

# Nicolas Papadakis

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## Professional

- 2018 - 2019 **Visiting researcher** at Department of Applied Mathematics and Theoretical Physics, University of Cambridge.
- 2013 - 2018 **CNRS Confirmed Researcher** in image processing at Institut de Mathématiques de Bordeaux.
- 2010 - 2012 **CNRS Junior Researcher** in image processing in the Laboratoire Jean Kuntzmann, Inria team MOISE.
- 2007 - 2010 **Post doctoral position** in "Depth estimation and novel view synthesis", Barcelona Media, Universitat Pompeu Fabra, Barcelona. Supervisor: Vicent Caselles.

## Education

- 2015 **Habilitation thesis on Applied mathematics:** Optimal Transport for Image Processing.
- 2004 - 2007 **Ph.D on Applied mathematics**, VISTA Group, IRISA/INRIA Rennes, France. Thesis on image assimilation: application to curve and vector field tracking. Supervisor: Étienne Mémin.
- 2003 - 2004 **Master of science in Analysis and Stochastic Models**, university of Rouen, France. Thesis on  $C^1$  approximation of oceanographic surface from lagrangian data. Supervisor: Christian Gout.
- 1999 - 2004 **Master of Engineering in Applied Mathematics and Computer Sciences** from the INSA (National Institute of Applied Sciences), Rouen, France.

## Research Interests

**Subjects:** Image and video processing, optimal transport, variational methods, non-linear problems, convex optimization, non-local methods.

**Applications in computer vision:** Segmentation, denoising, motion/depth estimation, registration, object tracking, histogram equalization, colorization, video surveillance, synthesis of virtual cameras, urban reconstruction.

**Applications in geosciences:** Assimilation of image data in geophysical dynamical models, learning of periodic flows characteristics from image sequences.

## Scientific Responsibilities

### National

- 2017 - 2020 Co-director of the Groupe de Recherche "Mathématiques de l'Imagerie et de ses Applications" GdR MIA) .

### PhD Supervision

- 2015 - 2018 E. Cazelles, **Univ. Bordeaux**, co-supervision with J. Bigot, IMB. PCA in Wasserstein spaces.
- 2014 - 2017 R. Giraud, **Univ. Bordeaux, Cluster d'Excellence CPU**, co-supervision with V.-T. Ta, LaBRI. Matching Algorithms and Superpixels for Image Analysis and Processing .
- 2012 - 2016 R. Hug (Assistant professor), **Grenoble INP**, co-supervision with E. Maitre, LJK. Optimal transport with physical constraints.
- 2012 - 2014 R. Yıldızoğlu (Math teacher), **Univ. Bordeaux**, co-supervision with J.-F. Aujol and C. Dossal, IMB. Convexification methods and texture segmentation.

## Post-doctorate Supervision

- 2015 - 2016 A. Dessein (Research Eng., Qucit). **CPU, Univ. Bord..** Optimal Transport for audio processing.  
2012 A. Makris (Researcher, Crete). **UJF.** Image assimilation for oceanography.

## Internship Supervision

- 2017 A. Thibault. **License 3**, ENS Paris, Optimal Transport and proximal algorithms.  
2016 L. Boisseuil. **Master 1**, MMSI, Univ. Bordeaux. Image segmentation.  
2014 C. Collin. **Master 1**, MIMSE, Univ. Bordeaux. Detection of faces in videos.  
2013 E. Nicolas. **Master 1**, MIMSE, Univ. Bordeaux. Extraction of 3D neuronal networks in microscopy.

## Teaching

- 2016 - 2018 PDE and Image processing, Master 2 TDSI, Univ Bordeaux.  
2015 - 2017 Computer vision project, Master 2 IPCV, Bordeaux.  
2016 - 2018 Linear solvers, Master 1 Matmeca, Bordeaux.  
2014 - 2016 PDE and Image processing, Master 1 TDSI, Univ Bordeaux.  
2014 Numerical algorithms, License 3 Enseirb, Bordeaux.  
2013 - 2015 Numerical analysis, License 3 Matmeca, Bordeaux.

## Life of Laboratory

- 2017 - 2018 Member of the Laboratory Committee of IMB.  
2013 - Member of the Consultative Committee in Applied Mathematics of IMB.  
2013 - 2016 Monthly **Signal-Image**, inter-laboratory IMB/IMS/LaBRI seminar.  
2010 - 2012 Monthly **working group** of Inria team MOISE, LJK.  
2010 - 2012 Weekly **EDP-MOISE**, seminar, LJK.  
2010 - 2011 Monthly seminar **Optimal Transport**, LJK.

## Contractual activities

### Project leading

- 2016 - 2020 PI of project **GOTMI** Generalized Optimal Transport Models for Image processing, funded by French ANR.  
2015 - 2016 PI of project **DADOT** Data Analysis with Discrete Optimal Transport, funded by "Bis Japan" project, IdEX Bordeaux, for collaboration with Kyoto University.  
2012 - 2015 PI of project **TOSCANA** Optimal Transport with Physical Constraints, Numerical Analysis and Application to data Assimilation, funded by Grenoble INP.  
2011 - 2013 PI of project **ASIOME**: Assimilation of Oceanographic Image Structures and Error Modelling, funded by the pole MSTIC of the Joseph Fourier University (10K€) and the LEFE/MANU program of INSU, CNRS

## Projects

- 2018 - 2022 RISE project **NoMADS** : Nonlocal Methods for Arbitrary Data Sources (H2020 - Marie Skłodowska-Curie - Research and Innovation Staff Exchange). PI: D. Tenbrinck (Univ. Münster).
- 2017 - 2021 ANR project **BOOST-SWOT** : Building Of Ocean Surface Topography maps with SWOT. PI: E. Cosme (LGGE, Grenoble).
- 2017 - 2018 OSTST project **MOMOMS** (CNES et NASA): Merging Ocean Models and Observations at Mesoscale and Submesoscale. PI: E. Cosme (LGGE, Grenoble).
- 2015 - 2016 CNRS Imag'in project **CAVALIERI**: CALculus of VARIations for Imaging: Editing and Retrieval of Images. PI: V. Duval (Inria, Rocquencourt).
- 2013 - 2016 Signal-Image of **Cluster d'Excellence CPU**.
- 2012 - 2015 Project PGM **MAORI** (program: Mathematics and optimization for images, in the setting of the Gaspard Monge call on optimization and operational research. PI: M. Kowalski (Supelec).
- 2012 - 2015 Aquitaine region project "Modeling for multi-modal data". PI: J-F. Aujol (IMB).
- 2011 - 2015 French ANR project **TOMMI**: Optimal Transportation and Image Multiphysics Models. PI : E. Maitre (Grenoble INP).
- 2012 - 2013 Programm **Swot/Ocean** of CNES: Assimilation of images in oceanography.

## Scientific diffusion

### Organization of conferences and workshops

- Nov. 2018 **Journées communes des GdR MIA et ImaBio: "Microscopie et traitement d'image"**, Illkirch.
- June 2018 Mini-symposium **Optimal Transport and Patch Methods for Color Image Editing**", Bologna.
- Oct. 2017 **Journées annuelles 2017 des GdR MOA et MIA**, IMB, Bordeaux.
- Oct. 2016 **Workshop on Optimal Transport and Optimization in Imaging**, Inria, Paris.
- Oct. 2015 **Workshop on Optimal Transport: Numerics and Applications**, IMB, Bordeaux.
- June 2015 **International Conference on Scale Space and Variational Methods**, SSVM, Cap Ferret, France.
- Apr. 2014 **Second Workshop on Mathematical Analysis of Images in Bordeaux**, LaBRI, Bordeaux.
- Nov. 2013 **First Workshop on Optimization for Image and Signal Processing**, École Polytechnique, Projet MAORI.
- Oct. 2013 **Workshop on Modelisation with optimal transport**, ANR TOMMI, Grenoble.
- May 2013 **Mini-Symposium Méthodes Numériques pour le Transport Optimal**, Seignosse, SMAI.
- Nov. 2012 **Journées Bordelaises d'Analyse Mathématique des Images**, IMB, Bordeaux.

### Invited presentations

- Feb. 2019 **Workshop Variational methods and optimization in imaging**, IHP, Paris
- June 2017 **Journées Image, Optimisation, Probabilités et Statistique**, Le Teich, France.
- Mar. 2017 **Imaging in Paris**, Paris, Covariant LEAsT-square Re-fitting for image restoration.
- Sep. 2016 **CSASC joint meeting of the Czech, Slovenian, Austrian, Slovak and Catalan mathematical societies**, Barcelona, Image segmentation with optimal transport.
- Jund 2016 **PICOF (Problèmes Inverses, Contrôle et Optimisation de Formes)**, Autrans, France, A Forward-Backward algorithm for geodesic PCA of histograms in the Wasserstein space.
- Oct. 2015 **1st Applied Mathematics Symposium Variational Methods for Dynamic Inverse Problems and Imaging**, Münster, Germany, Generalized optimal transport models for image processing.
- Jul. 2015 **IFIP TC7 Conference 2015 on System Modelling and Optimization**, Nice, Convex Color Image Segmentation with Optimal-transport Distances.
- Apr. 2015 **Lecture**, Kyoto, Japan, Color transfer and Image segmentation with optimal transport.
- Nov. 2014 **Workshop on Optimal Transport**, Toulouse, Image segmentation with optimal transport.
- Jund 2014 **Laboratoire Mathématiques, Images and Applications**, Univ. de la Rochelle, Color transfer and colorization.
- May 2014 **SIAM Conf. on Image Sciences**, Hong-Kong, Variational methods for virtual soccer game replays.
- Jan. 2014 **Institut de Mathématiques de Toulouse**, Transport optimal pour le traitement d'image.
- Jan. 2014 **Colloque LEFE (INSU/CNRS)**, Météo-France, Toulouse, Métriques pour l'assimilation d'images.
- Dec. 2013 **SIAM Conference on analysis of PDE**, Orlando, US, Optimal transport with proximal splitting.
- Sep. 2013 **Congrès GRETSI**, Signaux et Images en Océanographie, Brest, Assimilation de structures d'images.

## Awards and Grants

- 2015 **Prime d'Excellence Scientifique** of CNRS.
- 2008 **Best Ph.D. thesis Award of EADS** Enterprise Foundation for Geosciences.
- 2008 **Best Ph.D. thesis Award of AFRIF**, French Association for Pattern Recognition, 2008.
- 2008 - 2010 Funded by the Spanish **Torres Quevedo National Research Grant**.

## International Collaborations

- 2015 - 2016 M. Cuturi, Assistant Professor, Kyoto University [J29].
- 2013 - G. Gilboa, Assistant Professor, Technion, Israël [C25,J27,J32].
- 2007 - 2013 V. Caselles, PR Universitat Pompeu Fabra, Barcelona [J7,J8,J10-J13, C13-C17].
- 2006 - 2007 G. Artana, PR Universidad de Buenos Aires, Argentina [J2].

## Expertize

- 2015- Evaluation of projects for French ANR.
- 2012- Evaluation of projects for LEFE/MANU of CNRS.
- 2010 - Reviews for IEEE Trans. on Image Processing, IEEE Trans. on Pattern Analysis and Machine Intelligence, SIAM J. on Imaging Sciences, Multiscale Modeling and Simulation, Tellus Series A, IEEE Int. Conf. on Computer Vision (ICCV), Europ. Conf. on Computer Vision (ECCV).
- 2009 Member of AFRIF jury for the 2009 best PhD award.

## PhD jury

- Oct. 2018 A. Houdard, Université Paris Descartes. Reviewer.
- Apr. 2018 C. Ocampo, Télécom ParisTech. Reviewer.
- Nov. 2017 L. Chizat, Université Paris-Dauphine. Examiner.
- Dec. 2016 N. Feyeux, Université Grenoble Rhône-Alpes. Examiner.
- Dec. 2016 F. Pierre, Université de Bordeaux. Examiner.
- Nov. 2016 O. Frigo Université Paris Descartes. Reviewer.
- Jun. 2016 M. Henry, Université Grenoble Rhône-Alpes. Examiner.
- Jan. 2016 V. Lazcano, Universitat Pompeu Fabra. Examiner.
- May 2015 M. Saleh, Université de la Rochelle. Examiner.
- Jul. 2014 V. Chabot, LJK/Inria Rhônes-Alpes, Université Joseph Fourier. Invited member.

## Softwares

- 2018 Matlab code for **Geodesic PCA in Wasserstein space** [J27]
- 2017 Matlab code for **Over-relaxed Sinkhorn algorithm**
- 2017 Matlab code for **Superpixel decomposition** [C30, J26]
- 2017 Matlab code for **Histogram transfer** [C27]
- 2016 Collaborative image colorization **Colociel** based on [C23,J17]. Dépôt Agence de Protection des Programmes N° IDDN.FR.001.080021.000.S.P.2016.000.2100
- 2015 Integration of OPAL [J20] in the Automated MRI Brain volumetry system **volBrain**.
- 2015 Matlab code for **histogram-based segmentation of color images** [C21,C24,J25].
- 2013 Matlab code for **continuous** [J15] and **discrete** [J16] computation of Optimal Transport .
- 2013 C++ software for **image colorization** [J14].
- 2011 QT Interface of **color transfer** between images [J10], realized for the “ fête de la science” in LJK.
- 2010 C++ software of **object tracking** in videos [J9].
- 2010 C++ software on urban reconstruction from aerial images [J7], Barcelona3D project, property of Barcelona Media.
- 2007 Fluid motion estimation softwares for the European project FluidD: Vorticity estimation [J4] and characterization of turbulent structures [J2].

## Linguistic Skills

- Fluent English and Spanish (Castilian)
- Beginner Catalan and Japanese (4 year study, Level 2 of Cardiff test)

## Scientific Publications

Published : 29 international journals and 33 international conferences with peer-reviews. H-index 21 (Google Scholar, Sept. 2018).

### Pre-prints

- J33 J. Bigot, E. Cazelles and **N. P.** – Central limit theorems for Sinkhorn divergence between probability distributions on finite spaces and statistical applications – *Submitted to Electronic Journal of Statistics*, 2018.
- J32 T. Feld, J.-F. Aujol, G. Gilboa and **N. P.** – Rayleigh quotient minimization for absolutely one-homogeneous functionals, *Submitted to Inverse Problems*, 2018.
- J31 R. Hug, E. Maitre and **N. P.** – On the convergence of augmented Lagrangian method for optimal transport between nonnegative densities, *Submitted to Journal of Mathematical Analysis and Applications*, 2018.
- J30 J. Bigot, E. Cazelles and **N. P.** – Penalization of barycenters in the Wasserstein space – *Submitted to Annals of Statistics*, 2016.

### International Journals

- J29 E. Cazelles, V. Seguy, J. Bigot, M. Cuturi and **N. P.** – Geodesic PCA versus Log-PCA of histograms in the Wasserstein space – *SIAM Journal on Scientific Computing*, 40(2),: B429–B456, 2018.
- J28 A. Dessein, **N. P.** and J.-L. Rouas – Regularized Optimal Transport and the Rot Mover’s Distance – *Journal of Machine Learning Research*, 15: 1-53, 2018.
- J27 A. Aujol, G. Gilboa and **N. P.** – Theoretical Analysis of Flows Estimating Eigenfunctions of One-homogeneous Functionals – *SIAM Journal on Imaging Sciences*, 11(2): 1416–1440, 2018.
- J26 R. Giraud, V.-T. Ta and **N. P.** – Robust Superpixels using Color and Contour Features along Linear Path – *Computer Vision and Image Understanding*, 2018.
- J25 **N. P.** and J. Rabin – Convex Histogram-Based Joint Image Segmentation with Regularized Optimal Transport Cost - *Journal of Mathematical Imaging and Vision*, 59(2): 161 - 186, 2017.
- J24 R. Giraud, V.-T. Ta and **N. P.** – Evaluation Framework of Superpixel Methods with a Global Regularity Measure – *Journal of Electronic Imaging*, 26(6): 2017.
- J23 R. Giraud, A. Bugeau, P. Coupé, V.-T. Ta and **N. P.** – SuperPatchMatch: an Algorithm for Robust Correspondences of Superpixel Patches – *IEEE Transactions on Image Processing*, 26(8): 4068 - 4078, 2017.
- J22 C.-A. Deledalle, **N. P.**, J. Salmon and S. Vaiteer –CLEAR: Covariant LEAst-square Re-fitting with applications to image restoration – *SIAM Journal on Imaging Sciences*, 10 (1):243-284, 2017.
- J21 C. Zachiu, **N. P.**, M. Ries, C. Moonen and B. Denis de Senneville –A robust optical flow tracking technique for real-time MR-guided external beam therapies in moving organs – *Physics in Medicine and Biology*, 60(23): 9003-29, 2015.
- J20 R. Giraud, V.T. Ta, P. Coupé, **N. P.**, L. Collins and J. V. Manjón – Optimized Patchmatch for Multi-scale and Multi-feature label fusion – *NeuroImage*, 124: 770-82, 2015.
- J19 R. Hug, E. Maitre and **N. P.** – Multiphysics optimal transportation and image interpolation – *ÈSAIM: Mathematical Modelling and Numerical Analysis, Special Issue - Optimal Transport*, 49(6): 1671 - 1692, 2015.
- J18 V. Chabot, M. Nodet, **N. P.** and A. Vidard. – Accounting for observation errors in image data assimilation – *Tellus A: Dynamic Meteorology and Oceanography*, 67, 2015.
- J17 F. Pierre, J.-F. Aujol, A. Bugeau, **N. P.** and V.-T. Ta – Luminance-Chrominance Model for Image Colorization – *SIAM Journal on Imaging Sciences*, 8(1): 536–563, 2015.
- J16 S. Ferradans, **N. P.**, G. Peyré and J.-F. Aujol – Regularized discrete optimal transport – *SIAM Journal on Imaging Sciences*, 7(1): 212–238, 2014.
- J15 **N. P.**, G. Peyré, É. Oudet. – Optimal Transport with Proximal Splitting – *SIAM Journal on Imaging Sciences*, 7(1): 212-238, 2014.

- J14 A. Bugeau, V-T. Ta and **N. P.** – Variational exemplar-based image colorization – *IEEE Transactions on Image Processing*, 23(1): 298-307, 2013.
- J13 **N. P.**, R. Yıldızoğlu, J.-F. Aujol and V. Caselles – High-Dimension Multilabel Problems: Convex or Nonconvex Relaxation? – *SIAM Journal on Imaging Sciences*, 6(4): 2603-2639, 2013.
- J12 **N. P.**, A. Bugeau and V. Caselles – Image editing with spatiograms transfer – *IEEE Transactions on Image Processing*, 21(5): 2513 - 2522, 2012.
- J11 **N. P.**, A. Baeza, A. Bugeau, O. D'Hondt, P. Gargallo, V. Caselles X. Armangué, I. Rius, and S. Sagàs – Virtual camera synthesis for soccer game replays – *Journal of Virtual Reality and Broadcasting*, 9(5): 2012.
- J10 **N. P.**, E. Provenzi and V. Caselles – A Variational Model for Histogram Transfer of Color Images *IEEE Transactions on Image Processing*, 20, Issue 6, 1682 - 1695, 2011.
- J9 **N. P.** and A. Bugeau – Tracking with occlusions via graph cuts – *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 33(1): 144-157, 2011.
- J8 A. Baeza, V. Caselles, P. Gargallo and **N. P.** – A narrow band method for the convex formulation of discrete multi-label problems – *SIAM Multiscale Modeling and Simulation*, 8(5): 2048-2078, 2010.
- J7 **N. P.** and V. Caselles – Multi-label depth estimation for graph cuts stereo problems – *Journal of Mathematical Imaging and Vision*, 38(1): 70-82, 2010.
- J6 **N. P.**, É. Mémin, A. Cuzol and N. Gengembre – Data assimilation with the Weighted Ensemble Kalman Filter – *Tellus Series A: Dynamic Meteorology and Oceanography*, 62(5): 673-697, 2010.
- J5 T. Corpetti, P. Héas, É. Mémin and **N. P.** – Pressure image assimilation for atmospheric motion estimation – *Tellus Series A: Dynamic Meteorology and Oceanography*, Vol. 61, Issue 1, pp.160-178, 2009.
- J4 **N. P.** and É. Mémin – Variational assimilation of fluid motion from image sequence – *SIAM Journal on Imaging Sciences*, Vol. 1, Issue 4, pp. 343-363, 2008.
- J3 **N. P.** and É. Mémin – A variational technique for time consistent tracking of curves and motion – *Journal of Mathematical Imaging and Vision*, Vol. 31, Issue 1, pp. 81-103, 2008.
- J2 J. D'adamo, **N. P.**, É. Mémin and G. Artana – Variational assimilation of POD low-order dynamical systems – *Journal of Turbulence*, Vol. 8, 2007.
- J1 P. Héas, É. Mémin, **N. P.** and A. Szantai – Layered estimation of atmospheric mesoscale dynamics from satellite imagery – *IEEE transactions on Geosciences and Remote Sensing*, Vol. 45, Issue 12, Part 2, pp. 4087-4104, 2007.

#### International Conferences with peer review

- C34 E. Cazelles, J. Bigot and **N. P.**– Regularization of Barycenters in the Wasserstein Space – *Conference on Geometric Science of Information, GSI'17*, France, 2017.
- C33 R. Giraud, V.-T. Ta and **N. P.** – Superpixel-based Color Transfer – *International Conference on Image Processing, ICIP 2017*, China, 2017.
- C32 R. Giraud, V.-T. Ta and **N. P.** – Robust Shape Regularity Criteria for Superpixel Evaluation – *International Conference on Image Processing, ICIP 2017*, China, 2017.
- C31 C. Zachiu, **N. P.**, M. Ries, C. Moonen and B. Denis de Senneville – A robust optical flow tracking technique for real-time MR-guided external beam therapies in moving organs – *IEEE International Symposium on Biomedical Imaging, ISBI'16*, Czech Republic, 2016.
- C30 R. Giraud, V.-T. Ta and **N. P.** – SCALP: Superpixels with Contour Adherence using Linear Path – *International Conference on Pattern Recognition, ICPR 2016*, Mexico, 2016.
- C29 C.-A. Deledalle, **N. P.** and J. Salmon – Contrast re-enhancement of Total-Variation regularization jointly with the Douglas-Rachford iterations – *Signal Processing with Adaptive Sparse Structured Representations, SPARS'15*, UK, 2015.

- C28 J. Rabin and **N. P.** – Non-convex relaxation of optimal transport for color transfer between images – *Conference on Geometric Science of Information, GSI'15*, France, 2015.
- C27 C.-A. Deledalle, **N. P.** and J. Salmon – On debiasing restoration algorithms: applications to total-variation and nonlocal-means – *Scale Space and Variational Methods, SSVN'15*, France, 2015.
- C26 J.-F. Aujol, G. Gilboa and **N. P.** – Fundamentals of Non local Total Variation Spectral Theory – *Scale Space and Variational Methods, SSVN'15*, Clouey, France, 2015.
- C25 J. Rabin and **N. P.** – Global Color Image Segmentation with Optimal-transport Distances – *Scale Space and Variational Methods, SSVN'15*, France, 2015.
- C24 J. Rabin et **N. Papadakis** – Non-convex relaxation of optimal transport for color transfer – *NIPS Workshop on Optimal Transport & Machine Learning*, Montréal, Quebec Canada, Décembre 2014.
- C23 F. Pierre, J.-F. Aujol, A. Bugeau, **N. P.** and V.-T. Ta – Exemplar-based colorization in RGB color space – *IEEE Int. Conf. on Image Processing, ICIP'14*, France, 2014.
- C22 S. Ferradans, J. Rabin and **N. P.** – Adaptive color transfer with relaxed optimal transport – *IEEE Int. Conf. on Image Processing, ICIP'14*, France, 2014.
- C21 R. Yıldızoğlu, **N. P.** and J.-F. Aujol – A convex formulation for histogram based binary segmentation – *Int. Conf. on Energy Minimization Methods in Computer Vision and Pattern Recognition, EMMCVPR'13*, Sweden, 2013.
- C20 S. Ferradans, **N. P.**, J. Rabin, G. Peyré and J.-F. Aujol – Regularized discrete optimal transport – *Int. Conf. on Scale Space and Variational Method in Computer Vision, SSVN'13*, Austria, 2013.
- C19 A. Makris and **N. P.** – Data assimilation with state alignment using high-level image structures detection – *Int. Conf. on Computer Vision and Remote Sensing, CVRS'12*, China, 2012.
- C18 R. Yıldızoğlu, J.-F. Aujol and **N. P.** – Active Contours without Level Sets – *IEEE Int. Conf. on Image Processing, ICIP'12*, US, 2012.
- C17 A. Hervieu, **N. P.**, A. Bugeau, P. Gargallo and V. Caselles – Stereoscopic image inpainting using scene geometry – *IEEE Int. Conf. on Multimedia and Expo, ICME'11*, Spain, 2011.
- C16 A. Bugeau, P. Gargallo, O. D'Hondt, A. Hervieu, **N. P.** and V. Caselles – Coherent Background Video Inpainting through Kalman Smoothing along Trajectories – *Vision, Modeling and Visualization Workshop, VMV'10*, Germany, 2010.
- C15 **N. P.**, A. Baeza, X. Armangué, I. Rius, A. Bugeau, O. D'Hondt, P. Gargallo, V. Caselles and S. Sagàs – Virtual camera synthesis for soccer game replays – *European Conf. on Visual Media Production, CVMP'10*, UK, 2010.
- C14 **N. P.**, A. Baeza, P. Gargallo and V. Caselles – Polyconvexification of the multi-label optical flow problem – *IEEE Int. Conf. on Image Processing, ICIP'10*, Hong-Kong, 2010.
- C13 A. Hervieu, **N. P.**, A. Bugeau, P. Gargallo and V. Caselles – Stereoscopic image inpainting: distinct depth maps and images inpainting – *Int. Conf. on Pattern Recognition, ICPR'10*, Turkey, 2010.
- C12 T. Corpetti, P. Héas, É. Mémin and **N. P.** – Pressure image assimilation for atmospheric motion estimation – *IEEE Int. Geoscience and Remote Sensing Symp, IGARSS'08*, US, 2008.
- C11 **N. P.**, P. Héas and É. Mémin – Image assimilation for motion estimation of atmospheric layers with shallow-water model – *Asian Conference on Computer Vision, ACCV'07*, Japan, 2007.
- C10 **N. P.** and É. Mémin – Variational optimal control technique for the tracking of deformable objects – *IEEE International Conference on Computer Vision, ICCV'07*, Brazil, 2007.
- C9 **N. P.**, T. Corpetti and É. Mémin – Dynamically consistent optical flow estimation – *IEEE International Conference on Computer Vision, ICCV'07*, Brazil, 2007.
- C8 A. Szantai, A. Cuzol, P. Héas, **N. P.**, É. Mémin, B. Wieneke, L. Alvarez, F. Becker and P. Lopes – Comparison of MSG atmospheric motion vector fields produced by different methods – *EUMETSAT/AMS Conference*, Netherlands, 2007.



- C7 P. Héas, **N. P.**, É. Mémin and A. Szantai – Motion estimation of 2D atmospheric layers from satellite image sequences – *EUMETSAT/AMS Conference*, Netherlands, 2007.
- C6 **N. P.**, P. Héas and É. Mémin – Motion estimation of 2D atmospheric layers with variational assimilation techniques – *EUMETSAT/AMS Conference*, Netherlands, 2007.
- C5 T. Corpetti, **N. P.** and É. Mémin – Dense estimation of motion fields on Meteosat Second Generation images using a dynamical consistency – *IEEE Int. Geoscience and Remote Sensing Symp, IGARSS '07*, Spain, 2007.
- C4 **N. P.** and É. Mémin – A variational framework for spatio-temporal smoothing of fluid motions – *Scale Space and Variational Methods, SSVM'07*, Italy, 2007.
- C3 P. Héas, É. Mémin and **N. P.** – A consistent spatio-temporal motion estimator for atmospheric layers – *Scale Space and Variational Methods, SSVM'07*, Italy, 2007.
- C2 P. Héas, É. Mémin and **N. P.** – Dense estimation of layer motions in the atmosphere – *International Conference on Pattern Recognition, ICPR'06*, Hong-Kong, 2006.
- C1 **N. P.**, É. Mémin and F. Cao – A variational approach for object contour tracking – *Workshop on Level Set and Variational Methods, VLSM'05*, China, 2005.

### Research Report

- R1 A. Bouharguane, E. Maitre, É. Oudet and **N. P.** – Multiphysics optimal transportation and image analysis – *hal-00740671*, 2012.

### Other international Conferences

- 7 A. Thibault, L. Chizat, C. Dossal and **N. P.** Overrelaxed Sinkhorn-Knopp Algorithm for Regularized Optimal Transport – *NIPS Workshop on Optimal Transport & Machine Learning*, États-Unis, 2017. **(Oral)**
- 6 C.-A. Deledalle, **N. P.**, S. Vaiteer and J. Salmon – Characterizing the maximum parameter of the total-variation denoising through the pseudo-inverse of the divergence – *Signal Processing with Adaptive Sparse Structured Representations, SPARS'17*, Portugal, 2017. **(Poster)**
- 5 C.-A. Deledalle, **N. P.** and J. Salmon – Contrast re-enhancement of Total-Variation regularization jointly with the Douglas-Rachford iterations – *Signal Processing with Adaptive Sparse Structured Representations, SPARS'15*, UK, 2015.
- 4 J. Rabin et **N. Papadakis** – Non-convex relaxation of optimal transport for color transfer – *NIPS Workshop on Optimal Transport & Machine Learning*, Quebec Canada, 2014.
- 4 J. Rabin and **N. P.** – Non-convex relaxation of optimal transport for color transfer – *NIPS Workshop on Optimal Transport & Machine Learning*, Quebec Canada, 2014.
- 3 A. Makris and **N. P.** – Data assimilation with state alignment using the EnKF – *American Geophysical Union Meeting, AGU*, San Fransisco, US, 2012.
- 2 F.-X. Le Dimet, Y. Hussaini, **N. P.**, I. Souopgui and A. Vidard – Assimilation of Images: A variational framework – *Int. Symp. on Earth Sciences Challenges, ISEC*, Oklahoma,US, 2011.
- 1 **N. P.**, É. Mémin and T. Corpetti – Variational estimation of 2D time consistent dense motion from image sequence – *European Geoscience Union, Nonlinear processes in geophysics, Data assimilation in the presence of nonlinearities, EGU'07*, Austria, 2007.

### National Journal

- JN1 T. Corpetti, V. Dubreuil, É Mémin, **N. P.**, O. Planchon, and C. Thomas – Outils méthodologiques pour l'Analyse d'images MSG: Estimation du mouvement, suivi des masses nuageuses and détection de fronts – *Revue Française de Photogrammétrie et de Télédétection*, 205: 3-17, 2014.

### National Conferences with peer review



- CN12 R. Giraud, V.-T. Ta, **N. P.** – Transfert de couleurs basés superpixels – *Colloque du Groupe d'Études du Traitement du Signal et des Images, GRETSI, Juan-Les-Pins, 2017.*
- CN11 R. Giraud, V.-T. Ta, **N. P.** – Décomposition en superpixels via l'utilisation de chemin linéaire – *Colloque du Groupe d'Études du Traitement du Signal et des Images, GRETSI, Juan-Les-Pins, 2017.*
- CN10 R. Giraud, V.-T. Ta, **N. P.** L. Collins and P. Coupé – Optimisation de l'algorithme PatchMatch pour la segmentation de structures anatomiques – *Colloque du Groupe d'Études du Traitement du Signal et des Images, GRETSI, Lyon, 2015.*
- CN9 J. Rabin and **N. P.** – Cosegmentation non supervisée d'images utilisant les distances de Sinkhorn – *Colloque du Groupe d'Études du Traitement du Signal et des Images, GRETSI, Lyon, 2015.*
- CN8 V. Chabot, M. Nodet, **N. P.** and A. Vidard – Assimilation de séquences d'images: vers une prise en compte des corrélations spatiales au sein des erreurs d'observation – *Extraction and Gestion des Connaissances, EGC, Rennes, 2014.*
- CN7 **N. P.**, V. Chabot, A. Makris, M. Nodet, Maëlle and A. Vidard – Assimilation d'images et de structures – *Colloque du Groupe d'Études du Traitement du Signal et des Images, GRETSI, Brest, 2013.*
- CN6 R. Yıldızoğlu, J.-F. Aujol and **N. P.** – Une formulation convexe pour la segmentation binaire d'images à partir d'histogrammes – *GRETSI, Brest, 2013.*
- CN5 V. Chabot, M. Nodet, A. Vidard and **N. P.** – Assimilation directe de séquences d'images de traceur passif: application aux équations de Saint-Venant – *GRETSI, Brest, 2013.*
- CN4 J. Carlier, **N. P.** and É. Mémin – Assimilation variationnelle de données dans un système dynamique d'ordre réduit – *XIX Congrès Français de Mécanique, CFM, Marseille, Août 2009.*
- CN3 **N. P.** and É. Mémin – Estimation variationnelle and cohérente en temps de mouvements fluides. – *16ème Congrès Francophone AFRIF-AFIA de Reconnaissance des Formes and Intelligence Artificielle, RFIA'08, Amiens, 2008.*
- CN2 **N. P.**, A. Cuzol and É. Mémin – Suivi du mouvement fluide: approche stochastique and variationnelle – *In Journées Activités Universitaires de Mécanique, AUM'06, La Rochelle, 2006.*
- CN1 **N. P.**, É. Mémin and F. Cao – Une approche variationnelle pour le suivi de contours – *15ème Congrès Francophone AFRIF-AFIA de Reconnaissance des Formes and Intelligence Artificielle, RFIA'06, Tours, 2006.*

### Other National Conferences

- 5 A. Bouharguane, E. Maitre, É. Oudet and **N. P.** – Méthodes numériques pour le transport optimal: application en analyse d'image – *Congrès National d'Analyse Numérique, CANUM, Superbesse, 2012.*
- 4 V. Chabot, M. Nodet, A. Vidard and **N. P.** – Assimilation directe de séquences d'images bruitées – *Colloque National sur l'Assimilation de Données, Nice, 2012.*
- 3 **N. P.**, T. Corpetti and É. Mémin – Estimation de champs de mouvements denses cohérents en temps à partir de séquences d'images – *Colloque Météosat Seconde génération, Dijon, 2007.*
- 2 D. Heitz, P. Héas, J. Carlier, T. Corpetti, **N. P.** and É. Mémin – Estimation du flot optique dans les écoulements turbulents – *GdR Turbulence "Couplage modèle données", Cemagref, Rennes, 2008.*
- 1 **N. P.**, É. Mémin, J. D'adamo and G. Artana – Assimilation variationnelle de systèmes dynamiques d'ordre faible – *3e Congrès national de mathématiques appliquées and industrielles, SMAI'07, Grenoble, 2007.*