



Nicholas AYACHE

Born 1 Nov 1958, Paris, France.
French, married, 3 children.

Main Positions

Research Director at INRIA (class exceptional)
Science Director of AI Institute "3IA Côte d'Azur"
Member of the French Academy of Sciences
Member of the French Academy of Surgery
Head of Research Team EPIONE: *e-patient for e-medicine*
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<http://www-sop.inria.fr/members/Nicholas.Ayache/ayache.html>

Other Positions

2024 - : Member of the Strategic Council of the IHU RespirERA (pulmonary diseases)
2019 - : Holder of a 3IA Research Chair AI on *e-patient for e-medicine*
1995 - : Co-Editor in Chief and co-founder of *Medical Image Analysis journal* (2022 IF 13.828)
2013 - 2014 : Professor at Collège de France, *Chaire Informatique et sciences numériques*
2007 : Invited Scientist at MIT, Harvard, and Brigham & Women's Hospital, Boston.
2012 - 2015 : Scientific Director of *Institut Hospitalo-Universitaire* (IHU) de Strasbourg
2016 - 2019 : Scientific advisory committee for *Région Ile de France* (20 members)
2015 - 2019 : Research Committee of *Fondation pour la Recherche Médicale* (18 members)
2010 - 2024: *Scientific Advisory Boards* in London (ICL,KCL,UCL), Oxford & Nottingham
2009 - 2019: *Advisory Committee, Japan Initiative in Computational Anatomy, MEXT*
2005 - 2007 : VP for science at INRIA Sophia Antipolis (500 people, 30 research teams).
2001 - 2005 : Deputy of the VP for Science at Inria Sophia Antipolis.
2005 - 2017 : co-founder and head of Asclepios project-team at Inria.
1985 - 2010 : Invited Professor at *Ecole Centrale Paris*.
1988 - 2005 : founder and head of Epidaure team at Inria Rocquencourt then Sophia Antipolis (1992).

Education

1980: Ingénieur Civil des Mines de Saint-Etienne ; 1981: *Master of Science*, UCLA (USA).
1983 : Docteur-Ingénieur, Paris-Sud University; 1988: Docteur d'Etat, Paris-Sud University.

Publications

Author and co-author of 400+ archived scientific publications, author or editor of 12 books (including 1 monograph published by *MIT Press*), 30 book chapters.

Citations: 60 000+, **h-index:** 116 : <https://scholar.google.com/citations?user=29XL16UAAAAJ>

Student supervision

(co-) Supervised 90+ PhD students (1992 - 2024). 9 received a PhD award. 6 habilitations

Transfer and valorization

Co-founder of 7 companies linked to image computing. Scientific consultant for several companies. Co-author of 12 patents. Chairman of conferences: MICCAI'2012 (1270 participants), FIMH'2009, IS4TM'2002, CVRMed'1995

Prizes and honors (selection)

2022 : Elected *Fellow* of the *Asia-Pacific Artificial Intelligence Association (AAIA)*
2020 : **International Steven Hoogendijk Award**
2019 : Grand Prize of the City of Nice
2018 - : Member of **French Academy of Surgery**
2017 : Chevalier de l'ordre des palmes académiques
2015 : Scientific Medal from Université de la Côte d'Azur
2014 - : Member of **French Academy of Sciences**
2014 : Laureate of **Grand Prize Inria – Académie des sciences** (25000€)
2013 : Laureate of *Miccai 2013 Enduring Impact Prize* (Nagoya, Japon)
2012 : appointed Scientific Director of Institut Hospitalo-Universitaire (IHU) de Strasbourg
2011 : Laureate of **European Research Council ERC** (2.5 Millions€)

2009 : Elected *Fellow* of MICCAI society (London)
 2008 : Laureate of **Microsoft award** for Science in Europe (250.000€), awarded by *Royal Society* (London) and **French Academy of Sciences** (Paris).
 2008 : *Fellow, American Inst. for Med. and Biol. Engin. (Nat. Acad. Sc., Washington DC)*.
 2006 : Laureate of **Prize of Information Sciences** from **Fondation EADS** (25.000€)
 2005 : promoted to the rank of « directeur de recherche de classe exceptionnelle, INRIA ».
 1999 : *Laval Virtual Prize* for the introduction of virtual reality in surgery
 1996 : *ECCV Computer Vision Award* for the transfer towards industry

Plenary Invited Lectures (selection)

- *Keynote at First French Conf. on AI for Biomedical Imaging, Paris, 2023*
- *Invited Lectures in Tokyo on AI for Medicine organized by the French Embassy, 2023*
- *Invited Lecture for the History of Inserm in Medical imaging, Paris, 2022*
- *Invited Speaker at the 10th anniversary of SIF (Société Informatique de France), 2022*
- *Keynote at Global Congress on AI, Montreal, 2022*
- *AI4Health - Winter School of HDH, 2022 and 2021 (visio);*
- *French-German International Symposium, 2021 (visio);*
- *International Steven Hoogendijk Award Lecture, Rotterdam City Hall, 2021;*
- *Keynote at Sofcot Forum (Orthopedic surgery) in Paris, 2021;*
- *International 3IA Prairie Workshop in Paris, 2021;*
- *AI and Medical Imaging – the role of models, Académie des Sciences, Paris, 2020*
- *AI for Healthcare: Hopes & Challenges. Global Forum on AI for Humanity, Paris, 2019*
- *AI for Medical Imaging & Digital Twins, Keynote Lecture, Shenzhen University, China, 2019*
- *AI for e-medicine, 5th Int. Symp. Multid. Comput. Anatomy, Fukuoka, Japan, 2019.*
- *Le jumeau numérique: images, modèles et IA. Académie nationale de médecine, Paris, 2019*
- *Intelligence Artificielle et médecine. Académie des Sciences à Nice, 2019.*
- *La Santé à l'ère numérique, Institut de l'ENS, 2019.*
- *Imaging in Cancer – Multimodal Analysis, iBV, Nice, 2019*
- *IA, santé numérique, enjeux pour la France – OPECST- Assemblée Nationale, Paris, 2019*
- *IA et Santé numérique, round table organized at Opera Bastille by newspaper Le Monde, 2019*
- *AI for Digital Patients, Int Conf on Image Comput. and Digital Medicine, Chengdu, China, 2018*
- *IA et Santé, Sophia Summit - Sophia Antipolis, 2018*
- *Patient numérique: images, apprentissage, intelligence artificielle, Collège de France 2018*
- *L'intelligence artificielle au cœur de la médecine de précision, Medicen, Paris, 2018*
- *From Cardiac Images to Digital Hearts ; Inria 50th anniversary, Paris 2017*
- *From Medical Images to Digital Patients, Inria 50th anniversary, Sophia Antipolis, 2017*
- *Important MICCAI contributions of the past 20 years, MICCAI, Québec, 2017*
- *Le patient numérique, Académie Nationale de Chirurgie, Paris, 2017*
- *Images, informatique et médecine : Institut Mondor de recherche biomédicale, 2017*
- *Le patient numérique pour la médecine de précision, Académie des sciences, 2016*
- *From Cardiac Images to Computational Cardiology, IHU Bordeaux, 2016*
- *Vers un patient numérique? Institut Universitaire de France, Rennes, 2016*
- *A Nice Tribute to Michel Lazdunski, CHU de Nice, 2016*
- *Les savoirs de l'ENS, Ecole Normale Supérieure, Paris 2015*
- *Première conférence CYBERMED, Juan-les-Pins, 2015*
- *Forum Chili-France, La société intelligente, Paris 2015*
- *Conférences du Collège de France en Tunisie, ENIT, Tunis, 2015*
- *Journées françaises des doubles cursus, Paris 2015*
- *Institut du cerveau et de la moelle épinière, Hôpital de la Pitié Salpêtrière, Paris 2015*
- *Multidisciplinary Computational Anatomy Initiative, Keynote, Fukuoka, Japon 2015*
- *International Conference on Image Processing, Opening Lecture, Paris 2014*
- *Leçon inaugurale, Chaire Informatique, Collège de France, 2014*
- *Functional Imaging and Modeling of the Heart, London, 2013.*
- *Computational Medicine Institute anniversary, Johns Hopkins Univ., Baltimore, 2013*
- *Rank Prize Symposium, Grasmere, UK, 2013*
- *French-Japan Symposium on Future of Surgery, Strasbourg, 2012.*
- *Biomedical Imaging Festival Annual Guest lecture, Oxford University, 2012.*
- *Kyushu University, Fukuoka, Japan, 2012.*
- *Academy of Sciences, Rabbat, Marocco, 2012*
- *Technion 100 year anniversary, Maison de la Chimie, Paris, 2011*
- *Académie de médecine, Paris 2011*

- *Physiome International Course, Oxford University, UK, 2011*
- *ICCU Conference, Nice, Fr, 2011*
- *Tata Institute, Mumbai, India, 2011*
- *Royal Society, Computational Frontiers of Scientific Discovery, London UK, 2010*
- *Ecole Centrale Paris, Scientific Challenges in Health, Biology and IT, 2010*
- *Inria-Industry annual meeting, Bordeaux, 2010*
- *Tokyo University and MEXT, Japan, 2010*
- *Osaka University, Japan, 2010*
- *Isaac Newton Institute, Cambridge (UK), 2009*
- *Académie des sciences, défis du 21ème siècle, Paris France, 2009*
- *Medical Imaging Conference, 2009, Orlando, USA*
- *College de France, Paris, 2008*

Main Scientific Contributions of Nicholas Ayache

From 1981 to 1988, Nicholas Ayache sought to equip autonomous robots with new **artificial vision** capabilities (bulk object recognition, bi- and trinocular stereoscopic vision, navigation from visual maps). He introduced highly original methods for comparing images and shapes, combining symbolic graph traversal and optimal filtering. His work has been pioneering and influential in the computer vision and mobile robotics community. N. Ayache presented his work in a monograph published by Masson in 1989 and by MIT-Press in 1991, two highly-cited works

From 1988 onwards, N. Ayache undertook pioneering research at the intersection of **medical imaging** and **computer vision**, creating the Epidauré project at INRIA Rocquencourt and participating in the design of new systems for medical image analysis, image-guided therapy and surgical simulation. This research led to the **first systems** to enable **temporal tracking** of patient images, **fusion** of medical images from several modalities (X-ray scanner, MRI, ultrasound, nuclear medicine, etc.), introduction of **augmented reality** in surgery and interventional radiology, **dynamic analysis** of deformable structures, and **surgical simulation** with real-time visual and force feedback. This work has had a major impact on the scientific, clinical and industrial communities.

N. Ayache is considered one of the **founders** of this young discipline, **computational medical imaging**, at the crossroads of medicine, imaging and computer science. He helped to structure it by co-founding the scientific journal Medical Image Analysis (impact factor 13.828 in 2022), of which he has been editor-in-chief since its creation, and the annual conference MICCAI - Medical Image Computing and Computer Assisted Intervention - which he chaired in Nice in Oct. 2012 (1270 participants).

Since 2005, N. Ayache has devoted his research to the **physiological virtual patient**, a subject he **introduced** at a strategic brainstorming meeting in Brussels in October 2004, then consolidated by participating in the drafting of the first European white report, co-founding the Virtual Physiological Institute and co-founding the Asclepios project-team at Inria Sophia Antipolis. A central focus of his research is the introduction of geometric, statistical, biophysical and functional models of the human body to guide the analysis and simulation of medical images.

This approach is proving promising for quantifying the current evolution of a pathology and predicting its future course, particularly in **cardiac imaging**, **neuroimaging** and **image-guided therapy**. With his team, he has made numerous theoretical and algorithmic contributions. These include the introduction of nonlinear and diffeomorphic image registration algorithms parameterized by stationary velocity fields, the log-Euclidean analysis of diffusion tensor images, the establishment of a formal framework for performing anatomical shape statistics from deformations, the customization of electromechanical models of the heart from image sequences and electrophysiology signals, the customization of mathematical models (EDPs) of brain tumor growth.

In 2018, N. Ayache and his Inria collaborators created a new research team, EPIONE, dedicated to *e-patient* and *e-medicine*. In particular, N. Ayache is dedicated to developing modern **machine learning** and **artificial intelligence** methods to jointly exploit medical

images, biological and behavioral data available on the patient, in order to better guide diagnosis, prognosis and therapeutic action.

N. Ayache has supervised (or co-supervised) the theses of over **90 doctoral students**, most of whom work in the field of digital imaging, mainly in the medical field. 9 of his doctoral students have received a thesis prize, including two Gilles Kahn second prizes and 1 Cor Baayen second prize.

The theoretical and algorithmic contributions made by N. Ayache's team have often been integrated into concrete **applications** in close partnership with industry and medical practitioners. These include close collaborations with major industrial players in the field of medical imaging (General Electric, Philips, Siemens) or software (Microsoft Research), and SMEs (Dosisoft, Mauna Kea Technologies, Neurelec, etc.).

N. Ayache's team is closely involved in the research of 4 IHUs (**Instituts Hospitalo-Universitaires**); 3 IHUs created in 2012: the Strasbourg IHU on image-guided mixed surgery, the Bordeaux IHU on cardiac rhythm disorders, and the Pitié Salpêtrière neuroscience IHU, as well as the RespirERA IHU created in Nice in 2024 and dedicated to lung diseases.

The team has participated in the development of widely distributed software (MedInria, SOFA, Cardioviz3D, diffeomorphic demons, etc.). N. Ayache is **co-founder of 7 high-tech companies** associated in part with his work and that of his collaborators.

Recent Publications of N. Ayache (2016-2024)

Editorial & Book Chapters (Selection 2015-2020)

1. James S Duncan, Michel F Insana, and Nicholas Ayache. Biomedical Imaging and Analysis In the Age of Sparsity, Big Data, and Deep Learning. Proceedings of the IEEE, January 2020
2. Nicholas Ayache Medical Imaging in the Age of Artificial Intelligence. In Nordlinger B., Villani C., and Rus D., editors, Healthcare and Artificial Intelligence, pages 89-91. Springer International Publishing, March 2020
3. Nicholas Ayache, Alain Damasio, Yuval Noah Harari, Cathy O'Neil, and Nicolas Revel. Nouvelle enquête sur l'intelligence artificielle, Champs Actuel. Flammarion, June 2020.
4. Nicholas Ayache. L'imagerie médicale à l'heure de l'intelligence artificielle. In Cédric Villani and Bernard Nordlinger, editors, *Santé et intelligence artificielle*, pages 151-154. CNRS Editions, October 2018.
5. Nicholas Ayache. Des images médicales au patient numérique, Leçons inaugurales du Collège de France. Collège de France / Fayard, March 2015.
6. Nikos Paragios, Jim Duncan, and Nicholas Ayache. Handbook of Biomedical Imaging: Methodologies and Clinical Research. Springer, 2015.

Peer-Reviewed Journal Articles (selection 2016-2024)

1. Hind Dadoun, Hervé Delingette, Anne-Laure Rousseau, Eric de Kerviler, and Nicholas Ayache. Deep Clustering for Abdominal Organ Classification in US imaging. Journal of Medical Imaging, 10(3):034502, 2023.
2. Dimitri Hamzaoui, Sarah Montagne, Raphaële Renard-Penna, Nicholas Ayache, and Hervé Delingette. Morphologically-Aware Consensus Computation via Heuristics-based Iterative Optimization (MACCHIato). Journal of Machine Learning for Biomedical Imaging, 2(UNSURE 2022 Special Issue):361-389, 2023.
3. Sébastien Molière, Dimitri Hamzaoui, Anna Luzurier, Benjamin Granger, Sarah Montagne, Alexandre Allera, Malek Ezziane, Raphaële Quint, Mehdi Kalai, Nicholas Ayache, Hervé Delingette, and Raphaële Renard-Penna. Reference standard for the evaluation of automatic segmentation algorithms: Quantification of inter observer variability of manual delineation of prostate contour on MRI. Diagnostic and Int. Imaging, 2023.
4. Théodore Soulier, Olivier Colliot, Nicholas Ayache, and Benjamin Rohaut. How will tomorrow's algorithms fuse multimodal data? The example of the neuroprognosis in Intensive Care. Anaesthesia Critical Care & Pain Medicine, pp 101301, September 2023.
5. Paul Tourniaire, Marius Ilie, Paul Hofman, Nicholas Ayache, and Hervé Delingette. MS-CLAM: Mixed Supervision for the classification and localization of tumors in Whole Slide Images. Medical Image Analysis, 85:102763, 2023.

6. Clément Abi Nader, Federica Ribaldi, Giovanni B Frisoni, Valentina Garibotto, Philippe Robert, Nicholas Ayache, and Marco Lorenzi. SimulAD: A dynamical model for personalized simulation and disease staging in Alzheimer's disease. *Neurobiology of Aging*, 113:73-83, May 2022.
7. Nicholas Ayache. La fée IA au chevet des malades. *Pour la Science*. Dossier, (hors série 115):18-23, 2022. Note: The article is available at the following address: <https://www.pourlascience.fr/sd/medecine/la-fee-ia-au-chevet-des-malades-23684.php>.
8. Hind Dadoun, Anne-Laure Rousseau, Eric de Kerviler, Jean Michel Correas, Anne-Marie Tissier, Fanny Joujou, Sylvain Bodard, Kemel Khezzane, Constance de Margerie-Mellon, Hervé Delingette, and Nicholas Ayache. Detection, Localization, and Characterization of Focal Liver Lesions in Abdominal US with Deep Learning. *Radiology: Artificial Intelligence*, 4(3), 2022.
9. Dimitri Hamzaoui, Sarah Montagne, Benjamin Granger, Alexandre Allera, Malek Ezziane, Anna Luzurier, Raphaëlle Quint, Mehdi Kalai, Nicholas Ayache, Hervé Delingette, and Raphaëlle Renard-Penna. Correction to: Prostate Volume Prediction on MRI: Tools, Accuracy and Variability. *European Radiology*, 32(7):5035-5035, 2022. Note: Correction about the name of the author Raphaëlle Renard-Penna.
10. Dimitri Hamzaoui, Sarah Montagne, Benjamin Granger, Alexandre Allera, Malek Ezziane, Anna Luzurier, Raphaëlle Quint, Mehdi Kalai, Nicholas Ayache, Hervé Delingette, and Raphaelae Renard-Penna. Prostate volume prediction on MRI: tools, accuracy and variability. *European Radiology*, February 2022. Note: The original publication is available at www.springerlink.com: <https://link.springer.com/article/10.1007/s00330-022-08554-4>.
11. Dimitri Hamzaoui, Sarah Montagne, Raphaelae Renard-Penna, Nicholas Ayache, and Hervé Delingette. Automatic Zonal Segmentation of the Prostate from 2D and 3D T2-weighted MRI and Evaluation for Clinical Use. *Journal of Medical Imaging*, 9(2):024001, March 2022.
12. Marius Ilie, Jonathan Benzaquen, Paul Tourniaire, Simon Heeke, Nicholas Ayache, Hervé Delingette, Elodie Long-Mira, Sandra Lassalle, Marame Hamila, Julien Fayada, Josiane Otto, Charlotte Cohen, Abel Gomez Caro, Jean Philippe Berthet, Charles Hugo Marquette, Véronique Hofman, Christophe Bontoux, and Paul Hofman. Deep learning facilitates distinguishing histologic subtypes of pulmonary neuroendocrine tumors on digital whole-slide images. *Cancers*, 14(7):1740, March 2022.
13. Fabien Lareyre, Christian-Alexander Behrendt, Arindam Chaudhuri, Nicholas Ayache, Juliette Raffort, and Hervé Delingette. Big Data and Artificial Intelligence in Vascular Surgery: Time for Multidisciplinary Cross-Border Collaboration. *Angiology*, 73(8):697-700, September 2022.
14. Marius Schmidt- Mengin, Théodore Soulier, Mariem Hamzaoui, Arya Yazdan-Panah, Benedetta Bodini, Nicholas Ayache, Bruno Stankoff, and Olivier Colliot. Online hard example mining vs. fixed oversampling strategy for segmentation of new multiple sclerosis lesions from longitudinal FLAIR MRI. *Frontiers in Neuroscience*, 16:100405, 2022.
15. Carine Wu, Sarah Montagne, Dimitri Hamzaoui, Nicholas Ayache, Hervé Delingette, and Raphaëlle Renard-Penna. Automatic segmentation of prostate zonal anatomy on MRI: a systematic review of the literature. *Insights into Imaging*, 13(1):202, December 2022.
16. Clément Abi Nader, Nicholas Ayache, Giovanni B Frisoni, Philippe Robert, and Marco Lorenzi. Simulating the outcome of amyloid treatments in Alzheimer's Disease from multi-modal imaging and clinical data. *Brain Communications*, February 2021.
17. Julian Krebs, Hervé Delingette, Nicholas Ayache, and Tommaso Mansi. Learning a Generative Motion Model from Image Sequences based on a Latent Motion Matrix. *IEEE Trans. on Medical Imaging*, February 2021.
18. Sarah Montagne, Dimitri Hamzaoui, Alexandre Allera, Malek Ezziane, Anna Luzurier, Raphaëlle Quint, Mehdi Kalai, Nicholas Ayache, Hervé Delingette, and Raphaelae Renard Penna. Challenge of prostate MRI segmentation on T2-weighted images: inter-observer variability and impact of prostate morphology. *Insights into Imaging*, 12(1), June 2021.
19. Maxime Sermesant, Hervé Delingette, Hubert Cochet, Pierre Jaïs, and Nicholas Ayache. Applications of artificial intelligence in cardiovascular imaging. *Nature Reviews Cardiology*, 18:600-609, March 2021.
20. Kevin Zhou, Hoang Ngan Le, Khoa Luu, Hien van Nguyen, and Nicholas Ayache. Deep reinforcement learning in medical imaging: A literature review. *Medical Image Analysis*, 73:102193, October 2021.
21. Nicholas Ayache. Foreword. In Jean-François Uhl, Joaquim Jorge, Daniel Simoes Lopes, and Pedro F Campos, editors, *Digital Anatomy - Applications of Virtual, Mixed and Augmented Reality*, Human-Computer Interaction Series. Springer Nature, May 2021.
22. Qiao Zheng, Hervé Delingette, Kenneth Fung, Steffen E Petersen, and Nicholas Ayache. Pathological Cluster Identification by Unsupervised Analysis in 3,822 UK Biobank Cardiac MRIs. *Frontiers in Cardiovascular Medicine*, 7:164, November 2020.
23. Wen Wei, Emilie Poirion, Benedetta Bodini, Matteo Tonietto, Stanley Durrleman, Olivier Colliot, Bruno Stankoff, and Nicholas Ayache. Predicting PET-derived Myelin Content from Multisequence MRI for Individual Longitudinal Analysis in Multiple Sclerosis. *NeuroImage*, 223C(117308), December 2020.

24. Raphaël Sivera, N Capet, V Manera, R Fabre, M Lorenzi, H Delingette, X Pennec, N Ayache, P Robert. Voxel-based assessments of treatment effects on longitudinal brain changes in the Multidomain Alzheimer Preventive Trial cohort. *Neurobiology of Aging*, 94:50-59, October 2020
25. Pawel Mlynarski, H A Alghamdi, PY Bondiau, N Ayache. Anatomically consistent CNN-based segmentation of organs-at-risk in cranial radiotherapy. *Journal of Medical Imaging*, 7(1):1-21, February 2020
26. Fanny Orlhac, A Lecler, J Savatovski, J Goya-Outi, C Nioche, F Charbonneau, N Ayache, F Frouin, L Duron, I Buvat. How can we combat multicenter variability in MR radiomics? Validation of a correction procedure. *European Radiology*, 2020.
27. Luigi Antelmi, N Ayache, P Robert, M Lorenzi. Sparse Multi-Channel Variational Autoencoder for the Joint Analysis of Heterogeneous Data. *Proceedings of Machine Learning Research*, (97):302-311, 2019
28. Pawel Mlynarski, H Delingette, A Criminisi, N Ayache. 3D Convolutional Neural Networks for Tumor Segmentation using Long-range 2D Context. *Computerized Medical Imaging and Graphics*, 2019.
29. Pawel Mlynarski, Hervé Delingette, Antonio Criminisi, and Nicholas Ayache. Deep Learning with Mixed Supervision for Brain Tumor Segmentation. *Journal of Medical Imaging*, 2019.
30. Clement Abi Nader, Nicholas Ayache, Philippe Robert, and Marco Lorenzi. Monotonic Gaussian Process for Spatio-Temporal Disease Progression Modeling in Brain Imaging Data. *NeuroImage*, 2019.
31. Raphaël Sivera, N Capet, V Manera, R Fabre, M Lorenzi, H Delingette, X Pennec, N Ayache, P Robert. Voxel based assessments of treatment effects on longitudinal brain changes in the MAPT cohort. *Neurobiology of Aging*, 2019.
32. R Sivera, H Delingette, M Lorenzi, X Pennec, and N Ayache. A model of brain morphological changes related to aging and Alzheimer's disease from cross-sectional assessments. *NeuroImage*, 198:255-270, 2019.
33. Wen Wei, Emilie Poirion, Benedetta Bodini, Stanley Durrleman, Nicholas Ayache, Bruno Stankoff, and Olivier Colliot. Predicting PET-derived Demyelination from Multimodal MRI using Sketcher-Refiner Adversarial Training for Multiple Sclerosis. *Medical Image Analysis*, 2019
34. Wen Wei, Emilie Poirion, Benedetta Bodini, Stanley Durrleman, Olivier Colliot, Bruno Stankoff, and Nicholas Ayache. Fluid-attenuated inversion recovery MRI synthesis from multisequence MRI using three-dimensional fully convolutional networks for multiple sclerosis. *Journal of Medical Imaging*, 6(01), 2019
35. Qiao Zheng, H Delingette, and Nicholas Ayache. Explainable cardiac pathology classification on cine MRI with motion characterization by semi-supervised learning of apparent flow. *Medical Image Analysis*, 2019
36. Thomas Demarcy, Isabelle Péliesson, Dan Gnansia, Hervé Delingette, Nicholas Ayache, Charles Raffaelli, Clair Vandersteen, and Nicolas Guevara. Un modèle de reconstruction tridimensionnelle de la cochlée au service de l'implantation cochléaire. *Les cahiers de l'audition*, 2019.
37. Paul Hofman, Nicholas Ayache, Pascal Barbry, Michel Barlaud, Audrey Bel, Philippe Blancou, Frédéric Checler, Sylvie Chevillard, Gael Cristofari, Mathilde Demory, Vincent Esnault, Claire Falandry, Eric Gilson, Olivier Guerin, Nicolas Glaichenhaus, Joël Guigay, Marius I. Ilie, Bernard Mari, Charles-Hugo Marquette, Véronique Paquis-Flucklinger, Frédéric Prate, Pierre Saintigny, Barbara Seitz-Polsky, Taycir Skhiri, Ellen Van Obberghen-Schilling, Emmanuel Van Obberghen, and Laurent Yvan-Charvet. The OncoAge Consortium: Linking Aging and Oncology from Bench to Bedside and Back Again. *Cancers*, 2019. Julian Krebs, Hervé Delingette, Boris Mailhé, Nicholas Ayache, and Tommaso Mansi. Learning a Probabilistic Model for Diffeomorphic Registration. *IEEE Transactions on Medical Imaging*, 2019.
38. Rocio Cabrera Lozoya, Benjamin Berte, Hubert Cochet, Pierre Jaïs, Nicholas Ayache, and Maxime Sermesant. Model-based Feature Augmentation for Cardiac Ablation Target Learning from Images. *IEEE Transactions on Biomedical Engineering*, 2018.
39. Nicolas Duchateau, Maxime Sermesant, Hervé Delingette, and Nicholas Ayache. Model-based generation of large databases of cardiac images: synthesis of pathological cine MR sequences from real healthy cases. *IEEE Transactions on Medical Imaging*, 37:755-766, 2018.
40. Sophie Giffard-Roisin, Hervé Delingette, Thomas Jackson, Jessica Webb, Lauren Fovargue, Jack Lee, Christopher A Rinaldi, Reza Razavi, Nicholas Ayache, and Maxime Sermesant. Transfer Learning from Simulations on a Reference Anatomy for ECGI in Personalised Cardiac Resynchronization Therapy. *IEEE Trans. On Biomedical Engineering*, 20, 2018.
41. Pietro Gori, Olivier Colliot, Linda Marrakchi Kacem, Yulia Worbe, Alexandre Routier, Cyril Poupon, Andreas Hartmann, Nicholas Ayache, and Stanley Durrleman. Double diffeomorphism: combining morphometry and structural connectivity analysis. *IEEE Transactions on Medical Imaging*, 2018.
42. Roch Molléro, X Pennec, H Delingette, N Ayache, M Sermesant. Population-based priors in cardiac model personalisation for consistent parameter estimation in heterogeneous databases. *International Journal for Numerical Methods in Biomedical Engineering*, 2018

43. Qiao Zheng, H Delingette, N Duchateau, N Ayache. 3D Consistent & Robust Segmentation of Cardiac Images by Deep Learning with Spatial Propagation. *IEEE Transactions on Medical Imaging*, 2018.
44. Nicholas Ayache. L'imagerie médicale à l'heure de l'intelligence artificielle. In Cédric Villani and Bernard Nordlinger, editors, *Santé et intelligence artificielle*, pages 151-154. CNRS Editions, 2018.
45. Fanny Orlhac, Frédérique Frouin, Christophe Nioche, Nicholas Ayache, and Irene Buvat. Validation of a method to compensate multicenter effects affecting CT radiomic features. *Radiology*, 2018.
46. Fanny Orlhac, P.-A Mattei, C. Bouveyron, and N Ayache. Class-specific Variable Selection in High-Dimensional Discriminant Analysis through Bayesian Sparsity. *Journal of Chemometrics*, 2018.
47. Thomas Demarcy, Clair Vandersteen, Nicolas Guevara, Charles Raffaelli, Dan Gnansia, Nicholas Ayache, and Hervé Delingette. Automated analysis of human cochlea shape variability from segmented microCT images. *Computerized Medical Imaging and Graphics*, 59:1 - 12, 2017.
48. Sophie Giffard-Roisin, Thomas Jackson, Lauren Fovargue, Jack Lee, Hervé Delingette, Reza Razavi, Nicholas Ayache, and Maxime Sermesant. Non-Invasive Personalisation of a Cardiac Electrophysiology Model from Body Surface Potential Mapping. *IEEE Transactions on Biomedical Engineering*, 64(9):2206 - 2218, September, 2017.
49. Pietro Gori, Olivier Colliot, Linda Marrakchi-Kacem, Yulia Worbe, Cyril Poupon, Andreas Hartmann, Nicholas Ayache, and Stanley Durrleman. A Bayesian Framework for Joint Morphometry of Surface and Curve meshes in Multi-Object Complexes. *Medical Image Analysis*, 35:458-474, 2017.
50. Bishesh Khanal, Nicholas Ayache, and Xavier Pennec. Simulating Longitudinal Brain MRIs with known Volume Changes and Realistic Variations in Image Intensity. *Frontiers in Neuroscience*, 2017.
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