# Pierre-Antoine THOUVENIN
*Curriculum Vitae*

🌐 *pthouvenin.github.io/*
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in *pierre-antoine-thouvenin-87103365*

## Research interests

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| Optimization | Non-convex optimization, stochastic optimization, online algorithms, proximal algorithms, distributed asynchronous algorithms. |
| Bayesian inference | Statistical modeling, hierarchical Bayesian models, MCMC algorithms. |
| Applications | Blind source separation, hyperspectral imaging, remote sensing, radio-interferometric imaging. |

## Scientific experience

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| Sep. 2019 – today | **Assistant professor at Centrale Lille**, *Centre de Recherche en Informatique, Signal et Automatique de Lille (CRIStAL)*, Villeneuve d'Ascq, France<br>Section CNU 61 (Génie informatique, Automatique et Traitement du Signal). |
| Sep. 2017 – Aug. 2019 | **Research associate at Heriot-Watt University**, *Institute of Sensors, Signals and Systems (ISSS)*, Edinburgh, United-Kingdom<br>Research conducted within the Biomedical and Astronomical Signal Processing (BASP) group led by Prof. Yves Wiaux. |
| Keywords | Primal-dual algorithm, variable metric block-coordinate forward-backward algorithm, joint calibration and imaging, radio-interferometry, C++ programming |
| Jan. 2018 | **Qualification aux fonctions de maître de conférence**, *section CNU 61 (Génie informatique, Automatique et Traitement du Signal)*<br>French qualification to serve as an assistant professor in Signal Processing. |
| 2014 – Oct. 2017 | **PhD degree in Signal and Image Processing**, *IRIT*, University of Toulouse, France |
| Advisors | Prof. Nicolas DOBIGEON and Prof. Jean-Yves TOURNERET |
| Title | Modeling spatial and temporal variabilities in hyperspectral image unmixing |
| Keywords | Hyperspectral unmixing, source separation, non-convex optimization, online algorithm, Bayesian inference, MCMC algorithms, distributed algorithms. |
| 2014 (6 months) | **Research internship**, *IRIT*, University of Toulouse, France |
| Advisors | Dr. Nicolas DOBIGEON and Prof. Jean-Yves TOURNERET |
| Title | Modeling spatial endmember variability in hyperspectral image unmixing |
| Keywords | Hyperspectral unmixing, spectral variability, Alternating Direction Method of Multipliers. |

## Teaching experience

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| 2019– today | **Assistant professor**, *Centrale Lille*, Lille, France |
| Field | Data science. |
| Details | Signal processing, Image processing, Models for machine learning, Signal representations and inverse problems, LaTeX, Python programming. |
| 2017–2019 | **Teaching assistant**, *Heriot-Watt University*, Edinburgh, United Kingdom |
| Field | Signal processing: continuous-time linear time-invariant system modeling, Fourier analysis, Laplace transform. |
| Details | Supervision of MATLAB programming sessions and tutorials (L2 students). |
| 2014–2017 | **Teaching assistant, department of Electronics and Signal Processing**, *INP-ENSEEIHT*, Toulouse, France |

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| Fields | Digital signal processing, digital filtering, audio signal processing, algorithm implementation on Blackfin DSPs (C/assembly laguage). |
| Details | Supervision of practical sessions and projects (first and third year engineering students, equivalent to L3 and M2 level). |
| 2014–2015 | **Personal tutor**, Toulouse, France |
| | Self-employed personal tutor in mathematics and physics (undergraduate level). |

## Education

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| 2014 – 2017 | **PhD degree in Signal and Image Processing**, *Institut de Recherche en Informatique de Toulouse (IRIT)*, Toulouse, France |
| | Funding from the French Ministry of Defence (Direction Générale de l'Armement). |
| 2011 – 2014 | **Electrical engineering degree**, *École Nationale Supérieure d'Électronique, d'Électrotechnique, d'Informatique, d'Hydraulique et des Télécommunications (INP-ENSEEIHT)*, Toulouse, France |
| | Major in Signal and Image processing. |
| 2009 – 2011 | **Classes préparatoires scientifiques**, *Lycée Kléber*, Strasbourg, France |
| | Two year special undergraduate classes in Mathematics and Physics to prepare the competitive entrance examinations for admission in engineering schools. |
| 2009 | **Baccalauréat scientifique**, *Lycée Schwilgué*, Sélestat, France |

## Distinctions

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| Dec. 2017 | **Léopold Escande Award**, *Institut National Polytechnique de Toulouse (INPT)*, France |
| | Distinction awarded to the best PhD theses defended at INPT between Nov. 2016 and Nov. 2017. |
| Oct. 2014 | **Award from the Institut National Polytechnique de Toulouse (INPT)**, France |
| | Distinction awarded for outstanding academic achievement during the engineering degree. |

## Professional activities

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| Refereeing | IEEE Trans. Computational Imaging, IEEE Trans. Goescience and Remote Sensing. |
| Conference organization | International BASP Frontiers workshop 2019 (webmaster), IEEE IPAS 2018 (member of the technical program committee). |

## Programming and languages

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| Programming | Matlab, Python, Julia, C/C++, LaTeX |
| Softwares | MS office, ADS, OrCAD/PSpice |
| French | native |
| English | C1 level (CEFRL level) *fluent, Toeic 980/990 obtained in June 2013* |
| German | C1 level (CEFRL level) *advanced level, Goethe-Zertifikat C1 obtained in June 2009* |

## List of publications

▶ International journals

[J1] P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "Partially asynchronous distributed unmixing of hyperspectral images," *IEEE Trans. Geosci. Remote Sens.*, vol. 57, no. 4, pp. 2009–2021, Apr. 2019. DOI: 10.1109/TGRS.2018.2870486.

[J2] P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "A hierarchical Bayesian model accounting for endmember variability and abrupt spectral changes to unmix multitemporal hyperspectral images," *IEEE Trans. Comput. Imag.*, vol. 4, no. 1, pp. 32–45, 2018. DOI: 10.1109/TCI.2017.2777484.

[J3] P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "Hyperspectral unmixing with spectral variability using a perturbed linear mixing model," *IEEE Trans. Signal Process.*, vol. 64, no. 2, pp. 525–538, Jan. 2016. DOI: 10.1109/TSP.2015.2486746.

[J4]  P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "Online unmixing of multitemporal hyperspectral images accounting for spectral variability," *IEEE Trans. Image Process.*, vol. 25, no. 9, pp. 3979–3990, Sep. 2016. DOI: 10.1109/TIP.2016.2579309.

▶ International conferences

[C1]  P.-A. Thouvenin, A. Abdulaziz, M. Jiang, A. Repetti, A. Dabbech, and Y. Wiaux, "A faceted prior fo scalable wideband imaging: Application to radio astronomy," in *Proc. IEEE Int. Workshop Comput. Adv. Multi-Sensor Adaptive Process. (CAMSAP)*, Le Gosier, Guadeloupe, West Indies, Dec. 2019.

[C2]  P.-A. Thouvenin, A. Abdulaziz, M. Jiang, A. Repetti, and Y. Wiaux, "A faceted prior for scalable wideband computational imaging," in *Signal Process. with Adaptive Sparse Structured Representations (SPARS) Workshop*, Toulouse, France, Jul. 2019, pp. 1–5.

[C3]  P.-A. Thouvenin, A. Repetti, A. Dabbech, and Y. Wiaux, "Time-regularized blind deconvolution approach for radio interferometry," in *Proc. IEEE Sensor Array and Multichannel Signal Process. Workshop (SAM)*, Sheffield, U.-K., Jul. 2018, pp. 475–479. DOI: 10.1109/SAM.2018.8448891.

[C4]  P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "Unmixing multitemporal hyperspectral images accounting for smooth and abrupt variations," in *Proc. European Signal Process. Conf. (EUSIPCO)*, Kos, Greece, Sep. 2017. DOI: 10.23919/EUSIPCO.2017.8081636.

[C5]  P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "Unmixing multitemporal hyperspectral images with variability: An online algorithm," in *Proc. IEEE Int. Conf. Acoust., Speech, and Signal Processing (ICASSP)*, Shanghai, China, Mar. 2016. DOI: 10.1109/ICASSP.2016.7472298.

[C6]  P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "A perturbed linear mixing model accounting for spectral variability," in *Proc. European Signal Process. Conf. (EUSIPCO)*, Nice, France, Sep. 2015, pp. 819–823. DOI: 10.1109/EUSIPCO.2015.7362496.

▶ National conferences

[NC1]  P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "Une approche distribuée asynchrone pour la factorisation en matrices non-négatives – application au démélange hyperspectral," in *Actes du XXVI ième Colloque GRETSI*, in French, Juan-les-Pins, France, Sep. 2017.

[NC2]  P.-A. Thouvenin, N. Dobigeon, and J.-Y. Tourneret, "Estimation de variabilité pour le démélange non-supervisé d'images hyperspectrales," in *Actes du XXVième Colloque GRETSI*, in French, Lyon, France, Sep. 2015.