise, datacenter, and backbone networks, to mention a few. NFV enables network managers to replace specialized middlebox hardware (performing functions such as firewalling, intrusion detection, load balancing, content caching, etc.) with equivalent, software-based network functions, running on top of commodity, off-the-shelf hardware. There are several ways in which network managers can potentially benefit from this paradigm. For example, it breaks dependency on specialized middlebox hardware, which has traditionally accounted for a large fraction of network complexity and total cost of ownership in most organizations. For some of these organizations, the number of middleboxes deployed is comparable to their L2/L3 infrastructure. As another benefit, NFV enables promptly responding to fluctuations in the aggregated flow traffic through dynamic, on demand (de)allocation/dimensioning of network functions. The potentialities of NFV has made it gain an important support from industry, as one can note from existing, ongoing standardization efforts. NFV has also seen some intense research activity in the past two years, including (a) creating technical conditions for deploying and running networks functions in a virtualized environment, (b) optimizing virtual network function placement and chaining, and (c) devising orchestration mechanisms so as to adapt the virtualized function environment to fluctuating demands. In many of these aspects, NFV has benefited significantly from Software Defined Networking (SDN), which has supported automated steering of flows across deployed functions and, consequently, key management features such as load balancing and policy compliance. In this talk, I will revisit some of the most relevant research challenges in the NFV/SDN realm and present what we have been investigating (on the topic) at INF/UFRGS. Furthermore, I will explore opportunities for collaboration in the context of the LICIA Lab.

**Bio:** Luciano Paschoal Gasparly holds a Ph.D. in Computer Science (UFRGS, 2002) and serves as Associate Professor at the Institute of Informatics, UFRGS. From 2008 to 2014, he worked as Director of the National Laboratory on Computer Networks (LARC) and, from 2009 to 2013, was Managing Director of the Brazilian Computer Society (SBC). Prof. Gasparly has been involved in various research areas, mainly computer networks, network management and computer system security. He is author of more than 120 full papers published in leading peer-reviewed publications and has a history of dedication to research activities such as organization of scientific events, participation in the TPC of relevant symposia, and participation as editorial board member of various journals. In 2016, Prof. Gasparly has been appointed as Associate Managing Editor for the Springer’s Journal of Network and Systems Management and Publications Committee member of the IEEE SDN initiative. His current research interests include: network, service, and application management; computer system security; software-defined networking; network function virtualization; network virtualization; and cloud computing. More information about Prof. Gasparly can be found at <http://www.inf.ufrgs.br/~paschoal/>.

# Emerging Trends and Working Groups

## **WG1:** *Advances in Software Architecture Recovery*

by **Prof. Dr. Ingrid Nunes**

**Abstract:** Software systems should respect a set of architectural rules to have a controlled development and evolution. However, this is not always the case because such rules are often undocumented or outdated. Moreover, its manual documentation is error-prone and time-consuming. In this talk, I'll present work that has been done by the Prosoft group from UFRGS in order to support architecture recovery. I'll also overview research that has been carried out on other topics by the group, such as web application development and agent-oriented software engineering. Prosoft website: <http://www.inf.ufrgs.br/prosoft/>.

**Bio:** Ingrid Nunes is a Professor Adjunto (Associate Professor) of the Instituto de Informática at the Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Brazil. She is currently on a sabbatical year at TU Dortmund, Germany, with a CAPES-Alexander von Humboldt Postdoctoral Fellowship. She is the head of the Prosoft research group, and holds a research productivity (PQ) fellowship Level 2 granted by CNPq. She obtained her Doctor's degree in Informatics at the Pontifical Catholic University of Rio de Janeiro (2012). Her phd was in cooperation with King's College London (UK), under a sandwich Ph.D. programme of one year, and with University of Waterloo (Canada), with three three-month research visits. She was also a post-doc researcher at PUC-Rio in the Software Engineering Laboratory (LES) (2012), and has experience in the industry, where she worked as a software developer from 2005 to 2007. She is a section editor of the Scientific Initiation Magazine (REIC) and Regional Secretary of the Brazilian Computer Society (SBC) from the Rio Grande do Sul state. Her main research areas are software engineering and artificial intelligence.

## **WG2:** *Research on Cloud-Robotics using Unmanned Aerial Vehicles and Wireless Sensor Networks*

by **Prof. Dr. Edison Pignaton de Freitas**

**Abstract:** This talk aims to present the current research status of Prof. Edison focusing his work with cloud-robotics and wireless sensor networks and multi- Unmanned Aerial Vehicles systems. Cloud-Robotics is an emerging research area in which the robots can be considered both service consumers and providers. The research to be presented explores both perspectives, but also connecting other subjects of interest, as the use of static sensor networks as data providers to the cloud. Unmanned Aerial Vehicles are the main robotic platforms considered in this research. Thus, additional topics specific related to these platforms are also presented, as the capability to provide embedded intelligence so that they can autonomously perform tasks.

**Bio:** Prof. Dr. Edison Pignaton de Freitas received his Bac. degree in Computer Engineering from the Military Institute of Engineering, Brazil (2003), and his MSc degree in Computer Science from Federal University of Rio Grande do Sul (UFRGS), Brazil (2007). He received his PhD from Halmstad University, Sweden, (2011) and UFRGS, Brazil, (2011) in a joint PhD program in the area of sensor networks. During 2001-2002 he studied in France, at Institut National des Sciences Appliquées, Toulouse, with a scholarship from the Brazilian National Counsel of Technological and Scientific Development (CNPq). Currently he holds a position as Associate Professor at Informatics Institute at UFRGS since 2014. He worked as Computer Engineer and Researcher at the Brazilian Army from 2004 to 2013, working in several areas, such as computer tactical edge networks and aerospace defence projects. During his stay in France, he performed an internship at AIRBUS Central Entity A380 project. His main research interests are in computer networks, distributed and embedded systems, focusing cloud-based systems, wireless sensor networks and multi- Unmanned Aerial Vehicles systems.

## **WG3:** *Applications of sentiment analysis*

by **Prof. Dr. Karin Becker**

**Abstract:** Sentiment Analysis is the field of study that analyzes people's opinions, sentiments, evaluations, attitudes, and emotions from written language. There is an impressive market potential for sentiment analysis and that the knowledge extracted from user-generated contents is key to many sectors of the society. This talk describes on-going reserach on sentiment analysis at UFRGS, such as multi-lingual emotion mining, sentiment analysis in software tickets, stance detection in tweets, toxic behavior in on-line games, opinion mining from the reader's standpoint, among others. Data mining, natural language processing, information retrieval, and semantic enrichment are among the expertise areas that can be leveraged to promote cooperation between researchers in the LICIA context.

**Bio:** Karin Becker is an Associate Professor at the Computer Science Institute of UFRGS since 2010. She received a Ph.D. degree the Facultés Universitaires Notre-Dame de la Paix (Belgium), and spent an year at the Information Science Institute of University of Sourthern California (USA) as a visiting scholar. She holds a large background on research and development in both the academia and industry, mainly in the areas of data and web mining. Her current interests are focused on the application of data mining techniques to web-related data (opinion mining, web services, social networks, linked data). She has near 100 published papers, and served as chairperson and member of program committee in several conferences.