

# Curriculum Vitae

Benoit Scherrer

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## EDUCATION

### 2009-Now Postdoctoral research fellow

*Harvard Medical School, Children's Hospital Boston*

Development of novel diffusion weighted imaging techniques (acquisition scheme, diffusion signal modeling) for clinical routinely use.

P.I. : Simon K. Warfield, Computational Radiology Laboratory

### 2005-2008 Ph. D. Thesis in Applied Mathematics and Computer Science.

*Institut National Polytechnique de Grenoble (INPG)*

Thesis Topic: MR Brain scan tissues and structures segmentation: local cooperative Markovian agents and Bayesian formulation.

Advisors: Catherine Garbay, LIG, MAGMA Team ;  
Michel Dojat, INSERM U836, Functional and Metabolic Neuroimaging Team

Collaboration: Florence Forbes, INRIA Grenoble, MISTIS Team

### 2004-2005 Master of Science in Imagery, Vision and Robotics

*ENSIMAG, Grenoble*

Distributed Segmentation of MR Brain Scans. Introduction of fuzzy spatial relations in MRF models for subcortical structure segmentation.

### 2003-2004 Third year of engineering school, Student Program Exchange

*Ecole Polytechnique de Montreal, Canada*

### 2001-2003 Engineering school in Applied Mathematics and Computer Science

*ENSEEHT, Toulouse*

### 1999-2001 Preparatory Classes for French Engineering Schools (Maths SUP/Maths SPE)

*Lycée Corneille, Rouen*

Two years of high level mathematics and physics courses to get in the highly competitive french engineering schools ("Grandes Ecoles"). Major: Mathematics

## PROFESSIONAL EXPERIENCE

### 2005-2008 Teacher Assistant in Applied Mathematics (Monitorat - Polytech' Grenoble)

- *Numerical Analysis*: Function integration, differential equations, optimisation, least square approximation... (using Matlab / Scilab)

- *Signal processing*

- *Microcontroller programming* in assembly language.

### 2007 Member of the AFIA Conference 2007 Organizing Committee

Coordinator of PhD students' participation to the organizing committee of the AFIA Conference (French Association for Artificial Intelligence). Grenoble.

<b>2004-2005</b>	<b>Training Period in a Neurostimulation Laboratory (Polystim, Montreal, 5 months)</b> (5 months) Bladder implant project. Conception of a wireless external controller using on a PALM(c) to send neurostimulation parameters to the implant. Evaluation during real experimental surgical surgery.
<b>2002</b>	<b>Computer Science Teaching (Bobo-Dioulasso, Burkina Faso)</b> Six weeks in Burkina Faso to teach computer science & web site creation

## AWARDS AND GRANTS

- **Thesis Grant from the French Minister (MENRT Grant)**
- **Young Investigator Award at the MICCAI 2008 Conference (New York)** in the category "Segmentation" for the paper "*Fully Bayesian Joint Model for MR Brain Scan Tissue and Structure Segmentation*".
- **3<sup>rd</sup> place of the company creation contest organized by "La Maison de l'Entrepreneuriat"** (2007)
- **Winner of the company creation contest organized during "les DOCTORIALES"** (2007)
- **Final of the national programming contest for people under 21 years old** (1996, 1997, 1998) : Three time among the 100 in the final round (First time: younger finalist, 15years old). 36 hours of programming. Best podium: 26<sup>th</sup>

## RESEARCH INTERESTS

- Bayesian Analysis, Statistical Learning, Markov Random Fields & Image Segmentation.
- Image Registration, Log-Euclidian Metric, Shape Analysis, Cortex Unfolding, Functional MRI, Diffusion MRI.
- Distributed and Multi-agent Systems.
- Medical & Neuroscience Applications.

## PUBLICATIONS

### Journals Paper

- B. Scherrer, F. Forbes, C. Garbay, M. Dojat, *Distributed Local MRF Models for Tissue and Structure Brain Segmentation*, IEEE Transactions on Medical Imaging, 28(8), 1296-1307, 2009.
- B. Scherrer, M. Dojat, F. Forbes, C. Garbay, *Agentification of Markov Model Based Segmentation: Application to MRI Brain Scans*, Artificial Intelligence in Medicine (AIM), 46(1), 81-95, 2009

### Chapter Book

- Scherrer B, Forbes F, Garbay C and Dojat M. *A joint Bayesian framework for MR brain scan tissue and structure segmentation based on distributed Markovian agents*. In: I. Bichindaritz and L. Jain, eds., Computational Intelligence in Healthcare. Springer-Verlag, Berlin, 309, 81-101, 2010.

### Peer-Reviewed Conference Papers with proceedings

- B. Scherrer, S. K. Warfield, *Toward an accurate multi-fiber assessment strategy for clinical practice*, in the Proceedings of the 2011 IEEE International Symposium on Biomedical Imaging (ISBI), Chicago, 2011, to appear
- B. Scherrer, S. K. Warfield, *Why multiple b-values are required for multi-tensor models. Evaluation with a constrained log-euclidean model*, in the Proceedings of the 2010 IEEE International Symposium on Biomedical Imaging (ISBI), Rotterdam, 2010, 1389-1392
- B. Scherrer, F. Forbes, M. Dojat, *A Conditional Random Field Approach for Coupling Local Registration with Robust Tissue and Structure Segmentation*, in the Proceedings of the 11th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), Springer-Verlag Berlin, 2009, 540-548
- B. Scherrer, F. Forbes, C. Garbay, M. Dojat, *Fully Bayesian Joint Model for MR Brain Scan Tissue and Structure Segmentation*, in the Proceedings of the 11th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), Springer-Verlag Berlin, 2008, p1066-1074 *\*young investigator award\**

- B. Scherrer, M. Dojat, F. Forbes, C. Garbay, *LOCUS: Local Cooperative Unified Segmentation of MRI Brain Scans*, in the Proceedings of the 10th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), Springer-Verlag Berlin, 2007, p219-227
- B. Scherrer, M. Dojat, F. Forbes, C. Garbay, *MRF Agent Based Segmentation: Application to MRI Brain Scans*, in the Proceedings of the 11th Conference on Artificial Intelligence In Medicine (AIME), Springer-Verlag Berlin, 2007, p13-23
- Y.Kabir, M.Dojat, B.Scherrer, F.Forbes, C.Garbay, *Multimodal MRI segmentation of ischemic stroke lesions*, in the proceedings of the 29th Annual International Conference of the IEEE Engineering in Medicine and biology Society (EMBC), Lyon, 2007
- B. Scherrer, M. Dojat, F. Forbes, C. Garbay, *Une Approche SMA pour la Segmentation Markovienne des Tissus et Structures Présents dans les IRM Cérébrales*, JETIM, Alger, 2006
- B. Scherrer, M. Dojat, F. Forbes, C. Garbay, *Segmentation markovienne distribuée et coopérative des tissus et structures présents dans des IRM 3D cérébrales*, RFIA 2006.

### Abstract

- B. Scherrer, S. K. Warfield, *Characterizing complex white-matter structure from Cube and Sphere diffusion imaging with a multi-fiber model (CUSP-MFM)*, ISMRM, Montreal, 2011, to appear
- B. Scherrer, S. K. Warfield, *Optimal HARDI acquisition schemes for multi-tensor models*, ISMRM, Stockholm, 2010
- B. Scherrer, M. Dojat, F. Forbes, C. Garbay, *Distributed and Cooperative Markovian Segmentation of Tissues and Structures in MRI Brain Scans*, Human Brain Mapping, Florence, 2006

## (PERSONNAL) SOFTWARE DEVELOPMENTS & PROJECTS

- **Viewer/Editor for MRI Brain Scan:** Complete viewer/editor programmed in C++ with QT and VTK.
- **File Manager for TI-89 and TI-92 calculators:** (100% Assembly Language, more than 18000 lines of code)
- **Digital Electronic:** Timer with 128x64 graphical screen, IR receiver for computer, Monitoring Station with color screen for my camper van..
- **Furnishing of a camper van:** Transformation of a commercial vehicle into a real camper van: isolation, additional 12V battery, 230V converter, kitchen, bed, ...

## REFERENCES

Catherine GARBAY	LIG – Grenoble Informatics Laboratory MAGMA Team	Email : Catherine.Garbay@imag.fr
Michel DOJAT	GIN - Grenoble - Institute of Neuroscience Functional and Metabolic Neuroimaging	Email : Michel.Dojat@ujf-grenoble.fr
Florence FORBES	INRIA Rhône-Alpes MISTIS Team	Email : Florence.Forbes@inrialpes.fr
Christoph Segebarth	GIN - Grenoble - Institute of Neuroscience Functional and Metabolic Neuroimaging	Email : Christoph.Segebarth@ujf-grenoble.fr
Simon K. Warfield	CRL – Harvard Medical School Children’s Hospital Boston	Email : Simon.Warfield@childrens.harvard.edu