

Frédéric PASCAL CV

SONDRA Laboratory, Supelec

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Frédéric PASCAL

Born June 8, 1979 (Age: 26)
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1 Current Situation

From march 2008, he is an Assistant Professor in the SONDRALAB laboratory, SUPELEC. His research interests contain detection and estimation in statistical signal processing and radar processing.

2 Education

- 2007 **Qualification in sections 26 (Applied Mathematics) and 61(Signal Processing)**
- 2006 - 2007 **Post-Doctoral position from the DGA (French Defence) in the SATIE laboratory of ENS de Cachan "Analysis of improved detectors, adapted to non-Gaussian, impulsive and heterogeneous clutter"**
- 2003 - 2006 **PhD of Signal Processing, university Paris X - Nanterre, advised by Pr. Philippe Forster: "Detection and Estimation in Compound Gaussian Noise"** (with merit)
PhD made at ONERA with Dr. Jean-Philippe Ovarlez, in the Signal Processing team of the Electromagnetism and Radar Department (DEMR/TSI). This PhD has been made in collaboration with the laboratory "Groupe d'Electromagnétisme Appliqué" from IUT de Ville d'Avray (GEA).
(Defence on December 10, 2006)
- 2002 - 2003 **Master's degree "Probabilities, Statistics and Applications: Signal, Image et Networks" of Pr. Picard, university Paris VII - Jussieu**
(with merit)
Courses followed: Stochastic Calculus, Statistics of the Processes and Modelling, Data Processing and Algorithmic, Stochastic processes applied in Financial Engineering , Statistical Estimation, Data Mining and Neural Networks, Monte-Carlo Methods.
- 2001 - 2002 **Four-year university degree in Applied Mathematics, university Paris VII - Jussieu**
(with merit)
Courses followed: Probabilities, Statistics, Numerical Analysis and Data Processing
- 1999 - 2001 **Bachelor degree in Mathematics, university Paris VII - Jussieu**
(with merit)
Courses followed: Algebra, Topology, Convex Analysis and Optimisation
- 1997 - 1999 **Two-year university degree in Mathematics, university Paris VII - Jussieu** (with merit)
- 1997 **Baccalauréat of Science (equivalent to A-levels or High School Graduation)** (with merit)

3 Scientific interests

Mathematics

- ★ Probabilities
- ★ Statistics
- ★ Algebra
- ★ Optimization

Statistical Signal Processing

- ★ Statistical estimation
- ★ Estimates performance
- ★ Detection

Radar Processing

- ★ Polarimetry
- ★ SAR
- ★ STAP
- ★ Real data analysis

Data processing

Languages **C, Matlab, Maple, R, Statlab, Visual Basic, SAS, SQL, Latex**

Systems **Windows, Unix**

4 Internships

- 2003 - 2006 **PhD Student at ONERA: "Detection and Estimation in Compound Gaussian Noise"**
- 2003 - 2006 **Moniteur (graduate assistant) at university Paris VII - Jussieu**
- 2003 **Training period (6 months) at ONERA in the Signal Processing team of the Electromagnetism and Radar Department (DEMR/TSI): "Detection in non Gaussian Noise"**
Establishment of theoretical tools within the framework of constant false alarm rate, with Dr. Jean-Philippe Ovarlez. This work leads to the publication of a conference paper [C1] and a dissertation.
- 2002 Training period (4 months) at the "middle office" in the Trading Floor of a French bank (CIC): Optimization of financial data bases.
- 1998 - 2001 Part-time jobs:
- Cetelem (BNP Paribas), 2 years: After-sales service
 - Mac Donald's, 1 year
 - Mutuelle de France (insurance company), 1 month
 - Micro-mechanic factory, 4 months

5 Professional activities

PhD Student at ONERA (DEMR/TSI):

- * Researcher in the Signal Processing team,
- * Seminar Organization, "Théorie de l'estimation et bornes minimales d'estimation: application à l'analyse spectrale et au Radar passif", ONERA , March 2005, Palaiseau, France,
- * PhD Students Days (2004, 2005, 2006).

Teacher (graduate assistant) at university Paris VII - Jussieu

Member of CNRS Research Group on Information, Signal, Images and ViSion
(GDR ISIS / CNRS)

External and Internal Collaborations:

- Yacine Chitour, Professor, LSS Laboratory of university Paris XI - Orsay.
 - Eric Chaumette, PhD, Thales Naval France.
 - Pascal Larzabal, Professor, SATIE Laboratory, ENS Cachan.
 - Hugo Harari-Kermadec, Assistant Professor at university Paris - Dauphine.
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Reviewer for:

- IEEE Transactions on Signal Processing.
- IEEE Workshop on Statistical Signal Processing 2005, Bordeaux, France.
- IEEE Signal Processing Letters.
- Elsevier Signal Processing.

6 Publications

• Journal papers :

- [J1] **F. Pascal**, Y. Chitour, J-P. Ovarlez, P. Forster and P. Larzabal, "Covariance Structure Maximum Likelihood Estimates in Compound Gaussian Noise: Existence and Algorithm Analysis", *IEEE Trans.-SP*, vol. 56, no. 1, pp. 34-48, January 2008.
- [J2] S. Bausson, **F. Pascal**, P. Forster, J-P. Ovarlez and P. Larzabal, "First and Second Order Moments of the Normalized Sample Covariance Matrix of Spherically Invariant Random Vectors", *IEEE Signal Processing Letters*, vol. 14, pp. 425-428, June 2007.
- [J3] **F. Pascal**, P. Forster, J-P. Ovarlez and P. Larzabal, "Performance Analysis of Covariance Matrix Estimates in Impulsive Noise", *IEEE Trans.-SP*, vol. 56, no. 6, pp. 2006-2017, June 2008.
- [J4] Y. Chitour and **F. Pascal**, "Exact Maximum Likelihood Estimates for SIRV Covariance Matrix: Existence and Algorithm Analysis", *IEEE Trans.-SP*. (to appear)
- [J5] **F. Pascal**, H. Harari-Kermadec and P. Larzabal, "The Empirical Likelihood Method: an Alternative for Signal Processing Estimation in Unknown Noise Field", *IEEE Trans.-SP*. (submitted)
- [J6] **F. Pascal**, P. Forster, J-P. Ovarlez and P. Larzabal, "An Improved Estimation Scheme for the GLRT Detection in Non-Gaussian Noise", *IEEE Trans.-AES*. (in redaction)

• Conferences papers :

- [C1] **F. Pascal**, J.-P. Ovarlez, P. Forster and P. Larzabal, "Constant False Alarm Rate Detection in Spherically Invariant Random Processes", *Proc. of the European Signal Processing Conference, EUSIPCO-04*, Vienna, pp. 2143-2146, Sep. 2004.
- [C2] **F. Pascal**, J.-P. Ovarlez, P. Forster and P. Larzabal, "Radar Detection in Compound-Gaussian Clutter", *Proc. of the IEEE-RADAR 2004*, Toulouse, Oct. 2004.
- [C3] J.-P. Ovarlez, E. Jay and **F. Pascal**, "Bayesian Optimum Radar Detector Performance Against Ground Data", *Proc. of the IEEE-RADAR 2004*, Toulouse, Oct. 2004.
- [C4] **F. Pascal**, P. Forster, J.-P. Ovarlez and P. Larzabal, "Theoretical Analysis of an Improved Covariance Matrix Estimator in Non-Gaussian Noise", *Proc. of the IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP-05*, Philadelphia, vol. IV, pp. 69-72, Mar. 2005.

Publications

- [C5] **F. Pascal**, J.-P. Ovarlez, P. Forster and P. Larzabal, "Propriété CFAR-Matrice du Détecteur BORD - Application Radar sur Signaux Expérimentaux non Gaussien", *Actes du Vingtième Colloque GRETSI 2005*, Louvain-La-Neuve, Belgium, Sep. 2005.
- [C6] **F. Pascal**, J.-P. Ovarlez, P. Forster and P. Larzabal, "On a SIRV-CFAR detector with radar experimentations in impulsive noise", *Proc. of the European Signal Processing Conference, EUSIPCO-06*, Florence, Italy, Sep. 2006.
- [C7] G. Pailloux, P. Forster, J.-P. Ovarlez and **F. Pascal**, "On persymmetric covariance matrices in adaptive detection", *IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP-08*, Las Vegas, USA, Apr. 2008.
- [C8] H. Harari-Kermadec and **F. Pascal**, "On the Use of Empirical Likelihood for Non-Gaussian Clutter Covariance Matrix Estimation", *Proc. of the IEEE-RADAR 2008*, Roma, Italy, May 2008.
- [C9] G. Pailloux, J.-P. Ovarlez, **F. Pascal** and P. Forster, "A SIRV-CFAR Adaptive Detector Exploiting Persymmetric Clutter Covariance Structure", *Proc. of the IEEE-RADAR 2008*, Roma, Italy, May 2008.
- [C10] G. Vasile, J.-P. Ovarlez, **F. Pascal**, C. Tison, L. Bombrun, M. Gay and E. Trouve, "Normalized coherency matrix estimation under the SIRV model. Alpine glacier POLSAR data analysis.", *IGARSS 2008 (Invited paper)*, Boston, Massachusetts, USA, July 2008.
- [C11] **F. Pascal**, J.-P. Barbot, H. Harari-Kermadec, R. Suyama and P. Larzabal, "An Empirical Likelihood Method for Data Aided Channel Identification in Unknown Noise Field", *Proc. of the European Signal Processing Conference, EUSIPCO-08*, Lausanne, Switzerland, August 2008.

Publications

- **Seminaries :**

[S1] "Utilisation de Techniques non Gaussiennes pour la Détection sur des Images Polarimétriques", Journée scientifique "Identification Radar", ONERA, Palaiseau, Novembre 2005.

[S2] "Détection et Estimation en Environnement Non Gaussien - Application sur données réelles", Journées des doctorants, ONERA, Chatillon, Mai 2005 et Janvier 2006.

[S3] "Détection Radar en Environnement de Fouillis Non-Gaussien", Comité d'Evaluation et d'Orientation (CEO), ONERA, Palaiseau, Mars 2004.

[S4] "Nouvel estimateur de la matrice de covariance pour la détection en environnement non Gaussien", GEA, Ville d'Avray, Décembre 2004.

[S5] "Détection et Estimation en Environnement non Gaussien", Séminaire "Détection Electromagnétique" de la DGA, ENSTA, Paris, Novembre 2006.

[S6] Organisation de la journée "Estimation de matrice de covariance structurée", Laboratoire SATIE, ENS de Cachan, 24 Avril 2007.

- **Internship Reports of students I advised :**

[M1] "Traitement de Données Radar", Romain Péchabrier, Rapport de Stage de Magistère de Mathématiques de l'université Paris XI - Sud, Laboratoire SATIE, Août 2007.

[M2] "Traitement de données radar - Modélisation du bruit Gaussien et détection de cibles", J. Arbel, M. Lasnier, C. Perchet et S. Scheuring, Statistiques Appliquées, ENSAE, Juin 2007.