PENNEC Xavier

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Senior Research Scientist (Directeur de recherche) at Inria, Ph.D. in Computer Science, Specialized in 3D Image and Data Processing for Medical Image Analysis

Research Interests

Mathematical Image Analysis, Geometric Data Processing, Geometry and Statistics, Medical and Functional Image Analysis, Feature-based and Image-based Registration, Algorithms Performances, Shape Statistics.

Education

2006	**Habilitation à diriger des recherches (HDR), Nice-Sophia Antipolis University** in Computer Science
1996	**Ph.D., École Polytechnique, Paris, France**, in Computer Science, with highest honors.
1993	**Master degree (DEA), École Polytechnique - École Normale Supérieure, Paris, France**, in Mathematical Computer Science and Applications, specialization in Geometric Computing, with highest honors.
1992	**Graduate of the École Polytechnique, Paris, France**. Specialization in Computer Science and Physics.
1987	**Baccalauréat** in Mathematics and Techniques, with highest honors.

Positions

2015	3 month visit at Stanford Statistics Department, Palo-Alto, CA, USA.
2014 -	Senior Research Scientist (DR1) at INRIA, Asclepios team.
2007-2013	Senior Research Scientist (DR2) at INRIA, Asclepios team.
2000-2007	Junior Research Scientist (CR1) at INRIA, Epidaure / Asclepios team.
1999-2003	Consultant for AREALL (Paris): *registration for surgical navigation in dental implantology.*
1998-2000	Junior Research Scientist (CR2) at INRIA, Epidaure team.
1998	Postdoctoral/Expert Engineer INRIA, Epidaure team.
1997	Postdoctoral Associate at MIT, Artificial Intelligence Lab, Vision Group.
1993-1996	Ph.D. student at INRIA, Epidaure team.
1993	Master degree research training period (6 months) at INRIA, Epidaure team.
1992	Graduate degree research training period (4 months) at ONERA Châtillon, DMI-GIA (FRANCE).
1990	Military service: company commanding officer in the French Air Force.

Professional activities

Conference Organization

- **MICCAI** (Int. Conf. on Medical Image Computing and Computer Assisted Intervention):
  - **Program Commitee member** in 2007, 2009, 2011, 2012, 2013, 2014;
  - **Workshops, Tutorials and Challenges chair** and member of the local organization commitee of **MICCAI 2012**, Nice October 1-5. Coordination of 32 MICCAI satellite events with 140 organizers and 975 participants.
  - **Workshop co-chair** of MICCAI 2009.
- **MFCA** (Mathematical Foundations of Computational Anatomy): **Founder and General Chair of the workshop series**.
  - **MFCA'15**, Munich, Germany, October 9, 2015;
  - **MFCA'13**, Nagoya, Japan, September 22, 2013;
  - **MFCA'11**, Toronto, September 22, 2011.
  - **MFCA'08**, New York, September 6, 2008.
  - **MFCA'06**, Copenhagen, October 1st, 2006.
- **ISBI 2015** (International Symposium on Biomedical Imaging), April 16-19, New York, USA. **Area Chair**.
- **ICPR 2014** (International Conference on Pattern Recognition), August 24-28, Stockholm, Sweden. **Area chair** in Biomedical Image Analysis.
- **STIA** (Spatio-Temporal Image Analysis for Longitudinal and Time-Series Image Data):
  - **Workshop organizer** with M. Niethammer, S. Durrleman, T. Fletcher and G. Gerig of **STIA'14**, Cambridge, MA, USA, Sept. 22, 2014.
  - **Workshop organizer** with T. Fletcher and G. Gerig of **STIA'10**, Beijing, China, Sept. 20, 2010.
- **GSI** (Geometric Science of Information):
  - **GSI 2015**, Saclay, Oct. 28-30 2015. **Scientific Committee**.
  - **GSI 2013**, Paris, Aug. 28-30, 2013. **Scientific Committee**.
- **IPMI 2013** (Inf. Proc. in Medical Images), Asilomar, CA, USA, Jun. 28-Jul. 3, 2013. **Paper selection committee**.
- **Health-e-Child conference**, Sestri-Levante, Italy, April 23-24, 2010. Virtual Physiological Human **track organizer**.
- **Medical Physics and Biomedical Engineering World Congress 2009**, Theme 4 (Image Processing, Biosignal Processing, Modelling and Simulation, Biomechanics), Registration and Segmentation **track chair**.

Editorial Board of Journals

- **Medical Image Analysis journal (MedIA) (Elsevier) since 2008**. IF 2015: 4.565.
- **International Journal of Computer Vision (IJCV) (Springer) since 2009.** IF 2015: 4.270.
- **SIAM Journal on Imaging Sciences (SIIMS) since 2010.** IF 2015: 2.687.
- **Journal of Mathematical Imaging and Vision since 2014.** IF 2015: 1.461.

Journal Reviewer for: Proc. of the Nat. Academy of Science (PNAS), Journal of Computational and Applied Mathematics (JCAM), Methods of Information in Medicine (MIM), NeuroImage, IEEE Trans. in Medical Imaging (IEEE TMI), Medical Image Analysis (MedIA), Signal Processing (SIGPRO), Computer Aided Surgery (CAS), International Statistical Reviews (ISR), Journal of Mathematical Imaging and Vision (JMIV), IEEE Trans. on Robotics and Automation, Int. Journal of Computer Vision (IJCV), IEEE Trans. on Image Processing (IEEE TIP), Image and Vision Computing (IMAVIS), IEEE Trans. Pattern Analysis and Machine Intelligence (PAMI), Computer Vision and Image Understanding (CVIU), IEE Proceedings - Vision, Image and Signal Processing, Traitement du Signal (TS).

Conferences and Workshops Review Committees

- MICCAI (Medical Image Computing and Computer Assisted Intervention) 2002 to 2010 (except 2007 and 2009 where PC member), 2015.
- IPMI (Information Processing in Medical Images) 2007, 2009, 2011, 2015.
- MMBIA (IEEE W. on Math. Methods in Biomed. Image Analysis) 2006, 2007, 2008, 2010, 2012.
- WBIR (W. on Biomed. Image Registration) 2003, 2006, 2010, 2012, 2014.
- VG (IEEE/EG Int. Symp. on Volume Graphics) 2007, 2008, 2010.
- ISBI (Int. Symposium on Biomedical Imaging) 2002, 2004, 2006, 2007, 2008, 2015.
- CDMRI (Computational Diffusion MRI) 2008, 2010, 2011, 2012.
- HP-MICCAI / MICCAI-DCI (High Perf. and Distributed Comp. for Med. Imaging) 2011, 2013, 2014.
- MCV (MICCAI workshop on Medical Computer Vision) 2010, 2013, 2014.
- NORDIA (W. on Non-Rigid Shape Analysis and Deformable Image Alignment) 2008, 2011, 2014.
- STACOM (Statistical Atlases and Computational Models of the Heart) 2010.
- 13th IMA conference on Mathematics of Surfaces 2009.
- PPMIA (MICCAI workshop on Probabilistic Models for Medical Image Analysis) 2009.
- MICCAI-grid workshop (Medical imaging on grids: achievements and perspectives) 2008.
- MLMI (MICCAI Workshop on Manifold Learning in Medical Imaging) 2008.
- SA2PM'06 (From Statistical Atlases to Personalized Models).
- DEFORM'06 (W. on Image Registration in Deformable Environments).
- DIDAMIC 2004 (Distrib. Databases and processing in Medical Image Comp.).
- AMI-ARCS (MICCAI W. on Augmented env. for Med. Imag. and Comp. aided Surgery) 2004.
- CVPR 2006, EUROGRAPHICS'05, HealthGrid'03, FIMH 2003, GRETSI'03, IJCAI'99.

Services to the community

- International
  - **MICCAI Society boards of Directors** (2012-2015).
  - **Member of the panel** for the joint FLAG-ERA Joint / HBM flagship Transnational Call (JTC), 2015.
  - **Member of the jury** for Life Science 2014 call of the the Vienna Science and Technology fund (**WWTF**), 2014.
  - **EU reviewer for the STREP PredictAD** (neuroimaging in Alzheimer's disease), January 2012.
  - **On site project review committee for the Science Foundation Ireland (SFI)** in 2010.

- Evaluator for:

  the European Research Concil (**ERC**) in 2013; the Council of Physical Science of the Netherlands Organization for Scientific Research (**NWO, NL**) in 2011, 2013; the Science Foundation Ireland (**SFI, IR**) in 2011; the Banff International Research Station for Mathematical Innovation and Discovery (**BIRS, CA**) in 2009; the National Sciences and Engineering Research Council of Canada (**NSERC, CA**) in 2009 and 2010; the University of Liege in 2009; Fonds de la Recherche Scientifique (**FNRS, BE**) in 2010 and 2011; the Air Force Office of Scientific Research (**AFOSR, US**) in 2009; the US-Israel Binational Science Foundation (**BSF, US, IL**) in 2010;

- National
  - Commission de spécialistes PR26 (Math professor recruitment committee) at Toulouse university, 2011.
  - **Jury of the Gilles Kahn SPECIF PhD award** (2006, 2009);
  - **Visiting committee of the French Agence d'Evaluation de la Recherche (AERES)** for the creation of a research unit in 2009.
  - Evaluator for: the French Agence Nationale de la Recherche (**ANR, FR**), 2009 to 2013; Digiteo (French Cluster of research in Information Science and Technology) in 2011; the French National Center for Scientific Research **CNRS** (PEPII) in 2011.
- Local
  - Member of the **Comité de Centre** of Inria Sophia-Antipolis Méditerranée (2013-2016).
  - **In charge of the relationship between Inria-Sophia Antipolis Méditerranée research center and the Nice University Department (Faculté de Medecine)** since 2013.
  - Doctoral follow-up Committee (CSD) at INRIA Sophia Antipolis since 2010;
  - Steering committee of the International Master 2 "Computational Biology" (Master IFI of the university of Nice) since its inception in 2009;
  - Member of the Working Group on Incentive Actions (GTAI) of the Scientific and Technological Orientation Council (COST) of INRIA in 2011;
  - Recruiting committee for the INRIA - University of Nice chair of Digital Medicine in 2009.

Participation to PhD and HDR committees

- Thomas Benseghir, University of Nice-Sophia Antipolis, 2015. President of the jury.
- Laurence Rouet (HDR), U. Paris-Decsartes, 2015. Reviewer.
- Stéphanie Allassonière (HDR), ENS Cachan, Novembre 2013. Reviewer.
- Fabrice Michel, Ecole Centrale, Octobre 2013. Reviewer.
- Aymeric Stamm, university of Rennes, Novembre 2103.
- Kevin Sol, University of Montpellier II, December 2013. Reviewer.
- Jean-Baptiste Fiot, University Paris Dauphine, September 2013. Reviewer.
- Barthélémy Serres, University of Tours, July 2013. President of the jury.
- Nicolas Duchateau, U. Pompeu Fabra, Barcelona, 2012. President of the jury.
- Le Yang, University of Poitier, FR, December 2011. Reviewer.
- Marc Modat, University College London, UK, November 2011. External examiner.
- Aristeidis Sotiras, Ecole centrale Paris, FR, November 2011.
- Rémi Cuingnet, University Paris XI Orsay, FR, March 2011, Reviewer.
- Mickaël Savinaud, Ecole centrale Paris, FR, October 2010.

- Manik Bhattacharjee, University Paris XI Orsay, FR, December 2009, Reviewer.
- Guillaume Auzias, University Paris XI Orsay, FR, November 2009, Reviewer.
- Matthieu Perrot, Ecole normale supérieure, Cachan, FR, October 2009, Reviewer.
- Mickaël Péchaud, Ecole Normale Supérieure, Cachan, FR, September 2009. Reviewer.
- Chafik Samir, Telecom-Lille and Science and Technology University of Lille, FR, September 2007.
- Niels Holm Olsen, IT University of Copenhagen, DK, March 2003. Opponent.
- Ch. Seiler, 2012; S. Durrleman, 2010; Th. Mansi, 2010; H. Hufnagel, 2010; P. Fillard, 2008; T. Vercauteren, 2008; T. Glatard, 2007; V. Arsigny, 2006; R-C. Stefanescu, 2005; S. Nicolau, 2004; G. Flandin, 2004; S. Granger, 2003; P. Cachier, 2002. Supervisor / co-supervisor.

Invited talks

Plenary talks in conferences

1. Workshop on Geometry and Stochastics of Nonlinear, Functional and Graph Data, Bornholm (DK), 15-19 August 2016.
2. 12th IEEE IVMSP Workshop 2016, Bordeaux (FR), July 11-12, 2016.
3. Statistical Analysis of Manifold-Valued Data and Beyond: Nottingham workshop, 4-6 April 2016, UK.
4. Mathematical Imaging and Surface Processing, Mathematisches Forschungsinstitut Oberwolfach (DE), 24-30 January 2016.
5. Programme on Infinite-Dimensional Riemannian Geometry with Applications to Image Matching and Shape Analysis, Schrödinger institute, Vienna, February 2015.
6. 2015 Joint Mathematics Meetings (AMS/MAA) AMS Special Session on Differential Geometry and Statistics, San Antonio, Texas, January 2015.
7. Geometry of Information and Optimization (GIO), Bordeaux, December 4-5, 2014.
8. Geometrical Models in Vision workshop, semester on Geometry, Analysis and Dynamics on Sub-Riemannian Manifolds, Institut Henry Poincarré, Paris - October 22nd-24th, 2014.
9. MICCAI PC Workshop, Cambridge, MA, USA, May 16, 2014.
10. Seminar at Collège de France within the chair "Informatique et sciences numériques" of Nicholas Ayache on the personalized digital patient, Paris, May 13, 2014.
11. Symposium on Statistical Shape models & Applications (Shape 2014), Delémont, Swiss, June 11-13 2014. Keynote speaker.
12. IMA Annual Program Year Workshop on Topological Structures in Computational Biology, Minneapolis, US, December 9-13, 2013.
13. Advances in Matrix Functions and Matrix Equations (FUN13), Manchester, UK, April 10-12, 2013.
14. Distinguished seminar series, SCI institute, Salt-Lake City, February 13 2013.
15. Geometric Mechanics and Shape, NZMRI workshop 2013, Ohope beach, New Zealand, January 13-19, 2013.
16. Geometry and Statistics in Bioimaging: Manifolds and Stratified Spaces, Sonderborg, DK, October 8-12, 2012.
17. STACOM 2012 (MICCAI workshop and challenge on Statistical Atlases and Computational Models of the Heart: Imaging and Modeling Challenges), Nice, October 5, 2012.
18. 1ères rencontres Technologies de l'Information et de la Communication pour la santé mentale, 21 et 22 octobre 2011, Nice et Monaco.

19. Geometry for Anatomy, Banff International Research Station for Mathematical Innovation and Discovery (BIRS) workshop, Banff, Alberta, Canada, Aug. 28 - Sep. 2, 2011.
20. Fields-MITACS Conference on Mathematics of Medical Imaging, Fields Institute, Toronto, Canada, June 20-24, 2011.
21. Workshop on Manifold Learning, Hausdorff Research Institute for Mathematics, Bonn, Germany, May 30 - June 3, 2011. (Abstracts book).
22. Colloquium "Le modèle et l'algorithme", INRIA Rocquencourt, March 3 2011. (Video).
23. Indo-French workshop on Matrix Information Geometry (MIG), Thales & Ecole Polytechnique, Palaiseau, February 23-25, 2011. (Abstracts book).
24. Trends in Mathematical Imaging and Surface Processing, Mathematisches Forschungsinstitut Oberwolfach, Germany January 30th - February 5th, 2011. (Abstract book).
25. 10th Symposium of Mathematical Aspects of Image Processing and Computer Vision (MAIPCV 2010), Sapporo, Hokkaido Univ. November 25-27, 2010.
26. Workshop on Biomedical Image registration (WBIR'2010), Lübeck, July 12-13 2010.
27. Traumatic Brain Injury Diffusion Tensor Imaging Roadmap Workshop, Chicago, June 7-8, 2010.
28. Leon Brillouin trans-disciplinary seminar, GdR Science de Géométrie de l'Information, Paris, Mai 28, 2010. (Video).
29. Trimestrial colloquium of the Jean Kuntzmann Laboratory, Grenobe, June 11 2009.
30. Emerging Trends in Visual Computing (ETVC'08), Ecole Polytechnique, November 18th-20th, 2008. http://www.lix.polytechnique.fr/Labo/Frank.Nielsen/ETVC08/
31. Journés MAS de la SMAI (french applied and industrial mathematical society). Rennes, August 29, 2008 http://mas2008.univ-rennes1.fr/.
32. Institute for Pure and Applied Mathematics (IPAM) Summer School Program on Mathematics in Brain Imaging. UCLA, July 14-25, 2008. http://www.ipam.ucla.edu/programs/mbi2008/
33. Interdisciplinary Workshop on 3D Paleo-Anthropology, Anatomy, Computer Science & Engineering - Synergies for the Future, Toulouse, June 19-20 2008.
34. Mathematical meeting "Statistical modeling of images", Luminy, Mai 5-9, 2008.
35. "Mathematics and Life-Science", Dieudonné lab.-INRIA meeting, Nice, November 16, 2007.
36. Statistical Registration: Pair-wise and Group-wise Alignment and Atlas Formation. MICCAI'07 Workshop, Brisbane, Australia, November 2, 2007.
37. SAMSI Summer 2007 Program on the Geometry and Statistics of Shape Spaces, Raleigh, NC, USA, July 7-13, 2007.
38. 15th ERNSI (European Network on System Identification) Workshop. Linköping, Sweden. September 20-21, 2006.
39. Mathematics and Image Analysis (MIA'06), Paris, 18-21 September, 2006.
40. Shape Spaces. IMA, Minneapolis, April 3-7, 2006.
41. Conference-winter school on singularities and applications, CIRM, Luminy, February 7-11, 2005.
42. Workshop on Computational Topology (ECG'02), Sophia-Antipolis, October 21-25, 2002.
43. CARS 2002, "Validation of medical image processing in image-guided therapy session", Paris, June 2002.
44. Journées "Mathématiques et sciences du vivant", Nice-Sophia Antipolis University, March 2002.
45. First Astronomical and Medical Imaging Meeting (AMI'01), Royal Statistical Society, London, UK, April 2001.
46. Journées Statistiques, INRIA Rennes IRISA, 15-16 November 2001.
47. Image Analysis and High Level Vision, IMA workshop, Minneapolis, MN, USA, December 13-17, 2000.

Invited seminars in universities

- Colloquium of the Dieudonné (JAD) Lab, Nice University, October 10, 2016.
- Center for Health Sciences, SRI international, Menlo Park, USA, June 4 2015.
- Statistics Department Seminar, Stanford University, April 21, 2015.
- Sḿinaire de théorie du contrôle, Univ. Toulon, Decembre 11, 2014.
- Laboratoire de Mécanique, Lille, March 20 2014.
- Hamiltonian Dynamics Seminar, Chair of Geometric Analysis Section de Mathématiques, EPFL, Lausanne, October 9, 2013.
- Thematic day on initial stress for geomechanical models at IFP Energies nouvelles (IFPEN), Rueil-Malmaison, Sept. 19, 2013.
- PENN Image Computing and Science Lab (PICSL), Philadelphia, May 23, 2012.
- Minisymposium on 4D Medical Imaging, SIAM Imaging Science Conf., Philadelphia, May 20-22, 2012.
- 23rd GRETSI Symposium on Signal and Image Processing, Bordeaux, September 5-8 2011. Special session on Information Geometry Sciences.
- UCL Center for Medical Imaging (CMIC), London, January 26, 2011.
- Department of Computing, Imperial College, London, January 25, 2011.
- Colloquium "Le modèle et l'algorithme", INRIA Rocquencourt, March 3 2011.
- International seminar of the Computational anotomy project, Tokyo, November 24, 2010.
- Leon Brillouin transdisciplinary seminar, GdR Science de Géométrie de l'Information, Paris, Mai 28, 2010.
- Trimestrial colloquium of the Jean Kuntzmann Laboratory, Grenobe, June 11 2009.
- Systems and Modeling Seminar Series, Montefiore Institute, University of Liège, Belgium, April 3, 2009.
- Join GdR Isis / GdR Stic-Sante meeting day on diffusion imaging, ENST, Paris, December 9, 2008.
- CSAIL, MIT (Biomedical Imaging and Analysis seminar series), September 12, 2008.
- Probability and Statistics Lab (LSP), Toulouse, February 19, 2008.
- Institut de Mathématiques et de Modélisation de Montpellier, Mai 21, 2007.
- GIPSA-lab (ex LIS), Grenoble, France, April 26, 2007.
- Johns Hopkins University, Baltimore, USA, April 2006.
- University of Utah, Salt Lake City, USA, July 2005.
- University of North-Carolina (UNC) at Chapel Hill, USA, July 2005.
- University of Southern California (USC) Los-Angeles, USA, July 2004.
- Technical University of Denmark (DTU), Copenhagen, March 2003.
- University of Grenada, Spain, December 1999.
- Université Claude Bernard Lyon 1, France, March 1998.
- Artificial Intelligence Lab. Seminar Series, MIT, Cambridge, Mass, USA, March 1997.
- Université Claude Bernard Lyon 1, France, April 1996.
- Lab. Biologie Moléculaire des Relations Plantes-Micro-organismes (LBMRPM), Toulouse, April 1995.

Supervision of research activities

Former PhD Students

1. **Vikash Gupta** (2012-2015): *Diffusion tensor imaging of the brain: towards quantitative clinical tools.* Currently Post-doct at LONI, USC.
2. **Kristin McLeod** (2010-2013): *Modeling of Cardiac Growth and Deformation from Medical Images.* Co-supervision with M. Sermesant. One book chapter, two journal papers (plus one submitted), 2 conference and 4 workshop papers. **Best Paper Award, Cardiac Motion Estimation Challenge at STACOM 2011**, Toronto, CA. Currenlty post-doct at Simula research labs (Cardiac modeling group), Norway.
3. **Marco Lorenzi** (2009-2012): *Deformation-based morphometry of the brain for the development of surrogate markers in Alzheimer's disease.* Co supervision with G. Frisoni, IRCCS Fatebenefratelli, Brescia, Italy. 5 journal papers, 4 selective conference plus 4 workshop papers and 5 clinical conference presentations. **honorary mention at the 2015 Cor Baayen Award in 2015, Runner-up for the Erbsmann Award at IPMI 2011, and best oral presentation award at the STIA workshop associated to MICCAI 2010, Beijing.** Currently post-doc at UCL.
4. **Christof Seiler** (2009-2012): *Trees on Geometrical Deformations to Model the Statistical Variability of Organs in Medical Images.* Joint PhD (cotutelle) of U. of Bern and U. of Nice Sophia Antipolis. September 2012. Co-supervision (40%) with M. Reyes from U. Bern. Multi-scale and hierarchical description and estimation of locally affine deformations between anatomical shapes. 3 journal papers and 2 selective conference papers. **Young Scientist Award at MICCAI 2011**. Currently post-doct in Prof S. Holmes' lab, Statistics dept., Stanford U., USA.
5. **Heike Hufnagel** (2005 -2010, with interruptions): *Statistical shape analysis of normal and pathological organs within the abdomen.* U. of Hamburg / Lubeck. July 2010. Co-supervision with Pr.-Dr. H. Handels (50%). Statistical models of the shape from point sets with application to medical image segmentation. 2 journal paper, 1 selective conference and 6 workshop papers. **Third prize for the best scientific work at Bildverarbeitung fuer die Medizin 2007**. Currently working as technical officer at the World Health Organization (WHO) in Geneva.
6. **Thomas Mansi** (2007-2010): *Image-Based Physiological and Statistical Models of the Heart, Application to Tetralogy of Fallot.* Ecole des Mines de Paris, September 2010. Co-supervision (40%) with N. Ayache and M. Sermesant. Patient specific biomechanical modeling of the heart, statistical modeling of the heart growth in Tetralogy of Fallot patients, quantification of cardiac deformation in image sequences through incompressible non-linear registration (ilog-demons). 3 journal and 3 selective conference papers. **MICCAI 2011 Young Investigated Award**. Currently research scientist at Siemens Corporate Research, Princeton, USA).
7. **Stanley Durrleman** (2006-2010): *Statistical models of currents for measuring the variability of anatomical curves, surfaces and their evolution.* Nice-Sophia Antipolis University. March 2010. In collaboration with A. Trouvé, CMLA, ENS. Co-supervision (60%) with N. Ayache. Statistical theory and numerical algorithms for currents (from the geometric integration theory) and their diffeomorphic registration with applications ranging from the brain shape to the remodeling of the heart. 5 journal (including one in J. of Human Evolution) and 4 selective conference papers. **MICCAI 2008 Young Investigator Award** and **2nd Gilles Kahn PhD prize 2010** awarded by the Soc. Informatique de France and the French Academy of Science. Currently a researcher in the joint INRIA-ICM team ARAMIS (Institut Cerveau Moelle, Pitié Salpêtrière Hospital).
8. **Pierre Fillard** (2004-2008): *Riemannian processing of tensors for diffusion MRI and computational anatomy of the brain.* University of Nice-Sophia Antipolis, February 2008. **Special mention for best PhD in Biomedical Engineering from the SFGBM-IEEE France Section, Lille, march 2009**. Co-supervision with N. Ayache.
9. **Jonathan Boisvert**: *Models of the geometric variability of the scoliotic spine.* University of Nice-Sophia-Antipolis and Polytechnique School of Montreal, Canada. March 2008. **France-Quebec co-supervised PhD prize 2009**. Co-supervision with N. Ayache and Farida Cheriet.
10. **Tom Vercauteren**: *Image registration and mosaicing for dynamic in vivo fibered confocal microscopy.* École des Mines de Paris, January 2008. Cifre with Mauna-Kea-Technologies. Co-supervision with N. Ayache. Currently Senior Lecturer at University College London

11. **Tristan Glatard**: *Description, deployment and optimization of medical image analysis workflows on production grids.* University of Nice-Sophia Antipolis, November 2007. Co-supervision with J. Montagnat (Rainbow team, I3S, UNSA).
12. **Vincent Arsigny**: *Processing Data in Lie Groups: an Algebraic Approach. Application to Non-Linear Registration and Diffusion Tensor MRI* École Polytechnique. December 2006. **Runner up for the PhD prize Gilles Kahn 2007 awarded by the French Academy of Science and the SPECIF association (http://specif.org/prix-these/)**. Co-supervision with N. Ayache.
13. **Radu-Constantin Stefanescu**: *Parallel nonlinear registration of medical images with a priori information on anatomy and pathology.* University of Nice-Sophia-Antipolis, March 2005. Co-supervision with N. Ayache.
14. **Stéphane Nicolau**: *An augmented reality system for hepatic surgery.* University of Nice-Sophia-Antipolis, November 2004. Co-supervision with L. Soler (IRCAD,Strasbourg) and N. Ayache.
15. **Guillaume Flandin**: *Using geometric information for the statistical analysis of fMRI data.* University of Nice-Sophia-Antipolis, March 2004. Co-supervision with J.-B. Poline (CEA-SHFJ, Orsay) and N. Ayache.
16. **Sébastien Granger**: *Registration and reconstruction of surfaces: a multi-scale statistical approach. Application to computer-assisted dental implantology.* École des Mines de Paris, April 2003, with highest honors. Co-supervision with N. Ayache.
17. **Pascal Cachier**: *Non-rigid registration of tri-dimensional medical images. Contributions to iconic and geometric approaches.* Ecole Centrale Paris, January 2002, with highest honors. Co-supervision with N. Ayache.

Current PhD Students

1. Mehdi Hadj-Hamou *Biophysical modeling of the anatomical evolution of the brain.* Co-supervision with N. Ayache.
2. Bishesh Khanal: *Modeling the atrophy of the brain in Alzheimer's disease.*
3. **Nina Miolane** (2013-2016): *Geometric Statistics in Computational Anatomy: Template Estimation and Subspace Learning in Manifolds, Lie groups and Stratified Spaces.*
4. **Marc-Michel Rohé** (2014-2017): *Statistical analysis of shapes, flows and physiological properties over time in heart diseases.*
5. **Loic Devillier** (2015-2018): *Consistency of statistics on infinite dimensional orbifolds - Applications to computational anatomy.* Co-supervision with Stéphanie Allassonière.

Visiting Scientists

2012, sep-nov **Marc Niethammer** (Assoc. Prof. at the Biomedical Research Imaging Center (BRIC), Univ. North Carolina Chapel Hill). Hosted by the Inria-Microsoft common research lab. *Control methods in diffeomorphic non linear registration for longitudinal image analysis.*

2011, oct **Stephen Marsland** (Ass. Prof. at Univ. Massey, NZ). *Machine learning and geometrical mechanics.*

Visiting PhD Students

2010-2011 Stefan Sommer (PhD student at the Image Group, Dept. of Computer Science, Univ. Copenhagen, with François Lauze and Mads Nielsen). 6 months. *Shape manifolds, statistics, and computations on Riemannian manifolds.*

2009 Maxime Boucher (PhD student at McGill Univ, Montreal, Canada, with A. Evans and K. Siddiqi). 5 months. *Multivariate statistical analysis on the cortex surface.*

2009 Vladlena Gorbunova (PhD student at Univ. Copenhagen (DIKU), with Marleen de Bruijne). 6 months. *Monitoring of chronic obstructive pulmonary disease progression from longitudinal lung CT scans using current-based image registration approaches.*

2007-2008 Alexander Schmidt - Richberg (University of Hamburg, PhD with Pr.-Dr. H. Handels), 6 month in 2007-2008. *Joint segmentation and registration of medical images.*

2007 Darko Zikic (Tech. Univ. Munich, PhD with N. Navab), 2 month in 2007. *Deformable registration of medical images.*

Engineers

1. Irina Vidal Migallon (Oct. 2012-2014): *Real-time multiple image registration for mosaicing.* Engineer recruited by Inria for the I-Lab SIWA with Mauna Kea Technologies.
2. Pascal Girard (8 month in 2011): fusion of the NeuroDMS and Shanoir software plateforms in the framework of the Neurolog project (a distributed platform to support multi-centric studies in neurosciences). Currently software engineer at Cap-Gemini.
3. Andrew Sweet (9 month in 2009-2010): *Computational anatomy of the brain: from DTI population analysis to inter-subject registration constrains.* Work on Diffusion Tensor Image registration with log-demons: 2 conference publications in 9 month and open-source software integrated into the Tensor Toolkit. After 2 years at Massachusetts Institute of Technology (MIT, Cambridge, USA), Andrew Sweet became an image analyst and software engineer at inviCRO, Cambridge, Mass. USA.

Master students

1. Bishesh Khanal: *Modeling and Simulation of Local Atrophy in Alzheimer's disease from 3D longitudinal MRI Images.* Master Computational Biology and Biomedicine, Nice Sophia Antipolis University, France (6 month in 2012)
2. Vikash Gupta: *Statistical atlases of diffusion tensor images.* Master Computational Biology and Biomedicine, Nice Sophia Antipolis University, France (6 month in 2011)
3. Andrew Sweet: *Computational anatomy of the brain: from DTI population analysis to inter-subject registration constrains.* Post master training period (6 month), 2009-2010.
4. Kristin McLeod. *Statistical shape analysis of the RV in rToF.* Post master training period (9 month in 2010).
5. Antoine Azar: *An Interactive Intensity- and Feature-Based Non-Rigid Registration Framework for 3D Medical Images.* Master IGMMV, University of Nice-Sophia Antipolis, 2005.
6. Pierre Fillard: *A Riemannian Framework for Tensor Imaging.* Master Optique-Image-Vision, Jean Monnet University, Saint-Etienne, 2004.
7. Heike Hufnagel: *Robust deformable registration of medical images using block matching.* Diploma Thesis, University of Luebeck, Germany, 2004.
8. Radu-Constantin Stefanescu: *Parallelization of registration algorithms.* DEA, Ecole Polytechnique, 2001.
9. Niels Raynaud: *A statistical approach for liver segmentation from tri-dimensional images.* DEA Mathématiques, Vision, Apprentissage, ENS Cachan, 2000.
10. Alejandro Ribes: *2D-3D registration for augmented reality.* DEA ARAVIS, University of Nice-Sophia-Antipolis, 1999.
11. Pascal Cachier: *Registration of tri-dimensional ultrasonic images.* DEA Math. and Artificial Intelligence, ENS Cachan, 1998.
12. Frédéric Nahon: *Image registration by maximization of mutual information.* Graduate degree, École Polytechnique, 1996.

Teaching

Courses

- Infinite-dimensional Riemannian geometry with applications to image matching and shape analysis program, Vienna, February 9-13, 2015, 4h.
- Medical Imaging Summer School (MISS) 2014, Favignana (Sicily) July 28 - August 1, 2014, 3h.

- DIU (Inter-University Diploma) Radiothérapie externe haute technicité, *Recalage d'image médicales et atlas anatomiques*, November 2012, 1h30, November 2013, 1h.
- Master 2 Computational Biology, University of Nice-Sophia Antipolis, *Computational Anatomy and Physiology module*, module responsible, 15h in 2009 to 2015. Responsible for the Master from 2015.
- Master 2 MVA (first semester). *Medical imaging, registration.* Sept. to December 2011 to 2015 (12h).
- Master 2 MVA / Ecole Centrale Paris (Applied math option, 3rd year). *Medical image registration and tensor computing.* January to March 2008 to 2016. (15h).
- Master 1 ENS (Ecole Normale Supérieure de Lyon / Université de Nice Sophia Antipolis). *Medical image processing.* March-April (24h module in 2008, 21h module in 2009 and 2011).
- Spring school on Medical image processing: from voxels to numerical atlases, *Computational anatomy and atlases*, Strasbourg, France, June 2-6, 2008 (3h).
- Biomedical Engineering inter-university PhD program from Zaragoza University and Polytechnique University of Catalonia (Spain). *Statistics on Riemannian Manifolds for Computational Anatomy*, September 2007 (20h).
- Master 2 MVA / Ecole Centrale Paris (3rd year). *Non-rigid registration and statistics on manifolds* February 2007 (9h).
- IT Univ. Copenhagen. *Non-linear shape modeling.* PhD Course, December 5-10, 2005. 30 h. module, with S. Joshi.
- Univ. Nice-Sophia Antipolis (UNSA). *Introduction to medical imaging.* DUT informatique, numerical images option, March 2003 (4h).
- ENSTA, 3rd year of engineer school course. *Introduction to medical image analysis.* January 1999 (3h).
- IMAC, 3e year of engineer school course. *Recognition and registration techniques.* 1998 (3h).

Tutorials

- *The SVF Framework for Longitudinal Statistics on Deformations.* MICCAI 2014 workshop on Spatio-Temporal Image Analysis for Longitudinal and Time-Series Image Data, Cambridge, MA, USA, September 2014.
- *Diffusion analysis using a Riemannian Framework.* MICCAI 2008 tutorial on Advances in Diffusion MRI Analysis, tutorial, Ney-York, (NY, USA), September 2008.
- *Statistical Computing on Riemannian Manifolds: From Riemannian Geometry to Computational Anatomy.* MICCAI'05, Palm Spring, (CA, USA), October 2005.
- *Grids services for medical image analysis and registration.* MICCAI'04, Saint-Malo, September 2004.
- *Performance evaluation of registration algorithms in the absence of gold standard.* MICCAI'03, Montreal, November 2003.

Contracts and Grants

European projects

- **MD-Paedigree ICT-2011.5.2 (2013-2016):** *Model-Driven European Paediatric Digital Repository.* (INRIA amount: 400 k€). Industrial partners: Siemens AG (DE), Siemens SCR (USA), Maat France (FR), MOTEK (NL), EMP (DE), VUmc (NL), Lynkeus (IT). Universities: KU Leuven (BE), Fraunhofer (DE), UMC Utrecht (NL), TU Delft(NL), Sheffield (UK), Athens (GR), Genoa (IT), Transilvania din Brasov (RO); Hospitals: OPBG (Roma, IT), Gaslini (Genoa, IT), GOSH/UCL (London, UK), JHU (Baltimore, USA). Proposal writing in 2012. PI at INRIA. Project under negociation as of October 7, 2012.

- **HEALTH-e-CHILD IST-2004-027749 (2006-2009):** *An Integrated health-care platform for European paediatrics. A Grid-enabled European network of leading clinical centers. Individualized disease prevention, screening, early diagnosis, therapy and follow-up of pediatric heart diseases, inflammatory diseases, and brain tumors.* (INRIA amount: 900 k€). Industrial partners: Siemens, Maat G-knowledge, CERN. Universities: West-England (Bristol, UK), Athens (GR), Genoa (IT); Hospitals: Gaslini (Genoa, IT), Necker (Paris, FR), GOSH/UCL (London, UK). Proposal writing and project inception from 2003 to 2005. Leader of WP11 (*integrated disease modeling*), member of the *Executive board* and of the *Project management team*, deputy of N. Ayache to the *Governing board*.
- **ROBOSCOPE HC 4018 (HC) (1998-2000):** *Ultrasound-image-guided manipulator-assisted system for minimally invasive endo-neuro-surgery*, (INRIA amount: 507 kECU). IBMT-Fraunhofer, ISM, Fokker Control, Imperial College. Scientific responsible of the project for INRIA; Leader of the *Multi Modal Image Fusion Tools* workpackage (including KU Leuven as sub-contractor); WP and INRIA deputy at the annual EC evaluation.

Industrial contracts

- **Therapixel (2013-)**: Co-Founder.
- **Mauna-Kea Technologies (MKT) (2012-2015)**: Inria Industrial lab (I-Lab) SIWA with MKT. *Real-time mutliple image registration for mosaicing.*
- **Median (2006-2007):** consultant.
- **Siemens Corporate Research (2004-2008) :** *Learning for error correction and validation of non-rigid registration algorithms.* Joint elaboration and follow-up of the contract (DEA of A. Azar, PhD of J.-M. Peyrat).
- **Medtronics (2004-2005) :** *Localization and segmentation of deep gray nuclei for electrode stimulation implantation in Alzheimer's disease.* Technical follow-up of the post-doctoral fellow (R. Stefanescu).
- **AREALL (1998-2002):** *A surgical navigation system for dental implantology.* Consultant from 1998 to 2002. Preparation and follow-up of the the research contract and Cifre fellowship for the PhD of S. Granger (2000-2002).
- **CNES (2002):** *Comparison of the performances of non-linear registration algorithms on aerial and satellite images.*
- **QuantifiCare (2001-):** *Medical image analysis for pharmaceutical applications.* Software and patents transfer. Founder and Scientific Council member.

Research grants

- **Associated team GeomStats (2015-2018):** *Geometric statistics and geometric subspace learning.* PI with Susan Holmes, Statistics Department, Stanford University.
- **France Stanford Collaborative Project (2013-2014):** *Understanding Lower Back Pain through Geometric Statistical Analysis of computed toomography(CT) Images.* PI with Susan Holmes, Statistics Department, Stanford University.
- **ANR blanc Karametria (2010-2013):** *a generic and extensible toolbox for feature-based morphometry in neuroimaging.* CEA-SHFJ, INSERM, Univ. Paris 5. Principal investigator at INRIA-Sophia.
- **INRIA ARC BrainVar (2007-2008):** *Analysis of the brain variability.* IRISA, ENS Cachan, La Pitié Salpêtrière, CEA-SHFJ (DRM). Writing of the proposal, coordinator of the action.
- **ANR TechLog NeuroLog ANR-06-TLOG-024 (2007-2009):** *Grid solutions for the processing of large databases of images in neurological disorders.* I3S, IRISA, INRIA, LRI, GIN UMR-S 836, IFR 49, Visioscopie, LaRIA, Business Object. Principal investigator at INRIA-Sophia.

- **ACI Masses de données AGIR (2004-2007):** *Grid Analysis of Radiological Images Data.* CRAN, LORIA, INRIA, LIMSI, LRI, LPC. French multi-disciplinary project aiming at leveraging medical imaging algorithms trough grid systems. Proposal writing, principal investigator at INRIA-Sophia, joint advisor of the PhD of T. Glatard.
- **Associated team Brain Atlas with LONI at UCLA (2001-2008):** *Development of new methods to build atlases and to quantify the variability of the brain.* Joint writing of the proposal, general coordination of the collaboration with P. Thompson from 2001 to 2006, leader of the INRIA part from 2007.
- **Development Action IRMf (2000-2002):** *Non-linear registration of anatomical and functional MR images.* Robotvis, Vista (INRIA), INSERM (U494), CEA-SHFJ (DRM). Joint writing of the proposal, general coordinator of the action.
- **ARC MC2 (2000-2001):** *New methods to fuse MRI and MEEG.* Robotvis, Vista (INRIA), CNRS UPR 640, CEA-SHFJ.
- **Specific Action on Non-Rigid Registration (2003-2004):** CNRS, ENS, GET/TNT, LSIIT.

Softwares

- **LCC log-Demons**: Log-Demons Image registration with local correlation coefficient. Supervision of the software written by Marco Lorenzi. Open-source code available at the Asclepios web-page.
- **DTI log-Demons**: Log-Demons Diffusion Tensor Image registration. Supervision of the software written by Andrew Sweet. Open-source code integrated into the Tensor Toolkit.
- **ExoShape** Non-linear deformation and statistics on curves and surfaces using currents. Diffusion and maintenance of the software written by S. Durrleman & J. Glaunes.
- **MedINRIA Registration module** Linear and non-linear registration of medical images. Initiation and diffusion of the module realized by N. Toussaint through the EU project Healt-e-Child
- **Pasha:** (25 %) Non-rigid registration of 3D images (C++, 21 000 lines). Transferred to 4 universities and about to be distributed on the web.
- **Baladin:** (5 %) Multimodal registration of images using block-matching (C, 15 000 lines). Transferred to 2 universities and one industrial partner; exploitation licenses.
- **MIPS:** (5 %) Effort to gather and capitalize all the software developments of the Epidaure/Asclepios team on visualization and analysis of medical images. The library comprises le visualization tool Yav++ (C++, OpenGL and Tcl/Tk) and the other softwares of this section.
- **Yasmina:** (5%) Multimodal registration of medical images (C, 15000 lines). Transferred to 3 universities and 3 industrial partners; exploitation licenses; patent.
- **Roboscope MMIT package:** integration and distribution in the consortium of 115000 line of C, 122000 of C++ code and 5000 of Tcl code.
- **PFRegister, PFMatchICP, PFMatchIT, PFMatchGH:** (100 %) softwares for the registration and matching of geometric features (C, 27000 lines); registered at the APP in June 1997; Transferred to 3 universities and one industrial partner; Exploitation license.
- **Prospect:** (100 %) software for detecting common substructures in protein structures (C, 5000 lines); Registered at the APP in December 1997; Transferred to 3 universities.

Prizes and Awards

- French PEDR Outstanding research award (PEDR 2015-2018)
- French PES Outstanding research award (PES 2011-2014)

Best paper awards (including best papers by students)

2015 *Best paper award at the STACOM 2015 workshop* (J. L Bruse, K. McLeod, G. Biglino, H. N Ntsinjana, C. Capelli, T.-Y. Hsia, M. Sermesant, X. Pennec, A. M. Taylor, S. Schievano: A Non-parametric Statistical Shape Model for Assessment of the Surgically Repaired Aortic Arch in Coarctation of the Aorta: How Normal is Abnormal?) Statistical Atlases and Computational Models of the Heart STACOM 2015, Munich, Germany.

2013 *Young Scientist Publication Impact Award, MICCAI Society, Oct 2013.* (T. Vercauteren, X. Pennec, A. Perchant, N. Ayache. Symmetric log-domain diffeomorphic Registration: a demons-based approach. Published at MICCAI 2008).

2012 *MICCAI Young Scientist Publication Impact Award 2012* (C. Brun, N. Leporé, X. Pennec, Y.Y. Chou, A.D. Lee, M. Barysheva, G.I. de Zubicaray, M. Meredith, K. McMahon, M.J. Wright, A.W. Toga, and P.M. Thompson. A tensor-based morphometry study of genetic influences on brain structure using a new fluid registration method. MICCAI 2008).

2012 *Best paper award at the MICCAI workshop on Medical Computer Vision* (Groupwise Spectral Log-Demons Framework for Atlas Construction. H. Lombaert, L. Grady, X. Pennec, J.-M. Peyrat, N. Ayache, F. Cheriet).

2011 *Young investigator award* at MICCAI 2011 (C. Seiler, X. Pennec and M. Reyes: Geometry-Aware Multiscale Image Registration Via OBBTree-Based Polyaffine Log-Demons).

2011 *Honorable Mention (runner-up) for the Erbsmann Award* at the IPMI 2011 (M. Lorenzi, N. Ayache, X. Pennec: Schilds Ladder for the parallel transport of deformations in time series of images).

2011 *Best paper award - motion challenge* at the Statistical Atlases and Computational Models of the Heart MICCAI workshop 2011 (K. McLeod, A. Prakosa, T. Mansi, M. Sermesant, and X. Pennec, An Incompressible Log-Domain Demons Algorithm for Tracking Heart Tissue).

2010 *Best oral presentation* at the STIA Workshop, Beijing, 2010 (M. Lorenzi, N. Ayache, G. Frisoni, and X. Pennec: 4D registration of serial brain MR's images: a robust measure of changes applied to Alzheimer's disease.)

2009 *IGI-Global Medical Information Science Discoveries-Research Book Chapter of 2009 Award.* for the book chapter *Grid Analysis of Radiological Data.*

2008 *Young investigator award* at MICCAI 2008 (S. Durrleman, X. Pennec, A. Trouvé and N. Ayache: Sparse Approximation of Currents for Statistics on Curves and Surfaces).

2007 *Third prize in category best scientific work* at Bildverarbeitung fuer die Medizin 2007 (H. Hufnagel, X. Pennec, J. Ehrhardt, H Handels and N. Ayache: Point-Based Statistical Shape Models with Probabilistic Correspondences and Affine EM-ICP).

2006 *Medical Image Analysis (MedIA)-MICCAI best paper award 2006* (T. Vercauteren, A. Perchant, X. Pennec G. Malandain and N. Ayache: Mosaicing of Confocal Microscopic In Vivo Soft Tissue Video Sequences).

2006 *AMDO (IV Conference on Articulated Motion and Deformable Objects) best paper award 2006* (J. Boisvert, X. Pennec, H. Labelle, F. Cheriet and N. Ayache: Principal Spine Shape Deformation Modes Using Riemannian Geometry and Articulated Models).

2003 *Young investigator award* at MICCAI'03 (V. Arsigny, X. Pennec, and N. Ayache: Polyrigid transformations).

1997 *Giovanni DiChiro Award for Outstanding Scientific Research* (*Journal of Computer Assisted Tomography*, 21(4):554-566, 1997).

Distinguished Dissertations of PhD Students

2015 **Marco Lorenzi:** Honorary mention at the 2015 Cor Baayen Award.

2010 **S. Durrleman:** second Gilles Kahn Prize (Socété Informatique de France and Academy of Sciences).

2009 **J. Boisvert:** best thesis award among PhDs co-supervised between France and Quebec.

2009 **P. Fillard:** special mention for best PhD in Biomedical Engineering from SFGBM-IEEE France.

2007 **V. Arsigny:** second Gilles Kahn Prize (Socété Informatique de France and Academy of Sciences).

Other awards

1997 INRIA Post-doctoral Fellowship, 1997.

1996 PhD with outstanding praises (mention très honnorable avec les félicitations du jury), École Polytechnique (Palaiseau), 1996.

1993 DRET/CNRS PhD Fellowship, 1993-1996.

1992 DEA fellowship from the Ecole Polytechnique, 1992-1993.

1987 Baccalauréat with highest praises (mention très bien), Limoges, 1987.

Patents

[1] Natasha Lepore, Fernando Ypes-Calderon, Yalin Wang, Paul M. Thompson, Xavier Pennec, Marvin D. Nelson, Caroline Brun, and Wayne L. TANG. Magnetic resonance imaging tool to detect clinical difference in brain anatomy, February 2015.

[2] Tom Vercauteren, Aymeric Perchant, Nicholas Ayache, Xavier Pennec, and Grégoire Malandain. Robust mosaicing method with correction of motion distorsions and tissue deformations for in vivo fibered microscopy, August 2007.

[3] Vincent Arsigny, Xavier Pennec, Pierre Fillard, and Nicholas Ayache. Device for processing raw images or tensor images, July 2006.

[4] Vincent Arsigny, Xavier Pennec, Pierre Fillard, and Nicholas Ayache. Dispositif perfectionné de traitement ou de production d'images de tenseurs, April 2005. International application number PCT/FR2006/000774 published 12.10.2006.

[5] Alexis Roche, Grégoire Malandain, Nicholas Ayache, and Xavier Pennec. Electronic device for automatic registration of images, March 2003.

[6] Alexis Roche, Grégoire Malandain, Nicholas Ayache, and Xavier Pennec. Dispositif électronique de recalage automatique d'images, September 2000.

Publications

This bibliography is available on-line at the Asclepios publication page as well a on the open archive hal system with links on original versions and author-pdfs for most of the publications. These links can also be followed by clicking on the titles or on the doi in the text below. The bibliography can also be retrived with citation ranks at Google scholar; ISI web of science / Researcher ID; Scopus.

- 64 Journals, 6 proceedings, 137 peer-reviewed and archived conference articles, 12 book chapters or invited articles;
- 14,047 citations, h-index of 55 (Google scholar, Aug. 2016);
- 4993 citations for 136 publications and a h-index of 34 on ResearcherID;
- 6319 citations for 223 documents and a h-index of 38 in Scopus;
- 81 Pubmed entries

Original contributions in international peer-reviewed journals

[1] Mehdi Hadj-Hamou, Marco Lorenzi, Nicholas Ayache, and Xavier Pennec. Longitudinal Analysis of Image Time Series with Diffeomorphic Deformations: A Computational Framework Based on Stationary Velocity Fields. *Frontiers in Neuroscience*, June 2016.

[2] Bishesh Khanal, Marco Lorenzi, Nicholas Ayache, and Xavier Pennec. A biophysical model of brain deformation to simulate and analyze longitudinal MRIs of patients with Alzheimer's disease. *NeuroImage*, 134:35–52, June 2016.

[3] David M. Cash, Chris Frost, Leonardo O. Iheme, Devrim Ünay, Melek Kandemir, Jurgen Fripp, Olivier Salvado, Pierrick Bourgeat, Martin Reuter, Bruce Fischl, Marco Lorenzi, Giovanni B. Frisoni, Xavier Pennec, Ronald K. Pierson, Jeffrey L. Gunter, Matthew L. Senjem, Clifford R. Jack, Nicolas Guizard, Vladimir S. Fonov, D. Louis Collins, Marc Modat, M. Jorge Cardoso, Kelvin K. Leung, Hongzhi Wang, Sandhitsu R. Das, Paul A. Yushkevich, Ian B. Malone, Nick C. Fox, Jonathan M. Schott, and Sebastien Ourselin. Assessing atrophy measurement techniques in dementia: Results from the MIRIAD atrophy challenge. *NeuroImage*, 123:149–164, December 2015.

[4] Marco Lorenzi, Nicholas Ayache, and Xavier Pennec. Regional flux analysis for discovering and quantifying anatomical changes: An application to the brain morphometry in Alzheimer's disease. *NeuroImage*, 115:224–234, July 2015.

[5] Marco Lorenzi, Xavier Pennec, Giovanni B. Frisoni, and Nicholas Ayache. Disentangling normal aging from Alzheimer's disease in structural magnetic resonance images. *Neurobiology of Aging*, 36:S42–S52, January 2015.

[6] Kristin Mcleod, Maxime Sermesant, Philipp Beerbaum, and Xavier Pennec. Spatio-Temporal Tensor Decomposition of a Polyaffine Motion Model for a Better Analysis of Pathological Left Ventricular Dynamics. *IEEE Transactions on Medical Imaging*, 34(7):1562–1675, July 2015.

[7] Nina Miolane and Xavier Pennec. Computing Bi-Invariant Pseudo-Metrics on Lie Groups for Consistent Statistics. *Entropy*, 17(4):1850–1881, April 2015.

[8] Herve Lombaert, Leo Grady, Xavier Pennec, Nicholas Ayache, and Farida Cheriet. Spectral Log-Demons: Diffeomorphic Image Registration with Very Large Deformations. *International Journal of Computer Vision*, 107(3):254–271, May 2014.

[9] Stanley Durrleman, Xavier Pennec, Alain Trouvé, José Braga, Guido Gerig, and Nicholas Ayache. Toward a Comprehensive Framework for the Spatiotemporal Statistical Analysis of Longitudinal Shape Data. *International Journal of Computer Vision*, 103(1):22–59, May 2013.

[10] Romain Guibert, Kristin Mcleod, Alfonso Caiazzo, Tommaso Mansi, Miguel Angel Fernández, Maxime Sermesant, Xavier Pennec, Irene Vignon-Clementel, Younes Boudjemline, and Jean-Frédéric Gerbeau. Group-wise Construction of Reduced Models for Understanding and Characterization of Pulmonary Blood Flows from Medical Images. *Medical Image Analysis*, 18(1):63–82, October 2013.

[11] Benedetta Leonardi, Andrew Taylor, Tommaso Mansi, Ingmar Voigt, Maxime Sermesant, Xavier Pennec, Nicholas Ayache, Younes Boudjemline, and Giacomo Pongiglione. Computational modelling of the right ventricle in repaired tetralogy of Fallot: can it provide insight into patient treatment? *European Heart Journal - Cardiovascular Imaging*, 14(4):381–6, April 2013.

[12] Marco Lorenzi, Nicholas Ayache, Giovanni B. Frisoni, and Xavier Pennec. LCC-Demons: a robust and accurate symmetric diffeomorphic registration algorithm. *NeuroImage*, 81(1):470–483, 2013.

[13] Marco Lorenzi and Xavier Pennec. Efficient Parallel Transport of Deformations in Time Series of Images: from Schild's to Pole Ladder. *Journal of Mathematical Imaging and Vision*, 50(1-2):5–17, October 2013.

[14] Marco Lorenzi and Xavier Pennec. Geodesics, Parallel Transport & One-parameter Subgroups for Diffeomorphic Image Registration. *International Journal of Computer Vision*, 105(2):111–127, November 2013.

[15] Stefan Sommer, François Lauze, Mads Nielsen, and Xavier Pennec. Sparse Multi-Scale Diffeomorphic Registration: the Kernel Bundle Framework. *Journal of Mathematical Imaging and Vision*, 46(3):292–308, 2013.

[16] Stefan Sommer, Mads Nielsen, Sune Darkner, and Xavier Pennec. Higher-order momentum distributions and locally affine LDDMM registration. *SIAM J. on Imaging Science (SIIMS)*, 6(1):341–367, February 2013.

[17] Catalina Tobon-Gomez, Mathieu De Craene, Kristin Mcleod, Lennart Tautz, Wenzhe Shi, Anja Hennemuth, Adityo Prakosa, Hengui Wang, Gerald Carr-White, Sergio Kapetanakis, Albert Lutz, Vernon Rasche, Tobias Schaeffter, Constantin Butakoff, Oskar Friman, Tommaso Mansi, Maxime Sermesant, Xiahai Zhuang, Sébastien Ourselin, Hans Otto Peitgen, Xavier Pennec, Reza Razavi, Daniel Rueckert, Alejandro F. Frangi, and Kawal Rhode. Benchmarking framework for myocardial tracking and deformation algorithms: an open access database. *Medical Image Analysis*, 17(6):632–648, 2013.

[18] Stanley Durrleman, Xavier Pennec, Alain Trouvé, Nicholas Ayache, and José Braga. Comparison of the endocranial ontogenies between chimpanzees and bonobos via temporal regression and spatiotemporal registration. *Journal of Human Evolution*, 62(1):74 – 88, 2012.

[19] Christof Seiler, Xavier Pennec, and Mauricio Reyes. Capturing the multiscale anatomical shape variability with polyaffine transformation trees. *Medical Image Analysis (MedIA)*, 16(7):1371–1384, 2012.

[20] Caroline Brun, Natasha Leporé, Xavier Pennec, Yi-Yu Chou, Agatha Lee, Greig De Zubicaray, Katie Mcmahon, Margaret Wright, James C. Gee, and Paul Thompson. A nonconservative Lagrangian framework for statistical fluid registration-SAFIRA. *IEEE Transactions on Medical Imaging*, 30(2):184–202, February 2011. PMID: 20813636.

[21] Stanley Durrleman, Pierre Fillard, Xavier Pennec, Alain Trouvé, and Nicholas Ayache. Registration, atlas estimation and variability analysis of white matter fiber bundles modeled as currents. *NeuroImage*, 55(3):1073–1090, 2011.

[22] Tommaso Mansi, Xavier Pennec, Maxime Sermesant, Hervé Delingette, and Nicholas Ayache. iLogDemons: A demons-based registration algorithm for tracking incompressible elastic biological tissues. *International Journal of Computer Vision*, 92(1):92–111, 2011.

[23] Tommaso Mansi, Ingmar Voigt, Benedetta Leonardi, Xavier Pennec, Stanley Durrleman, Maxime Sermesant, Hervé Delingette, Andrew M. Taylor, Younes Boudjemline, Giacomo Pongiglione, and Nicholas Ayache. A statistical model for quantification and prediction of cardiac remodelling: Application to tetralogy of fallot. *IEEE Transactions on Medical Imaging*, 9(30):1605–1616, September 2011.

[24] Vincent Arsigny, Olivier Commowick, Nicholas Ayache, and Xavier Pennec. A fast and log-Euclidean polyaffine framework for locally linear registration. *Journal of Mathematical Imaging and Vision*, 33(2):222–238, 2009.

[25] Caroline Brun, Natasha Leporé, Xavier Pennec, Agatha D Lee, Marina Barysheva, Sarah K Madsen, Christina Avedissian, Yi-Yu Chou, Greig I. de Zubicaray, Katie McMahon, Margaret Wright, Arthur W. Toga, and Paul M. Thompson. Mapping the regional influence of genetics on brain structure variability - a tensor-based morphometry study. *NeuroImage*, 48(1):37–49, October 2009.

[26] Stanley Durrleman, Xavier Pennec, Alain Trouvé, and Nicholas Ayache. Statistical models on sets of curves and surfaces based on currents. *Medical Image Analysis*, 13(5):793–808, October 2009.

[27] Heike Hufnagel, Jan Ehrhardt, Xavier Pennec, Nicholas Ayache, and Heinz Handels. Computation of a probabilistic statistical shape model in a maximum-a-posteriori framework. *Methods of Information in Medicine*, 48(4):314–319, 2009.

[28] S. Nicolau, Xavier Pennec, Luc Soler, X. Buy, A. Gangi, Nicholas Ayache, and J. Marescaux. An augmented reality system for liver thermal ablation: Design and evaluation on clinical cases. *Medical Image Analysis*, 13(3):494–506, June 2009.

[29] Tom Vercauteren, Xavier Pennec, Aymeric Perchant, and Nicholas Ayache. Diffeomorphic demons: Efficient non-parametric image registration. *NeuroImage*, 45(1, Supp.1):S61–S72, March 2009.

[30] Boon Thye Thomas Yeo, Tom Vercauteren, Pierre Fillard, Jean-Marc Peyrat, Xavier Pennec, Polina Golland, Nicholas Ayache, and Olivier Clatz. DT-REFinD: Diffusion tensor registration with exact finite-strain differential. *IEEE Transactions on Medical Imaging*, 28(12):1914–1928, December 2009. PMID:19556193.

[31] Jonathan Boisvert, Farida Cheriet, Xavier Pennec, Hubert Labelle, and Nicholas Ayache. Articulated spine models for 3d reconstruction from partial radiographic data. *IEEE Transactions on Bio-Medical Engineering*, 55(11):2565–2574, November 2008.

[32] Jonathan Boisvert, Farida Cheriet, Xavier Pennec, Hubert Labelle, and Nicholas Ayache. Geometric variability of the scoliotic spine using statistics on articulated shape models. *IEEE Transactions on Medical Imaging*, 27(4):557–568, 2008.

[33] Jonathan Boisvert, Farida Cheriet, Xavier Pennec, Hubert Labelle, and Nicholas Ayache. Principal deformations modes of articulated models for the analysis of 3d spine deformities. *Electronic Letters on Computer Vision and Image Analysis*, 7(4):13–31, December 2008.

[34] Stanley Durrleman, Xavier Pennec, Alain Trouvé, Paul Thompson, and Nicholas Ayache. Inferring brain variability from diffeomorphic deformations of currents: an integrative approach. *Medical Image Analysis*, 12(5):626–637, 2008.

[35] Tristan Glatard, Johan Montagnat, Diane Lingrand, and Xavier Pennec. Flexible and efficient workflow deployment of data-intensive applications on grids with moteur. *International Journal of High Performance Computing Applications*, 3(22):347–360, August 2008. Special issue on Workflow Systems in Grid Environments.

[36] H. Hufnagel, X. Pennec, J. Ehrhardt, N. Ayache, and H. Handels. Generation of a statistical shape model with probabilistic point correspondences and EM-ICP. *International Journal for Computer Assisted Radiology and Surgery*, 2(5):265–273, March 2008.

[37] Johan Montagnat, Tristan Glatard, Isabel Campos Plasencia, Francisco Castejon, Xavier Pennec, Giuliano Taffoni, Vladimir Voznesensky, and Claudio Vuerli. Workflow-based data parallel applications on the egee production grid infrastructure. *Journal of Grid Computing*, 6(4):369–383, December 2008.

[38] Vincent Arsigny, Pierre Fillard, Xavier Pennec, and Nicholas Ayache. Geometric means in a novel vector space structure on symmetric positive-definite matrices. *SIAM Journal on Matrix Analysis and Applications*, 29(1):328–347, 2007.

[39] Pierre Fillard, Xavier Pennec, Vincent Arsigny, and Nicholas Ayache. Clinical DT-MRI estimation, smoothing and fiber tracking with log-Euclidean metrics. *IEEE Transactions on Medical Imaging*, 26(11):1472–1482, November 2007.

[40] Pierre Fillard, Vincent Arsigny, Xavier Pennec, Kiralee M. Hayashi, Paul M. Thompson, and Nicholas Ayache. Measuring brain variability by extrapolating sparse tensor fields measured on sulcal lines. *NeuroImage*, 34(2):639–650, January 2007. Also as INRIA Research Report 5887, April 2006. PMID: 17113311.

[41] Jean-Marc Peyrat, Maxime Sermesant, Xavier Pennec, Hervé Delingette, Chenyang Xu, Eliot R. McVeigh, and Nicholas Ayache. A computational framework for the statistical analysis of cardiac diffusion tensors: Application to a small database of canine hearts. *IEEE Transactions on Medical Imaging*, 26(11):1500–1514, November 2007.

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