

# Matthieu PUIGT

Updated February 8, 2023

**Email:** matthieu.puigt [at] univ-littoral.fr

**ORCID:** 0000-0002-3264-4981

**Phone:** (+33) [0]3 21 46 56 75 / (+33) [0]3 21 38 87 20

**Webpage:** <https://www-lisic.univ-littoral.fr/~puigt/>

**LinkedIn:** <https://www.linkedin.com/in/mpuigt/>

## Research interests

Signal processing, Machine learning, Compressive learning, Low-rank matrix approximation, Nonnegative matrix factorization, Low-rank matrix completion, Weighted nonnegative matrix factorization, Sparse component analysis, Multiple source counting and localization, Source separation, *In situ* sensor calibration, Sharpening, Demosaicing, Applications in audio signals, hyperspectral data, chemics, ...

## Work experience

### Associate Professor in Signal Processing and Machine Learning

University of Littoral Côte d'Opale (France) 09/2012 – Present

- Research activities at LISIC laboratory: compressive learning and signal processing methods with applications to audio and chemical source separation, sensor calibration, hyperspectral imaging...
- Research activities at SFR “Campus de la Mer”: hyperspectral imaging for marine applications
- Elected member at the LISIC council (substitute 2014-2017, holder since 2017)
- Teaching Programming, Signal Processing, System Modeling, Dependability & Reliability Engineering, Control Theory, Optimization...
- In charge of a Bachelor degree (Licence Professionnelle GRIT) since 01/2014
- In charge of the GIM department communication since 09/2012

### Marie Curie Postdoctoral Fellow

FORTH-ICS, SPL Lab (Greece) 08/2010 – 07/2012

- Hosting Prof.: Athanasios MOUCHTARIS
- Development of sparse source separation and localization methods, with application to speech processing
- Guest lecturer in Audio source separation at the University of Crete (Heraklion, Greece)

### Assistant Professor in Signal Processing and Computer Science

UIST “St-Paul the Apostle” (North Macedonia) 09/2009 – 07/2010

- University Senate Member
- Teaching Discrete Mathematics, Programming, Signal Processing, Assembly Language Processing

### Postdoctoral Lecturer (ATER)

University of Toulouse 3 (France) 09/2007 – 08/2009

- Hosting Prof.: Yannick DEVILLE
- Research activities at LATT laboratory: blind source separation methods applied to acoustics and astrophysics
- Teaching Signal and Image Processing, Machine Learning, Digital Signal Processors, Microcontrollers

### Teaching Assistant

University of Toulouse 3 (France) 01/2005 – 06/2007

- Teaching Signal and Image Processing, Machine Learning, Digital Signal Processors

### Engineer

University of Toulouse 3 (France) 09/2003 – 09/2004

- Mentor: Yannick DEVILLE
- Developing new time-frequency blind source separation methods

## Education

**University of Toulouse** Toulouse, France  
 Ph.D in Signal Processing 10/2004 – 12/2007

- Ph.D Advisor: Prof. Yannick DEVILLE
- Committee: P. Comon (President), A. Mansour (Reviewer), E. Moreau (Reviewer), J.-P. Bernard (Member), S. Hosseini (Member), Y. Deville (Advisor).

**University of Toulouse 3** Toulouse, France  
 M.Sc in Signal, Image Processing and Acoustics 09/2002 – 06/2003

- M.Sc Advisor: Prof. Yannick DEVILLE

**University of Perpignan** Perpignan, France  
 1st year of M.Sc (Maîtrise) in Applied Mathematics 09/2001 – 06/2002

- Project Advisor: Prof. Monique POLIT

**University of Perpignan** Perpignan, France  
 B.Sc in Mathematics 09/2000 – 06/2001

**University of Perpignan** Perpignan, France  
 Undergraduate diploma (DEUG) in Mathematics, Computer Science, and Scientific Applications 09/1998 – 06/2000

## Recent publications [\(full list\)](#)

### Filtering-based endmember identification method for snapshot spectral images

K. Abbas, MP, G. Delmaire, G. Roussel  
*Proc. IEEE WHISPERS, 2022.*

### DeepSen3: Deep multi-scale learning model for spatial-spectral fusion of Sentinel-2 and Sentinel-3 remote sensing images

A. Alboody, **MP**, G. Roussel, V. Vantrepotte, C. Jamet, T. K. Tran.  
*Proc. IEEE WHISPERS, 2022.*

**A new deep learning method for multispectral image time series completion using hyperspectral data**

C. T. Cissé, A. Alboody, **MP**, G. Roussel, V. Vantrepotte, C. Jamet, T. K. Tran.  
*Proc. IEEE ICASSP, 2022.*

**Semi-automatic spectral image stitching for a compact hybrid linescan hyperspectral camera. Application to remote monitoring of potatoe crop leaves in micro agriculture**

P. Chatelain, G. Delmaire, A. Alboody, **MP**, G. Roussel.  
*Sensors, Volume 21, Issue 22, 2021.*

**Random projection streams for (weighted) nonnegative matrix factorization**

F. Yahaya, **MP**, G. Delmaire, G. Roussel.  
*Proc. IEEE ICASSP, 2021.*

**In situ calibration of cross-sensitive sensors in mobile sensor arrays using fast informed non-negative matrix factorization**

O. Vu thanh, **MP**, F. Yahaya, G. Delmaire, G. Roussel.  
*Proc. IEEE ICASSP, 2021.*

**Informed weighted non-negative matrix factorization using  $\alpha\beta$ -divergence applied to source apportionment**

G. Delmaire, M. Omidvar, **MP**, F. Ledoux, A. Limem, G. Roussel, D. Courcot.  
*Entropy, Volume 21, Issue 3, Article #253, 2019.*

**Informed nonnegative matrix factorization methods for mobile sensor network calibration**

C. Dorffer, **MP**, G. Delmaire, G. Roussel.  
*IEEE Trans. Signal and Information Processing over Networks, 4(4):667–682, 2018.*

**Awards**

**2022 IEEE WHISPERS Jose Bioucas Dias outstanding paper award**  
(*Filtering-based endmember identification method for snapshot spectral images* by K. Abbas, **MP**, G. Delmaire, and G. Roussel)

**2019 JRDA workshop best poster award** (*NMF for Big Data with Missing Entries: A Random Projection Based Approach* by F. Yahaya, **MP**, G. Delmaire, and G. Roussel)

**Research projects  
& fundings**

**TI “Dunkerque, l’énergie créative” PIA 3 project** 2020 – 2030  
Consortium: SUEZ, CUD, ULCO research labs, ATMO, and many others

**“QLAPP” project** 2019 – Present  
 ULCO BQR funding 2023  
 Funding for one-year apprentice contract 2022–2023  
 Fundings for several undergraduate diploma theses 2020–2022  
 Consortium: LEM (ULCO, U. Lille, CNRS), LISIC (ULCO)  
 Co-PI: J. Creusier (LEM). Role: Co-PI

**Région Hauts-de-France Ph.D. funding** 06/2021 – 06/2024  
 Joint Hyperspectral Video Demosaicing and Unmixing

**CNES TOSCA “OSYNICO” project** 01/2020 – 12/2023  
 Consortium: LOG (ULCO, U. Lille, CNRS), LOV (Sorbonne University, CNRS),  
 MMS (University of Nantes), IFREMER, EPOC (University of Bordeaux), LISIC  
 (ULCO), SMEL (France)  
 PI: V. Vantrepotte (LOG). Role: Co-I

**ULCO MTE Research pole funding for an M.Sc. thesis** 03/2023 – 09/2023  
 PI: C. Guilloteau. Role: Co-I

**SFR “Campus de la Mer” funding for an M.Sc. thesis** 03/2023 – 09/2023  
 PI: MP

**Blind source separation methods for CVR signals** 2019 – 2022  
 BEA funding for an M.Sc. thesis 02/2020 – 07/2020  
 Consortium: BEA (Le Bourget), LISIC (ULCO)  
 PI: B. Bigot (BEA). Role: Co-I

**“HyperLighting 1.0” project** 2022  
 ULCO BQR funding for prototyping a new hyperspectral lighting system  
 PI: MP

**SFR “Campus de la Mer” funding for an M.Sc. thesis** 03/2021 – 09/2021  
 PI: MP

**ULCO Postdoctoral research funding** 01/2020 – 12/2020  
 Multi-shaprening Methods Applied to Coastal Marine Areas  
 PI: MP

**ULCO MTE Research pole funding for an M.Sc. thesis** 02/2020 – 07/2020  
 PI: MP

**ULCO BQR and FEDER “HyperQSE” project funds** 2018 – 2020

Investment for a new LISIC antenna in Saint-Omer dedicated to hyperspectral imaging.

Consortium: two teams at LISIC

PI: G. Roussel (LISIC). Role: Co-I

**Région Hauts-de-France Ph.D. funding** 10/2017 – 09/2020

Extended informed matrix factorization methods for incomplete and/or big data. Application to mobile crowdsensing data

**TIGA Proof of concept pre-proposal** 2018

Consortium: SUEZ, CUD, ULCO (several laboratories)

Funding for an undergraduate diploma thesis.

Role: participant

**CNRS MASTODONS “DoMasQ’Air” project** 2017

Consortium: CRISAL (U. Lille, Inria, CNRS, IUF), PC2A (U. Lille, CNRS), LISIC (ULCO)

PI: R. Rouvoy (CRISAL). Role: Co-I

**LISIC funding for an M.Sc. thesis** 06/2017 – 12/2017

PI: G. Roussel (LISIC). Role: Co-I

**Région Hauts-de-France “Chercheurs Citoyens” OSCAR project** 2015 – 2017

Consortium: ATMO Hauts-de-France, BES, CRISAL (U. Lille, Inria, CNRS, IUF), LISIC (ULCO)

[Project labeled by French Ministry of Environment under the REPERE program](#)

PI: G. Roussel (LISIC). Role: Co-I

**PMCO Ph.D. funding** 2014 – 2017

Blind Calibration Methods for Air Quality Sensors

**DREAL Nord - Pas de Calais “ECUME” project** 2013 – 2015

Consortium: UCEIV (ULCO), LISIC (ULCO), ATMO Nord Pas-de-Calais, Inéris, LSQCA (IMT Douai)

PI: D. Courcot (UCEIV, ULCO). Role: participant

**ULCO young researcher grant** 2013

Signal Processing Methods for Crowd-sensing

PI: MP

**ArcelorMittal project** 2012 – 2013

Air Suspended Particulate Source Identification Using Information Fusion

Consortium: ArcelorMittal, UCEIV (ULCO), LISIC (ULCO)

PI: D. Courcot (UCEIV, ULCO). Role: participant.

**Marie Curie IAPP “AVID-MODE” project** 2010 – 2012

Consortium: FORTH-ICS (Greece), University of Thessaly (Greece), TWS (Italy), Cidana (China/USA)

PI: A. Mouchtaris (SPL, FORTH-ICS, UoC). Role: Marie Curie post-doc fellow.

### Project evaluation

**Réseau de Recherche Qualité de l’Air en Ile-de-France (DIM-QI<sup>2</sup>)** 2019

**Association Nationale Recherche Technologie (ANRT)** 2017

**Singapore-MIT Alliance for Research and Technology (SMART)** 2016

### Editorial activities

**Topic editor (MDPI Sensors)** 2021 – Present

#### **Guest editor for a special issue**

“Machine Learning, Signal, and/or Image Processing Methods to Enhance Environmental Sensors”, Sensors (ISSN 1424-8220) 03/2021 – 02/2023

Guest editors: **MP**, G. Tzagkarakis, G. Delmaire, G. Roussel

#### **Guest organizer for a special session**

“Environmental Signal Processing”, ESANN 2017 08/2016 – 04/2017

Session organizers: G. Delmaire, **MP**, G. Roussel

#### **Session chair**

11th Workshop on Hyperspectral Image and Signal Processing: Evolutions in Remote Sensing (IEEE WHISPERS), Amsterdam, March 24-26, 2021.

Session on Marine Applications

### Reviewing / TPC

- IEEE Trans. Signal Processing
- IEEE Trans. Cybernetics
- IEEE Trans. Neural Networks and Learning Systems
- IEEE Journal of Selected Topics in Signal Processing
- IEEE/ACM Transactions on Audio, Speech, and Language Processing,
- IEEE Sensors Journal
- IEEE Access
- Signal Processing
- Mechanical Systems and Signal Processing
- Signal, Image and Video Processing
- Cognitive Computations
- Environmental Pollution
- International Journal of Disaster Risk Reduction
- European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN), (2018 – Present)

- International Symposium on Olfaction and Electronic Noise (ISOEN), (2019, 2022)
- IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA), (2021)
- IEEE Sensors Conference, (2020)
- European Signal Processing Conference (EUSIPCO), (2012 – 2014 / 2017 / 2018)
- International Conference on Latent Variable Analysis and Signal Separation (LVA-ICA), (2010 / 2017 / 2018)
- International Workshop on Cyber-Physical Systems for Smart Water Networks (CysWater, 2018)
- IEEE International Workshop of Electronics, Control, Measurement, Signals and their application to Mechatronics (ECMSM), (2015 / 2017)
- 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2014)
- 18th International Conference on Digital Signal Processing (DSP 2013)
- 12th Annual Conference of the International Speech Communication Association (Interspeech 2011)
- 9th African Conference on Research on Computer Science and Applied Mathematics (CARI 2008)

Advising experience  
(full list)

**Hosted postdoctoral researchers**

N. Mashhadi	02/2023 – Present
A. Alboody	02/2020 – 08/2022

**Ph.D. students**

K. Abbas (co-advised with G. Roussel)	06/2021 – Present
F. Yahaya (co-advised with G. Roussel)	05/2018 – 11/2021
C. Dorffer (co-advised with G. Roussel)	11/2014 – 12/2017

**M.Sc. students for their M.Sc thesis**

A. Hadir (co-advised with A. Alboody and G. Roussel)	03/2022 – 07/2022
C. T. Cissé (co-advised with A. Alboody and G. Roussel)	03/2021 – 09/2021
O. Vu thanh (co-advised with F. Yahaya and G. Roussel)	03/2020 – 07/2020
H. Devulder (co-advised with B. Bigot)	03/2020 – 07/2020
B. Bracq (co-advised with G. Roussel)	06/2017 – 12/2017
D. Pavlidi (co-advised with A. Griffin and A. Mouchtaris)	09/2010 – 03/2012
I. Meganem (co-advised with Y. Deville)	02/2009 – 07/2009
D. Grillière (co-advised with S. Hosseini)	02/2009 – 07/2009
B. Bigot (co-advised with Y. Deville)	02/2007 – 07/2007
D. Bissessur (co-advised with Y. Deville)	02/2005 – 07/2005

**M.Sc. students for intermediate internships**

P. Ducoroy (co-advised with G. Roussel)	06/2021 – 08/2021
---	-------------------

J. B. Arethens (co-advised with G. Roussel) 06/2016 – 08/2016  
A. Poberznick (co-advised with G. Roussel and C. Dorffer) 05/2015 – 07/2015

### **Undergraduate students for their diploma thesis**

C. Lams (co-advised with J. Creusier) 09/2022 – 08/2023  
A. Denys (co-advised with J. Creusier) 04/2022 – 06/2022  
C. Lams (co-advised with J. Creusier) 04/2022 – 06/2022  
C.-M. Mamboundou 04/2022 – 06/2022  
E. Vernalde (co-advised with J. Creusier) 04/2022 – 06/2022  
E. Attenborough (co-advised with J. Creusier) 03/2021 – 06/2021  
H. Kamel (co-advised with J. Creusier) 03/2021 – 06/2021  
T. Maillard (co-advised with J. Creusier) 03/2020 – 06/2020  
B. Defevre (co-advised with J. Creusier) 04/2020 – 06/2020  
R. Bève (co-advised with G. Roussel) 04/2018 – 06/2018  
J. Deboudt 05/2014 – 06/2014  
X. Fontaine 05/2014 – 06/2014  
A. A. Achahour 05/2013 – 06/2013

## **Committees**

### **Ph.D. thesis committees**

F. Delaine (defended in Dec. 2020) Invited member  
R. Chreiky (defended in Dec. 2017) Invited member  
A. Limem (defended in Dec. 2014) Invited member

### **External member of Ph.D. intermediate evaluation committees**

A. Boumchich 12/2020 ; 06/2021 ; 06/2022  
M. Bella 04/2022  
F. Delaine 05/2019

## **Skills**

### **Programming**

Proficient in: Matlab,  $\LaTeX$ , Arduino.  
Familiar with: C/C++ and a few others.

### **Other computer science skills**

Linux (BunsenLabs, Debian, Ubuntu)

### **Languages**

French (mother tongue), English (advanced), Spanish (intermediate),  
Greek (a few words), Macedonian (a few words)

## **Professional memberships**

**IEEE Member** 01/2014 – Present  
Member of the Signal Processing Society

**CASPA Member** 03/2019 – Present  
[Group interested in Participatory Sciences using Sensors](#)



Other interests

Playing music (piano & guitar), motorbiking, photography, oenology.