Salmon Joseph

Statistician

46, rue Barrault
75634 Paris Cedex 13, France
✆ *+33 1 45 81 75 47*
✉ *joseph.salmon@telecom-paristech.fr*
http://josephsalmon.eu

Current position

2012-   **Assistant Professor** , *Télécom ParisTech, <u>STA</u>*, Paris, France.

Education

2007-2010   **Ph.D. in Applied Mathematics: Image denoising, patch-based methods and statistical aggregation**, *Université Paris Diderot-Paris 7, <u>Lab: Probabilités et Modèles Aléatoires</u>*, Paris, France.
Under the supervision of <u>D. Picard</u> and <u>E. Le Pennec</u>.

2006-2007   **Master's degree in Statistics and Stochastic Models**, *Université Paris Diderot-Paris 7*, Paris, France.

2006   **Agrégation de Mathématiques**, *Option: Statistics and Probability* .

2005-2007   **ENS-Cachan**, *École Normale Supérieure*, Cachan, France.
General education in mathematics.

2003-2007   **ENSAE ParisTech**, *École Nationale de la Statistique et de l'Administration Économique*, Malakoff, France.
General education in mathematics, economics, computer science and statistics.

2000-2003   **Lycée Saint-Louis**, Paris, France.
Preparation for the entrance to "Grandes Écoles".

Employement and internship history

2011-2012   **Postdoctoral Associate** , *Duke University, <u>ECE department</u>*, Durham, USA.
Principal Investigator <u>Rebecca Willett</u>.

2010-2011   **Part time Teaching Assistant (ATER)** , *Université Paris Diderot-Paris 7*.

2006-2007 (6 months)   **Master's thesis: Denoising Numerical Images**, *Université Paris Diderot-Paris 7*, Lab: <u>Probabilités et Modèles Aléatoires</u>.
Subject: Wavelet and Bayesian Models, supervised by <u>E. Le Pennec</u>

2006 (3 months)   **Department of Applied Mathematics and Probability**, *Paris 5 – René Descartes Université*, Lab: <u>MAP5</u>.
Subject: Generalized Polya Urns, supervised by <u>J.-S. Dhersin</u>

2004 (1 month)   **Department of Mathematics**, *Université Paris 1 – Panthéon Sorbonne*, Lab: <u>Marin Mersenne</u>.
Subject: Banach Algebra, supervised by <u>D. Pennequin</u>

2004   **Édition H&K**, *Writer for a collaborative book, providing corrections of competitive examination for engineer schools, Annales du concours commun polytechnique, 2004*.

Research interests

Statistics / Machine learning

- Matrix completion [Klopp et al., 2014, Lafond et al., 2014]
- Non-Parametric estimation [Dalalyan and Salmon, 2012, Arias-Castro et al., 2012]
- High dimensional regression [Dalalyan et al., 2013, Fadili et al., 2013b]
- Statistical aggregation [Dalalyan and Salmon, 2012, Dalalyan and Salmon, 2011, Salmon and Dalalyan, 2011]
- Dictionary learning, matrix factorization, PCA [Deledalle et al., 2011b, Salmon et al., 2014]

Image Processing

- NL-Means and patch-based methods [Salmon and Le Pennec, 2009b, Salmon and Strozecki, 2010, Salmon and Strozecki, 2012, Salmon, 2010b, Deledalle et al., 2012]
- Neighborhood filters [Arias-Castro et al., 2012, Salmon et al., 2012b]

Visualization

- Uncertain Scalar Fields: [Günther et al., 2014]

Languages and computer skills

Languages	French: Native
	English: Fluent
	Italian: Conversant
	Spanish: Conversant

OS	Linux, Mac
Programming	Python, Matlab, R, Maple, Git, SVN, HTML, PHP, C, Latex, Moosetex
Graphics	Inkscape, GIMP

Ph.D. supervision

| 2013-201? | Jean Lafond (co-supervision with É. Moulines). |
| 2013-201? | Igor Colin (co-supervision with S. Clemençon). |

Intern supervision

| 2013 | Jean Lafond (co-supervision with É. Moulines, 6 months): Estimation with exponential weights. |

Comity member for Ph.D.

2014 Cecilia Aguerrebere (supervised by J. Delon and Y. Gousseau).

Grants

2014 ANR MIRIAM – PI: A. Almansa (≈ 250 K€).

2014 ANR MACARON – PI: J. Mairal (≈ 250 K€).

2014 Appel à projets 2014 du GdR ISIS – PI: C-A. Deledalle (≈ 6 K€).

Visiting researcher

April 2014 Invited by C-A. Deledalle, Université Bordeaux (IMB).

September 2013 Invited by M. Raginsky, UIUC (ECE Departement).

June 2013 Invited by R. Willett, Duke University (ECE Departement).

June-July 2012 Invited by G. Peyré in CEREMADE, Université de PARIS - DAUPHINE.

June 2012 Invited by S. van de Geer and M. Chichignoud in Seminar für Statistik, ETH.

Invited visitors

July 2014 J. Lederer, Cornell (Departement of statistical science).

June 2014 R. Willett, University of Wisconsin-Madison (ECE).

Other administrative roles

2014 Assistant professor hiring committee for the group TII, Télécom Paristech .

2013 Assistant professor hiring committee for the group STA, Télécom Paristech .

2007-2009 Ph.D. Students representative for École Doctorale de Sciences Mathématiques de Paris-Centre.

2007-2009 Ph.D. Students representative for École Doctorale de Sciences Mathématiques de Paris-Centre.

2007-2009 Ph.D. Students representative for UFR de Mathématiques, Université Paris Diderot-Paris 7.

Seminar / Workshop organization

2013-? SemStat.

2014-? SMILE.

2014 ICIP 2014 special session "Photon-Limited Image Reconstruction" with C.-A. Deledalle.

██ Papers

Journals

[Arias-Castro et al., 2012] Arias-Castro, E., Salmon, J., and Willett, R. (2012). Oracle inequalities and minimax rates for non-local means and related adaptive kernel-based methods. *SIAM J. Imaging Sci.*, 5(3):944–992.

[Dalalyan and Salmon, 2012] Dalalyan, A. S. and Salmon, J. (2012). Sharp oracle inequalities for aggregation of affine estimators. *Ann. Statist.*, 40(4):2327–2355.

[Deledalle et al., 2012] Deledalle, C.-A., Duval, V., and Salmon, J. (2012). Non-local methods with shape-adaptive patches (NLM-SAP). *J. Math. Imaging Vis.*, 43(2):103–120.

[Salmon and Strozecki, 2012] Salmon, J. and Strozecki, Y. (2012). Patch reprojections for Non Local methods. *Signal Processing*, 92(2):477 − 489.

[Salmon, 2010b] Salmon, J. (2010b). On two parameters for denoising with Non-Local Means. *IEEE Signal Process. Lett.*, 17:269–272.

[Salmon et al., 2014] Salmon, J., Harmany, Z. T., Deledalle, C.-A., and Willett, R. (2014). Poisson noise reduction with non-local PCA. *J. Math. Imaging Vis.*, 48(2):279–294.

Conference Proceedings

[Lafond et al., 2014] Lafond, J., Klopp, O., Moulines, E., and Salmon, J. (2014). Probabilistic low-rank matrix completion on finite alphabet. In *NIPS*.

[Günther et al., 2014] Günther, D., Salmon, J., and Tierny, J. (2014). Mandatory critical points of 2d uncertain scalar fields. In *Computer Graphics Forum*, volume 33.

[Dalalyan et al., 2013] Dalalyan, A. S., Hebiri, M., Meziani, K., and Salmon, J. (2013). Learning heteroscedastic models by convex programming under group sparsity. In *ICML*.

[Fadili et al., 2013c] Fadili, J., Peyré, G., Vaiter, S., Deledalle, C.-A., and Salmon, J. (2013c). Stable recovery with analysis decomposable priors. In *SampTA*.

[Fadili et al., 2013b] Fadili, J., Peyré, G., Vaiter, S., Deledalle, C.-A., and Salmon, J. (2013b). Stable recovery with analysis decomposable priors. In *SPARS*.

[Fadili et al., 2013a] Fadili, J., Peyré, G., Vaiter, S., Deledalle, C.-A., and Salmon, J. (2013a). Reconstruction stable par régularisation décomposable analyse. In *GRETSI*.

[Salmon et al., 2012b] Salmon, J., Willett, R., and Arias-Castro, E. (2012b). A two-stage denoising filter: the preprocessed Yaroslavsky filter. In *SSP*.

[Salmon et al., 2012a] Salmon, J., Deledalle, C.-A., Willett, R., and Harmany, Z. T. (2012a). Poisson noise reduction with Non-Local PCA. In *ICASPP*.

[Dalalyan and Salmon, 2011] Dalalyan, A. S. and Salmon, J. (2011). Competing against the best nearest neighbor filter in regression. In *ALT*, pages 129–143.

[Salmon and Dalalyan, 2011]   Salmon, J. and Dalalyan, A. S. (2011). Optimal aggregation of affine estimators. In *COLT*.

[Deledalle et al., 2011b]   Deledalle, C.-A., Salmon, J., and Dalalyan, A. S. (2011b). Image denoising with patch based PCA: local versus global. In *BMVC*.

[Salmon and Strozecki, 2010]   Salmon, J. and Strozecki, Y. (2010). From patches to pixels in Non-Local methods: Weighted-Average reprojection. In *ICIP*, pages 1929–1932.

[Salmon and Le Pennec, 2009b]   Salmon, J. and Le Pennec, E. (2009b). NL-Means and aggregation procedures. In *ICIP*, pages 2977–2980.

Unpublished

[Klopp et al., 2014]   Klopp, O., Lafond, J., Moulines, E., and Salmon, J. (2014). Adaptive multinomial matrix completion. Technical report.

Peer reviewing for journals

Statistics

Annals of Statistics
Bernouilli
Computational Statistics and Data Analysis
Electronic Journal of Statistics
ESAIM Probability and Statistics

Image and signal processing

SIAM Journal on Imaging Science
IEEE Transactions on Image Processing
Signal Processing
IEEE Signal Processing Letters
IEEE Transactions on Circuits and Systems for Video Technology
Signal Image and Video Processing
Journal of Visual Communication and Image Representation
EURASIP Journal on Image and Video Processing
IET Image Processing
Abstract and Applied Analysis

Peer reviewing for conferences

Machine learning

NIPS: Neural Information Processing Systems 2013, 2014
SPARS: Signal Processing with Adaptive Sparse Structured Representations 2013
ICML: International Conference on Machine Learning 2012

Signal Processing

ISIT: International Conference on Information Theory 2014
ICIP: International Conference on Image Processing 2014
EUSIPCO: European Signal Processing Conference 2012, 2014

Awards

Best reviewer for NIPS 2013

Special Session organizer

ICIP 2014: "Photon-Limited Image Reconstruction" co-organizer with C.-A. Deledalle

Oral Communications

August 2014   **Adaptive one-bit matrix completion**, *Journées MAS 2014*, Toulouse, France.
Contributed talk

June 2014   **Adaptive one-bit matrix completion**, *46th "Journées de Statistique"*, Rennes, France.
Contributed talk

April 2014   **Poisson noise reduction with non-local PCA**, *IMB Seminar*, Bordeaux, France.
Invited talk by N. Papadakis

Mars 2014   **Big data : problématiques informatiques et statistiques**, *20e Forum Systèmes & Logiciels pour les NTIC dans le Transport* , Paris, France.
Contributed talk

February 2014   **Poisson noise reduction with non-local PCA**, *Apprentissage de représentations et traitement du signal, Réunion du GdR ISIS*, Paris, France.
Contributed talk

June 2013   **Heteroscedastic Models by Convex Programming under Group Sparsity**, *Summer School in Signal Processing*, Peyresq, France.
Contributed talk

June 2013   **Heteroscedastic Models by Convex Programming under Group Sparsity**, *ICML*, Atlanta, USA.
Contributed talk

June 2013   **Heteroscedastic Models by Convex Programming under Group Sparsity**, *ECE Seminar Duke University*, Durham, USA.
Invited talk by R. Willett

May 2013   **Heteroscedastic regression in high dimension**, *SMAI*, Seignosse Le Penon, France.
Contributed talk

February 2013   **Heteroscedastic regression in high dimension**, *Séminaire parisien de statistiques (IHP)*, Paris, France.
Contributed talk

December 2012   **Oracle inequalities and minimax rates for non-local means**, *Nonparametric and high-dimensional statistics*, Luminy, France.
Contributed talk

August 2012   **A two-stage denoising filter: the preprocessed Yaroslavsky filter**, *NGA Academic Research Symposium and Workshops*, Washington, DC, USA.
Poster

August 2012	**Poisson noise reduction with non-local PCA**, *Solar Information Processing (SIP-Work VI)*, Bozeman, MT, USA. Contributed talk
August 2012	**A two-stage denoising filter: the preprocessed Yaroslavsky filter**, *SSP 2012*, Ann Harbor, USA. Poster
June 2012	**Non Local PCA for Poisson denoising**, *Seminar für Statistik*, Zurich, Swizterland. Invited talk by S. van de Geer
April 2012	**Non Local PCA for Poisson denoising**, *SIAM conference*, Philadelphia, USA. Invited talk by P. Milanfar and M. Elad
March 2012	**Optimal aggregation of affine estimators**, *Duke Data Seminar*, Durham, USA. Invited talk by P. Bendich
March 2012	**Poisson noise reduction with non-local PCA**, *ICASSP 2012*, Kyoto, Japan. Poster
January 2012	**Non Local PCA for Poisson denoising**, *Télécom ParisTech*, Paris, France. Invited talk by J. Delon
January 2012	**Non Local PCA for Poisson denoising**, *CMAP Seminar, École Polytechnique*, Palaiseau, France. Invited talk by S. Allassonnière
July 2011	**Optimal Aggregation for Affine Estimators**, *Stochastic seminar, Georgia Tech*, Atlanta, USA. Invited talk by K. Lounici
July 2011	**Non-local Methods with Shape-Adaptive Patches (NLM-SAP)**, *Workshop at Duke University*, Durham, USA. Invited poster session by R. Willett
July 2011	**Optimal aggregation of affine estimators**, *COLT 2011*, Budapest, Hungary. Contributed talk
March 2011	**Sharp oracle inequalities for aggregation of affine estimators for heteroscedastic regression**, *Séminaire du LMAC (UTC)*, Compiègne, France. Invited talk by G. Gayraud
February 2011	**Sharp oracle inequalities for aggregation of affine estimators for heteroscedastic regression**, *Séminaire de Statistique*, Lille, France. Invited talk by A. Celisse
January 2011	**Sharp oracle inequalities for aggregation of affine estimators for heteroscedastic regression**, *Groupe de Travail Modélisation numérique et Images, MAP5*, Paris, France. Invited talk by G. Koepfler
January 2011	**Sharp oracle inequalities for aggregation of affine estimators for heteroscedastic regression**, *Séminaire de Statistique*, Toulouse, France. Invited talk by C. Marteau
January 2011	**Sharp oracle inequalities for aggregation of affine estimators for heteroscedastic regression**, *Séminaire de Statistique*, Angers, France. Invited talk by S. Lousteau

November 2010	**Sharp oracle inequalities for aggregation of affine estimators for heteroscedastic regression**, *Séminaire de Statistique du crest*, Paris, France. Invited talk by A. Tsybakov
September 2010	**From Patches to Pixels in Non-Local methods: Weighted-Average Reprojection**, *ICIP 2010*, Hong-Kong, China. Poster
September 2010	**Sharp oracle inequalities for aggregation of affine estimators for heteroscedastic regression**, *Journées MAS 2010*, Bordeaux, France. Contributed talk
May 2010	**Reprojections and NL-Means**, *Statistical Models for Images*, Luminy, France. Contributed talk
December 2009	**NL-Means and aggregation procedures**, *Séminaire Image du GREYC, Université de Caen*, Caen, France. Invited talk by D. Fadili
November 2009	**NL-Means and Aggregation Procedure**, *ICIP 2009*, Cairo, Egypt. Contributed talk
August 2009	**Agreggation of estimators for image denoising**, *3rd "Rencontres de Jeunes Statisticiens"*, Aussois, France. Invited talk
May 2009	**Aggregation of estimators for image denoising**, *41st "Journées de Statistique"*, Bordeaux, France. Contributed talk
May 2008	**NL-Means et Agrégation**, *Statistical Modelisation of Images*, Luminy, France. Contributed talk

Teaching experience

2013-2014 **Machine Learning**, *Assistant professor for CES DATA Scientist, Télécom ParisTech*, Paris, France.
(20 h)

2013-2014 **Machine Learning**, *Assistant professor for MS Big Data, MD220, Télécom Paris-Tech*, Paris, France.
(20 h)

2013-2014 **Machine Learning**, *Assistant professor for MS Big Data, MD343, Télécom Paris-Tech*, Paris, France.
(24 h)

2013-2014 **Machine Learning**, *Assistant professor for first year students, MDI 103, Télécom ParisTech*, Paris, France.
(20 h)

2013-2014 **Machine Learning**, *Projects supervision for second year students ENSAE ParisTech*, Paris, France.
(30 h)

2013-2014 **Introduction to statistic modeling ENSAE**, *Lecturer for second and third year students at ENSAE ParisTech*, Paris, France.
(2h)

2013-2014 **Machine Learning**, *Assistant professor for Master 2 students, M2M0, Université Paris Diderot-Paris 7*, Paris, France.
(24 h)

2013-2014 **Machine Learning**, *Assistant professor for Master 2 students, ENS Lyon*, Lyon, France.
(10 h)

2012-2013 **Machine Learning**, *Assistant professor for second year students, MD343, Télécom ParisTech*, Paris, France.
(24 h)

2012-2013 **Machine Learning**, *Assistant professor for Master 2 students, M2M0, Université Paris Diderot-Paris 7*, Paris, France.
(24 h)

2010-2011 **Descriptive Statistics with R**, *Teaching assistant for Licence 1-2 students in economics and applied mathematics, Université Paris Diderot-Paris 7*, Paris, France.
(96 h per year)

2010-2011 **Introduction to statistic modeling ENSAE**, *Lecturer for second and third year students at ENSAE ParisTech*, Paris, France.
(2h)

2009-2010 **Econometrics**, *Teaching assistant for Licence 3 students (junior level) in economics and applied mathematics, Université Paris Diderot-Paris 7*, Paris, France.
Practical course (64 h per year)

2009-2011   **Statistics: Estimation and Tests**, *Teaching assistant for second year students at ENSAE ParisTech*, Paris, France.
Practical course (20 h per year)

2008-2009   **Mathematical project with Scilab**, *Teaching assistant for Master I students (senior level) in mathematics, Université Paris Diderot-Paris 7*, Paris, France.
Practical course (64 h per year)

2007-2008   **Introduction to Maple**, *Teaching assistant for Licence 1 sudents (freshman level) in mathematics and computing, Université Paris Diderot-Paris 7*, Paris, France.
Practical course (64 h per year)

References

RESEARCH:

Alexandre Tsybakov
Director of the Laboratory of Statistics, CREST
alexandre.tsybakov@ensae.fr
+33 1 41 17 50 59

Rebecca Willett
Assistant Professor, Univ. of Madison-Wisconsin
rmwillett@wisc.edu
+1 608-316-4357

Erwan Le Pennec
Associate Professor, École Polytechnique
Erwan.Le-Pennec@polytechnique.edu
+33 1 69 33 45 74

Arnak Dalalyan
Professor, ENSAE
arnak.dalalyan@ensae.fr
+ 33 1 41 17 65 33

TEACHING:

Stéphane Boucheron
Professor, Université Paris Diderot-Paris 7
stephane.boucheron@math.univ-paris-diderot.fr
+ 33 1 57 27 92 30

Pierre Alquier
Lecturer, University College Dublin
pierre.alquier@ucd.ie
+353 17 16 71 05

Éric Moulines
Professor, Télécom Paristech
moulines@telecom-paristech.fr
+33 1 45 81 77 03