Olivier Clatz

Medical imaging and computational medicine specialist

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EDUCATION

2002-06 **Ecole des Mines de Paris, France.** Ph.D. in computer science, with highest honors. Thesis : *"Modèles biomécaniques et physio-pathologiques pour l'analyse d'images cérébrales."*. Le Monde Prize for best Ph.D. in Science and Medicine.

2001-02 **Ecole Polytechnique, Ecole Normale Supérieure de Cachan (ENS), France.** M.S. in applied mathematics, with highest honor. Thesis : "*Analysis and prediction of the brain deformation during a neurosurgical procedure*".

2001 **Carnegie Mellon University, Pittsburgh, USA.** Exchange student, computer science. GPA 4.0/4.0.

1999-00 **Université Pierre et Marie Curie, Paris, France**. B.S. with honors, mechanical engineering.

1999 Admission to **ENS de Cachan, France**

EXPERIENCE

2007 **INRIA, Ascleopios lab, France.** Assistant professor (tenure position).

2006-07 **Harvard Medical School, Computational Radiology Laboratory, Boston USA.** Research Associate.

2002-06 **INRIA, Epidaure lab, France.** Ph.D. Research Assistant.

- Development of medical imaging segmentation, registration and meshing algorithms.
- Finite element analysis of the effect of mobile phone radiations on the brain (INRIA collaborative project HEADEXP).
- 3D+t modeling of the communicating hydrocephalus for neurosurgery simulation. Collaboration with S. Litrico MD. (Nice Hospital, France).
- Coupled mechanical and diffusion model of the anisotropic growth of brain tumors. Application in radiotherapy planning. Collaboration with P.-Y. Bondiau MD. (Antoine Lacassagne cancer institute, Nice, France).

2004 **Harvard University, Biorobotics Laboratory, Boston, USA** (5 months). Visiting scientist. Implementation of a fast finite element model to interact with a shape display. Teamwork with R. Fellller et C. Wagner, under the direction of R. Howe.

2004 **Harvard Medical School**, **Surgical Planning Laboratory, Boston, USA** (6 months). Research assistant, under the direction of S. Warfield. Development of a non rigid registration algorithm for image guided surgery. Integration at the Brigham and Women's Hospital.

2002 **INRIA Sophia-Antipolis, Epidaure lab, France.** M.S. Research assistant. Development of a patient-specific finite element model of the brain to account for brain shift during surgery.

2001 **Carnegie Mellon University**, **Navlab, Pittsburgh, USA** (8 months). Research assistant. Implementation of an obstacle detection algorithm based on stereo vision using co-planar correlation.

2000 **ENS Cachan, France.** Research trainee. Conception of a calibration test bench for jaw stress sensors.

1999-00 **Science Active Inc**. Web designer. Conception of online courses in solid and fluid mechanics.

LANGUAGE AND COMPUTER SKILLS

Expertise in: Medical imaging and computer science. Computational models for the human body. Numerical methods for the simulation of pathologies.

Experience in: C, C++, Matlab, OpenGL, HTML, PHP, XML, Latex, bash, Linux/Unix system administration, Windows, Solaris.

Language : French: native language. English: fluent, 2 years spent in the US.

OTHER ACTIVITIES

Skiing, hiking, travel, squash, photography.

PUBLICATIONS

- **Journals**

O. Clatz, S. Litrico, H. Delingette, N. Ayache. Dynamic Model of the Communicating Hydrocephalus Following Subarachnoid Hemorrhage: a Case Study. *IEEE Transactions on Biomedical Engineering.* 54(4):755-8. Apr 2007.

N. Archip, **O. Clatz**, S. Whalen, D. Kacher, F. Jolesz, A. Golby, P. Black, S. Warfield. Non-Rigid Alignment of Preoperative MRI, fMRI, and DT-MRI with Intra-Operative MRI for Enhanced Visualization and Navigation in Image-Guided Neurosurgery. *Neuroimage*. 35(2):609-24. Apr 1 2007.

O. Clatz, E. Mandonnet, S. Chanalet, C. Lebrun, E. Konukoglu, H. Delingette, N. Ayache, P.-Y. Bondiau. Modèles Biomathématiques de Croissance Des Gliomes : Recherche en Informatique et Perspectives en Neuro-oncologie. *Neurologies.* 9(93): 665-667, 2006.

O. Clatz, H. Delingette, I.-F. Talos, A. Golby, R. Kikinis, F. Jolesz, N.Ayache, S. Warfield. Robust Non-Rigid Registration to Capture Brain Shift from Intra-Operative MRI. *IEEE Transactions on Medical Imaging*, 24(11):1417-1427, Nov. 2005.

O. Clatz, M. Sermesant, P.-Y. Bondiau, H. Delingette, S. Warfield, G. Malandain, N. Ayache. Realistic Simulation of the 3D Growth of Brain Tumors in MR Images Including Diffusion and Mass Effect. *IEEE Transactions on Medical Imaging.* 24(10):1334-1346, Oct. 2005.

G. Scarella, **O. Clatz**, S. Lanteri, G. Beaume, S. Oudot, J.-P. Pons, S. Piperno, P. Joly, J. Wiart. Realistic Numerical Modelling of Human Head Tissues Exposure to Electromagnetic Waves From Cellular Phones. *Comptes rendus de l'Académie des sciences Physique*. 7(5): 501-508, 2006.

O. Clatz, H. Delingette, E. Bardinet, D. Dormont, and N. Ayache. Création d'un Modèle Biomécanique Spécifique du Cerveau par l'Analyse d'Images et son Application à la Neurochirurgie Stéréotaxique. *Mecanique et Industrie, numéro spécial CFM 2003*, 4(4):429-433, 2003.

N. Archip, **O. Clatz**, S. Whalen, P. Black, A. Golby, F. Jolesz, S. Warfield. Correction of geometric distortion effects on intra-operative MRI for enhanced visualization in image guided neurosurgery. *Academic Radiology.* (Submitted)

- **Selected Conferences**

E. Konukoglu, **O. Clatz**, P.-Y. Bondiau, H. Delingette, N. Ayache. Extrapolating tumor invasion margins for physiologically determined radiotherapy regions. *Proceedings of MICCAI'06.*

O. Clatz, S. Lanteri, S. Piperno, Unstructured mesh solvers for the simulation of electromagnetic wave propagation and induced temperature elevation in living tissues. *In 7th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering*, Antibes, France, March, 2006.

O. Clatz, H. Delingette, I.-F. Talos, A. Golby, N. Ayache, R. Kikinis, F. Jolesz, and S. Warfield. Hybrid Formulation of the Model-Based Non-Rigid Registration Problem to Improve Accuracy and Robustness. *In Proceedings of MICCAI'05***,** volume 3750 of LNCS, pages 295-302, October 2005. Springer Verlag.

C. Wagner, **O. Clatz**, R. Feller, D. Perrin, H. Delingette, N. Ayache, and R. Howe. Integrating Tactile and Force Feedback with Finite Element Models. In *International Conference on Robotics and Automation (ICRA'05)*, Barcelona, April 2005.

I. Bricault, S. DiMaio, **O. Clatz**, S. Pujol, K. Vosburgh, and R. Kikinis. Computer-Assisted Interventions on liver: Feasibility of the anchor needle technique for real-time targeting of lesions with respiratory motion.. In *Surgetica, Chambéry*, January 2005.

O. Clatz, P.Y. Bondiau, H. Delingette, G. Malandain, M. Sermesant, S. K. Warfield, and N. Ayache. In Silico Tumor Growth: Application to Glioblastomas.. In C. Barillot, D.R. Haynor, and P. Hellier, editors, *Proc. of the 7th Int. Conf on Medical Image Computing and Computer-Assisted Intervention - MICCAI 2004* (2), volume 3217 of LNCS, Saint-Malo, France, pages 337-345, September 2004. Springer Verlag.

O. Clatz, H. Delingette, E. Bardinet, D. Dormont, and N. Ayache. Patient Specific Biomechanical Model of the Brain: Application to Parkinson's disease procedure. In N. Ayache and H. Delingette, editors, *International Symposium on Surgery Simulation and Soft Tissue Modeling (IS4TM'03)*, volume 2673 of Lecture Notes in Computer Science, Juan-les-Pins, France, pages 321-331, 2003. Springer-Verlag.

M. Sermesant, **O. Clatz**, Z. Li, S. Lantéri, H. Delingette, and N. Ayache. A Parallel Implementation of Non-Rigid Registration Using a Volumetric Biomechanical Model. In J.C. Gee, J.B. A. Maintz, and M. W. Vannier, editors, *Second International Workshop on Biomedical Image Registration WBIR'03*, volume 2717 of Lecture Notes in Computer Science, Philadelphia, PA, USA, pages 398-407, 2003. Springer-Verlag.

C. Thorpe, **O. Clatz**, D. Duggins, J. Gowdy, R. MacLachlan, J.R. Miller, C. Mertz, M. Siegel, C. Wangand, and T. Yata. Dependable Perception for Robots. In *Proceedings of International Advanced Robotics Program IEEE, Robotics and Automation Society,* Seoul, Korea, May 2001.