Aurélie **Pirayre**

Engineer — PhD / Data processing & interpretation

personal records
04/09/1989 (27 years old)
Licence B

134 rue Pierre Brossolette
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aurelie.pirayre@gmail.com

website
http://www-syscom.univ-mlv.fr/~pirayre/

3 minute thesis
https://www.youtube.com/watch?v=ZUQj9YMPdVU

languages
french - native
english - working prof.

programming
Matlab, Python, C++
R (Rstudio, Shiny)
LaTeX, html

scientific networks
ANR GRAPHSIP

GdR ISIS, MaDICS,
BIM, Statomique

personal interests
stand-up paddle / surf
oenology
yoga

Skills

Bioinformatics — transcriptomics, computational biology, network analysis
Signal processing — filtering, trend estimation, normalization
Image processing — segmentation, restoration
Optimization — discrete/continuous, in graphs, proximal, majorize-minimize
Statistics — complicated data handling, statistical tests, Bayesian framework
Communication and popularization of science

Experience

2013 – 2017 **PhD in Signal Processing (defense: July 3rd)** IFP Energies nouvelles, Rueil-Malmaison, France – University Paris-Est, Champs-sur-Marne, France
Reconstruction and clustering with graph optimization and priors on gene networks and images
- multidisciplinary communication: links between mathematicians/computer engineers and biologists
- discrete and/or continuous optimization with priors
- software development: BRANE Cut and BRANE Clust
- article writing (list of publications below)
- biological interpretation of results
- internship supervisor of two students from Master EEA

Supervisors: Jean-Christophe Pesquet, Laurent Duval, Camille Couprie and Frédérique Bidard-Michelot

since 2013 **Teaching in signal processing** Engineer school ESIPE EISC, 2nd year, Marne-la-Vallée, France
Determinist and Stochastic Signal Processing module: 2 × 24 h per year
Lectures, tutorials and practical work: Fourier, sampling, filter characterization and design, quantization, spectral estimation

03 – 09 2013 **Research Internship in Bioinformatics** IFP Energies nouvelles, Rueil-Malmaison, France
Theoretical and practical benchmark on gene regulatory networks with development of a network visualization tool (R)

06 – 08 2012 **Research Internship in Bioinformatics** Pasteur Institute, Paris, France
Algorithm implementation to deal with HiC experiments

06 – 08 2011 **Research Internship** CEA, Saclay, France
Study of the molecular dynamic of a transmembrane protein

Education

2013 – 2017 **PhD in Signal Processing** IFP Energies nouvelles, Rueil-Malmaison

2010 – 2013 **Engineering school** in Biosciences ISBS, Créteil
Specialization: computer sciences, bioimaging, bioinformatics and drugs

2007 – 2010 **Classes Préparatoires aux Grandes Écoles** Lycée Ozenne, Toulouse
Technology Biology (TB)

2007 **French Baccalauréat STL** Lycée Borda, Dax
Specialization in biochemistry-biology

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Publications

Ongoing publications

Y. Zheng, A. Pirayre, L. Duval and J.-C. Pesquet
Joint restoration/segmentation of multicomponent images with variational Bayes and higher-order graphical models (HOGMep)
In progress, provisional submission in June 2017 to *IEEE Transactions on Computational Imaging*

L. Duval, A. Pirayre and I.W. Selesnick
BEADS unstrung: automated baseline and noise filtering guided by sparsity and positivity on analytical data
In progress, provisional submission in July 2017 to *ACS Analytical Chemistry*

A. Pirayre, D. Ivanoff, E. Jourdier, A. Margeot, L. Duval, and F. Bidard
Growing Trichoderma reesei on a mix of carbon sources reveals links between development and cellulase production
In progress, provisional submission in June 2017 to *BMC Genomics*

International journals

A. Pirayre, C. Couprie, L. Duval and J.-C. Pesquet
BRANE Clust: Cluster-Assisted Gene Regulatory Network Inference Refinement
In *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, Mar. 2017

A. Pirayre, C. Couprie, L. Duval, F. Bidard and J.-C. Pesquet
BRANE Cut: Biologically-Related Apriori Network Enhancement with Graph cuts for Gene Regulatory Network Inference
In *BMC Bioinformatics*, 16:369, Dec. 2015

D. Poggi-Parodi, F. Bidard, A. Pirayre, T. Portnoy, C. Blugeon, B. Seiboth, C.P. Kubicek, S. Le Crom and A. Margeot
Kinetic transcriptome reveals an essentially intact induction system in a cellulase hyper-producer Trichoderma reesei strain
In *Biotechnology and Biofuels*, 7:173, Dec. 2014

International conferences with proceedings

A. Pirayre, Y. Zheng, L Duval and J.-C. Pesquet
HOGMep: Variational Bayes and Higher-Order Graphical Models Applied to Joint image Segmentation and Reconstruction
Accepted to *ICIP (International Conference on Image Processing)*, Sep. 2017, Beijing, China

A. Pirayre, D. Ivanoff, E. Jourdier, A. Margeot, L. Duval and F. Bidard
Growing Trichoderma reesei on a mix of carbon sources reveals links between development and cellulase production
Presented at *FGC (Fungal Genetics Conference)*, Mar. 2017, Pacific Grove, USA

L. Duval, A. Pirayre, X. Ning and I.W. Selesnick
Suppression de ligne de base et débruitage de chromatogrammes par pénalisation asymétrique de positivité et dérivées parcimonieuses
Presented at *GRETSI (Groupe d'Etudes du Traitement du Signal et des Images)*, Sep. 2015, Lyon, France

A. Pirayre, C. Couprie, L. Duval, J.-C. Pesquet
Graph inference enhancement with clustering: application to gene regulatory network reconstruction
Presented at *EUSIPCO (European Signal Processing Conference)*, Sep. 2015, Nice, France

International conferences with proceedings (continued)

A. Pirayre, C. Couprie, L. Duval, J.-C. Pesquet
Fast convex optimization for connectivity enforcement in gene regulatory network inference
Presented at *ICASSP (International Conference on Acoustics, Speech and Signal Processing)*, Apr. 2015, Brisbane, Australia

A. Pirayre, C. Couprie, L. Duval, J.-C. Pesquet
Discrete vs Continuous Optimization for Gene Regulatory Network Inference
Presented at *BASP* (International Biomedical and Astronomical Signal Processing Workshop), Jan. 2015, Villars-sur-Ollon, Switzerland

Presentations without proceedings

A. Pirayre, C. Couprie, L. Duval and J.-C. Pesquet
Gene Regulatory Network inference refinement using clustering
Presented at the *GdR ISIS – Apprentissage et/ou traitement du signal et des images sur graphes*, Jun. 2016, Paris, France

A. Pirayre, D. Ivanoff, E. Jourdier, A. Margeot, L. Duval, F. Bidard
Growing Trichoderma reesei on a mix of carbon sources reveals links between development and cellulase production
Presented at *1st Trichoderma Workshop*, satellite meeting of *ECFG (European Conference on Fungal Genetics)*, Apr. 2016, Paris, France

A. Pirayre, C. Couprie, F. Bidard, L. Duval and J.-C. Pesquet
BRANE Cut: integrating biological a priori in Gene Regulatory Network inference with Graph cuts
Presented at *Statomique*, Nov. 2015, Paris, France

A. Pirayre, C. Couprie, L. Duval and J.-C. Pesquet
Graph enhancement via clustering: application to Gene Regulatory Network inference
Presented at the *GdR MaDICS – One-day Workshop on Emerging Trends in Clustering*, Jun. 2015, Orléans, France

A. Pirayre, C. Couprie, L. Duval, J.-C. Pesquet, F. Bidard
Incorporating biological a priori in Gene Regulatory Networks Inference using Graph Cuts
Presented at *ESCS (European Student Council Symposium)*, satellite meeting of *ECCB (European Conference on Computational Biology)* Sep. 2014, Strasbourg, France (**second best poster award**)

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