

PENNEC Xavier

March 4, 2018

Nationality: French

Date of birth: May the 2nd, 1970

INRIA Sophia - Asclepios team,
2004 Route des Lucioles BP 93,
06902 Sophia Antipolis Cedex
France

Tel: +33 4 92 38 76 64

Fax: +33 4 92 38 76 69

Email: Xavier.Pennec@sophia.inria.fr

<http://www-sop.inria.fr/members/Xavier.Pennec/>

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

- **MFCA** (Mathematical Foundations of Computational Anatomy): **Founder and General Chair**.
 - **MFCA'17**, Quebec, Canada, September 14, 2017.
 - **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.
- **TGSI 2017** (Topological and Geometrical Structure of Information), Aug. 28 - Sept. 1 2017, CIRM Luminy (FR): **Conference coorganizer**.
- **MICCAI** (Int. Conf. on Medical Image Computing and Computer Assisted Intervention):
 - MICCAI 2007, 2009, 2011, 2012, 2013, 2014: **Program Committee member**.
 - **MICCAI 2012**, Nice October 1-5: **Workshops, Tutorials and Challenges chair** and member of the **local organization committee**. Coordination of 32 MICCAI satellite events with 140 organizers and 975 participants.
 - **MICCAI 2009**, London, Sept. 20-24: **Workshop co-chair**.
- **STIA** (Spatio-Temporal Image Analysis for Longitudinal and Time-Series Image Data):
 - **STIA 2014**, Cambridge, MA, USA, Sept. 22, 2014: **Workshop coorganizer**.
 - **STIA 2010**, Beijing, China, Sept. 20, 2010: **Workshop coorganizer**.
- **IPMI** (Information Processing in Medical Images):
 - **IPMI 2013**, Asilomar, CA, USA, 2013: **Paper selection committee**.
 - **IPMI 2017**, Boone, NC, USA, 2017: **Paper selection committee**.
- **ISBI** (International Symposium on Biomedical Imaging)
 - **ISBI 2017**, April 18-21, Melbourne, Australia. **Area Chair**.
 - **ISBI 2015**, 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.
- **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**.
- **Geometry of shapes Workshop** (Math in the Mine), June 26 - July 2, 2016, Minière de Vallauria, Alpes Maritimes, FR. **Organizer**.

Editorial Board of Journals

- **Medical Image Analysis journal (MedIA) (Elsevier) since 2008**. IF 2016: 4.188.
- **International Journal of Computer Vision (IJCV) (Springer) since 2009**. IF 2016: 8.222.
- **SIAM Journal on Imaging Sciences (SIIMS) since 2010**. IF 2016: 2.485.
- **Journal of Mathematical Imaging and Vision since 2014**. IF 2016: 1.994.

Journal Reviewer for: Biometrika, Chaos, Proceedings on the London Mathematical Society (PLMS), Proc. of the Nat. Academy of Science (PNAS), Journal of Computational and Applied Mathematics (JCAM), Foundations of Computational Mathematics (FoCM), Methods of Information in Medicine (MIM), NeuroImage (NIMG), Journal of Machine Learning Research (JMLR), 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, 2016.
- 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, 2016.
- ISBI (Int. Symposium on Biomedical Imaging) 2002, 2004, 2006, 2007, 2008.
- RFIA RFP 2016 (Reconnaissance de Formes et Perception).
- CDMRI (Computational Diffusion MRI) 2008, 2010, 2011, 2012, 2013, 2014.
- 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.
- Diff-CVML (Int. W. on Differential Geometry in Computer Vision) 2016, 2017.
- VG (IEEE/EG Int. Symp. on Volume Graphics) 2007, 2008, 2010.
- ManifLearn 2017, ECCV 2016, STACOM 2010, Mathematics of Surfaces 2009, PPMIA 2009, MICCAI-grid 2008, MLMI 2008, CVPR 2006, SA2PM 2006, DEFORM 2006, EUROGRAPHICS 2005, DI-DAMIC 2004, AMI-ARCS 2004, HealthGrid 2003, FIMH 2003, GRETSI 2003, IJCAI 1999.

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 Council (**ERC**) in 2017 & 2013 (StG); 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, 2011, 2016; the Air Force Office of Scientific Research (**AFOSR, US**) in 2009; the US-Israel Binational Science Foundation (**BSF, US, IL**) in 2010;

- National (FR)
 - Committee for International Chairs, INRIA, 2017, 2018.
 - Commission de spécialistes PR26 (Math professor search 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**), 2009 to 2013, 2017; the **University Grenoble Alpes** in 2016; the Ecole Normale Supérieure PhD fellowships (**ENS Cachan**) 2016; the French Cluster of research in Information Science and Technology (**Digitéo**) in 2011; the French National Center for Scientific Research **CNRS** (PEPII) in 2011.
- Local (Nice Sophia-Antipolis, FR)
 - Ecole doctorale STIC (EDSTIC) of the University Cote d’Azur: Deputy Director (2017-), member of the board (2016-).
 - Steering committee of the University Côte d’Azur academy 4 on “Living systems Complexity and diversity” (2016-).
 - ”Comité de la Recherche Biomédicale en Santé Publique (CRBSP)” of the Nice hospitals (2016-).
 - In charge of the relationship between Inria-Sophia Antipolis Méditerranée research center and the Nice University Department (Faculté de Medecine) (2013-).
 - Doctoral follow-up Committee (CSD) at INRIA Sophia Antipolis (2010-).
 - Comité de Centre of Inria Sophia-Antipolis Méditerranée (2013-2016).
 - International Master 2 “Computational Biology” (Master IFI of the university of Nice): Steering committee (2009-2015); Co-responsible of the master (2015-2017).
 - 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

- Baptiste Moreau, University of Montpellier II, FR, March 2018. Reviewer.
- Rémi Agier, INSA Lyon, FR, 2017. Reviewer,
- Joan Alexis Glaunes (HDR), U. Paris Descartes, FR, 2017.
- Alice Le Briguant, U. Bordeaux, FR, July 2017. Reviewer.
- Jean-Baptiste Schiratti, University Paris Saclay, FR, January 2017.
- Thomas Benseghir, University of Nice-Sophia Antipolis, FR, 2015. President of the jury.
- Laurence Rouet (HDR), U. Paris-Decsartes, FR, 2015. Reviewer.
- Stéphanie Allassonnière (HDR), ENS Cachan, FR, Novembre 2013. Reviewer.
- Fabrice Michel, Ecole Centrale, FR, Octobre 2013. Reviewer.
- Aymeric Stamm, university of Rennes, FR, Novembre 2103.
- Kevin Sol, University of Montpellier II, FR, December 2013. Reviewer.
- Jean-Baptiste Fiot, University Paris Dauphine, FR, September 2013. Reviewer.
- Barthélémy Serres, University of Tours, FR, July 2013. President of the jury.
- Nicolas Duchateau, U. Pompeu Fabra, Barcelona, SP, 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.
- L. Devillier, 2017; R.-Ph. Mollero, 2017; M.-M. Rohé, 2017; N. Miolane, 2016; M. Hadj-Hamou, 2016; B. Khanal, 2016; V. Gupta, 2015; K. McLeod, 2013; M. Lorenzi, 2012; 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. [Statistics for Data with Geometric Structure](#), Mathematisches Forschungsinstitut Oberwolfach (DE), 21-27 January 2018.
2. [Mathematics and Image Analysis \(MIA 2018\)](#), 15-17 January 2018, Berlin, Germany.
3. [Computational Brain Connectivity Mapping Winter School Workshop \(CoBCoM 2017\)](#), November 20-24 2017, Juan-les-Pins, France.
4. [3rd Int. W on Differential geometry in Comp. Vis. and Machine Learning \(DIFF-CVML\)](#), Hawaii, USA, 21 July 2017.
5. [VIth Int. W. on Representation, analysis and recognition of shape and motion From Imaging data \(RFMI 2016\)](#), Sidi Bou Said village, Tunisia, October 27-29 2016.
6. [International Workshop on Geometry, PDE's and Lie Groups in Image Analysis](#), Eindhoven (NL) 24-26 August 2016.
7. [Workshop on Geometry and Stochastics of Nonlinear, Functional and Graph Data](#), Bornholm (DK), 15-19 August 2016.
8. [12th IEEE IVMSP Workshop 2016](#), Bordeaux (FR), July 11-12, 2016.
9. [Statistical Analysis of Manifold-Valued Data and Beyond: Nottingham workshop](#), 4-6 April 2016, UK.
10. [Mathematical Imaging and Surface Processing](#), Mathematisches Forschungsinstitut Oberwolfach (DE), 24-30 January 2016.
11. [Programme on Infinite-Dimensional Riemannian Geometry](#) with Applications to Image Matching and Shape Analysis, Schrödinger institute, Vienna, February 2015.
12. [2015 Joint Mathematics Meetings \(AMS/MAA\)](#) AMS Special Session on Differential Geometry and Statistics, San Antonio, Texas, January 2015.
13. [Geometry of Information and Optimization \(GIO\)](#), Bordeaux, December 4-5, 2014.
14. [Geometrical Models in Vision workshop](#), semester on Geometry, Analysis and Dynamics on Sub-Riemannian Manifolds, Institut Henry Poincaré, Paris - October 22nd-24th, 2014.

15. [MICCAI PC Workshop](#), Cambridge, MA, USA, May 16, 2014.
16. [Seminar at Collège de France](#) within the chair "Informatique et sciences numériques" of Nicholas Aya-ache on the personalized digital patient, Paris, May 13, 2014.
17. [Symposium on Statistical Shape models & Applications \(Shape 2014\)](#), Delémont, Swiss, June 11-13 2014. Keynote speaker.
18. [IMA Annual Program Year Workshop on Topological Structures in Computational Biology](#), Minneapolis, US, December 9-13, 2013.
19. [Advances in Matrix Functions and Matrix Equations \(FUN13\)](#), Manchester, UK, April 10-12, 2013.
20. [Distinguished seminar series, SCI institute](#), Salt-Lake City, February 13 2013.
21. [Geometric Mechanics and Shape, NZMRI workshop 2013](#), Ohope beach, New Zealand, January 13-19, 2013.
22. [Geometry and Statistics in Bioimaging: Manifolds and Stratified Spaces](#), Sonderborg, DK, October 8-12, 2012.
23. [STACOM 2012](#) (MICCAI workshop and challenge on Statistical Atlases and Computational Models of the Heart: Imaging and Modeling Challenges), Nice, October 5, 2012.
24. [1ères rencontres Technologies de l'Information et de la Communication pour la santé mentale](#), 21 et 22 octobre 2011, Nice et Monaco.
25. [Geometry for Anatomy](#), Banff International Research Station for Mathematical Innovation and Discovery (BIRS) workshop, Banff, Alberta, Canada, Aug. 28 - Sep. 2, 2011.
26. [Fields-MITACS Conference on Mathematics of Medical Imaging, Fields Institute](#), Toronto, Canada, June 20-24, 2011.
27. [Workshop on Manifold Learning, Hausdorff Research Institute for Mathematics](#), Bonn, Germany, May 30 - June 3, 2011. ([Abstracts book](#)).
28. [Colloquium "Le modèle et l'algorithme"](#), INRIA Rocquencourt, March 3 2011. ([Video](#)).
29. [Indo-French workshop on Matrix Information Geometry \(MIG\)](#), Thales & Ecole Polytechnique, Palaiseau, February 23-25, 2011. ([Abstracts book](#)).
30. [Trends in Mathematical Imaging and Surface Processing, Mathematisches Forschungsinstitut Oberwolfach](#), Germany January 30th - February 5th, 2011. ([Abstract book](#)).
31. [10th Symposium of Mathematical Aspects of Image Processing and Computer Vision \(MAIPCV 2010\)](#), Sapporo, Hokkaido Univ. November 25-27, 2010.
32. [Workshop on Biomedical Image registration \(WBIR'2010\)](#), Lübeck, July 12-13 2010.
33. [Traumatic Brain Injury Diffusion Tensor Imaging Roadmap Workshop](#), Chicago, June 7-8, 2010.
34. [Leon Brillouin trans-disciplinary seminar](#), GdR Science de Géométrie de l'Information, Paris, Mai 28, 2010. ([Video](#)).
35. [Trimestrial colloquium of the Jean Kuntzmann Laboratory, Grenoble](#), June 11 2009.
36. [Emerging Trends in Visual Computing \(ETVC'08\)](#), Ecole Polytechnique, November 18th-20th, 2008. <http://www.lix.polytechnique.fr/Labo/Frank.Nielsen/ETVC08/>
37. [Journées MAS de la SMAI](#) (french applied and industrial mathematical society). Rennes, August 29, 2008 <http://mas2008.univ-rennes1.fr/>.
38. [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/>
39. [Interdisciplinary Workshop on 3D Paleo-Anthropology, Anatomy, Computer Science & Engineering - Synergies for the Future](#), Toulouse, June 19-20 2008.
40. [Mathematical meeting "Statistical modeling of images"](#), Luminy, Mai 5-9, 2008.

41. “Mathematics and Life-Science”, Dieudonné lab.-INRIA meeting, Nice, November 16, 2007.
42. [Statistical Registration: Pair-wise and Group-wise Alignment and Atlas Formation](#). MICCAI’07 Workshop, Brisbane, Australia, November 2, 2007.
43. SAMSI Summer 2007 Program on the Geometry and Statistics of Shape Spaces, Raleigh, NC, USA, July 7-13, 2007.
44. 15th ERNSI (European Network on System Identification) Workshop. Linköping, Sweden. September 20-21, 2006.
45. Mathematics and Image Analysis (MIA’06), Paris, 18-21 September, 2006.
46. Shape Spaces. IMA, Minneapolis, April 3-7, 2006.
47. Conference-winter school on singularities and applications, CIRM, Luminy, February 7-11, 2005.
48. Workshop on Computational Topology (ECG’02), Sophia-Antipolis, October 21-25, 2002.
49. CARS 2002, “Validation of medical image processing in image-guided therapy session”, Paris, June 2002.
50. Journées “Mathématiques et sciences du vivant”, Nice-Sophia Antipolis University, March 2002.
51. First Astronomical and Medical Imaging Meeting (AMI’01), Royal Statistical Society, London, UK, April 2001.
52. Journées Statistiques, INRIA Rennes IRISA, 15-16 November 2001.
53. Image Analysis and High Level Vision, IMA workshop, Minneapolis, MN, USA, December 13-17, 2000.

Invited seminars in universities

1. [MIT CSAIL](#), Cambridge, MA, September 8 2017.
2. Imaging Genetics Center at USC, Marina del Rey, Los Angeles, CA, USA, 19 July 2017.
3. [Colloquium of the Dieudonné \(JAD\) Lab](#), Nice University, October 10, 2016.
4. Center for Health Sciences, SRI international, Menlo Park, USA, June 4 2015.
5. [Statistics Department Seminar, Stanford University, April 21, 2015](#).
6. Séminaire de théorie du contrôle, Univ. Toulon, Decembre 11, 2014.
7. [Laboratoire de Mécanique](#), Lille, March 20 2014.
8. Hamiltonian Dynamics Seminar, Chair of Geometric Analysis Section de Mathématiques, EPFL, Lausanne, October 9, 2013.
9. Thematic day on initial stress for geomechanical models at IFP Energies nouvelles (IFPEN), Rueil-Malmaison, Sept. 19, 2013.
10. PENN Image Computing and Science Lab (PICSL), Philadelphia, May 23, 2012.
11. Minisymposium on 4D Medical Imaging, SIAM Imaging Science Conf., Philadelphia, May 20-22, 2012.
12. 23rd GRETSI Symposium on Signal and Image Processing, Bordeaux, September 5-8 2011. Special session on Information Geometry Sciences.
13. UCL Center for Medical Imaging (CMIC), London, January 26, 2011.
14. Department of Computing, Imperial College, London, January 25, 2011.
15. Colloquium “Le modèle et l’algorithme”, INRIA Rocquencourt, March 3 2011.
16. International seminar of the Computational anatomy project, Tokyo, November 24, 2010.
17. Leon Brillouin transdisciplinary seminar, GdR Science de Géométrie de l’Information, Paris, Mai 28, 2010.

18. Trimestrial colloquium of the Jean Kuntzmann Laboratory, Grenoble, June 11 2009.
19. Systems and Modeling Seminar Series, Montefiore Institute, University of Liège, Belgium, April 3, 2009.
20. Join GdR Isis / GdR Stic-Sante meeting day on diffusion imaging, ENST, Paris, December 9, 2008.
21. CSAIL, MIT (Biomedical Imaging and Analysis seminar series), September 12, 2008.
22. Probability and Statistics Lab (LSP), Toulouse, February 19, 2008.
23. Institut de Mathématiques et de Modélisation de Montpellier, Mai 21, 2007.
24. GIPSA-lab (ex LIS), Grenoble, France, April 26, 2007.
25. Johns Hopkins University, Baltimore, USA, April 2006.
26. University of Utah, Salt Lake City, USA, July 2005.
27. University of North-Carolina (UNC) at Chapel Hill, USA, July 2005.
28. University of Southern California (USC) Los-Angeles, USA, July 2004.
29. Technical University of Denmark (DTU), Copenhagen, March 2003.
30. University of Grenada, Spain, December 1999.
31. Université Claude Bernard Lyon 1, France, March 1998.
32. Artificial Intelligence Lab. Seminar Series, MIT, Cambridge, Mass, USA, March 1997.
33. Université Claude Bernard Lyon 1, France, April 1996.
34. Lab. Biologie Moléculaire des Relations Plantes-Micro-organismes (LBMRPM), Toulouse, April 1995.

Supervision of research activities

Former PhD Students

1. **Roch-Philippe Mollero** (2014-2017): *Uncertainty quantification in personalized electromechanical models. Application to cardiomyopathies and obesity.* Co-supervision with M. Sermesant and N. Ayache.
2. **Loic Devillier** (2015-2017): *Consistency of statistics on infinite dimensional orbifolds - Applications to computational anatomy.* Co-supervision with Stéphanie Allasonnière.
3. **Marc-Michel Rohé** (2014-2017): *Reduced Representation of Segmentation and Tracking in Cardiac Images for Group-wise Longitudinal Analysis.* Co-supervision with M. Sermesant. Currently research engineer at Median technologies (Sophia-Antipolis, FR).
4. **Nina Miolane** (2013-2016): *Geometric Statistics in Computational Anatomy: Template Estimation and Subspace Learning in Manifolds, Lie groups and Stratified Spaces.* Co-supervision with S. Holmes (Stanford U.). First prize in the “Popular Vote Awards” at the MICCAI 2014 Educational Challenge for their video on “Statistics on Lie groups for Computational Anatomy”. Awardee of a **l’Oréal-UNESCO 2016 Fellowship for Women In Science**. **Second prize of the regional “My thesis in 180 seconds”** competition in Nice in April 2017. Currently Inria@SiliconValley **Post-Doctoral Fellow**.
5. Mehdi Hadj-Hamou (2012-2016): *Biophysical modeling of the anatomical evolution of the brain.* Co-supervision with N. Ayache.
6. Bishesh Khanal (2012-2016): *Modeling the atrophy of the brain in Alzheimer’s disease.* Currently Post-doc at Imperial Colledge London, UK.
7. **Vikash Gupta** (2012-2015): *Diffusion tensor imaging of the brain: towards quantitative clinical tools.* Currently Post-doct at LONI, USC.
8. **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. Currently Lead Engineer at **GE Healthcare**, Oslo, Norway

9. **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.
10. **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.
11. **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.
12. **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).
13. **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. Trounev, 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).
14. **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.
15. **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.
16. **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. **Medical Image Analysis (MedIA) 2016 best paper award and MICCAI 2013 "Young Scientist Publication Impact Award"**. Currently Senior Lecturer at University College London.
17. **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).
18. **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.

19. **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.
20. **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.
21. **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.
22. **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.
23. **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. **Shuman Jia** (2016-2019): *Population-based Model of Atrial Fibrillation: from Shape Statistics to Group-wise Physiology*. Co-supervision with Maxime Sermesant. **Best Challenge Paper Award at the 2016 STACOM Workshop**.

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 platforms 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 constraints*. 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. Yann Thanwerdas: *Barycentric subspace analysis for dimension reduction in EEG signals for Brain Computer Interfaces* Ecole centrale Paris (5 month in 2017).
2. Sofia Farina: *Barycentric subspaces registration for multi-atlas brain segmentation*. Master of Science in mathematics, University of Bologna, IT (Erasmus) (3 month in 2017).
3. 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).
4. Vikash Gupta: *Statistical atlases of diffusion tensor images*. Master Computational Biology and Biomedicine, Nice Sophia Antipolis University, France (6 month in 2011).
5. Andrew Sweet: *Computational anatomy of the brain: from DTI population analysis to inter-subject registration constrains*. Post master training period (6 month), 2009-2010.
6. Kristin McLeod. *Statistical shape analysis of the RV in rToF*. Post master training period (9 month in 2010).
7. Antoine Azar: *An Interactive Intensity- and Feature-Based Non-Rigid Registration Framework for 3D Medical Images*. Master IGMMV, University of Nice-Sophia Antipolis, 2005.
8. Pierre Fillard: *A Riemannian Framework for Tensor Imaging*. Master Optique-Image-Vision, Jean Monnet University, Saint-Etienne, 2004.
9. Heike Hufnagel: *Robust deformable registration of medical images using block matching*. Diploma Thesis, University of Luebeck, Germany, 2004.
10. Radu-Constantin Stefanescu: *Parallelization of registration algorithms*. DEA, Ecole Polytechnique, 2001.
11. Niels Raynaud: *A statistical approach for liver segmentation from tri-dimensional images*. DEA Mathématiques, Vision, Apprentissage, ENS Cachan, 2000.
12. Alejandro Ribes: *2D-3D registration for augmented reality*. DEA ARAVIS, University of Nice-Sophia-Antipolis, 1999.
13. Pascal Cachier: *Registration of tri-dimensional ultrasonic images*. DEA Math. and Artificial Intelligence, ENS Cachan, 1998.
14. Frédéric Nahon: *Image registration by maximization of mutual information*. Graduate degree, École Polytechnique, 1996.

Teaching

Courses

- Master 2 Computational Biology, University of Nice-Sophia Antipolis, *Computational Anatomy and Physiology module*, module responsible, 15h (2009-2017). Responsible for the Master (2015-2017).
- Master 2 MVA (first semester). *Medical imaging*. Sept. to December 2011 to 2017 (12h).
- Master 2 MVA / Ecole Centrale Paris (Applied math option, 3rd year). *Statistical computing on manifolds and data assimilation: from medical images to anatomical and physiological models*. January to March 2008 to 2018. (15h).
- DIU (Inter-University Diploma) Radiothérapie externe haute technicité, *Recalage d'images médicales et atlas anatomiques*, November 2012, 1h30, November 2013, 1h.
- 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

- *Minicourse on shape spaces and geometric statistics* with A. Trounev at TGSI, CIRM, Luminy, August 31 2017, 1h ([video](#)).
- *Geometric structures for statistics on shapes and deformations in computational anatomy*. [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.
- *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, New-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 (2013-2017)**: *Model-Driven European Paediatric Digital Repository*. (INRIA amount: 443 k€). Industrial partners: Siemens AG (DE), Siemens SCR (USA), Maat France (FR), MOTTEK (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.
- **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 multiple image registration for mosaicing*.
- **Median (2006-2007 & 2017):** 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).
- **Medtronic (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 (2015-2020):** *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 tomography(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 through 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.

Software

- **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 the 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

- **Fellow of the Medical Image Analysis and Computer Assisted Intervention (MICCAI) scientific society** for “pioneering theoretical contributions grounding the field of computational anatomy, shape statistics and medical image computing” (2017).
- 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 Zubizaray, 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

- 2016 **Nina Miolane:** [L'Oréal-UNESCO 2016 Fellowship for Women In Science.](#)
- 2015 **Marco Lorenzi:** [Honorary mention at the 2015 Cor Baayen Award.](#)
- 2010 **S. Durrleman:** [second Gilles Kahn Prize](#) (Soc  t   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](#) (Soc  t   Informatique de France and Academy of Sciences).

Other awards

- 1997 INRIA Post-doctoral Fellowship, 1997.
- 1996 PhD with outstanding praises (mention tr  s honorable avec les f  licitations du jury),   cole Polytechnique (Palaiseau), 1996.
- 1993 DRET/CNRS PhD Fellowship, 1993-1996.
- 1992 DEA fellowship from the Ecole Polytechnique, 1992-1993.
- 1987 Baccalaur  at with highest praises (mention tr  s 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 distortions 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 as 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 retrieved with citation ranks at [Google scholar](#); [ISI web of science / Researcher ID](#); [Scopus](#).

- 74 Journals, 6 proceedings, 148 peer-reviewed and archived conference articles, 12 book chapters or invited articles;
- 16,866 citations, h-index of 60 ([Google scholar](#), Feb. 2018); 36 papers over 100 citations.
- 6,151 citations for 136 publications and a h-index of 37 on [ResearcherID](#);
- 8,513 citations for 244 documents and a h-index of 45 in [Scopus](#);
- 89 [Pubmed entries](#)

Original contributions in international peer-reviewed journals

- [1] Marc-Michel Rohé, Maxime Sermesant, and Xavier Pennec. Low-Dimensional Representation of Cardiac Motion Using Barycentric Subspaces: a New Group-Wise Paradigm for Estimation, Analysis, and Reconstruction. *Medical Image Analysis*, 45:1–12, April 2018.
- [2] Xavier Pennec. Barycentric Subspace Analysis on Manifolds. *Annals of Statistics*, 2017.
- [3] Jan L. Bruse, Maria A. Zuluaga, Abbas Khushnood, Kristin Mcleod, Hopewell N. Ntsinjana, Tain-Yen Hsia, Maxime Sermesant, Xavier Pennec, Andrew M. Taylor, and Silvia Schievano. Detecting clinically meaningful shape clusters in medical image data: metrics analysis for hierarchical clustering applied to healthy and pathological aortic arches. *IEEE Transactions on Biomedical Engineering*, pages 1 – 13, February 2017.
- [4] Jan L. Bruse, Abbas Khushnood, Kristin Mcleod, Giovanni Biglino, Maxime Sermesant, Xavier Pennec, Andrew M. Taylor, Tain-Yen Hsia, and Silvia Schievano. How successful is successful? Aortic arch shape after successful aortic coarctation repair correlates with left ventricular function. *Journal of Thoracic and Cardiovascular Surgery*, 153(2):418 – 427, February 2017.
- [5] Loïc Devilliers, Stéphanie Allasonnière, Alain Trouvé, and Xavier Pennec. Inconsistency of template estimation by minimizing of the variance/pre-variance in the quotient space. *Entropy*, 19(6):28, June 2017.

- [6] Loïc Devilliers, Stéphanie Allasonnière, Alain Trouvé, and Xavier Pennec. Template estimation in computational anatomy: Fréchet means in top and quotient spaces are not consistent. *SIAM Journal on Imaging Sciences*, 10(3):1139–1169, August 2017.
- [7] Bishesh Khanal, Nicholas Ayache, and Xavier Pennec. Simulating Longitudinal Brain MRIs with known Volume Changes and Realistic Variations in Image Intensity. *Frontiers in Neuroscience*, 11(Article 132):18, February 2017.
- [8] Nina Miolane, Susan Holmes, and Xavier Pennec. Template Shape Estimation: Correcting an Asymptotic Bias. *SIAM Journal on Imaging Sciences*, 10(2):808 – 844, 2017.
- [9] Roch Molléro, Xavier Pennec, Hervé Delingette, Alan Garny, Nicholas Ayache, and Maxime Sermesant. Multifidelity-CMA: a multifidelity approach for efficient personalisation of 3D cardiac electromechanical models. *Biomechanics and Modeling in Mechanobiology*, pages 1–16, September 2017.
- [10] Naiara Rodriguez-Florez, Jan L. Bruse, Alessandro Borghi, Herman Vercrusse, Juling Ong, Greg James, Xavier Pennec, David J. Dunaway, Owase Jeelani, and Silvia Schievano. Statistical shape modelling to aid surgical planning: associations between surgical parameters and head shapes following spring-assisted cranioplasty. *International Journal of Computer Assisted Radiology and Surgery*, pages 1–11, May 2017.
- [11] Avan A Suinesiaputra, Pierre A Ablin, Xènia A Albà, Martino Alessandrini, Jack A Allen, Wenjia Bai, Serkan Çimen, Peter Claes, Brett R Cowan, Jan D’Hooge, Nicolas Duchateau, Jan Ehrhardt, Alejandro F. Frangi, Ali A Gooya, Vicente Grau, Karim Lekadir, Allen A Lu, Anirban A Mukhopadhyay, Ilkay Oksuz, Nripesh Parajuli, Xavier Pennec, Marco Pereañez, Catarina Pinto, Paolo Piras, Marc-Michel Rohé, Daniel R Rueckert, Dennis Säring, Maxime Sermesant, Kaleem Siddiqi, Mahdi Tabassian, Luciano Teresi, Sotirios A Tsaftaris, Matthias Wilms, Alistair A Young, Xingyu Zhang, and Pau Medrano-Gracia. Statistical shape modeling of the left ventricle: myocardial infarct classification challenge. *IEEE Journal of Biomedical and Health Informatics*, page 13, 2017. In press.
- [12] Jan L. Bruse, Kristin Mcleod, Giovanni Biglino, Hopewell N. Ntsinjana, Claudio Capelli, Tain-Yen Hsia, Maxime Sermesant, Xavier Pennec, Andrew M. Taylor, and Silvia Schievano. A statistical shape modelling framework to extract 3D shape biomarkers from medical imaging data: assessing arch morphology of repaired coarctation of the aorta. *BMC Medical Imaging*, 16(1), May 2016.
- [13] 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*, 10(236):18, June 2016.
- [14] 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, July 2016.
- [15] David M. Cash, Chris Frost, Leonardo O. Ithome, 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.
- [16] 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.
- [17] 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.
- [18] 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.

- [19] Nina Miolane and Xavier Pennec. Computing Bi-Invariant Pseudo-Metrics on Lie Groups for Consistent Statistics. *Entropy*, 17(4):1850–1881, April 2015.
- [20] 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.
- [21] 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.
- [22] 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, 2014.
- [23] 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.
- [24] 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.
- [25] 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.
- [26] 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.
- [27] 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.
- [28] 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.
- [29] Catalina Tobon-Gomez, Mathieu De Craene, Kristin Mcleod, Lennart Tautz, Wenzhe Shi, Anja Henemuth, 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.
- [30] 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.
- [31] 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.
- [32] 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.
- [33] 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.
- [34] 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.

- [35] 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.
- [36] 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.
- [37] 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.
- [38] 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.
- [39] 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.
- [40] 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.
- [41] 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.
- [42] 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.
- [43] 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.
- [44] 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.
- [45] 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.
- [46] 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.
- [47] 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.
- [48] 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.
- [49] 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.
- [50] 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.

- [51] 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.
- [52] 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.
- [53] 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.
- [54] Vincent Arsigny, Pierre Fillard, Xavier Pennec, and Nicholas Ayache. Log-Euclidean metrics for fast and simple calculus on diffusion tensors. *Magnetic Resonance in Medicine*, 56(2):411–421, August 2006.
- [55] Hervé Delingette, Xavier Pennec, Luc Soler, Jacques Marescaux, and Nicholas Ayache. Computational models for image guided, robot-assisted and simulated medical interventions. *Proceedings of the IEEE*, 94(9):1678–1688, September 2006.
- [56] Xavier Pennec. Intrinsic statistics on Riemannian manifolds: Basic tools for geometric measurements. *Journal of Mathematical Imaging and Vision*, 25(1):127–154, July 2006. A preliminary appeared as INRIA RR-5093, January 2004.
- [57] Xavier Pennec, Pierre Fillard, and Nicholas Ayache. A Riemannian framework for tensor computing. *International Journal of Computer Vision*, 66(1):41–66, January 2006. A preliminary version appeared as INRIA Research Report 5255, July 2004.
- [58] Tom Vercauteren, Aymeric Perchant, Grégoire Malandain, Xavier Pennec, and Nicholas Ayache. Robust mosaicing with correction of motion distortions and tissue deformation for in vivo fibered microscopy. *Medical Image Analysis*, 10(5):673–692, October 2006. Annual Medical Image Analysis (MedIA) Best Paper Award 2006. PMID: 16887375.
- [59] Vincent Arsigny, Xavier Pennec, and Nicholas Ayache. Polyrigid and polyaffine transformations: a novel geometrical tool to deal with non-rigid deformations - application to the registration of histological slices. *Medical Image Analysis*, 9(6):507–523, December 2005.
- [60] C. Germain, V. Breton, P. Clarysse, Y. Gaudeau, T. Glatard, E. Jeannot, Y. Legré, C. Loomis, I. Magnin, J. Montagnat, J.-M. Moureau, A. Osorio, X. Pennec, and R. Texier. Grid-enabling medical image analysis. *Journal of Clinical Monitoring and Computing*, 19(4-5):339–349, October 2005.
- [61] Stéphane Nicolau, Alain Garcia, Xavier Pennec, Luc Soler, and Nicholas Ayache. An augmented reality system to guide radio-frequency tumor ablation. *Computer Animation and Virtual World (previously the Journal of Visualization and Computer Animation)*, 16(1):1–10, 2005.
- [62] Radu Stefanescu, Xavier Pennec, and Nicholas Ayache. A grid service for the interactive use of a parallel non-rigid registration algorithm of medical images. *Methods of Information in Medicine*, 44(2), 2005.
- [63] Miguel Angel González Ballester, Xavier Pennec, Marius George Linguraru, and Nicholas Ayache. Generalized image models and their application as statistical models of images. *Medical Image Analysis*, 8(3):361–369, September 2004.
- [64] Radu Stefanescu, Xavier Pennec, and Nicholas Ayache. Grid powered nonlinear image registration with locally adaptive regularization. *Medical Image Analysis*, 8(3):325–342, September 2004.
- [65] Radu Stefanescu, Xavier Pennec, and Nicholas Ayache. Grid-enabled non-rigid registration of medical images. *Parallel Processing Letters*, 14(2):197–216, 2004.
- [66] Pascal Cachier, Eric Bardinet, Didier Dormont, Xavier Pennec, and Nicholas Ayache. Iconic feature based nonrigid registration: The pasha algorithm. *Computer Vision and Image Understanding*, 89(2-3):272–298, Feb.-march 2003. Special Issue on Nonrigid Registration.

- [67] Xavier Pennec, Pascal Cachier, and Nicholas Ayache. Tracking brain deformations in time-sequences of 3d us images. *Pattern Recognition Letters*, 24(4-5):801–813, February 2003. Special Issue on Ultrasonic Image Processing and Analysis.
- [68] Maxime Sermesant, Clément Forest, Xavier Pennec, Hervé Delingette, and Nicholas Ayache. Deformable biomechanical models: Application to 4d cardiac image analysis. *Medical Image Analysis*, 7(4):475–488, December 2003.
- [69] Sébastien Ourselin, Alexis Roche, Gérard Subsol, Xavier Pennec, and Nicholas Ayache. Reconstructing a 3d structure from serial histological sections. *Image and Vision Computing*, 19(1-2):25–31, January 2001.
- [70] Alexis Roche, Xavier Pennec, Grégoire Malandain, and Nicholas Ayache. Rigid registration of 3d ultrasound with mr images: a new approach combining intensity and gradient information. *IEEE Transactions on Medical Imaging*, 20(10):1038–1049, October 2001.
- [71] Xavier Pennec. Toward a generic framework for recognition based on uncertain geometric features. *Videre: Journal of Computer Vision Research*, 1(2):58–87, 1998.
- [72] Xavier Pennec and Nicholas Ayache. Uniform distribution, distance and expectation problems for geometric features processing. *Journal of Mathematical Imaging and Vision*, 9(1):49–67, July 1998. A preliminary version appeared as INRIA Research Report 2820, March 1996.
- [73] Xavier Pennec and Nicholas Ayache. A geometric algorithm to find small but highly similar 3d substructures in proteins. *Bioinformatics*, 14(6):516–522, 1998.
- [74] André Guéziec, Xavier Pennec, and Nicholas Ayache. Medical image registration using geometric hashing. *IEEE Computational Science and Engineering*, 4(4):29–41, Oct-Dec 1997. special issue on Geometric Hashing.
- [75] Xavier Pennec and Jean-Philippe Thirion. A framework for uncertainty and validation of 3d registration methods based on points and frames. *International Journal of Computer Vision*, 25(3):203–229, December 1997.
- [76] J. West, J. M. Fitzpatrick, M. Y. Wang, B. M. Dawant, C. R. Maurer, Jr., R. M. Kessler, R. J. Maciunas, C. Barillot, D. Lemoine, A. Collignon, F. Maes, P. Suetens, D. Vandermeulen, P. A. van den Elsen, S. Napel, T. S. Sumanaweera, B. Harkness, P. F. Hemler, D. L. G. Hill, D. J. Hawkes, C. Studholme, J. B. A. Maintz, M. A. Viergever, G. Malandain, X. Pennec, M. E. Noz, G. Q. Maguire, Jr., M. Pollack, C. A. Pelizzari, R. A. Robb, D. Hanson, and R. P. Woods. Comparison and evaluation of retrospective intermodality brain image registration techniques. *Journal of Computer Assisted Tomography*, 21(4):554–566, 1997.

Book chapters

- [1] Xavier Pennec and Pierre Fillard. Statistical Computing on Non-Linear Spaces for Computational Anatomy. In Nikos Paragios, Jim Duncan, and Nicholas Ayache, editors, *Handbook of Biomedical Imaging: Methodologies and Clinical Research*, pages 147–168. Springer, 2015.
- [2] Marco Lorenzi and Xavier Pennec. Discrete Ladders for Parallel Transport in Transformation Groups with an Affine Connection Structure. In Frank Nielsen, editor, *Geometric Theory of Information, Signals and Communication Technology*, pages 243–271. Springer, 2014.
- [3] Kristin Mcleod, Tommaso Mansi, Maxime Sermesant, Giacomo Pongiglione, and Xavier Pennec. Statistical Shape Analysis of Surfaces in Medical Images Applied to the Tetralogy of Fallot Heart. In Frederic Cazals and Pierre Kornprobst, editors, *Modeling in Computational Biology and Biomedicine*, Lectures Notes in Mathematical and Computational Biology, pages 165–191. Springer, 2013.
- [4] Xavier Pennec and Vincent Arsigny. Exponential Barycenters of the Canonical Cartan Connection and Invariant Means on Lie Groups. In Frederic Barbaresco, Amit Mishra, and Frank Nielsen, editors, *Matrix Information Geometry*, pages 123–168. Springer, May 2012.

- [5] Nicholas Ayache, Olivier Clatz, Hervé Delingette, Grégoire Malandain, Xavier Pennec, and Maxime Sermesant. Asclepios: a Research Project-Team at INRIA for the Analysis and Simulation of Biomedical Images. In Y. Bertot, G. Huet, J.-J. Lévy, and G. Plotkin, editors, *From semantics to computer science: essays in honor of Gilles Kahn*, pages 415–436. Cambridge University Press, 2009.
- [6] Cecile Germain-Renaud, Vincent BRETON, Patrick Clarysse, Bertrand Delhay, Yann Gaudeau, Tristan Glatard, Emmanuel Jeannot, Yannick Legre, Johan Montagnat, Jean-Marie Moureaux, Angel Osorio, Xavier Pennec, Joel Schaerer, and Romain Texier. Grid Analysis of Radiological Data. In Mario Cantataro (Ed.), editor, *Handbook of Research on Computational Grid Technologies for Life Sciences, Biomedicine and Healthcare*, chapter 19, pages 363–391. IGI, May 2009. IGI-Global Medical Information Science Discoveries Research Award 2009.
- [7] Ender Konukoglu, Xavier Pennec, Olivier Clatz, and Nicholas Ayache. Tumor growth modeling in oncological image analysis. In I. Bankman, editor, *Handbook of Medical Image Processing and Analysis - New edition*, chapter 18, pages 297–307. Academic Press, December 2008.
- [8] Xavier Pennec, Nicholas Ayache, and Jean-Philippe Thirion. Landmark-based registration using features identified through differential geometry. In I. Bankman, editor, *Handbook of Medical Image Processing and Analysis - New edition*, chapter 34, pages 565–578. Academic Press, December 2008.
- [9] X. Pennec. Statistical computing on manifolds: from Riemannian geometry to computational anatomy. In Frank Nielsen, editor, *Emerging Trends in Visual Computing*, volume 5416 of *LNCS*, pages 347–386. Springer, 2008.
- [10] Xavier Pennec, Alexis Roche, Pascal Cathier, and Nicholas Ayache. Non-rigid MR/US registration for tracking brain deformations. In R.S. Blum and Zh. Liu, editors, *Multi-Sensor Image Fusion and Its Applications*, volume 26 of *Signal Processing and Communications*, chapter 4, pages 107–143. CRC Press - Taylor and Francis, July 2005.
- [11] Ignacio Blanquer, Vincent Hernandez, Guy Lonsdale, Kevin Dean, Sharon Lloyd, Richard McClatchey, Johan Montagnat, Mike Brady, Xavier Pennec, Howard Bolofsky, Chris Jones, Martin Hofmann, Tony Solmonides, Ilidio C. Oliveira, Juan Pedro Sanchez, Victoria Lopez, George De Moor, Brecht Claerhout, and Jean A.M. Harveg. Healthgrid white paper: <http://whitepaper.healthgrid.org/>. Edited by Cisco System. Also in *Studies in Health Technology and Informatics* volume 112, 2005, p.249-321 (PMID: 15923733), September 2004.
- [12] Xavier Pennec, Nicholas Ayache, and Jean-Philippe Thirion. Landmark-based registration using features identified through differential geometry. In I. Bankman, editor, *Handbook of Medical Imaging*, chapter 31, pages 499–513. Academic Press, September 2000.

Editorials and general purpose magazine articles

- [1] Xavier Pennec, Sarang Joshi, and Mads Nielsen. Mathematical Methods for Medical Imaging, August 2013. Editorial of the special issue following the Mathematical Foundations of Computational Anatomy (MFCA) 2011 workshop. *International Journal of Computer Vision: Volume 105, Issue 2 (2013)*, Page 109-110.
- [2] Nicholas Ayache, Olivier Clatz, Hervé Delingette, Grégoire Malandain, Xavier Pennec, and Maxime Sermesant. Vers un patient numérique personnalisé pour le diagnostic et la thérapie guidés par l’image [Towards a personalized digital patient for diagnosis and therapy guided by image]. *médecine/sciences*, 27(2):208–13, February 2011.
- [3] Xavier Pennec. From Riemannian geometry to computational anatomy of the brain. *ERCIM News* No.69, p.15-16, January 2007. Special issue on the Digital Patient.
- [4] Xavier Pennec and Pierre Fillard. Avons-nous tous le même cerveau? In *Voir l’invisible*, p.112-113, Omniscience, December 2007.
- [5] Xavier Pennec and Pierre Fillard. Les autoroutes de l’information neuronale. In *Voir l’invisible*, p.116-117, Omniscience, December 2007.
- [6] Xavier Pennec. A european paediatric platform. *INédit* 56, p.4, November 2006.

- [7] Xavier Pennec. Recaler pour mieux soigner. *Pour la science*, 338:126–131, December 2005.
- [8] Luc Soler, Nicholas Ayache, Stéphane Nicolau, Xavier Pennec, Clément Forest, Hervé Delingette, Didier Mutter, and Jacques Marescaux. Traitements d’images médicales pour la planification, la simulation et l’aide intra-opératoire des actes chirurgicaux. In M. Faupel, P. Smigielski, and R. Grzymala, editors, *Imagerie et Photonique pour les sciences du vivant et la médecine*, pages 19–31. Edition Fontis Media, 2004.
- [9] Luc Soler, Nicholas Ayache, Stéphane Nicolau, Xavier Pennec, Clément Forest, Hervé Delingette, and Jacques Marescaux. Traitement d’images médicales pour la planification, la simulation et l’aide intra-opératoire des actes chirurgicaux. *La Revue de l’Electricité et de l’Electronique*, pages 64–71, janvier 2004.
- [10] P. Jannin, J.M. Fitzpatrick, D.J. Hawkes, X. Pennec, R. Shahidi, and M.W. Vannier. Validation of medical image processing in image-guided therapy. *IEEE Transactions on Medical Imaging*, 21(12):1445–1449, December 2002.

Books and proceedings

- [1] Jorge M. Cardoso, Tal Arbel, Enzo Ferrante, Xavier Pennec, Dalca Adrian V., Sarah Parisot, Sarang Joshi, Nematollah K. Batmanghelich, Aristeidis Sotiras, Mads Nielsen, Mert Sabuncu, Fletcher Tom, Li Shen, Stanley Durrleman, and Stefan Sommer, editors. *Graphs in Biomedical Image Analysis, Computational Anatomy and Imaging Genetics First International Workshop, GRAIL 2017, 6th International Workshop, MFCA 2017, and Third International Workshop, MICGen 2017, Held in Conjunction with MICCAI 2017, Québec City, QC, Canada, September 10–14, 2017, Proceedings*, volume 10551 of *Lecture Notes in Computer Science*, France, September 2017.
- [2] Xavier Pennec, Sarang Joshi, Mads Nielsen, Thomas P. Fletcher, Stanley Durrleman, and Stefan Sommer, editors. *Proceedings of the fifth international workshop on Mathematical Foundations of Computational Anatomy (MFCA 2015)*, Munich, Germany, August 2015.
- [3] Stanley Durrleman, Thomas P. Fletcher, Guido Gerig, Marc Niethammer, and Xavier Pennec, editors. *Spatio-temporal Image Analysis for Longitudinal and Time-Series Image Data*, volume 8682 of *Lecture notes in computer science*, Cambridge, United States, January 2015. Springer International Publishing.
- [4] Xavier Pennec, Sarang Joshi, Mads Nielsen, Tom P. Fletcher, Stanley Durrleman, and Stefan Sommer, editors. *Proceedings of the Fourth International Workshop on Mathematical Foundations of Computational Anatomy - Geometrical and Statistical Methods for Biological Shape Variability Modeling (MFCA 2013)*, Nagoya, Japan. Inria, August 2013.
- [5] Xavier Pennec, Sarang Joshi, and Mads Nielsen, editors. *Proceedings of the Third International Workshop on Mathematical Foundations of Computational Anatomy - Geometrical and Statistical Methods for Modelling Biological Shape Variability*. HAL, 2011.
- [6] Xavier Pennec and Sarang Joshi, editors. *Proceedings of the Second International Workshop on Mathematical Foundations of Computational Anatomy (MFCA’08) - Geometrical and Statistical Methods for Modelling Biological Shape Variability*. MICCAI, Inria, Hal, August 2008.
- [7] Xavier Pennec and Sarang Joshi, editors. *Proceedings of the First International Workshop on Mathematical Foundations of Computational Anatomy (MFCA’06) - Geometrical and Statistical Methods for Modelling Biological Shape Variability*. MICCAI - Inria, 2006.

Ph.D. and Habilitation Thesis

- [1] Xavier Pennec. *Statistical Computing on Manifolds for Computational Anatomy*. Habilitation à diriger des recherches, Université Nice Sophia-Antipolis, December 2006.
- [2] Xavier Pennec. *L’incertitude dans les problèmes de reconnaissance et de recalage – Applications en imagerie médicale et biologie moléculaire*. Thèse de sciences (phd thesis), Ecole Polytechnique, Palaiseau (France), December 1996.

Other publications

- [1] Irina Vidal-Migallón, Olivier Commowick, Xavier Pennec, Julien Dauguet, and Tom Vercauteren. GPU & CPU implementation of Young - Van Vliet's Recursive Gaussian Smoothing Filter. *Insight Journal (ITK)*, page 16, July 2013. Open peer-review journal. Open code / open data.
- [2] Xavier Pennec. Program of the MICCAI 2012 workshops, challenges and tutorials. Printed booklet distributed to 967 participants, Nice, oct 2012. 90 pages.
- [3] Xavier Pennec and the MICCAI Workshops / Challenges / Tutorials Organizers. Proceedings of the MICCAI 2012 workshops, challenges and tutorials. USB key distributed to 967 participants, Oct 2012. 4080 pages.
- [4] I. L. Dryden, Xavier Pennec, and Jean-Marc Peyrat. Power Euclidean metrics for covariance matrices with application to diffusion tensor imaging. ArXiv e-prints, September 2010.

Workshops et Conferences

Full length articles in selective international peer-reviewed conferences with printed proceedings

- [1] Loïc Devilliers, Xavier Pennec, and Stéphanie Allasonnière. Inconsistency of Template Estimation with the Fréchet mean in Quotient Space. In *Information Processing in Medical Imaging 2017*, Information Processing in Medical Imaging: 25th International Conference, IPMI 2017, Boone, NC, USA, June 25-30, 2017, Proceedings, page 12, Boone, United States, June 2017. Martin Styner and Marc Niethammer and Dinggang Shen and Stephen Aylward and Ipek Oguz and Hongtu Zhu.
- [2] Shuman Jia, Claudia Camaioni, Marc-Michel Rohé, Pierre Jaïs, Xavier Pennec, Hubert Cochet, and Maxime Sermesant. Prediction of Post-Ablation Outcome in Atrial Fibrillation Using Shape Parameterization and Partial Least Squares Regression. In *FIMH 2017 - International Conference on Functional Imaging and Modeling of the Heart*, volume 10263 of *Lecture Notes in Computer Science*, pages 314 – 321, Toronto, Canada, June 2017.
- [3] Kristin Mcleod, Maxime Sermesant, and Xavier Pennec. Improving Understanding of Long-Term Cardiac Functional Remodelling via Cross-Sectional Analysis of Polyaffine Motion Parameters. In *FIMH 2017 - 9th International Conference on Functional Imaging and Modeling of the Heart*, volume 10263 of *Lecture Notes in Computer Science*, pages 51 – 59, Toronto, Canada, June 2017. Springer.
- [4] Roch Molléro, Hervé Delingette, Manasi Datar, Tobias Heimann, Jakob Hauser, Dilveer Panesar, Alexander Jones, Andrew Taylor, Marcus Kelm, Titus Kuehne, Marcello Chinali, Gabriele Rinelli, Nicholas Ayache, Xavier Pennec, and Maxime Sermesant. Longitudinal Analysis using Personalised 3D Cardiac Models with Population-Based Priors: Application to Paediatric Cardiomyopathies. In *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, MICCAI 2017, Lecture Notes in Computer Science, Québec City, Canada, September 2017.
- [5] Roch A Molléro, Jakob Hauser, Xavier Pennec, Manasi Datar, Hervé Delingette, Alexander A Jones, Nicholas Ayache, Tobias Heimann, and Maxime Sermesant. Longitudinal Parameter Estimation in 3D Electromechanical Models: Application to Cardiovascular Changes in Digestion. In *FIMH 2017 - 9th international conference on Functional Imaging and Modeling of the Heart*, Toronto, Canada, June 2017. Springer.
- [6] Marc-Michel Rohé, Manasi Datar, Tobias Heimann, Maxime Sermesant, and Xavier Pennec. SVF-Net: Learning Deformable Image Registration Using Shape Matching. In *MICCAI 2017 - the 20th International Conference on Medical Image Computing and Computer Assisted Intervention*, Québec, Canada, September 2017.
- [7] Roch Molléro, Xavier Pennec, Hervé Delingette, Nicholas Ayache, and Maxime Sermesant. A Multiscale Cardiac Model for Fast Personalisation and Exploitation. In *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, volume 9902 of *MICCAI 2016, Lecture Notes in Computer Science*, pages 174–182, Athens, Greece, October 2016.

- [8] Marc-Michel Rohé, Roch Molléro, Maxime Sermesant, and Xavier Pennec. Highly Reduced Model of the Cardiac Function for Fast Simulation. In *IEEE - IVMSP Workshop 2016, Image, Video, and Multidimensional Signal Processing Workshop (IVMSP)*, 2016 IEEE 12th, page 5, Bordeaux, France, July 2016. IEEE.
- [9] Marc-Michel Rohé, Maxime Sermesant, and Xavier Pennec. Barycentric Subspace Analysis: a new Symmetric Group-wise Paradigm for Cardiac Motion Tracking. In *MICCAI 2016 - the 19th International Conference on Medical Image Computing and Computer Assisted Intervention*, volume 9902 of *MICCAI 2016, Lecture Notes in Computer Science*, pages 300–307, Athens, Greece, October 2016.
- [10] Kristin Mcleod, Maxime Sermesant, Philipp Beerbaum, and Xavier Pennec. Descriptive and Intuitive Population-Based Cardiac Motion Analysis via Sparsity Constrained Tensor Decomposition. In *Medical Image Computing and Computer Assisted Intervention (MICCAI 2015)*, volume 9351 of *Lecture notes in computer science (LNCS)*, pages 419–426, Munich, Germany, October 2015.
- [11] Bishesh Khanal, Marco Lorenzi, Nicholas Ayache, and Xavier Pennec. A Biophysical Model of Shape Changes due to Atrophy in the Brain with Alzheimer’s Disease. In P. GOLLAND, N. HATA, C. BARILLOT, J. HORNEGGER, and R. HOWE, editors, *MICCAI 2014 - 17th International Conference Medical Image Computing and Computer-Assisted Intervention*, volume 8674 of *LNCS - Lecture Notes in Computer Science, Springer*, pages 41–48, Boston, United States, September 2014. Springer.
- [12] Vikash Gupta, Nicholas Ayache, and Xavier Pennec. Improving DTI Resolution from a Single Clinical Acquisition: A Statistical Approach using Spatial Prior. In Kensaku Mori, Ichiro Sakuma, Yoshinobu Sato, Christian Barillot, and Nassir Navab, editors, *Proceedings of Medical Image Computing and Computer Assisted Intervention 2013 (MICCAI)*, volume 8151 of *Lecture Notes in Computer Science - LNCS*, pages 477–484, Nagoya, Japan, September 2013. Springer.
- [13] Marco Lorenzi, Bjoern H. Menze, Marc Niethammer, Nicholas Ayache, and Xavier Pennec. Sparse Scale-Space Decomposition of Volume Changes in Deformations Fields. In Kensaku Mori, Ichiro Sakuma, Yoshinobu Sato, Christian Barillot, and Nassir Navab, editors, *Medical Image Computing and Computer Aided Intervention (MICCAI)*, volume 8150 of *Lecture Notes in Computer Science - LNCS*, pages 328–335, Nagoya, Japan, September 2013. Springer.
- [14] Kristin Mcleod, Christof Seiler, Maxime Sermesant, and Xavier Pennec. Spatio-Temporal Dimension Reduction of Cardiac Motion for Group-Wise Analysis and Statistical Testing. In Kensaku Mori, Ichiro Sakuma, Yoshinobu Sato, Christian Barillot, and Nassir Navab, editors, *MICCAI - Medical Image Computing and Computer Assisted Intervention - 2013*, volume 8150 of *Lecture Notes in Computer Science*, pages 501–508, Nagoya, Japan, 2013. Springer, Heidelberg.
- [15] Kristin Mcleod, Christof Seiler, Nicolas Toussaint, Maxime Sermesant, and Xavier Pennec. Regional Analysis of Left Ventricle Function using a Cardiac-Specific Polyaffine Motion Model. In Sébastien Ourselin, Daniel Rueckert, and Nicolas Smith, editors, *Functional Imaging and Modeling of the Heart 2013 (FIMH)*, volume 7945 of *Lecture Notes in Computer Science*, pages 483–490, London, United Kingdom, June 2013. Springer.
- [16] Birkan Tunç, Alex Smith, Demian Wasserman, Xavier Pennec, William M. Wells, Ragini Verma, and Kilian M. Pohl. Multinomial Probabilistic Fiber Representation for Connectivity Driven Clustering. In J. C. Gee, Sarang Joshi, Kilian M. Pohl, William M. Wells, and L. Zollei, editors, *IPMI 2013 - Information Processing in Medical Imaging*, volume 7917 of *LNCS*, pages 730–741, Asilomar, United States, June 2013. Springer.
- [17] Hervé Lombaert, Leo Grady, Xavier Pennec, Nicholas Ayache, and Farida Cheriet. Spectral Demons - Image Registration via Global Spectral Correspondence. In *Computer Vision - ECCV 2012*, volume 7573 of *Lecture Notes in Computer Science - LNCS*, pages 30–44, Florence, Italy, 2012. Springer.
- [18] Marco Lorenzi, Nicholas Ayache, and Xavier Pennec. Regional flux analysis of longitudinal atrophy in Alzheimer’s disease. In *Proceedings of Medical Image Computing and Computer Assisted Intervention 2012 (MICCAI)*, volume 7510 of *Lecture Notes in Computer Science - LNCS*, pages 739–746, Nice, France, 2012. Springer, Heidelberg. PMID: 23285618.
- [19] Christof Seiler, Xavier Pennec, and Mauricio Reyes. Simultaneous Multiscale Polyaffine Registration by Incorporating Deformation Statistics. In *MICCAI - Medical Image Computing and Computer Assisted*

- Intervention*, volume 7511 of *LNCS*, pages 130–137, Nice, France, 2012. Springer, Heidelberg. PMID 23286041.
- [20] Stefan Sommer, Mads Nielsen, and Xavier Pennec. Sparsity and Scale: Compact Representations of Deformation for Diffeomorphic Registration. In *IEEE Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA 2012)*, Breckenridge, Colorado, United States, January 2012.
 - [21] Marco Lorenzi, Nicholas Ayache, Giovanni B. Frisoni, and Xavier Pennec. Mapping the effects of $A\beta_{1-42}$ levels on the longitudinal changes in healthy aging: hierarchical modeling based on stationary velocity fields. In *Proceedings of Medical Image Computing and Computer Assisted Intervention (MICCAI)*, volume 6892 of *LNCS*, pages 663–670. Springer, 2011.
 - [22] Marco Lorenzi, Nicholas Ayache, and Xavier Pennec. Schilds ladder for the parallel transport of deformations in time series of images. In G. Székely and H. Hahn, editors, *Proceedings of Information Processing in Medical Imaging (IPMI'11)*, volume 6801 of *LNCS*, pages 463–474, 2011. Honorable Mention (runner-up) for the Erbsmann Award.
 - [23] Christof Seiler, Xavier Pennec, and Mauricio Reyes. Geometry-aware multiscale image registration via obbtrees-based polyaffine log-demons. In *Proceedings of Medical Image Computing and Computer Assisted Intervention 2011 (MICCAI)*, volume 6892 of *LNCS*, pages 631–638. Springer, Heidelberg, September 2011. Young Scientist Award.
 - [24] Stefan Sommer, François Lauze, Mads Nielsen, and Xavier Pennec. Kernel Bundle EPDiff: Evolution Equations for Multi-Scale Diffeomorphic Image Registration. In A.M. Bruckstein, B. ter Haar Romeny, A.M. Bronstein, and M.M. Bronstein, editors, *Scale Space and Variational Methods in Computer Vision*, volume 6667 of *Lecture Notes in Computer Science*, Ein-Gedi, Israël, June 2011. Springer.
 - [25] Stefan Sommer, François Lauze, Mads Nielsen, and Xavier Pennec. A multi-scale kernel bundle for LDDMM: Towards sparse deformation description across space and scales. In Gabor Székely and Horst Hahn, editors, *Proceedings of Information Processing in Medical Images IPMI'11*, volume 6801 of *LNCS*, pages 624–635. Springer, July 2011.
 - [26] Tommaso Mansi, Xavier Pennec, Maxime Sermesant, Hervé Delingette, and Nicholas Ayache. Logdemons revisited: Consistent regularisation and incompressibility constraint for soft tissue tracking in medical images. In *Proc. of Medical Image Computing and Computer-Assisted Intervention (MICCAI'10), part II*, volume 6362 of *LNCS*, pages 652–659, Beijing, China, September 2010.
 - [27] Andrew Sweet and Xavier Pennec. Log-domain diffeomorphic registration of diffusion tensor images. In *Proc. of Workshop on Biomedical Image Registration 2010*, volume 6204 of *LNCS*, pages 198–209, Lübeck, Germany, July 2010. Springer.
 - [28] Stanley Durrleman, Pierre Fillard, Xavier Pennec, Alain Trounev, and Nicholas Ayache. A statistical model of white matter fiber bundles based on currents. In Jerry L. Prince, Dzung L. Pham, and Kyle J. Myers, editors, *Proceedings of Information Processing in Medical Imaging (IPMI'09)*, volume 5636 of *LNCS*, pages 114–125, 2009.
 - [29] Stanley Durrleman, Xavier Pennec, Alain Trounev, Guido Gerig, and Nicholas Ayache. Spatiotemporal atlas estimation for developmental delay detection in longitudinal datasets. In Guang-Zhong Yang, David Hawkes, Daniel Rueckert, Alison Noble, and Chris Taylor, editors, *Medical Image Computing and Computer-Assisted Intervention (MICCAI'09), Part I*, volume 5761 of *Lecture Notes in Computer Science*, pages 297–304, London, UK, September 2009. Springer.
 - [30] Tommaso Mansi, Stanley Durrleman, Boris Bernhardt, Maxime Sermesant, Hervé Delingette, Ingmar Voigt, Philipp Lurz, Andrew M Taylor, Julie Blanc, Younes Boudjemline, Xavier Pennec, and Nicholas Ayache. A statistical model of right ventricle in tetralogy of fallot for prediction of remodelling and therapy planning. In *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'09)*, volume 5761 of *Lecture Notes in Computer Science*, pages 214–221, London, UK, September 2009. Springer.
 - [31] Caroline Brun, Natasha Leporé, Xavier Pennec, Yi-Yu Chou, Agatha D. Lee, Marina Barysheva, Greig I. de Zubicaray, Matthew Meredith, Katie McMahon, Margaret J. Wright, Arthur W. Toga, and Paul M. Thompson. A tensor-based morphometry study of genetic influences on brain structure using a new

- fluid registration method. In Dimitris Metaxas and Leon Axel, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'08)*, volume 5242 of *Lecture Notes in Computer Science*, pages 914–921, New York, USA, September 2008. Springer.
- [32] Stanley Durrleman, Xavier Pennec, Alain Trouvé, and Nicholas Ayache. Sparse approximation of currents for statistics on curves and surfaces. In Dimitris Metaxas, Leon Axel, Gábor Székely, and Gabor Fichtinger, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI), Part II*, volume 5242 of *LNCS*, pages 390–398, New-York, USA, September 2008. Springer.
- [33] Jean-Marc Peyrat, Hervé Delingette, Maxime Sermesant, Xavier Pennec, Chenyang Xu, and Nicholas Ayache. Registration of 4d time-series of cardiac images with multichannel diffeomorphic demons. In Dimitris Metaxas, Leon Axel, Gabor Fichtinger, and Gábor Székely, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'08)*, volume 5242 of *Lecture Notes in Computer Science*, pages 972–979, New York, USA, September 2008. Springer.
- [34] Tom Vercauteren, Xavier Pennec, Aymeric Perchant, and Nicholas Ayache. Symmetric log-domain diffeomorphic registration: A demons-based approach. In Dimitris Metaxas, Leon Axel, Gabor Fichtinger, and Gábor Székely, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'08), Part I*, volume 5241 of *Lecture Notes in Computer Science*, pages 754–761, New York, USA, September 2008. Springer.
- [35] Stanley Durrleman, Xavier Pennec, Alain Trouvé, and Nicholas Ayache. Measuring brain variability via sulcal lines registration: a diffeomorphic approach. In Nicholas Ayache, Sébastien Ourselin, and Anthony Maeder, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI)*, volume 4791 of *LNCS*, pages 675–682, Brisbane, Australia, October 2007. Springer.
- [36] H. Hufnagel, X. Pennec, J. Ehrhardt, H. Handels, and N. Ayache. Shape analysis using a point-based statistical shape model built on correspondence probabilities. In Nicholas Ayache, Sébastien Ourselin, and Anthony Maeder, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'07)*, volume 4791 of *LNCS*, pages 959–967, Brisbane, Australia, October 2007. Springer.
- [37] Natasha Leporé, Caroline Brun, Xavier Pennec, Yi-Yu Chou, Oscar L. Lopez, Howard J. Aizenstein, James T. Becker, Arthur W. Toga, and Paul M. Thompson. Mean template for tensor-based morphometry using deformation tensors. In Nicholas Ayache, Sébastien Ourselin, and Anthony Maeder, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'07)*, volume 4792 of *LNCS*, pages 826–833, Brisbane, Australia, October 2007. Springer.
- [38] Stephane Nicolau, Xavier Pennec, Luc Soler, and Nicholas Ayache. Clinical evaluation of a respiratory gated guidance system for liver punctures. In Nicholas Ayache, Sébastien Ourselin, and Anthony J. Maeder, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'07)*, volume 4792 of *Lecture Notes in Computer Science*, pages 77–85, Brisbane, Australia, October 2007. Springer.
- [39] Jean-Marc Peyrat, Maxime Sermesant, Hervé Delingette, Xavier Pennec, Chenyang Xu, Elliot McVeigh, and Nicholas Ayache. Statistical comparison of cardiac fibre architectures. In *Proceedings of Functional Imaging and Modeling of the Heart 2007 (FIMH'07)*, volume 4466 of *LNCS*, pages 413–423, 7-9 June 2007.
- [40] Tom Vercauteren, Xavier Pennec, Aymeric Perchant, and Nicholas Ayache. Non-parametric diffeomorphic image registration with the demons algorithm. In Nicholas Ayache, Sébastien Ourselin, and Anthony J. Maeder, editors, *Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI'07)*, volume 4792 of *Lecture Notes in Computer Science*, pages 319–326, Brisbane, Australia, October 2007. Springer.
- [41] Tom Vercauteren, Xavier Pennec, Ezio Malis, Aymeric Perchant, and Nicholas Ayache. Insight into efficient image registration techniques and the demons algorithm. In *Proc. Information Processing in Medical Imaging (IPMI'07)*, volume 4584 of *Lecture Notes in Computer Science*, pages 495–506, Kerkrade, The Netherlands, July 2007. Springer.
- [42] Vincent Arsigny, Olivier Commowick, Xavier Pennec, and Nicholas Ayache. A log-Euclidean framework for statistics on diffeomorphisms. In *Proc. of the 9th International Conference on Medical Image*

Computing and Computer Assisted Intervention (MICCAI'06), Part I, number 4190 in LNCS, pages 924–931, 2-4 October 2006.

- [43] Vincent Arsigny, Olivier Commowick, Xavier Pennec, and Nicholas Ayache. A log-Euclidean polyaffine framework for locally rigid or affine registration. In J.P.W. Pluim, B. Likar, and F.A. Gerritsen, editors, *Proceedings of the Third International Workshop on Biomedical Image Registration (WBIR'06)*, volume 4057 of LNCS, pages 120–127, Utrecht, The Netherlands, 9 - 11 July 2006. Springer.
- [44] Jonathan Boisvert, Xavier Pennec, Hubert Labelle, Farida Cheriet, and Nicholas Ayache. Principal spine shape deformation modes using Riemannian geometry and articulated models. In *Proc of the IV Conference on Articulated Motion and Deformable Objects, Andratx, Mallorca, Spain, 11-14 July*, volume 4069 of LNCS, pages 346–355. Springer, 2006. AMDO best paper award 2006.
- [45] Tristan Glatard, Xavier Pennec, and Johan Montagnat. Performance evaluation of grid-enabled registration algorithms using bronze-standards. In *Proc. of the 9th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI'06), Part II*, volume 4191 of LNCS, pages 152–160. Springer, 2-4 October 2006.
- [46] Jean-Marc Peyrat, Maxime Sermesant, Hervé Delingette, Xavier Pennec, Chenyang Xu, Elliot McVeigh, and Nicholas Ayache. Towards a statistical atlas of cardiac fiber structure. In *Proc. of the 9th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI'06), Part I*, volume 4190 of LNCS, pages 297–304. Springer, 2-4 October 2006.
- [47] Vincent Arsigny, Pierre Fillard, Xavier Pennec, and Nicholas Ayache. Fast and simple calculus on tensors in the log-Euclidean framework. In J. Duncan and G. Gerig, editors, *Proceedings of the 8th Int. Conf. on Medical Image Computing and Computer-Assisted Intervention - MICCAI 2005, Part I*, volume 3749 of LNCS, pages 115–122, Palm Springs, CA, USA, October 26-29, 2005. Springer.
- [48] Olivier Commowick, Radu Stefanescu, Pierre Fillard, Vincent Arsigny, Nicholas Ayache, Xavier Pennec, and Grégoire Malandain. Incorporating statistical measures of anatomical variability in atlas-to-subject registration for conformal brain radiotherapy. In J. Duncan and G. Gerig, editors, *Proceedings of the 8th Int. Conf. on Medical Image Computing and Computer-Assisted Intervention - MICCAI 2005, Part II*, volume 3750 of LNCS, pages 927–934, Palm Springs, CA, USA, October 26-29, 2005. Springer.
- [49] Pierre Fillard, Vincent Arsigny, Nicholas Ayache, and Xavier Pennec. A Riemannian framework for the processing of tensor-valued images. In Ole Fogh Olsen, Luc Florak, and Arjan Kuijper, editors, *Deep Structure, Singularities, and Computer Vision (DSSCV)*, LNCS, pages 112–123. Springer, June 2005.
- [50] Pierre Fillard, Vincent Arsigny, Xavier Pennec, Paul M. Thompson, and Nicholas Ayache. Extrapolation of sparse tensor fields: Application to the modeling of brain variability. In Gary Christensen and Milan Sonka, editors, *Proc. of Information Processing in Medical Imaging 2005 (IPMI'05)*, volume 3565 of LNCS, pages 27–38, Glenwood springs, Colorado, USA, July 2005. Springer.
- [51] Stéphane Nicolau, Xavier Pennec, Luc Soler, and Nicholas Ayache. A complete augmented reality guidance system for liver punctures: First clinical evaluation. In J. Duncan and G. Gerig, editors, *Proceedings of the 8th Int. Conf. on Medical Image Computing and Computer-Assisted Intervention - MICCAI 2005, Part I*, volume 3749 of LNCS, pages 539–547, Palm Springs, CA, USA, October 26-29, 2005. Springer.
- [52] Xavier Pennec, Radu Stefanescu, Vincent Arsigny, Pierre Fillard, and Nicholas Ayache. Riemannian elasticity: A statistical regularization framework for non-linear registration. In J. Duncan and G. Gerig, editors, *Proceedings of the 8th Int. Conf. on Medical Image Computing and Computer-Assisted Intervention - MICCAI 2005, Part II*, volume 3750 of LNCS, pages 943–950, Palm Springs, CA, USA, October 26-29, 2005. Springer.
- [53] Tom Vercauteren, Aymeric Perchant, Xavier Pennec, and Nicholas Ayache. Mosaicing of confocal microscopic in vivo soft tissue video sequences. In J. Duncan and G. Gerig, editors, *Proceedings of the 8th Int. Conf. on Medical Image Computing and Computer-Assisted Intervention - MICCAI 2005, Part I*, volume 3749 of LNCS, pages 753–760, Palm Springs, CA, USA, October 26-29, October 2005. Springer.

- [54] Stéphane Nicolau, Xavier Pennec, Luc Soler, and Nicholas Ayache. An accuracy certified augmented reality system for therapy guidance. In *Proc. of the 8th European Conference on Computer Vision (ECCV 04), Part III*, volume 3023 of *LNCS*, pages 79–91, Prague, May 2004. Springer.
- [55] Stéphane Nicolau, Jérôme Schmid, Xavier Pennec, Luc Soler, and Nicholas Ayache. An augmented reality and virtuality interface for a puncture guidance system: Design and validation on an abdominal phantom. In Guang-Zhong Yang and Tianzi Jiang, editors, *Proc of the Second Int. Workshop on Medical Imaging and Augmented Reality MIAR 2004*, volume 3150 of *LNCS*, pages 302–310, Beijing, China, August 2004. Springer.
- [56] Luc Soler, Stéphane Nicolau, Jérôme Schmid, Christophe Koehl, Jacques Marescaux, Xavier Pennec, and Nicholas Ayache. Virtual reality and augmented reality in digestive surgery. In *Proc. of IEEE International Symposium on Mixed and Augmented Reality (ISMAR'04)*, pages 278–279, November 2004.
- [57] Radu Stefanescu, Olivier Commowick, Grégoire Malandain, Pierre-Yves Bondiau, Nicholas Ayache, and Xavier Pennec. Non-rigid atlas to subject registration with pathologies for conformal brain radiotherapy. 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*, volume 3216 of *LNCS*, pages 704–711, Saint-Malo, France, September 2004. Springer.
- [58] Vincent Arsigny, Xavier Pennec, and Nicholas Ayache. Polyrigid and polyaffine transformations: A new class of diffeomorphisms for locally rigid or affine registration. In Randy E. Ellis and Terry M. Peters, editors, *Proc. of MICCAI'03, Part II*, volume 2879 of *LNCS*, pages 829–837, Montreal, November 2003. Springer. MICCAI 2003 Best Student Award in Image Processing and Visualization. PMID: 15948656.
- [59] Miguel Angel González Ballester, Xavier Pennec, and Nicholas Ayache. Generalized image models and their application as statistical models of images. In Randy E. Ellis and Terry M. Peters, editors, *Proc. of MICCAI'03*, volume 2879 of *Lecture Notes in Computer Science*, pages 150–157, Montreal, Canada, November 2003. Springer.
- [60] Stéphane Nicolau, Xavier Pennec, Luc Soler, and Nicholas Ayache. Evaluation of a new 3d/2d registration criterion for liver radio-frequencies guided by augmented reality. 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*, pages 270–283, Juan-les-Pins, France, 2003. INRIA Sophia Antipolis, Springer.
- [61] Radu Stefanescu, Xavier Pennec, and Nicholas Ayache. Grid enabled non-rigid registration with a dense transformation and a priori information. In Randy E. Ellis and Terry M. Peters, editors, *Proc. of MICCAI'03, Part II*, volume 2879 of *LNCS*, pages 804–811, Montreal, November 2003. Springer.
- [62] Guillaume Flandin, Ferath Kherif, Xavier Pennec, Grégoire Malandain, Nicholas Ayache, and Jean-Baptiste Poline. Improved detection sensitivity in functional mri data using a brain parcelling technique. In Takeyoshi Dohi and Ron Kikinis, editors, *Medical Image Computing and Computer-Assisted Intervention (MICCAI'02)*, volume 2488 of *LNCS*, pages 467–474, Tokyo, September 2002. Springer.
- [63] Sébastien Granger and Xavier Pennec. Multi-scale EM-ICP: A fast and robust approach for surface registration. In A. Heyden, G. Sparr, M. Nielsen, and P. Johansen, editors, *European Conference on Computer Vision (ECCV 2002)*, volume 2353 of *LNCS*, pages 418–432, Copenhagen, Denmark, 2002. Springer.
- [64] Sébastien Ourselin, Radu Stefanescu, and Xavier Pennec. Robust registration of multi-modal images: towards real-time clinical applications. In Takeyoshi Dohi and Ron Kikinis, editors, *Medical Image Computing and Computer-Assisted Intervention (MICCAI'02)*, volume 2489 of *LNCS*, pages 140–147, Tokyo, September 2002. Springer. A preliminary version appeared as INRIA RR-4333.
- [65] Maxime Sermesant, Clément Forest, Xavier Pennec, Hervé Delingette, and Nicholas Ayache. Biomechanical model construction from different modalities: Application to cardiac images. In Takeyoshi Dohi and Ron Kikinis, editors, *Medical Image Computing and Computer-Assisted Intervention (MICCAI'02)*, volume 2488 of *LNCS*, pages 714–721, Tokyo, September 2002. Springer.

- [66] Pascal Cachier, Jean-François Mangin, Xavier Pennec, Denis Rivière, Dimitri Papadopoulos-Orfanos, Jean Régis, and Nicholas Ayache. Multisubject non-rigid registration of brain mri using intensity and geometric features. In W.J. Niessen and M.A. Viergever, editors, *4th Int. Conf. on Medical Image Computing and Computer-Assisted Intervention (MICCAI'01)*, volume 2208 of *LNCS*, pages 734–742, Utrecht, The Netherlands, October 2001.
- [67] Sébastien Granger, Xavier Pennec, and Alexis Roche. Rigid point-surface registration using an EM variant of ICP for computer guided oral implantology. In W.J. Niessen and M.A. Viergever, editors, *4th Int. Conf. on Medical Image Computing and Computer-Assisted Intervention (MICCAI'01)*, volume 2208 of *LNCS*, pages 752–761, Utrecht, The Netherlands, October 2001.
- [68] Xavier Pennec, Nicholas Ayache, Alexis Roche, and Pascal Cachier. Non-rigid MR/US registration for tracking brain deformations. In IEEE Computer Society Press, editor, *Proc of Int. Workshop on Medical Imaging and Augmented Reality (MIAR 2001), 10-12 June 2001, Shatin, Hong Kong*, pages 79–86, June 2001.
- [69] Xavier Pennec, Pascal Cachier, and Nicholas Ayache. Tracking brain deformations in time sequences of 3d us images. In M.I. Insana and R.M. Leahy, editors, *Proc. of IPMI'01*, volume 2082 of *LNCS*, pages 169–175, Davis, CA, USA, June 2001. Springer.
- [70] A. Roche, X. Pennec, M. Rudolph, D. P. Auer, G. Malandain, S. Ourselin, L. M. Auer, and N. Ayache. Generalized correlation ratio for rigid registration of 3d ultrasound with mr images. In A.M. DiGioia and S. Delp, editors, *Proc. of the 3rd Int. Conf. on Medical Image Computing and Computer-Assisted Intervention (MICCAI'00)*, volume 1935 of *LNCS*, pages 567–577, Pittsburgh, Pennsylvania, USA, October 11-14 2000. Published in *IEEE TMI* 20(10), oct. 2001, p. 25-31.
- [71] Xavier Pennec, Pascal Cachier, and Nicholas Ayache. Understanding the “demon’s algorithm”: 3d non-rigid registration by gradient descent. In C. Taylor and A. Colchester, editors, *Proc. of 2nd Int. Conf. on Medical Image Computing and Computer-Assisted Intervention (MICCAI'99)*, volume 1679 of *LNCS*, pages 597–605, Cambridge, UK, September 1999. Springer.
- [72] Xavier Pennec, Charles R.G. Guttmann, and Jean-Philippe Thirion. Feature-based registration of medical images: Estimation and validation of the pose accuracy. In *Proc. of First Int. Conf. on Medical Image Computing and Computer-Assisted Intervention (MICCAI'98)*, volume 1496 of *LNCS*, pages 1107–1114, Cambridge, USA, October 1998. Springer.
- [73] Alexis Roche, Grégoire Malandain, Xavier Pennec, and Nicholas Ayache. The correlation ratio as a new similarity measure for multimodal image registration. In *Proc. of First Int. Conf. on Medical Image Computing and Computer-Assisted Intervention (MICCAI'98)*, volume 1496 of *LNCS*, pages 1115–1124, Cambridge, USA, October 1998. Springer.
- [74] Xavier Pennec and Nicholas Ayache. Randomness and geometric features in computer vision. In *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR'96)*, pages 484–491, San Francisco, Cal, USA, June 1996. Published in *J. of Math. Imag. and Vision* 9(1), July 1998, p. 49-67.
- [75] Xavier Pennec and Jean-Philippe Thirion. Validation of 3d registration methods based on points and frames. In *Proc. of the 5th Int. Conf on Comp. Vision (ICCV'95)*, pages 557–562, Cambridge, Ma, June 1995. Published in *Int. J. of Comp. Vision* 25(3), 1997, p. 203-229.

Articles in international conferences and workshops with proceedings

- [1] Xavier Pennec. Sample-limited L_p Barycentric Subspace Analysis on Constant Curvature Spaces. In *Geometric Sciences of Information (GSI 2017)*, Paris, France, November 2017.
- [2] Marc-Michel Rohé, Maxime Sermesant, and Xavier Pennec. Automatic Multi-Atlas Segmentation of Myocardium with SVF-Net. In *Statistical Atlases and Computational Modeling of the Heart (STACOM) workshop*, Québec, Canada, September 2017.
- [3] Jan L. Bruse, Kristin Mcleod, Elena Cervi, Giovanni Biglino, T.-Y Hsia, Maxime Sermesant, Xavier Pennec, Andrew Taylor, and Silvia Schievano. Discovering clusters in pathologic cardiac morphology: MR-based hierarchical 3D shape clustering of surgically repaired aortic arches. In *Computer Assisted Radiology, 30th International Congress and Exhibition*, Heidelberg, Germany, June 2016.

- [4] Stéphanie Allasonnière, Loïc Devilliers, and Xavier Pennec. Estimating the Template in the Total Space with the Fréchet Mean on Quotient Spaces may have a Bias: a Case Study on Vector Spaces Quotiented by the Group of Translations. In *Mathematical Foundations of Computational Anatomy (MFCA '15)*, Proceedings of the fifth international workshop on Mathematical Foundation of Computational Anatomy (MFCA'15), pages 131–142, Munich, Germany, October 2015.
- [5] Jan L. Bruse, Kristin Mcleod, Giovanni Biglino, Hopewell N. Ntsinjana, Claudio Capelli, Tain-Yen Hsia, Maxime Sermesant, Xavier Pennec, Andrew Taylor, and Silvia Schievano. A Non-parametric Statistical Shape Model for Assessment of the Surgically Repaired Aortic Arch in Coarctation of the Aorta: How Normal is Abnormal? In *Statistical Atlases and Computational Modeling of the Heart (STACOM 2015)*, volume 9534 of *Statistical Atlases and Computational Models of the Heart. Imaging and Modelling Challenges: 6th International Workshop, STACOM 2015, Held in Conjunction with MICCAI 2015, Munich, Germany, October 9, 2015, Revised Selected Papers*, Munich, Germany, October 2015. Springer.
- [6] Bishesh Khanal, Marco Lorenzi, Nicholas Ayache, and Xavier Pennec. Simulating Patient Specific Multiple Time-point MRIs From a Biophysical Model of Brain Deformation in Alzheimer’s Disease. In *Workshop on Computational Biomechanics for Medicine - X*, Computational Biomechanics for Medicine: Imaging, Modeling and Computing, pages 167–176, Munich, France, October 2015. Springer International Publishing.
- [7] Nina Miolane and Xavier Pennec. Biased estimators on Quotient spaces. In *Geometric Science of Information. Second International Conference, GSI 2015.*, volume 9389 of *Lecture notes in computer science (LNCS)*, pages 130–139, Palaiseau, France, October 2015. Springer.
- [8] Nina Miolane and Xavier Pennec. A survey of mathematical structures for extending 2D neurogeometry to 3D image processing. In *MICCAI Workshop on Medical Computer Vision: Algorithms for Big Data (MICCAI-MCV 2015)*, Munich, Germany, October 2015.
- [9] Xavier Pennec. Barycentric Subspaces Analysis on Spheres. In *Mathematical Foundation of Computational Anatomy (MFCA '15)*, Proceedings of the fifth international workshop on Mathematical Foundation of Computational Anatomy (MFCA'15), pages 71–82, Munich, Germany, October 2015.
- [10] Xavier Pennec. Barycentric Subspaces and Affine Spans in Manifolds. In *Geometric Science of Information GSI'2015, Second International Conference*, volume 9389 of *Lecture Notes in Computer Science*, pages 12–21, Palaiseau, France, October 2015.
- [11] Marc-Michel Rohé, Nicolas Duchateau, Maxime Sermesant, and Xavier Pennec. Combination of Polyaffine Transformations and Supervised Learning for the Automatic Diagnosis of LV Infarct. In *Statistical Atlases and Computational Modeling of the Heart (STACOM 2015)*, Munich, Germany, 2015.
- [12] Nina Miolane and Xavier Pennec. Statistics on Lie groups : a need to go beyond the pseudo-Riemannian framework. In *MaxEnt 2014*, volume 1641 of *Bayesian inference and Maximum Entropy Methods in Science and Engineering (MaxEnt 2014)*, pages 59–66, Amboise, France, September 2014. AIP Proceedings.
- [13] Marco Lorenzi and Xavier Pennec. Parallel Transport with Pole Ladder: Application to Deformations of time Series of Images. In Frank Nielsen and F. Barbaresco, editors, *GSI2013 - Geometric Science of Information*, volume 8085 of *Lecture Notes in Computer Science - LNCS*, pages 68–75, Paris, France, August 2013. Springer.
- [14] Kristin Mcleod, Christof Seiler, Maxime Sermesant, and Xavier Pennec. A Near-Incompressible Poly-Affine Motion Model for Cardiac Function Analysis. In *Proc. MICCAI Workshop on Statistical Atlases and Computational Models of the Heart: Mapping Structure and Function + a Cardiac Electrophysiological Simulation Challenge (STACOM+CESC'12)*, volume 7746 of *Lecture Notes in Computer Science - LNCS*, pages 288–297, Nice, France, 2012. Springer.
- [15] Xavier Pennec. Bi-invariant means on Lie groups with Cartan-Schouten connections. In Frank Nielsen and F. Barbaresco, editors, *Geometric Science of Information (GSI 2013)*, volume 8085 of *Lecture Notes in Computer Science - LNCS*, pages 59–67, Paris, France, August 2013. Springer.

- [16] Christof Seiler, Xavier Pennec, and Susan Holmes. Random Spatial Structure of Geometric Deformations and Bayesian Nonparametrics. In *GSI - Geometric Science of Information - 2013*, volume 8085 of *Lecture Notes in Computer Science - LNCS*, pages 120–127, Paris, France, August 2013. Springer.
- [17] Nicolas Duchateau, Mathieu De Craene, Xavier Pennec, Beatriz Merino, Marta Sitges, and Bart Bijmens. Which Reorientation Framework for the Atlas-Based Comparison of Motion from Cardiac Image Sequences? In Stanley Durrleman, Tom Fletcher, Guido Gerig, and Marc Niethammer, editors, *STIA 2012 (Spatio-Temporal Image Analysis for Longitudinal and Time-Series Image Data)*, volume 7570 of *LNCS*, pages 25–37, Nice, France, September 2012. Springer, Heidelberg.
- [18] Hervé Lombaert, Leo Grady, Xavier Pennec, Jean-Marc Peyrat, Nicholas Ayache, and Farida Cheriet. Groupwise Spectral Log-Demons Framework for Atlas Construction. In *Medical Computer Vision (MCV'12) MICCAI workshop*, volume 7766 of *Lecture Notes in Computer Science - LNCS*, pages 11–19, Nice, France, 2012. Springer. Best paper award.
- [19] Marco Lorenzi, Xavier Pennec, Nicholas Ayache, and Giovanni Frisoni. Disentangling the normal aging from the pathological Alzheimer’s disease progression on cross-sectional structural MR images. In *MICCAI workshop on Novel Imaging Biomarkers for Alzheimer’s Disease and Related Disorders (NIBAD’12)*, pages 145–154, Nice, France, 2012.
- [20] Marco Lorenzi, Giovanni B. Frisoni, Nicholas Ayache, and Xavier Pennec. Probabilistic Flux Analysis of Cerebral Longitudinal Atrophy. In *MICCAI workshop on Novel Imaging Biomarkers for Alzheimer’s Disease and Related Disorders (NIBAD’12)*, pages 256–265, Nice, France, 2012.
- [21] Adityo Prakosa, Kristin Mcleod, Maxime Sermesant, and Xavier Pennec. Evaluation of iLogDemons Algorithm for Cardiac Motion Tracking in Synthetic Ultrasound Sequence. In *Proc. MICCAI Workshop on Statistical Atlases and Computational Models of the Heart: Imaging and Modelling Challenge (STACOM12)*, volume 7746 of *Lecture Notes in Computer Science - LNCS*, pages 178–187, Nice, France, 2012. Springer.
- [22] Marco Lorenzi and Xavier Pennec. Geodesics, parallel transport & one-parameter subgroups. In *3rd MICCAI workshop on Mathematical Foundations of Computational Anatomy Workshop*, September 2011.
- [23] Kristin Mcleod, Adityo Prakosa, Tommaso Mansi, Maxime Sermesant, and Xavier Pennec. An Incompressible Log-Domain Demons Algorithm for Tracking Heart Tissue. In *Proc. MICCAI Workshop on Statistical Atlases and Computational Models of the Heart: Mapping Structure and Function (STACOM11)*, volume 7085 of *Lecture Notes in Computer Science - LNCS*, pages 55–67, Toronto, Canada, September 2011. Springer.
- [24] Christof Seiler, Xavier Pennec, Lucas Ritacco, and Mauricio Antonio Reyes Aguirre. Femur Specific Polyaffine Model to Regularize the Log-Domain Demons Registration. In Benoit M. Dawant and David R. Haynor, editors, *Proceedings of SPIE Medical Imaging ’11*, volume 7962 of *Medical Imaging 2011: Image Processing*, pages Paper 7962–15, Lake Buena Vista, Floride, United States, 2011. SPIE Publishing.
- [25] Viviana Silless, Pamela Guevara, Xavier Pennec, and Pierre Fillard. Joint T1 and Brain Fiber Diffeomorphic Registration Using the Demons. In Tianming Liu, Dinggang Shen, Luis Ibanez, and Xiaodong Tao, editors, *Multimodal Brain Image Analysis First International Workshop, MBIA 2011, Held in Conjunction with MICCAI 2011*, volume 7012 of *Lecture Notes in Computer Science*, pages 10–18, Toronto, Canada, September 2011. Springer Berlin / Heidelberg.
- [26] Caroline Brun, Natasha Leporé, Xavier Pennec, Y.-Y. Chou, A.D. Lee, M. Barysheva, Greig de Zubicaray, K.L. McMahon, M.J. Wright, and Paul M. Thompson. Statistically assisted fluid image registration algorithm - safra. In *Proceedings of the Seventh IEEE International Symposium on Biomedical Imaging 2010 (ISBI’10)*, pages 364–367. IEEE, 2010.
- [27] V. Gorbunova, Stanley Durrleman, Pechin Lo, Xavier Pennec, and M. de Bruijne. Lung ct registration combining intensity, curves and surfaces. In *Proceedings of the Seventh IEEE International Symposium on Biomedical Imaging 2010 (ISBI’10)*, pages 340–343. IEEE, 2010.

- [28] Hans Lamecker and Xavier Pennec. Atlas to Image-with-Tumor Registration based on Demons and Deformation Inpainting. In *MICCAI Workshop on Computational Imaging Biomarkers for Tumors - From Qualitative to Quantitative (CIBT'2010)*, The MIDAS Journal - Computational Imaging Biomarkers for Tumors (CIBT)., Beijing, China, 2010.
- [29] Natasha Lepore, Anand A. Joshi, Richard M. Leahy, Caroline C. Brun, Yi-Yu Chou, Xavier Pennec, Agatha D. Lee, Marina Barysheva, Greg I. De Zubicaray, Margaret J. Wright, Kathie L. McMahon, AW Toga, and Paul M. Thompson. A New Combined Surface and Volume Registration. In Benoit M. Dawant and David R. Haynor, editors, *Medical Imaging 2010*, volume 7623 of *SPIE Proceedings*, pages 76231E–76231E–9, San Diego, United States, February 2010. SPIE.
- [30] Kristin McLeod, Alfonso Caiazzo, Miguel A. Fernández, Tommaso Mansi, Irene E. Vignon-Clementel, Maxime Sermesant, Xavier Pennec, Younes Boudjemline, and Jean-Frederic Gerbeau. Atlas-based reduced models of blood flows for fast patient-specific simulations. In *Proc. MICCAI Workshop on Statistical Atlases and Computational Models of the Heart: Mapping Structure and Function + a Cardiac Electrophysiological Simulation Challenge (STACOM+CESC'10)*, volume 6364 of *LNCS*, pages 95–104, Beijing, September 2010. Springer.
- [31] Franck Michel, Alban Gaignard, Farooq Ahmad, Christian Barillot, Benedicte Batrancourt, Michel Dojat, Bernard Gibaud, Pascal Girard, David Godard, Gilles Kassel, Diane Lingrand, Grégoire Malandain, Johan Montagnat, Mélanie Pelegrini-Issac, Xavier Pennec, Javier Rojas Balderrama, and Bacem Wali. Grid-wide neuroimaging data federation in the context of the neurolog project. In *Proc. of HealthGrid Conference*, volume 159 of *Studies in Health Technology and Informatics*, pages 112–123, 2010.
- [32] Christof Seiler, Xavier Pennec, and Mauricio Reyes. Parametric regression of 3d medical images through the exploration of non-parametric regression models. In *Proceedings of the Seventh IEEE International Symposium on Biomedical Imaging 2010 (ISBI'10)*, pages 452–455. IEEE, 2010.
- [33] C.C. Brun, N. Leporé, X. Pennec, Yi-Yu Chou, A.D. Lee, M. Barysheva, G.I. de Zubicaray, K.L. McMahon, M.J. Wright, A.W. Toga, and P.M. Thompson. A lagrangian formulation for statistical fluid registration. In *Proceedings of the Sixth IEEE International Symposium on Biomedical Imaging 2009 (ISBI'09)*, pages 975–978. IEEE, 2009.
- [34] V. Gorbunova, Stanley Durrleman, P. Lo, Xavier Pennec, and M. de Bruijne. Curve- and surface-based registration of lung ct images via currents. In M. Brown, M. de Bruijne, B. van Ginneken, A. Kiraly, J.M. Kuhnigk, C. Lorenz, J.R. McClelland, K. Mori, A.P. Reeves, and J. Reinhardt, editors, *Proc. of Second International Workshop on Pulmonary Image Analysis*, pages 15–25, London United Kingdom, 2009.
- [35] Heike Hufnagel, Jan Ehrhardt, Xavier Pennec, and Heinz Handels. Application of a probabilistic statistical shape model to automatic segmentation. In *World Congress on Medical Physics and Biomedical Engineering, WC 2009, München*, volume 25/4 of *IFMBE Proceedings*, pages 2181–2184. Springer, 2009.
- [36] Heike Hufnagel, Jan Ehrhardt, Xavier Pennec, Alexander Schmidt-Richberg, and Heinz Handels. Level set segmentation using a point-based statistical shape model relying on correspondence probabilities. In *Proc. of MICCAI Workshop Probabilistic Model for Medical Image Analysis (PMMIA'09)*, 2009.
- [37] Caroline Brun, Natasha Leporé, Xavier Pennec, Yi-Yu Chou, Agatha D. Lee, Greig I. de Zubicaray, Katie McMahon, Margaret J. Wright, Marina Barysheva, Arthur W. Toga, and Paul M. Thompson. A new registration method based on log-Euclidean tensor metrics and its application to genetic studies. In *Proc. of the 2008 IEEE Int. Symp. on Biomedical Imaging: From Nano to Macro (ISBI'08), Paris, France, May 14-17*, pages 1115–1118, 2008.
- [38] Stanley Durrleman, Xavier Pennec, Alain Trouvé, and Nicholas Ayache. A forward model to build unbiased atlases from curves and surfaces. In X. Pennec and S. Joshi, editors, *Proc. of the International Workshop on the Mathematical Foundations of Computational Anatomy (MFCA-2008)*, September 2008.
- [39] Tristan Glatard, Johan Montagnat, and Xavier Pennec. A probabilistic model to analyse workflow performance on production grids. In *8th IEEE International Symposium on Cluster Computing and the Grid (CCGRID'08)*, pages 510–517. IEEE, May 2008.

- [40] Tristan Glatard, Johan Montagnat, and Xavier Pennec. A framework for evaluating the impact of compression on registration algorithms without gold standard. In *International Conference on Image Processing*, pages 2912–2915, 2008.
- [41] Monica Hernandez, Salvador Olmos, and Xavier Pennec. Comparing algorithms for diffeomorphic registration: Stationary lddmm and diffeomorphic demons. In X. Pennec and S. Joshi, editors, *Proc. of the International Workshop on the Mathematical Foundations of Computational Anatomy (MFCA-2008)*, September 2008.
- [42] H. Hufnagel, X. Pennec, J. Ehrhardt, N. Ayache, and H. Handels. Comparison of statistical shape models built on correspondence probabilities and one-to-one correspondences. In *Proc. SPIE Symposium on Medical Imaging '08*, volume 6914 of *SPIE Conference Series*, San Diego, USA, February 2008.
- [43] Natasha Leporé, Caroline Brun, Yi-Yu Chou, Agatha D. Lee, Marina Barysheva, Xavier Pennec, Katie McMahon, Matthew Meredith, Greig I. de Zubicaray, Margaret J. Wright, Arthur W. Toga, and Paul M. Thompson. Best individual template selection from deformation tensor minimization. In *Proc. of the 2008 IEEE Int. Symp. on Biomedical Imaging: From Nano to Macro (ISBI'08)*, Paris, France, May 14-17, pages 460–463, 2008.
- [44] Erik Pernod, Jean-Christophe Souplet, Javier Rojas Balderrama, Diane Lingrand, and Xavier Pennec. Multiple sclerosis brain mri segmentation workflow deployment on the egee grid. In *MICCAI-Grid Workshop (MICCAI-Grid)*, pages 55–64, New York, NY, USA, September 2008.
- [45] Boon Thye Thomas Yeo, Tom Vercauteren, Pierre Fillard, Xavier Pennec, Polina Golland, Nicholas Ayache, and Olivier Clatz. Dti registration with exact finite-strain differential. In *Proceedings of the IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'08)*, Paris, France, May 2008. IEEE.
- [46] Caroline Brun, Natasha Leporé, Xavier Pennec, Yi-Yu Chou, Oscar L. Lopez, Howard J. Aizenstein, James T. Becker, Arthur W. Toga, and Paul M. Thompson. Comparison of standard and Riemannian fluid registration for tensor-based morphometry in hiv/aids. In *Proc. of MICCAI'07 Workshop on Statistical Registration: Pair-wise and Group-wise Alignment and Atlas Formation*, Brisbane, Australia, 2007.
- [47] P. Fillard, X. Pennec, P.M. Thompson, and N. Ayache. Evaluating brain anatomical correlations via canonical correlation analysis of sulcal lines. In *Proc. of MICCAI'07 Workshop on Statistical Registration: Pair-wise and Group-wise Alignment and Atlas Formation*, Brisbane, Australia, 2007.
- [48] Tristan Glatard, Johan Montagnat, and Xavier Pennec. Optimizing jobs timeouts on clusters and production grids. In *International Symposium on Cluster Computing and the Grid (CCGrid)*, pages 100–107, Rio de Janeiro, May 2007. IEEE.
- [49] Tom Vercauteren, Xavier Pennec, Aymeric Perchant, and Nicholas Ayache. Diffeomorphic demons using itk's finite difference solver hierarchy. In *Insight Journal – ISC/NA-MIC Workshop on Open Science at MICCAI 2007*, October 2007. Source code available at <http://hdl.handle.net/1926/510>.
- [50] Antoine Azar, Chenyang Xu, Xavier Pennec, and Nicholas Ayache. An interactive intensity- and feature-based non-rigid registration framework for 3d medical images. In *Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI 2006)*, pages 824–827, Crystal Gateway Marriott, Arlington, Virginia, USA, April 2006.
- [51] Jonathan Boisvert, Farida Cheriet, Xavier Pennec, Nicholas Ayache, and Hubert Labelle. A novel framework for the 3d analysis of spine deformation modes. In *Research into Spinal Deformities*, volume 123 of *Studies in Health Technology and Informatics*, pages 176–182, 2006.
- [52] Jonathan Boisvert, Farida Cheriet, Xavier Pennec, Nicholas Ayache, and Hubert Labelle. Assessment of brace local action on vertebrae relative poses. In *Research into Spinal Deformities*, volume 123 of *Studies in Health Technology and Informatics*, pages 372–378, 2006.
- [53] Jonathan Boisvert, Xavier Pennec, Nicholas Ayache, Hubert Labelle, and Farida Cheriet. 3D anatomic variability assesment of the scoliotic spine using statistics on Lie groups. In *Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI 2006)*, pages 750–753, Crystal Gateway Marriott, Arlington, Virginia, USA, April 2006. IEEE.

- [54] Pierre Fillard, Vincent Arsigny, Xavier Pennec, and Nicholas Ayache. Clinical DT-MRI estimation, smoothing and fiber tracking with log-Euclidean metrics. In *Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI 2006)*, pages 786–789, Crystal Gateway Marriott, Arlington, Virginia, USA, April 2006.
- [55] J. Freund, D. Comaniciu, Y. Ioannis, P. Liu, R. McClatchey, E. Moley-Fletcher, X. Pennec, G. Pongiglione, and X.S. Zhou. Health-e-child: An integrated biomedical platform for grid-based pediatrics. In *Proc of Health-Grid 2006*, volume 120 of *Studies in Health Technology and Informatics*, pages 259–270, Valancia, Spain, 2006.
- [56] Tristan Glatard, Johan Montagnat, and Xavier Pennec. Efficient services composition for grid-enabled data-intensive applications. In IEEE, editor, *Proceedings of the IEEE International Symposium on High Performance Distributed Computing (HPDC'06), Paris, France, June 19*, pages 333–334. IEEE, June 2006.
- [57] Tristan Glatard, Johan Montagnat, and Xavier Pennec. Probabilistic and dynamic optimization of job partitioning on a grid infrastructure. In *14th euromicro conference on Parallel, Distributed and network-based Processing (PDP06)*, pages 231–238, Montbéliard-Sochaux, February 2006. IEEE.
- [58] Tristan Glatard, Johan Montagnat, and Xavier Pennec. An experimental comparison of grid5000 clusters and the egee grid. In *Proc of the Workshop on Experimental Grid testbeds for the assessment of large-scale distributed applications and tools (EXPGRID'06), Paris, France, June 19-23*, 2006.
- [59] Tristan Glatard, Johan Montagnat, and Xavier Pennec. Medical image registration algorithms assessment: Bronze standard application enactment on grids using the moteur workflow engine. In *Proc. of the HealthGrid conference (HealthGrid'06), Valencia, Spain, June 7-9*, volume 120 of *Studies in Health Technology and Informatics*, pages 93–103, 2006.
- [60] Xavier Pennec. Left-Invariant Riemannian Elasticity: a distance on shape diffeomorphisms ? In Xavier Pennec and Sarang Joshi, editors, *1st MICCAI Workshop on Mathematical Foundations of Computational Anatomy: Geometrical, Statistical and Registration Methods for Modeling Biological Shape Variability*, pages 1–13, Copenhagen, Denmark, October 2006.
- [61] Cécile Germain, Vincent Breton, Patrick Clarysse, Y. Gaudeau, Tristan Glatard, Emmanuel Jeannot, Yannick Legré, Charles Loomis, Johan Montagnat, Jean-Marie Moureau, Angel Osorio, Xavier Pennec, and Romain Texier. Grid-enabling medical image analysis. In *proceedings of the IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGRID'05)*, volume 1, pages 487–495, Cardiff, UK, May 2005. IEEE.
- [62] Tristan Glatard, Johan Montagnat, and Xavier Pennec. Grid-enabled workflows for data intensive applications. In *Proc. 18th IEEE Symp. on Computer Based Medical Systems (CBMS'05), Dublin, Ireland, June 23-24*, pages 537–542. IEEE, 2005.
- [63] Stéphane Nicolau, Xavier Pennec, Luc Soler, and Nicholas Ayache. An augmented reality system to guide liver punctures. In *Workshop AMI-ARCS 2004 held in conjunction with MICCAI'04*, pages 77–86. IRISA Rennes, September 2004.
- [64] Luc Soler, Nicholas Ayache, Stéphane Nicolau, Xavier Pennec, Clément Forest, Hervé Delingette, Didier Mutter, and Jacques Marescaux. Virtual reality, augmented reality and robotics in surgical procedures of the liver. In Th. M. Buzug and T. C. Lueth, editors, *Perspectives in Image-guided Surgery. Proceedings of the Scientific Workshop on Medical Robotics, Navigation and Visualization (MRNV) 2004*, pages 476–484, RheinAhrCampus Remagen, Germany, March 11-12 2004. World Scientific.
- [65] Radu Stefanescu, Xavier Pennec, and Nicholas Ayache. A grid service for the interactive use of a parallel non-rigid registration algorithm. In *Proc. of HealthGrid 2004*, Clermont-Ferrand, January 2004. European Commission, DG Information Society.
- [66] Radu Stefanescu, Xavier Pennec, and Nicholas Ayache. Parallel non-rigid registration on a cluster of workstations. In Sofie Norager, editor, *Proc. of HealthGrid'03*, Lyon, January 2003. European Commission, DG Information Society.
- [67] Guillaume Flandin, Ferath Kherif, Xavier Pennec, Denis Rivière, Nicholas Ayache, and Jean-Baptiste Poline. Parcellation of brain images with anatomical and functional constraints for fmri data analysis. In *IEEE International Symposium on Biomedical Imaging*, pages 907–910, Washington, USA, 2002.

- [68] P. Jannin, J.M. Fitzpatrick, D.J. Hawkes, X. Pennec, R. Sahidi, and M.W. Vannier. White paper: validation of medical image processing in image-guided therapy. In H.U. Lemke, M.W. Vannier, K. Inamura, A.G. Farman, K. Doi, and J.H.C. Reiber, editors, *Proc. of Int. Conf. on Computer Assisted Radiology (CARS 2002)*, pages 299–305. Springer, 2002.
- [69] D. Etienne, A. Stankoff, X. Pennec, S. Granger, A. Lacan, and R. Derycke. A new approach for dental implant aided surgery. a pilot evaluation. In H.U. Lemke, M.W. Vannier, K. Inamura, A.G. Farman, and K. Doi, editors, *Proc. of CARS'2000*, pages 927–931. Elsevier, 2000.
- [70] Pascal Cachier and Xavier Pennec. 3d non-rigid registration by gradient descent on a gaussian-windowed similarity measure using convolutions. In *Proc. of IEEE Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA'00)*, pages 182–189, Hilton Head Island, South Carolina, USA, June 2000. IEEE Computer society.
- [71] Sébastien Ourselin, Alexis Roche, Gérard Subsol, and Xavier Pennec. Automatic alignment of histological sections. In F. Pernus, S. Kovacic, H.S. Stiehl, and M.A. Viergever, editors, *International Workshop on Biomedical Image Registration, WBIR'99*, pages 1–13, Bled (Slovénie), August 1999.
- [72] Xavier Pennec. Probabilities and statistics on Riemannian manifolds: Basic tools for geometric measurements. In A.E. Cetin, L. Akarun, A. Ertuzun, M.N. Gurcan, and Y. Yardimci, editors, *Proc. of Nonlinear Signal and Image Processing (NSIP'99)*, volume 1, pages 194–198, June 20-23, Antalya, Turkey, 1999. IEEE-EURASIP.
- [73] J. West, J.M. Fitzpatrick, M.Y. Wang, B.M. Dawant, C.R. Maurer, Jr., R.M. Kessler, R.J. Maciunas, C. Barillot, D. Lemoine, A. Collignon, F. Maes, P. Suetens, D. Vandermeulen, P.A. van den Elsen, P.F. Hemler, S. Napel, T.S. Sumanaweera, B. Harkness, D.L.G. Hill, C. Studholme, G. Malandain, X. Pennec, M.E. Noz, G.Q. Maguire, Jr., M. Pollack, C.A. Pelizzari, R.A. Robb, D. Hanson, and R.P. Woods. Comparison and evaluation of retrospective intermodality image registration techniques. In *Medical Imaging 1996: Image Processing*, volume 2710 of *SPIE proceedings series*, Newport Beach, California, USA, February 10-15 1996.
- [74] Xavier Pennec and Nicholas Ayache. An $\mathcal{O}(n^2)$ algorithm for 3d substructure matching of proteins. In A. Califano, I. Rigoutsos, and H.J. Wolson, editors, *Shape and Pattern Matching in Computational Biology – Proc. First Int. Workshop, Seattle, Wash, June 20, 1994*, pages 25–40. Plenum Publishing, 1994. Published in *Bioinformatics* 14(6), 1998, p. 516-522.

Clinical abstracts and short papers in international conferences and workshops

- [1] Hugo Darmanté, Benoit Bugnas, Régis Bernard De Dompure, Laurent Barresi, Nina Miolane, Xavier Pennec, Fernand DE PERETTI, and Nicolas BRONSARD. Analyse biométrique de l’anneau pelvien en 3 dimensions - à propos de 100 scanners. In *89e Réunion annuelle de la SOFCOT*, volume 100 of *Revue de Chirurgie Orthopédique et Traumatologique*, Paris, France, November 2014.
- [2] Marco Lorenzi, Martina Bochetta, Nicholas Ayache, Xavier Pennec, and Giovanni B. Frisoni. Conversion to MCI in healthy individuals with abnormal CSF Ab42 levels is associated with specific longitudinal morphological changes. In *Alzheimer’s Association International Conference 2013*, volume 9, issue 4 (supplement) of *Alzheimer’s & Dementia: The Journal of the Alzheimer’s Association*, page P596, Boston, United States, July 2013.
- [3] Marco Lorenzi, Xavier Pennec, Nicholas Ayache, and Giovanni B. Frisoni. Modeling the longitudinal atrophy in healthy subject at risk for Alzheimer’s disease. In *Alzheimer’s Association International Conference 2012*, volume 8, Issue 4, Supplement of *Alzheimer’s & Dementia: The Journal of the Alzheimer’s Association*, page P340, Vancouver, Canada, July 2012.
- [4] Marco Lorenzi, Xavier Pennec, Nicholas Ayache, and Giovanni B. Frisoni. Spatio-temporal model of atrophy progression in healthy subjects at risk for Alzheimer’s disease. In *Alzheimer’s Association International Conference 2012*, volume 8, Issue 4, Supplement of *Alzheimer’s & Dementia: The Journal of the Alzheimer’s Association*, pages P340–P341, Vancouver, Canada, July 2012.
- [5] Marco Lorenzi, Nicholas Ayache, Xavier Pennec, Giovanni B. Frisoni, and for the Alzheimer’s Disease Neuroimaging Initiative (ADNI). Differentiating pathological brain atrophy from normal aging: a

- promising diagnostic tool for alzheimer’s disease. 2nd Virtual Physiological Human European Conference (VPH2012), London, Sep 2012.
- [6] Marco Lorenzi, Nicholas Ayache, Xavier Pennec, Giovanni B. Frisoni, and for the Alzheimer’s Disease Neuroimaging Initiative (ADNI). Disentangling the normal aging from the pathological alzheimer’s disease progression on structural mr images. 5th Clinical Trials in Alzheimer’s Disease (CTAD’12), Monte Carlo, Oct 2012.
- [7] Michel Dojat, Mélanie Péligrini-Issac, Farooq Ahmad, Christian Barillot, Bénédicte Batrancourt, Alban Gaignard, Bernard Gibaud, Pascal Girard, David Godard, Gilles Kassel, Diane Lingrand, Grégoire Malandain, Franck Michel, Johan Montagnat, Xavier Pennec, Javier Balderrama, and Bacem Wali. Neurolog: A framework for the sharing and reuse of distributed tools and data in neuroimaging. 17th Annual Meeting of the Organization for Human Brain Mapping (OHBM), June 26-30, 2011.
- [8] B. Gibaud, F. Ahmad, C. Barillot, F. Michel, B. Wali, B. Batrancourt, M. Dojat, P. Girard, A. Gaignard, D. Lingrand, J. Montagnat, J. Rojas Balderrama, G. Malandain, X. Pennec, D. Godard, G. Kassel, and M. Péligrini-Issac. A federated system for sharing and reuse of images and image processing tools in neuroimaging. In *Proc. of Computer Assisted Radiology and Surgery 2011 (CARS 2011)*, June 2011.
- [9] Marco Lorenzi, Xavier Pennec, and Giovanni B. Frisoni. Monitoring the brain’s longitudinal changes in clinical trials for Alzheimers disease: a robust and reliable non-rigid registration framework. In *Alzheimer’s Association 2011 International Conference on Alzheimer’s Disease (AAICAD)*, volume 7, Issue 4, Supplement of *Alzheimer’s & Dementia: The Journal of the Alzheimer’s Association*, page S376, Paris, France, July 2011.
- [10] Caroline Brun, Natasha Leporé, Y.-Y. Chou, Xavier Pennec, Greig de Zubicaray, K.L. McMahon, M.J. Wright, James C. Gee, and Paul M. Thompson. A 3d statistical fluid registration algorithm. In *Workshop on Machine Learning in Medical Imaging (MLMI’2010)*, Beijing, September 2010.
- [11] Stanley Durrleman, Xavier Pennec, Alain Trouvé, Nicholas Ayache, and José Braga. Comparison of the endocast growth of chimpanzees and bonobos via temporal regression and spatiotemporal registration. In *Miccai Workshop on Spatio-Temporal Image Analysis for Longitudinal and Time-Series Image Data*, Beijing, China, September 2010.
- [12] Stanley Durrleman, Xavier Pennec, Alain Trouvé, Nicholas Ayache, and José Braga. Measuring the inter-species variability of endocast growth using shape regression and spatiotemporal registration. In *Abstracts of the 79-th annual meeting of the American Assoc. of Physical Anthropologists (AAPA), April 2010, Albuquerque*, pages 78–79, 2010.
- [13] Kristin McLeod, Tommaso Mansi, Stanley Durrleman, Maxime Sermesant, and Xavier Pennec. Statistical analysis of the anatomy: From digital patient to digital population. First VPH Conference (VPH2010), Brussels), September 2010. Abstract.
- [14] Marco Lorenzi, Nicholas Ayache, G. Frisoni, and Xavier Pennec. 4d registration of serial brain mr’s images: a robust measure of changes applied to alzheimer’s disease. In *Miccai Workshop on Spatio-Temporal Image Analysis for Longitudinal and Time-Series Image Data*, Beijing, China, September 2010. Best Oral Presentation award.
- [15] Marco Lorenzi, G. Frisoni, Nicholas Ayache, and Xavier Pennec. Mapping longitudinal changes in the brain affected by alzheimer’s disease. First VPH Conference (VPH2010), Brussels), September 2010.
- [16] Andrew Sweet and Xavier Pennec. A log-Euclidean statistical analysis of dti brain deformations. In *Proc. of MICCAI Workshop on Computational Diffusion MRI 2010*, Beijing, China, September 2010.
- [17] Javier Rojas Balderrama, Diane Lingrand, Erik Pernod, Jean-Christophe Souplet, Xavier Pennec, and Johan Montagnat. Neurolog: neuroscience application workflows execution on the egee grid. Enabling Grid for E-sciencE (EGEE) conference, September 2008. EGEE’08 best paper award.
- [18] C Brun, N Leporé, X Pennec, YY Chou, AD Lee, M Barysheva, K McMahon, GI de Zubicaray, M Wright, AW Toga, and PM Thompson. Volumetric differences in brain structure in identical and fraternal twins computed using Riemannian tensor-based morphometry. 13th Annual Meeting of the Organization for Human Brain Mapping (OHBM), June 15-19, 2008.

- [19] Tommaso Mansi, Maxime Sermesant, Martin Huber, Andrew Taylor, Giacomo Pongiglione, Xavier Pennec, and Younes Boudjemline. Modélisation électromécanique du coeur et analyse d'images. Archives de Pédiatrie - Congrès des Sociétés Françaises Médico-chirurgicales Pédiatriques, February 2008. Archives de Pédiatrie 15(5):1032 – Special award for best presentation.
- [20] Guillaume Flandin, Xavier Pennec, Alexis Roche, Will Penny, Nicholas Ayache, and Jean-Baptiste Poline. Multi-subject anatomo-functional classification for activation studies. In *NeuroImage (HBM'04)*, Budapest, Hungary, 2004.
- [21] Derek Hill, Xavier Pennec, Michael Burns, Michael Parkin, Jo Hajnal, Radu Stefanescu, Daniel Rueckert, and Johan Montagnat. Intraoperable medical image registration grid service. In *Proc. of HealthGrid 2004*, Clermont-Ferrand, January 2004. European Commission, DG Information Society.
- [22] Guillaume Flandin, Will Penny, Xavier Pennec, Nicholas Ayache, and Jean-Baptiste Poline. A multi-subject anatomo-functional parcellation of the brain. In Tomas Paus, Ed Bullmore, and Jonathan D. Cohen, editors, *NeuroImage (HBM'03)*, New York, USA, 2003. Academic Press.
- [23] Stéphane Nicolau, Alain Garcia, Xavier Pennec, Luc Soler, and Nicholas Ayache. Augmented reality guided radio-frequency tumor ablation. In *Proceedings of Augmented and Virtual Reality Workshop (AVIR03)*, pages 34–35, Genève, 2003.
- [24] Guillaume Flandin, Ferath Kherif, Xavier Pennec, Denis Rivière, Nicholas Ayache, and Jean-Baptiste Poline. A new representation of fmri data using anatomo-functional constraints. In *NeuroImage (HBM'02)*, Sendai, Japan, 2002.
- [25] Nicholas Ayache, Xavier Pennec, and Pascal Cachier. Fusing 3-d ultrasound and mri for real-time image-guided neurosurgery. In *Medical Physics and Clinical Engineering Conference*, 2001. Invited talk, Physica Medica (European journal of Medical Physics) 17(3).
- [26] Xavier Pennec. Evaluation of the uncertainty in various registration problems. In K.W. Bowyer, M.H. Loew, H. S. Stiehl, and M. Viergever, editors, *Methodology of Evaluation in Computational Medical Imaging*, pages 15–16, Dagstuhl, March 2001. Schloss Dagstuhl, Int. Conf. and Research Center for Computer Science. Dagstuhl Seminar 01111.
- [27] D. Etienne, A. Stankoff, X. Pennec, S. Granger, A. Lacan, and R. Derycke. A new approach for dental implant aided surgery. 4th Congresso Panamericano de Periodontologia, 17-19 august 2000, Santiago, Chili, 2000.

National reviewed workshops

- [1] Xavier Pennec and Marco Lorenzi. Which parallel transport for the statistical analysis of longitudinal deformations? In *Colloque GRETSI '11*, September 2011.
- [2] Tommaso Mansi, Maxime Sermesant, Hervé Delingette, Xavier Pennec, Nicholas Ayache, and Younes Boudjemline. Modèles numériques pour la simulation et la prédiction de la fonction cardiaque. In *Congrès de la Société Française de Pédiatrie et de l'Association des Pédiatres de Langue Française (APLF)*, 2010. Archives de Pédiatrie 17(6):611-2, PMID: 20654804.
- [3] Heike Hufnagel, Xavier Pennec, Jan Ehrhardt, Nicholas Ayache, and Heinz Handels. A global criterion for the computation of statistical shape model parameters based on correspondence probabilities. In Springer, editor, *Bildverarbeitung für die Medizin 2008*, volume 14 of *Informatik aktuell*, pages 277–282, 2008.
- [4] Heike Hufnagel, Xavier Pennec, Jan Ehrhardt, Heinz Handels, and Nicholas Ayache. Point-based statistical shape models with probabilistic correspondences and affine EM-ICP. In Springer, editor, *Bildverarbeitung fuer die Medizin 2007*, Informatik aktuell, pages 434–438. Springer, March 2007. Third prize in category best scientific work.
- [5] Heike Hufnagel, Xavier Pennec, Grégoire Malandain, Hans Handels, and Nicholas Ayache. Non-linear 2d and 3d registration using block-matching and b-splines. In *Bildverarbeitung fuer die Medizin 2005*, Informatik aktuell, pages 325–329, Heidelberg, Germany, March 2005. Deutsches Krebsforschungszentrum, Springer.

- [6] Stéphane Nicolau, Xavier Pennec, Luc Soler, and Nicholas Ayache. Vision augmentée de structures anatomiques abdominales recalées par stéréoscopie. In *Actes du quatrième colloque francophone. Méthodes et Techniques Optiques pour l'Industrie*, volume 1, pages 413–418, Belfort, 2003.
- [7] Stéphane Nicolau, Alain Garcia, Xavier Pennec, Luc Soler, and Nicholas Ayache. Guidage de ponctions percutanées à l'aide d'un système de vision basé sur une méthode de recalage 3d/2d. In *Actes du colloque Imagerie pour les sciences du vivant et de l'ingénieur (IMVIE03)*, Strasbourg, 2003.
- [8] Xavier Pennec. Registration of uncertain geometric features: Estimating the pose and its accuracy. In J. Le Moigne, editor, *Proc of the First Image Registration Workshop, November 20-21 1997, Greenbelt, Maryland, USA*, pages 263–272. CESDIS, November 1997.
- [9] Xavier Pennec and Nicholas Ayache. Quelques problèmes posés par la gestion des primitives géométriques en vision par ordinateur. In *Journées ORASIS*, pages 111–116, May 1996.
- [10] Xavier Pennec. Multiple registration and mean rigid shape - application to the 3d case. In K.V. Mardia, C.A. Gill, and Dryden I.L., editors, *Image Fusion and Shape Variability Techniques (16th Leeds Annual Statistical Workshop)*, pages 178–185. University of Leeds, UK, July 1996.