



**IRIT**

Informatics Research  
Institute of Toulouse

Seminar

Within the framework of  
**LabEx CIMI**



**Friday 9 February 2018**

**11h00 – 12h00**

**UT3 Paul Sabatier, IRIT, Auditorium J. Herbrand**

**Prof. Dr. Lena MAIER-HEIN**

**Div. Computer Assisted Medical Interventions (CAMI)**

**German Cancer Research Center (DKFZ) (Allemagne)**

**Thematic Semeste on Mathematic and Computer  
Science in Biology: Computational biophotonics  
and surgical data science for next-generation cancer  
treatment**

*Abstract:* Key challenges in interventional tumor diagnosis and therapy consist of the detection and discrimination of malignant tissue as well as the monitoring of tissue perfusion. While traditional approaches in the field of computer assisted surgery are typically based on multi-modal data fusion of intra-operative data with “offline“ pre-operative images, our concept focusses on optimizing the information acquired during surgery. Based on recent biophotonics techniques, including multispectral optical and optoacoustic imaging, as well as modern machine learning approaches, our methods allow for Augmented Reality visualization of a range of important morphological and functional tissue parameters, such as blood oxygenation, without relying on highly accurate deformable registration algorithms. We further work on surgical data science techniques to provide context-aware assistance to physicians. The work to be presented in the talk has resulted from the European Research Council (ERC) starting grant COMBIOSCOPY — Computational Biophotonics in Endoscopic Cancer Diagnosis and Therapy.

*Short bio:* Prof. Lena Maier-Hein received the doctoral degree (Dr.-Ing.) from Karlsruhe Institute of Technology KIT with distinction in 2009 and conducted her postdoctoral research in the Division of Medical and Biological Informatics at the German Cancer Research Center (DKFZ) in Heidelberg, Germany, and at the Hamlyn Centre for Robotics Surgery at Imperial College London. As a full professor and department head at the DKFZ she is currently leading the Division of Computer-assisted Medical Interventions. Her primary research interests are in multi-modal data fusion in the presence of uncertainties, surgical data science and computational biophotonics with a strong focus on clinical translation. She has received numerous awards, including the Ingrid-zu-Solms Prize 2009/2010, the Heinz Maier-Leibnitz Prize 2013 and the Berlin-Brandenburg Academy Prize 2017. She is/ has further been (co-) principal investigator on a number of national and international grants including a European Research Council (ERC) starting grant 2014.

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