

Guillaume CHARPIAT's Curriculum Vitæ

Identity

Guillaume Charpiat

Nationality : French

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Studies and Employment

- since **Jan. 2015** : Researcher at INRIA Saclay, in the TAO team.
- Dec. 2007 - Dec. 2014** : Researcher in INRIA Sophia-Antipolis, in the Pulsar team
(permanent position : Junior (CR2) then Senior (CR1) since Jan. 2011).
- Feb. 2007 - Dec. 2007** : Post-doctoral position in *statistical learning for computer vision* in the Max Planck Institute for Biological Cybernetics, in Bernhard Schölkopf's team, in Tübingen (Germany).
- Sep. 2004 - Aug. 2007** : Grant for PhD thesis & teaching (doctoral school : École Polytechnique).
- Sep. 2003 - Dec. 2006** : PhD thesis on *Shape statistics for image segmentation with priors*, in the Odyssee team (INRIA) :
Supervisors : Olivier Faugeras and Renaud Keriven,
Jury chair : Grégoire Allaire,
Reviewers : David Mumford, Guillermo Sapiro, Alain Trouvé.
- 2002 - 2003** : Theoretical Physics (Master's final year lessons as free attender).
Obtainment of the École Normale Supérieure's Magistere diplom.
- 2001 - 2002** : Vision and Learning (Master's final year degree) at the ENS Cachan (with highest honors),
Master internship on *Planar curve deformation*, supervised by Olivier Faugeras and Renaud Keriven.
- 2000 - 2001** : Mathematics (Master's first year degree, with high honors),
Mathematics (Bachelor's degree, with great honors),
Physics (Bachelor's degree, with highest honors),
Master's internship on numerical scheme errors of fluid mechanics, supervised by Cécile Appert (LPS).
- Sep. 2000 - Aug. 2004** : École Normale Supérieure de Paris (ENS) student.
- 2000** : Successful candidate in the exams of the Ecole Normale Supérieure and École Polytechnique.

Teaching

- 2016 - 2017** : *Advanced Machine Learning* course (Information Theory + Reinforcement Learning) in the *Data Science* program at École Centrale (Master 2).
- 2015 - 2016** : *Idem*
- 2006 - 2007** : *Initiation to C++ programming* course-exercise at the École Polytechnique.
- 2004 - 2006** : *Numerical Analysis and Optimization* exercices and support course at the École Polytechnique.
- 2003 - 2004** : *Initiation to C++ programming* course and exercises at the École Nationale des Ponts et Chaussées.
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Supervision

PhD Theses :

- since **Sep. 2016** : Pierre Wolinski (*Learning the architecture of neural networks*), co-supervised with Yann Ollivier (CNRS, TAO team, LRI, Univ. Paris-Sud).
- since **Jan. 2015** : Emmanuel Maggiori (*Learning Approaches for Large-Scale Remote Sensing Image Classification*), main supervision by Yuliya Tarabalka and Pierre Al-liez (Titane team, INRIA Sophia-Antipolis).
- Jan. 2011 - Dec. 2014** : Ratnesh Kumar (*Fiber-based segmentation of videos for activity recognition*), PhD thesis co-supervised with Monique Thonnat (INRIA).

Master 2 students :

- Feb. 2017 - Jul. 2017** : Théophile Sanchez (*Neural networks for people genetics*), co-supervised with Flora Jay (CNRS, BioInfo team, LRI, Univ. Paris-Sud).
- Jan. 2017 - May 2017** : Priyanka Mandikal (*Neural networks for 3D medical image registration*), in a collaboration with the startup Therapixel.
- Jan. 2011 - June 2011** : Kandan Ramakrishnan (*Detection and tracking dust particles in a fusion reactor*), co-supervised with Vincent Martin (CEA).
- Feb. 2010 - July 2010** : Ezequiel Cura (*Strategies for automatic model construction*).
- Oct. 2009 - Mar. 2010** : Anja Schnaars (*Texture-based segmentation*).

Master 1, L3, other :

- Jan. 2017 - June 2019** : Martin Toth (*Explanation of the decision taken by a neural net*), in a collaboration with Hossein Khonsari (surgeon at Necker hospital).
- June 2016 - July 2016** : Etienne Desbois (*Classification of skin diseases*), in a collaboration with Hossein Khonsari.
- July 2012 - Sep. 2012** : Sorana Capalnean (*Classification of gestures using a depth camera*).
- July. 2012 - Aug. 2012** : Bertrand Simon (*Classification of gestures using a depth camera*), co-supervised with Olivier Clatz (Asclepios team, INRIA Sophia-Antipolis).

Note : HDR (diplom to supervise PhD students), 2 new PhD + 2 other Master students planned this year.

Publications

Thesis :

- G. Charpiat, *Distance-based shape statistics for image segmentation with prior*, PhD Thesis, École Polytechnique, 12/2006.

Book chapters :

- G. Charpiat, I. Bezrukov, Y. Altun, M. Hofmann and B. Schölkopf, *Machine Learning Methods for Automatic Image Colorization*, Computational Photography : Methods and Applications (R. Lukac ed.), CRC Press, 11/2010.
- G. Charpiat, M. Hofmann and B. Schölkopf, *Kernel methods in medical imaging*, Handbook of Biomedical Imaging (N. Paragios, J. Duncan and N. Ayache, eds.), Springer, 12/2008.
- G. Charpiat, O. Faugeras, R. Keriven and P. Maurel, *Approximations of shape metrics and application to shape warping and empirical shape statistics*, Statistics and Analysis of Shapes (H. Krim and A. Yezzi, eds.), Birkhäuser, 2006, pp. 363–395.

International Journals with Reviewing Board :

- G. Charpiat, G. Nardi, G. Peyré and F-X. Vialard, *Finsler Steepest Descent with Applications to Piecewise-regular Curve Evolution*, Interfaces and Free Boundaries, 2016.
- E. Maggiori, Y. Tarabalka, G. Charpiat and P. Alliez, *Convolutional Neural Networks for Large-Scale Remote Sensing Image Classification*, Transactions on Geoscience and Remote Sensing, 2016.
- Y. Tarabalka, G. Charpiat, L. Brucker and B. Menze, *Spatio-Temporal Video Segmentation with Shape Growth or Shrinkage Constraint*, Transactions on Image Processing, 2014.
- A. Gamal Eldin, X. Descombes, G. Charpiat and J. Zerubia, *Multiple Birth and Cut Algorithm for Multiple Object Detection*, Journal of Multimedia Processing and Technologies, 2011.
- M. Hofmann, F. Steinke, V. Scheel, G. Charpiat, J. Farquhar, P. Aschoff, M. Brady, B. Schölkopf and B. J. Pichler, *MR-based attenuation correction for PET/MR : A novel approach combining pattern recognition and atlas registration*, Journal of Nuclear Medicine, 11/2008.
- G. Charpiat, P. Maurel, J.-P. Pons, R. Keriven and O. Faugeras, *Generalized gradients : Priors on minimization flows*, International Journal of Computer Vision, 2007.
- G. Charpiat, O. Faugeras and R. Keriven, *Approximations of shape metrics and application to shape warping and empirical shape statistics*, Foundations of Computational Mathematics, 2005.

Other International Journals :

- O. Faugeras, G. Adde, G. Charpiat, C. Ched'Hotel, M. Clerc, T. Deneux, R. Deriche, G. Hermosillo, R. Keriven, P. Kornprobst, J. Kybic, C. Lenglet, L. Lopez-Perez, T. Papadopoulo, J.-P. Pons, F. Ségonne, B. Thirion, D. Tschumperlé, T. Viéville and N. Wotawa, *Variational, geometric, and statistical methods for modeling brain anatomy and function*, Special issue : Mathematics in Brain Imaging, NeuroImage 23S1, 2004.

Pre-prints :

- Y. Ollivier and G. Charpiat, *Training recurrent networks online without backtracking*, available on arXiv, invited as a poster to the Deep Learning Symposium at NIPS (2015).

International Conferences with Reviewing Board and Proceedings :

- E. Maggiori, Y. Tarabalka, G. Charpiat and P. Alliez, *High-resolution image classification with convolutional networks*, International Geoscience and Remote Sensing Symposium, IGARSS 2017.

- E. Maggiori, Y. Tarabalka, G. Charpiat and P. Alliez, *Can semantic labeling methods generalize to any city? The Inria aerial image labeling benchmark* International Geoscience and Remote Sensing Symposium, IGARSS 2017.
- E. Maggiori, Y. Tarabalka, G. Charpiat and P. Alliez, *Fully Convolutional Neural Networks For Remote Sensing Image Classification*, International Geoscience and Remote Sensing Symposium, IGARSS 2016
- E. Alberts, G. Charpiat, Y. Tarabalka, T. Huber, M.-A. Weber, J. Bauer, C. Zimmer and B. Menze, *A Nonparametric model for Brain Tumor Segmentation and Volumetry in Longitudinal MR Sequences*, MICCAI Brain Lesion Workshop, 2015.
- E. Maggiori, Y. Tarabalka and G. Charpiat, *Optimizing Partition Trees for Multi-Object Segmentation with Shape Prior*, British Machine Vision Conference, BMVC 2015.
- E. Maggiori, Y. Tarabalka and G. Charpiat, *Improved Partition Trees for Multi-Class Segmentation of Remote Sensing Images*, International Geoscience and Remote Sensing Symposium, IGARSS 2015.
- R. Kumar, G. Charpiat and M. Thonnat, *Multiple Object Tracking by Efficient Graph Partitioning*, Asian Conference on Computer Vision, ACCV 2014.
- R. Kumar, M. Thonnat and G. Charpiat, *Hierarchical Representation of Videos with Spatio-Temporal Fibers*, Winter Conference on Applications of Computer Vision, WACV 2014.
- Y. Tarabalka, G. Charpiat, L. Brucker and B. Menze, *Enforcing Monotonous Shape Growth or Shrinkage in Video Segmentation*, British Machine Vision Conference, BMVC 2013.
- A. Gamal Eldin, G. Charpiat, X. Descombes and J. Zerubia, *An efficient optimizer for simple point process models*, SPIE Computational Imaging XI, 2013.
- Y. Tarabalka and G. Charpiat, *A Graph-Cut-Based Method for Spatio-Temporal Segmentation of Fire from Satellite Observations*, International Geoscience and Remote Sensing Symposium, IGARSS 2013.
- S. Bak, G. Charpiat, E. Corvée, F. Bremond and M. Thonnat, *Learning to Match Appearances by Correlations in a Covariance Metric Space*, European Conference on Computer Vision, ECCV 2012.
- V. Martin, V. Moncada, J.-M. Traverre, T. Loarer, F. Bremond, G. Charpiat and M. Thonnat, *A Cognitive Vision System for Nuclear Fusion Device Monitoring*, International Conference on Computer Vision Systems, ICVS 2011.
- A. Gamal Eldin, X. Descombes, G. Charpiat and J. Zerubia, *A Fast Multiple Birth and Cut Algorithm using Belief Propagation*, International Conference on Image Processing, ICIP 2011.
- G. Charpiat, *Exhaustive Family of Energies Minimizable Exactly by a Graph Cut*, Computer Vision and Pattern Recognition, CVPR 2011.
- S. Chen, G. Charpiat and R.J. Radke, *Converting Level Set Gradients to Shape Gradients*, European Conference on Computer Vision, ECCV 2010.
- G. Charpiat, *Learning Shape Metrics based on Deformations and Transport*, Second Workshop on Non-Rigid Shape Analysis and Deformable Image Alignment, at ICCV 2009.
- G. Charpiat, M. Hofmann and B. Schölkopf, *Automatic image colorization via multimodal predictions*, European Conference on Computer Vision, ECCV 2008.
- M. Hofmann, F. Steinke, V. Scheel, G. Charpiat, M. Brady, B. Schölkopf and B. J. Pichler, *MR-based PET attenuation correction – Method and validation*, Medical Imaging Conference, 2007.
- G. Charpiat, O. Faugeras and R. Keriven, *Shape statistics for image segmentation with prior*, Conference on Computer Vision and Pattern Recognition, CVPR 2007.
- G. Charpiat, R. Keriven, J.-P. Pons and O. Faugeras, *Designing spatially coherent minimizing flows for variational problems based on active contours*, International Conference on Computer Vision, ICCV 2005.
- G. Charpiat, R. Keriven and O. Faugeras, *Image statistics based on diffeomorphic matching*, International Conference on Computer Vision, ICCV 2005.
- G. Charpiat, O. Faugeras and R. Keriven, *Shape metrics, warping and statistics*, International Conference on Image Processing, ICIP 2003.

Other International Conferences with Proceedings :

- G. Charpiat, P. Maurel, R. Keriven and O. Faugeras, *Distance-based shape statistics*, Special Session : Statistical Inferences on Nonlinear Manifolds with Applications in Signal and Image Processing, at ICASSP 2006.

Invited Talks

- December 2015 : Invited poster « Learn As You Go! Training Recurrent Networks Online Without Backtracking » at the *Deep Learning Workshop*, NIPS 2015, Montréal (Canada).
- January 2015 : « Shape matching, statistics, and piecewise rigidification » in the INRIA Morphéo team, Grenoble.
- December 2011 : « Estimating metrics suitable to an empirical manifold of shapes, using transport against the curse of dimensionality » at the *INRIA Workshop on Statistical Learning*, Institut Henri Poincaré, Paris ;
- June 2011 : « Famille exhaustive des énergies minimisables globalement par une coupe dans un graphe » at the *Semaine optimisation et traitement des images* organized by the research groups GDR MOA & MSCP, La Londe-les-Maures.
- April 2010 : « Estimating Suitable Metrics for an Empirical Manifold of Shapes » at the workshop *Metric and Riemannian methods in Shape Analysis*, during the *SIAM Conference on Imaging Science*, Chicago (IL, USA) ;
- July 2007 : « Shape Statistics for Image Segmentation with Prior » at the workshop *Geometry and Statistics of Shape Spaces* at the Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park (NC, USA) ;
- November 2005 : « Statistiques de formes et d'images » at the Physical Spectrometry laboratory seminarium, Joseph Fourier University, Grenoble (France) ;
- June 2005 : « Moyenne et statistiques de formes » at the special day *Optimisation de forme et analyse d'images* in Paris Dauphine University ;
- November 2004 : « Shape and Image Statistics » in Guillermo Sapiro's team, in Minneapolis (MN, USA) ;
- September 2003 : Poster at the workshop *Designing Tomorrow's Category-Level 3D Object Recognition Systems : An International Workshop*, in Taormina (Sicily, Italy).

Other activities related to Research

- Reviewer for : - the main conferences in machine learning and computer vision (NIPS, CVPR, ICCV, ECCV, BMVC, MICCAI...),
- the main journals in computer vision (the International Journal of Computer Vision (IJCV), Transactions on Pattern Analysis and Machine Intelligence (TPAMI), JMIV, CVIU, IVC, Proc. of the Royal Society, TIP, etc.).
- Expertise for : Various selection committees (Cordi S PhD grant, professor position at École Centrale, PhD thesis review, Digitéo project proposals, etc.).
- Administrative tasks : Secretary of the INRIA Sophia-Antipolis Project Committee meetings during 3 years.
- Scientific life : Organization of inter-teams seminars at Sophia-Antipolis.
- Science popularization : A few articles, trainings and taking part in committees (Mastic).

Misc.

Computer skills : C/C++, HTML, \LaTeX , Linux, basics in Python ;
Languages : French (native), English (fluent), German (basics) ;
Other : Driving licence ; Piano, music, lindy-hop.