

Sylvain Meignen

Associate Professor, Grenoble-INP, HdR

Born the 6th of june 1975, married, three children

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Background

2012-2013 : Fellowship of the univeristy of Edinburgh (3 months)

2012 : Qualified for professorship positions CNU sections 26 and 61.

2011-2012 : Sabbatical year at the IDCOM Laboratory of the University of Edinburgh, United Kingdom.

2011 : Habilitation thesis defended the 17th of february 2011

Title : "Différentes approches non linéaires multi-échelles pour l'analyse des signaux et des images".

2009-2010 : 6 months stay at GIPSA-Lab (Grenoble)

2004 : Grant for excellent research (preserved since).

2002- : associate professor in applied maths at Grenoble-INP (Research carried out at the LJK Laboratory)

2001-2002 : Temporary academic position at the Ensimag

1998-2001 : PhD in applied maths, University of Grenoble

Title : "Problèmes d'échelle dans la segmentation par ondelettes d'images texturées"

Director : J. Demongeot

1998 : Msc in applied maths, University of Grenoble, with honors

1997 : Graduated from the Ensimag

Students and Research Projects

-Students :

Msc : { Quentin Legros, "FRI representations of signals", march-june 2017.
Duong-Hung Pham, "Nonuniform Sampling and Synchrosqueezing of Multicomponent Signals", march-june 2014.
Thomas Oberlin, "on Novel approaches to EMD", mars-juin 2010.
Christophe Damerval, "Empirical Mode Decomposition", march-june 2004.
Manel Tayachi, "Image compression and denoising using wavelets", march-june 2003.

PhD : { Quentin Legros, "Bayesian approaches to Lidar Imaging",
October 2017- (co-supervision with Heriot Watt university, Edinburgh, Scotland)
Duong-Hung Pham,
"Irregular sampling for image coding relation with compressed sensing",
october 2015-
Thomas Oberlin,
"Compressed sensing : sparse representation, irregular sampling and empirical mode decomposition",
PhD of the university of Grenoble, october 2010-october 2013
Christophe Damerval,
"Reconnaissance et segmentation par ondelettes de textures invariantes par transformation affine locale",
PhD of the university of Grenoble, october 2004-april 2008

Post-Doc : { Dominique Fourier,
"High order estimate of instantaneous frequency", march 2016 - september 2016.
Ratikanta Behera,
"Theoretical study of second order synchrosqueezing and applications to the study of marine mammals echolocation sounds", january 2015-december 2016 (ASTRES and AGIR projects)
Olivier Lecadet,
"Texture analysis using generalized Gaussian density", september 2006-september 2007
Anastasia Zakharova,
"Geometric images representation using box splines : application to image compression",
january 2009-september 2010

-Research projects :

- Projet Persyval (2017)** : "Signal Processing for Enhanced Recording", collaboration with B. Ravet (GIPSA-Lab) and J. Fontecave-Jallon (TIMC).
- Projet AGIR (2014)** : "Analysis of marine mammals echolocation calls using synchrosqueezing", collaboration with J. Mars, GIPSA-Lab, Grenoble.
- Projet ANR ASTRES (octobre 2013-mars 2017)** : "Analyse, Synthèse et Transformations par Réallocation, EMD et Synchrosqueezing", collaboration between LJK, ENS Lyon and Centrale Nantes.
- Projet BQR Paris XIII (2013)** : "Compression d'images avec contrôle de qualité - au delà de JPEG 2000", collaboration between university Paris XIII and LJK.
- BQR INP-Grenoble (2008)** : "geometric image representation using box splines : with an application to compression"
- TUMEURS (Rhône-Alpes project,2003-2006)** : "Classification techniques and MRI imaging using wavelets : diagnosis of brain tumors"
- IHP (European Project)** : "Breaking Complexity"
- AMOA (IMAG Project,2001-2003)** : "Multiresolution analysis, Wavelet and Applications"
- MADemo (Rhône-Alpes project, 2001-2003)** :
- MATH-STIC Project** : "EMD : theory and applications", in collaboration with P. Flandrin of ENS Lyon.

-Other Responsibilities :

- Head of the MOSAIC team of the LMC (Grenoble) 2003-2006
- Involved in several experts commission.
- Reviewer for two PhD thesis.

-Responsability in terms of teaching activity :

- Member of the board of the Ensimag (2016-)
- Responsable for the organisation of industrial conferences at Ensimag
- Collaboration with industry through the MaiMosine platform

Journal Papers

Submitted papers

- A33 C. Gérot and S. Meignen, "Multiresolution Framework on the Interval based on L-systems, B-splines and Lifting Scheme".
- A32 S. Meignen and D-H Pham, "Signal Denoising and Mode Reconstruction from Downsampled Short Time Fourier Transform of Multicomponent Signals".
- A31 D-H. Pham and S. Meignen, "Second-order Synchrosqueezing Transform : The Wavelet Case and Comparisons".

Accepted papers

- A30 D-H. Pham and S. Meignen, "An Adaptive Computation of Contour Representations for Mode Decomposition", *IEEE Signal Processing Letters*, vol. 24, no. 11, pp. 1596-1600, 2017.
- A29 D. Fourer, F. Auger, K. Czarnecki, S. Meignen and P. Flandrin, "Chirp rate and instantaneous frequency estimation : application to recursive vertical synchrosqueezing", *IEEE Signal Processing Letters*, vol. 24, no. 11, pp. 1724-1728, 2017.
- A28 D-H. Pham and S. Meignen, "High-Order Synchrosqueezing Transform for Multicomponent Signals Analysis - With an Application to Gravitational-Wave Signal", *IEEE Transactions on Signal Processing*, vol. 65, no. 12, pp. 3168-3178, 2017.
- A27 S. Meignen, D-H. Pham and S. McLaughlin, "On Demodulation, Ridge Detection and Synchrosqueezing for Multicomponent Signals", *IEEE Transactions on Signal Processing*, vol. 65, no. 8, pp. 2093-2103, 2017.
- A26 R. Behera, S. Meignen and T. Oberlin, "Theoretical analysis of second order synchrosqueezing", *Applied and Computational Harmonic Analysis*, doi : 10.1016/j.acha.2016.11.001, 2016.
- A25 S. Meignen, T. Oberlin, P. Depalle, P. Flandrin, and S. McLaughlin, "Adaptive multimode signal reconstruction from time-frequency representation", *Transactions of the Royal society of London A*, 2016.
- A24 B. Mateï, S. Meignen, "Nonlinear and nonseparable bidimensional representation based on cell-average representation", *IEEE Transactions on Image Processing*, vol. 24, no. 11, pp. 4570-4580, 2015.
- A23 T. Oberlin, S. Meignen and V. Perrier, "Second-order synchrosqueezing transform or invertible reassignment? Towards ideal time-frequency representations", *IEEE Transactions on Signal Processing*, vol. 63, no. 5, pp. 1335-1344, 2015.
- A22 B. Mateï, S. Meignen, "A new Optimization Based Approach to the Empirical Mode Decomposition", *Annals of the university of Bucharest*, vol. 4, p. 129-139, 2013.
- A21 F. Auger, P. Flandrin, Y-T. Lin, S. McLaughlin, S. Meignen, T. Oberlin, H-T. Wu, "An Overview of Time-Frequency Reassignment and Synchrosqueezing", *IEEE Signal Processing Magazine*, vol. 30, no. 6, pp. 32-41, 2013.
- A20 S. Meignen, T. Oberlin, S. McLaughlin, "A New Algorithm for Synchrosqueezing : With an Application to Multicomponent Signals Sampling and Denoising", *IEEE Transactions on Signal Processing*, vol. 60, no. 12, pp. 5787-5798, 2012.
- A19 B. Mateï, S. Meignen, "Nonlinear Cell-Average Multiscale Signal Representations : Applications to Signal Denoising", *Signal Processing*, vol. 92, no. 11, pp. 2738-2746, 2012.
- A18 T. Oberlin, S. Meignen, V. Perrier, "An Alternative Formulation for the Empirical Mode Decomposition", *IEEE Transactions on Signal Processing*, vol. 60, no. 5, pp. 2236-2246, 2012.
- A17 B. Mateï, S. Meignen, "Analysis of a Class of Nonlinear and non-Separable Multiscale Representation", *Numerical Algorithms*, vol. 60, no. 3, pp. 391-418, 2012.
- A16 C. Gérot, B. Mateï, S. Meignen, "Nonlinear and Non-Separable Multiscale Representation Based on Lipschitz Perturbation", *Comptes rendus mathématiques de l'académie des sciences*, vol. 349, issues 13-14, pp. 741-744, 2011.
- A15 B. Mateï, S. Meignen, A. Zakharova, "Smoothness Characterization and Stability of Nonlinear and Non-Separable Multiscale Representation", *Journal of Approximation Theory*, vol. 163, pp. 1707-1728, 2011.
- A14 B. Mateï, S. Meignen, A. Zakharova, "Smoothness of Nonlinear and Non-separable Subdivision Schemes", *Asymptotic Analysis*, vol. 74, pp. 229-247, 2011.
- A13 C. Damerval, S. Meignen, "Study of a Robust Feature : the Pointwise Lipschitz Regularity", *International Journal of Computer Vision*, vol. 88, no. 3, pp. 363-381, 2010.
- A12 P-Y. Guméry, J. Fontecave, E. Aithocine, S. Meignen L. Heyer, P. Baconnier, "Modified Structural Intensity for Singularity Localization in Noisy Signals : Application to Coherent Averaging for Event-Synchronous ECG Interference Cancellation in Diaphragmatic EMG Signals", *International Journal of Adaptive Control and Signal Processing*, vol. 24, no. 5, pp. 424-433, 2010.

- A11 S.Meignen, "Application of the Convergence of the Control Net of Box Splines to Scale-Space Filtering", IEEE Transactions on Image Processing, vol. 16, no. 11, pp. 2842-2848, 2007.
- A10 S. Meignen,V. Perrier, "A New Formulation for Empirical Mode Decomposition Based on Constrained Optimization", IEEE Signal Processing Letters, vol. 14, no. 12, pp. 932-935, 2007.
- A9 S. Meignen, P-Y. Guméry, "Reconstruction of Finite Signal Derivatives from Multiscale Extrema Representations : Application to Transient Estimation and Signal Approximation", IEEE Transactions on Signal Processing, vol. 55, no. 4, pp. 1554-1559, 2007.
- A8 C. Damerval, S. Meignen, "Blob Detection with Wavelet Maxima Lines", IEEE Signal Processing Letters, vol.14, no. 1, pp. 43-46, 2007.
- A7 S. Meignen, H. Meignen, "On the Modeling of Small Sample Distributions with Generalized Gaussian Density in a Maximum Likelihood Framework", IEEE Transactions on Image Processing, vol. 15, no. 6, pp. 1647-1652, 2006.
- A6 C. Damerval, S. Meignen and V. Perrier, "A fast Algorithm for Bidimensional EMD", IEEE Signal Processing Letters, vol. 12, no. 10, pp. 701-704, 2005.
- A5 S. Meignen, "Application of the Convergence of the Control Points of B-Splines to Wavelet Decomposition at Rational Scales and Rational Location", IEEE Signal Processing Letters, vol. 12, no. 1, pp. 29-32, 2005.
- A4 S. Meignen , S. Achard and P-Y Guméry, "Time Localization of Transients with Wavelet Maxima Lines", IEEE Transactions on Signal Processing, vol. 53, no. 6, pp. 2251-2258, 2005.
- A3 P-Y Guméry, H. Roux-Buisson, S. Meignen, F.L. Comyn, M. Dematteis,B. Wuyam, J.L. Pépin and P.Levy, "An Adaptive Detector of Genioglossus EMG Reflex Using Berkner Transform for Time Latency Measurement in OSA Pathophysiological Studies ", IEEE Transactions on Biomedical Engineering, vol. 52, no. 8, pp. 1382-1389, 2005.
- A2 S. Meignen et P-Y Guméry, " Contribution au schéma hiérarchique de Berkner pour l'approximation de la transformée en ondelettes : application à la mesure du temps électromyographique du muscle génio-glosse ", Revue Traitement du Signal, volume 20, no. 4, pages 375-388,2003.
- A1 A. Tonnelier, S. Meignen, H. Bosch, J. Demongeot, "Synchronization and Desynchronization of Neural Oscillators", Neural Networks, vol. 12, pp. 1213-1228, 1999.

International Conferences

- C21 T. Oberlin and S. Meignen,"The Second-Order Wavelet Synchrosqueezing", IEEE ICASSP 2017.
- C20 S. Meignen, T. Oberlin and S. McLaughlin, "Time-Frequency Ridge Analysis Based on the Reassignment Vector", IEEE ICASSP 2017.
- C19 S. Meignen and B. Mateï, "Nonlinear and Nonseparable Bidimensional Multiscale Representation Based on Cell-Average Representation", MMCS 9, Tonsberg, Norvège, 2016.
- C18 S. Meignen, T. Gardner and T. Oberlin "Time-Frequency Ridge Analysis Based on Reassignment Vector", EUSIPCO 2015.
- C17 M. Kaaniche, B. Mateï and S. Meignen "Optimized Lifting Schemes Based on ENO Stencils for Image Approximation", ICIP 2015.
- C16 T. Oberlin, S. Meignen and V. Perrier, "The Fourier Based Synchrosqueezing Transform ", ICASSP 2014 .
- C15 S. Meignen, T.Oberlin and S. McLaughlin,"A Novel Time-Frequency Technique For Multicomponent Signal Denoising", EUSIPCO, 2013.
- C14 T.Oberlin, S. Meignen and S. McLaughlin,"Analysis of Strongly Modulated Multicomponent Signals with the Short-Time Fourier Transform", ICASSP, 2013.
- C13 B. Mateï, S. Meignen,"A new optimization based approach to the empirical mode decomposition", Annals of the University of Bucharest (mathematical series) - issue 1/2013, dedicated to the XI^Ème Colloque Franco-Roumain de Mathématiques Appliquées, Bucarest, 2012.
- C12 T. Oberlin, S. Meignen and V. Perrier," On the Mode Synthesis in the Synchrosqueezing Method", accepted for publication, EUSIPCO, 2012.
- C11 S. Meignen, T. Oberlin and S. McLaughlin,"Multicomponent Signal Denoising with SynchroSqueezing", accepted for publication, IEEE SSP, 2012.
- C10 B. Mateï, S. Meignen and A. Zakharova,"On a (W)ENO-type multiscale representation based on quincunx refinement : application to image compression", proceedings of the 7th international conference on curves and surfaces, Volume 6920 of Lecture Notes in Computer Science, pages 473-487, Springer, 2012.
- C9 C. Damerval and S. Meignen, "Highlight on a feature extracted at fine scales : the pointwise Lipschitz regularity", Proceedings of the 2nd international conference on scale space and variational Methods,

Volume 5567 of Lecture Notes in Computer Science, pages 782-794, Springer, 2009.

- C8 S. Meignen et Valérie Perrier, "Une nouvelle formulation de la décomposition modale empirique fondée sur l'optimisation sous contraintes", congrès SMAI, 5 juin, 2007.
- C7 C. Damerval and S. Meignen, "Computation of Blob-like Structures Characteristic Scale with Wavelet Maxima Lines", Sixth international conference on curves and surfaces, pp. 111-120, T2, Editors : P. Chenin, T. Lyche and L. Schumaker, 2007.
- C6 Elise Aithocine, Pierre-Yves Guméry, Sylvain Meignen, Laurent Heyer, and Stewart B. Gottfried," Contribution to Structural Intensity Tool : Application to the Cancellation of ECG Interference in Diaphragmatic EMG", IEEE BME Conference, New York, 2006.
- C5 P-Y. Guméry, S. Meignen, H. Roux-Buisson, E. Aithocine and P. Levy," Reconstruction Process of the Berkner Transform : Application to Scale Range Determination in a Genioglossal EMG Reflex Time-Scale Detector ", 25th Annual International Conference of the Engineering in Medicine and Biology Society, pp. 2606-2609, 2003, Cancun.
- C4 S. Meignen and V. Perrier,"Texture Segmentation Using Stable Texture Features", Proceedings of the 5th international conference on curves and Surfaces, pp. 313-322, T2, Editors : A. Cohen, J.L. Merrien, L. Schumaker,2003.
- C3 S. Meignen and V. Perrier, "Texture scale and image Segmentation using Wavelet filters", fifth international conference on curves and surfaces, Saint-Malo, June 27-July 3, 2002. poster.ppt
- C2 S. Meignen and V. Perrier, "Unsupervised texture segmentation and texture scale definition", CEMRACS 2002, transparent.ps.gz
- C1 S. Meignen and P.Y. Guméry,"Application of Berkner transform to the detection and the classification of transients in EMG signals", CongrÈs de la SMAI-SMF, Nice 2003, poster.ppt