

DEPARTMENT OF COMPUTER SCIENCE
University of Houston

SPRING SEMINAR 2012

WHEN: WEDNESDAY, APRIL 18, 2012
WHERE: PGH 232
TIME: 11:00 AM

SPEAKER: Dr. Christophe Collet, University of Strasbourg

Host: Dr. Shishir Shah

TITLE: Detection of Biomarker in Biopsies Based on HR-MAS 2D HSQC Spectroscopy Indexation

ABSTRACT: Intraoperative biopsy analysis during surgical operation is of great interest to give an immediate feedback to the surgeons and help him to take the good decision. One of the strategies employed by the emergent science of metabolomics is biomarker identification. In this context, the technique of High-Resolution Magic Angle Spinning (HR-MAS) Nuclear Magnetic Resonance (NMR) spectra is widely used in metabolomic analysis involving tissue studies. Indeed, the NMR offers the potential to study molecular structures and their associations and interactions. In this talk, I will present a new content-based object indexing and retrieval scheme for biomarkers detection. The biomarker identification is addressed by comparing 2D NMR MS spectrum groups for metabolite change detection using kernel based support vector data description. The approach presented allows to have a quick access to the information, whereas the detection and annotation process remains often manually and time consuming.

BIO: Christophe Collet was born in 1966 in France. He graduated from the Université Paris-Sud Orsay in 1989 (Master in Signal Processing and Robotics, DEA) and received a Ph.D. in Image Processing from the University of Toulon in 1992. He spent 8 years at the French Naval Academy where he created and was the chairman of the laboratory GTS "Groupe de Traitement du Signal" from 1994 to 2000. During these years, he developed hierarchical Markovian approaches for SONAR image analysis and remote sensing multiband image reconstruction. Since 2001 he holds a full Professor position at the University of Strasbourg where he joined the Image Sciences, Computer Sciences and Remote Sensing Laboratory (LSIIT UMR CNRS 7005). From this date, he has developed new statistical image analysis both for **medical and astronomy applications**. Independently of the application, he develops new approaches based on Bayesian inference and graphical models for image segmentation, classification, fusion or restoration. He currently works on fusion of massive hyperspectral data and unsupervised multiband galaxy classification in astronomy, segmentation of brain MRI, detection of lesions on multimodal 3d+t MRI with Strasbourg Hospital physicians, breath signal analysis and HR-MAS 2D biopsy analysis for metabolite annotation. His major research interests include multi-image segmentation and classification with hierarchical approaches (wavelet decomposition, multigrid optimization, multiscale modeling), Bayesian inference, Markovian chain/field/tree modeling, approaches for pattern recognition, Bayesian networks. This research activity generated more than 100 peer review publications since 1990 including 8 book chapters, 40 research articles in international journals, more than 80 papers published in international conference with review). Christophe Collet has supervised 15 PhD thesis since 1994 and more than 35 MSc Internships. Since 2011, Christophe Collet is in charge of International Relations for Telecom Physique Strasbourg (Graduate Engineering School of Physics, University of Strasbourg).