LALYS Florent, PhD

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Post-doctoral candidate

Medical image analysis – Computer vision

EDUCATION AND PROFESSIONAL EXPERIENCE

2012 - present **Post-doctoral fellow** at LTSI - Medicis research team (INSERM - University of Rennes I).
Subject: Creation of anatomo-clinical atlases for helping the pre-operative targeting of Deep Brain Stimulation Surgery (*Medical image processing, statistics, data-mining*)

2009 - 2012 **PhD thesis of the University of Rennes I** at VisAGeS research team (INSERM - INRIA - CNRS - University of Rennes I) under the supervision of Pierre Jannin - Phd defended in May 2012.
Subject*:* Automatic recognition of low-level and high-level surgical tasks in the operating room from video images (*computer vision, image-guided surgery, image/video analysis, time-series modeling, statistical classification, feature extraction/selection, dimensionality reduction*)
Jury members of the PhD defense: Pr Nassir Navab (TUM Munich, Germany), Pr Guang-Zhong Yang (Imperial College London, GB), Pr Philippe Poignet (LIRMM Montpellier, France), Pr Xavier Morandi (Rennes University Hospital, France), Pr Philippe Cinquin (TIMC-IMAG Grenoble, France), Dr Marco Wilzbach (Carl Zeiss Meditec®, Germany), Dr Pierre Jannin (LTSI Rennes, France)

2008 **Fixed-term contract** at VisAGeS team. Construction and assessment of a mono-subject MRI brain template (*linear/non-linear registration, medical image analysis, image quality assessment*)

2007 - 2008 **Master degree in computer science (entirely research-based)** in Image Processing - University of Rennes I, France (ranked 3rd).
Master thesis: 6 months at VisAGeS team. Segmentation and registration for the analysis of Deep Brain Stimulation Surgery (*medical image segmentation, linear/non-linear registration, statistics*)

2003 - 2008 **Master degree in computer engineering** – Signal/Image Processing - ESEO Engineering School, Angers, France.
Internship: 3 months at IETR research institute (CNRS – University Rennes I). Analysis of radar signatures (*feature extraction/selection, wavelets, supervised classification, signal processing*)
Internship: 1 month at Alcatel® Lannion, France. Updates of databases, antivirus, installation of softwares

2003 **Bachelor** (specialty: Mathematic)

OTHER PROFESSIONAL ACTIVITIES

Reviewing

2012	Reviewer for the Journal of Biomedical Informatics (*Elsevier*)
2012	Reviewer for the Artificial Intelligence in Medicine journal (*Elsevier*)
2011 - present	Official reviewer for the MICCAI (Medical Image Computing and Computer Assisted Intervention) conference

Teaching

2010 - present	Basic informatics programming - University of Rennes

Workshop Organization

2011 & 2013	Organizer of M-DBS (Model Deep Brain Stimulation) French-speaking workshop in Rennes, France
2011	Organizer of the M2CAI (Modeling and Monitoring of Computer-Assisted Intervention) workshop, part of the MICCAI conference in Toronto, Canada

Student supervision

2011	1 medical student
2010 - 2012	3 computer engineering master's students

TECHNICAL SKILLS

Main technical skills	**Computer vision** (feature extraction, object recognition, tracking) **medical image processing** (registration, segmentation, filtering)**, data-mining** (supervised and non-supervised classification, feature selection, dimensionality reduction), probabilistic atlases, time-series modeling, mathematical models
Secondary technical skills	Statistics, signal processing, optimization
Imaging modalities	CT, MRI, DTI
Programming languages	C, C++, Matlab, Python,
Bibliography and writing	Latex, word, Zotero, Endnote
Data-mining softwares	Weka, R, SPSS
Libraries/toolboxes	OpenCV, BrainVisa, Minc Tools, SPM8
Vizualisation tool	ItkSnap, Anatomist, 3DSlicer, MITK
Operating Systems	Linux (Ubuntu, Fedora, openSuse), Windows
Versioning	Subversion, Trac, TortoiseSVN

LANGUAGES

French	Mother tongue
English	Fluent, TOEFL 563 (2007) and FIRST level C (2007), more than 10 travels in English-speaking countries (mainly US, Canada and Great-Britain)
German	Basic

EXTRA-CURRICULAR ACTIVITIES

2002 - 2006	Summer job (waiter, warehouseman)
2005 - 2008	Was part of school working committee to organize cultural and sport events of the School (e.g. coach of the school soccer team)
Sports	Soccer (weekly – member of a sports federation), Swimming/squash (weekly), Triathlon (occasional)
Travels	2/3 international travels per year

PUBLICATIONS

In blue: poster or oral presentation in conferences where I attended

Journals

2012 - A framework for the recognition of high-level surgical tasks from video images for cataract surgeries. **Lalys, F**., Riffaud, L., Bouget, D., Jannin, P. IEEE Transactions on Biomedical Engineering. 59(4), p. 966-976.

2012 - Automatic knowledge-based recognition of low-level tasks in the OR. **Lalys, F**., Bouget, D., Riffaud, L., Jannin, P. Int Journal of Computer Assisted Radiology and Surgery (*e-pub ahead of print) (oral presentation at CARS)*

2012 - Classification of Surgical Processes using Dynamic Time Warping. Forestier, G., **Lalys, F.,** Riffaud, L., Trelhu, B., Jannin, P. Journal of Biomedical Informatics. 45, p. 255-264.

2011 - Automatic computation of electrode trajectories for Deep Brain Stimulation: a hybrid symbolic and numerical approach. Essert, C., Haegelen, C., **Lalys, F**., Abadie, A., Jannin, P. Int Journal of Computer Assisted Radiology and Surgery. 7(4), p. 517-532.

2011 - Construction and assessment of a 3-T MRI brain template. **Lalys, F**., Haegelen, C., Ferre, JC., El-Ganaoui, O., Jannin, P. NeuroImage, 49 (1), p. 345-354.

Conferences with proceedings

2012 - Surgical tools recognition and pupil segmentation for cataract surgery modeling. Bouget, D., **Lalys, F**., Jannin, P. *MMVR* (oral presentation)

2012 - Analysis of electrodes' placement and deformation in deep brain stimulation from medical images. Mehri, M., **Lalys, F**., Maumet, C., Haegelen, C., Jannin, P. *SPIE medical imaging*, San Diego, United States (poster presentation)

2011 - An application-dependent framework for the recognition of high-level surgical tasks in the OR. **Lalys, F**., Riffaud, L., Bouget, D., Jannin, P. *MICCAI*, Toronto, Canada (poster presentation)

2011 - Analyse de vidéos de microscopes chirurgicaux pour la reconnaissance automatique d'étapes en combinant SVM et HMM. **Lalys, F**., Riffaud, L., Morandi, X., Jannin, P. *ORASIS*, Praz-Sur-Arly (oral presentation)

2011 - Correlating Clinical Scores with Anatomical Electrodes Locations for Assessing Deep Brain Stimulation. **Lalys, F**., Haegelen, C., Abadie, A., Jannin, P. *IPCAI*, Berlin, Germany. 6689, p. 113-121 (oral presentation)

2010 - Surgical Phases Detection from Microscope Videos by Combining SVM and HMM. **Lalys, F**., Riffaud, L., Morandi, X., Jannin, P. *MCV 2010 (MICCAI Workshop)*, Beijing, China. p. 54-62 (oral presentation)

2010 - Automatic phases recognition in pituitary surgeries by microscope images classification. **Lalys, F**., Riffaud, L., Morandi, X., Jannin, P. *IPCAI*. Geneva, Switzerland. p. 34-44 (oral presentation)

2009 - Post-operative assessment in Deep Brain Stimulation based on multimodal images: registration workflow and validation. **Lalys, F**., Haegelen, C., Abadie, A., Jannin, P. *SPIE Medical Imaging.* Lake Buena Vista, FL, United States (poster presentation)

2009 - Analyse de données pour la construction de modèles de procédures neurochirurgicales. Trelhu, B., **Lalys, F**., Riffaud, L., Morandi, X., Jannin, P. *EGC.* Strasbourg, France. p. 427-432

2009 - Analyse post-opératoire en stimulation cérébrale profonde basée sur des images multimodales : mise en place et validation des chaînes de recalage. **Lalys, F**., Haegelen, C., Abadie, A., El Ganaoui, O., Jannin, P. *ORASIS.* Trégastel, France (oral presentation)

Conferences without proceedings

2011 - Assessment of surgical skills using Surgical Processes and Dynamic Time Warping. Forestier, G., **Lalys, F**., Riffaud, L., Trelhu, B., Jannin, P. *M2CAI 2011 (MICCAI workshop)* - Toronto, Canada

2011 - Validation of basal ganglia segmentation on a 3T MRI template. Haegelen, C., Guizard, N., Coupé, P., **Lalys, F**., Jannin, P., Morandi, X., Collins., DL *Human Brain Mapping*, Quebec City, Canada

2010 - Validation de la Segmentation des Ganglions de la Base sur un Template IRM 3 Tesla. Haegelen, C., **Lalys, F**., Abadie, A., Collins, L., Brassier, G., Morandi, X.. *Réunion de la Société de Neurochirurgie de Langue Française*, Marne-la-Vallée, France.

2010 - Anatomo-clinical atlases in subthalamic Deep Brain Stimulation correlating clinical data and electrode contacts coordinates. **Lalys, F.,** Haegelen, C., Baillieul, M., Abadie, A., Jannin, P., *IBMISPS*, United States.

Software

2012 - ProcSide: software for recording surgical procedures. Bouget, D., Jannin, P., **Lalys, F**. *Dépôt APP*