

Current position

Professor at Conservatoire National des Arts et Metiers (CNAM) since 2023
Informatics department (EPN05) & CEDRIC laboratory (EA 4629)

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🌐 <https://abreloy.github.io/>

Previous work experience

- **2021: Invited reasercher** (6 months thanks to 1/2 CRCT)
Aalto University, Helsinki, Finland
- **2016-2023: Associate Professor** (MCF)
University Paris Nanterre, Electrical Engineering department & LEME (EA4416)
- **2015-2016: full-time temporary assistant professor** (ATER)
University Paris Nanterre, Electrical Engineering department
- **2012-2015: Ph.D student** CNRS (DGA grant) and **Teaching Assistant** (Monitorat)
SATIE (ENS-Cachan) and SONDRRA (CentraleSupélec)
University Paris Nanterre, Electrical Engineering department

Education

- **2020 HDR** (Research Directorship Habilitation) **of University Paris Nanterre**
Title: “*Some flavours of PCA*”
Jury: * Cédric Richard, Professor, University Côte d’Azur (Reviewer)
* Jean-Yves Tourneret, Professor, INP-ENSEEIH (Reviewer)
* Olivier Besson, Professor, ISAE-SUPAERO (Examinator)
* Emilie Chouzenoux, CR, Inria Saclay (OPIS) (Examinator)
* Nicolas Le Bihan, DR, GIPSA-lab (Examinator, Jury chair)
* Mohammed Nabil El Korso, MCF University Paris Nanterre (Local Reviewer)
- **2015 Ph.D of University Paris Saclay**
Title: “*Estimation/detection algorithms in low-rank heterogeneous context*”
Laboratories: SATIE (ENS-Cachan) and SONDRRA (CentraleSupélec)
Jury: * Pierre Comon, CNRS research director, GIPSA-Lab (Chairman)
* Olivier Besson, Professor, ISAE-SUPAERO (Reviewer)
* Pascal Chevalier, Professor, CNAM (Reviewer)
* Chin Yuan Chong, Research Engineer, DSO (Examinator)
* Guillaume Ginolhac, Professor, University Savoie-Mont-Blanc (Director)
* Frédéric Pascal, Professor, CentraleSupélec (Advisor)
* Philippe Forster, Professor, University Paris Nanterre (Advisor)
- **2013 Engineer degree from Ecole Centrale Marseille (ECM)**
- **2012 Master’s degree of University Aix-Marseille**

Research themes and keywords

My research activities concern statistics and optimization methods for various applications in machine learning and signal processing:

- **Dimension reduction** and variable selection: probabilistic/sparse PCA, robust subspace recovery, low-rank matrix factorization.
- **Information geometry**: Riemannian optimization, and classification/clustering with metrics induced by statistical models, performance bounds.
- **Statistical signal processing**: robust signal subspace and structured covariance matrix estimation, adaptive detection/beamforming.
- **Applications** in array processing (radar, interferometer calibration/imaging for radioastronomy), satellite image time-series analysis (change detection, clustering), and EEG signal classification.

I also recently started to work on the links between these approaches with graphical models, and their use for graph learning problems my ANR-JCJC project (MASSILIA).

Conferences activities

Tutorials, lectures

- **EUSIPCO 2022**: “Riemannian and information geometry in signal processing and machine learning”, with F. Bouchard and A. Mian, full day (6h) tutorial [\[link\]](#) [\[slides\]](#)
- **SLSIP Workshop 2021**: “Riemannian geometry in elliptical distributions”, lecture [\[link\]](#) [\[slides\]](#)
- **IEEE RadarConf 2020**: “Robust statistical framework for radar change detection applications”. with G. Ginolhac, 3h tutorial [\[slides1\]](#) [\[slides2\]](#)
- **EUSIPCO 2018**: “Robust Covariance and Subspace Learning: dealing with high-dimensionality and small sample support”. with F. Pascal and G. Ginolhac, 3h Tutorial [\[link\]](#) [\[slides\]](#)

Special sessions organization and invitations

- **EUSIPCO 2023**: “Geometries in signal processing”, co-organized with F. Bouchard
- **GRETSI 2023**: “Graph learning & learning with graphs”, co-organized with T. Vayer
- **EUSIPCO 2020**: “Recent advances in differential geometry for signal and image processing”, co-organized with N. Le Bihan and G. Ginolhac [\[program\]](#)
- **EUSIPCO 2018**: “Emerging Data Structure Paradigms for Subspace Estimation”, co-organized with M.N. El Korso and H. Krim [\[program\]](#)
- 6 invited conference papers in special sessions.

Committees

- **EUSIPCO 2018, 2020, 2022, 2023**: TPC member
- **NCMIP 2019**: Scientific committee member

Other scientific animation activities in the community

- **GdR-ISIS meeting**: “Géométrie différentielle et estimation sur variétés” (7/10/2020), co-organized with A. Giremus [\[program\]](#)

Positions of trust

Editorial service

- **Associate Editor** for Elsevier Signal Processing (SP) since October 2023
- **Associate Editor** for Elsevier Digital Signal Processing (DSP) since April 2021
- **Reviewer** (journals): IEEE Trans. on SP/AES, Elsevier SP/DSP, EURASIP JASP.
- **Reviewer** (conferences): ICASSP, EUSIPCO, SSP, ISIT, IEEE RadarConf.

Thesis jurys

- **Opponent for:** Roberto Pereira, Universitat Politecnica de Catalunya
- **Examinator for:** Samy Labsir (defended the 15/12/2020), Université de Bordeaux

Others

- Jury member for GDR-ISIS / Club EEA best thesis award since 2023 (for 3 years)
The GDR ISIS is a structure of INS2I institue of CNRS for the scientific animation and federation of the french community in signal/image processing and computer vision (CNU 61, CNU 27) [\[Link\]](#)

Distinctions, gratifications

- **Prime d'encadrement doctoral et de recherche (PEDR)**, since 2021

International collaborations

- **Technische Universität Darmstadt, Germany**, with Michael Muma: host of the PhD student Jasin Machkour (3 months visit in Paris in 2022), 1 week as invited researcher in 2023, a journal article is in preparation.
- **Aalto University, Finland**, with Prof. Esa Ollila: 6 months as invited researcher in 2021 (visiting position thanks to 1/2 CRCT). One conference (December 2019) and one journal article in IEEE Trans. on Signal Processing (2022).
- **HKUST, Hong Kong**, with Prof. Daniel P. Palomar: 1 month as invited Ph.D student in July 2015. Two journal and three conferences articles (latest in 2021).
- **Xidian University, China**, with Prof. Yongchan Gao: one journal article in 2021.
- **NC State University (NCSU), Raleigh, USA**, with Prof. Hamid Krim: 2 weeks as invited researcher in October 2016. One conference article and co-organization of a special session at the conference EUSIPCO 2018.

Research projects and grants

ANR projects

ANR-JCJC	Principal Investigator	2022-26	235k€
<p>MASSILIA (Matrices spectral structures in graph learning), Ref. ANR-21-CE23-0038-01</p> <p>This project aims at tackling current problems related to graph learning and its applications in a unified way centered around the spectral decomposition of the graph Laplacian. The central objective of this project is to model graph structures (distributions on spectral parameters) and leverage this formalism in to a) improve graph learning processes; b) handle graphs as main features of classification/clustering algorithms.</p> <p>Project members: F. Bouchard, A. Mian, T. Vayer, R. Flamary, C. Richard</p>			
ANR-ASTRID	Sub-tasks manager	2017-22	78k€
<p>MARGARITA (Modern Adaptive Radar), Ref. ANR-17-ASTR-0015 [link]. PI: G. Ginolhac</p> <p>In this project, I was responsible of sub-task 1.1 (Robust structured covariance matrix estimation) and sub-task 2.1 (Bayesian subspace methodologies for detection)</p> <p>In was also involved in the supervision of the post-doc A. Hippert-Ferrer (funded by this project)</p> <p>I contributed to 13 journal publications within this project [Publication list]</p>			

Other projects

Univ. Paris Lumières research grant	Principal investigator	2019-22	14k€
<p>Sparse PCA for EEG signals classification</p> <p>Project members : M.N. El Korso and L. Boubchir</p>			
PNTS	Collaborator	2019-20	15k€
<p>Statistical learning in SAR image time series with missing data</p> <p>Project members : Y. Yan (PI), G. Ginolhac, M.N. El Korso, A. Hippert-Ferrer</p>			
PHC-PROCORE	Collaborator	2019-20	14k€
<p>Robust signal processing and detection without secondary data</p> <p>Project members : M.N. El Korso (PI-Fr), M. Pesavento (PI-Ger), P. Forster, C. Ren</p>			
Young researcher GDR-ISIS	Co-Principal investigator	2016-18	7k€
<p>Project ON FIRE (robust calibration of future large interferometers)</p> <p>Project members : M.N. El Korso (PI), Rémi Flamary, Franck Iutzeler</p>			

Ph.D. grants obtained from call for projects

DGA 1/2 thesis grant	Co-Principal investigator	2017-20	50k€
<p>Thesis of Bruno Meriaux, “<i>Robust adaptive signal processing without secondary data</i>”</p> <p>Project members: P. Forster (PI), M.N. El Korso, C. Ren</p>			
Digiteo-DigiCosme grant	Co-Principal investigator	2016-19	100k€
<p>Thesis of Gordana Drašković, “<i>Robust estimation analysis for signal and image processing</i>”</p> <p>Project members : F. Pascal (PI), F. Tupin</p>			

Supervision experience

Ph.D. Students (current)

- **Thu Ha Phi** (director, 50%), LEME, defense expected for 2025

Title: “*Graph Learning for EEG signals classification*”

Co-supervisors: F. Bouchard (co-supervisor, 50%)

Funding: ANR MASSILIA

- **Hugo Brehier** (co-supervisor, 25%), SONDRRA, defense expected for 2024

Title: “*Detection and classification for through the wall radar from subspaces model*”

Co-supervisors: G. Ginolhac (director, 25%), C. Ren (co-supervisor, 25%), I. Hinostroza (co-supervisor, 25%)

Funding: SONDRRA

Publications: 1 journal paper (submitted), 2 international conferences, and 1 national conference

- **Hoa Vu** (co-supervisor, 25%), ONERA, defense expected for 2023

Title: “*Robust SAR interferometry*”

Co-supervisors: G. Ginolhac (director, 25%), Y. Yan (co-supervisor, 25%), F. Brigui (co-supervisor, 25%)

Funding: ONERA

Publications: 1 journal paper (submitted), 1 international conference, and 1 national conference

Ph.D. Students (past)

- **Yassine Mhiri** (co-supervisor, 30%), SATIE, defended the 19/10/2023 (36 months)

Title: “*Contributions to calibration and imaging methods for radio interferometers in the presence of interferences*”

Co-supervisors: P. Larzabal (director, 30%), M.N. EL Korso (co-supervisor, 40%)

Funding: Paris-Saclay ADUM grant

Publications: 2 journal paper, 2 international conferences, 2 national conference

- **Antoine Collas** (co-supervisor, 25%), SONDRRA, defended the 25/11/2022 (36 months)

Title: “*Riemannian geometry for statistical estimation and learning: application to remote sensing*”

Co-supervisors: J-P. Ovarlez (co-director, 25%), G. Ginolhac (co-director, 25%), C. Ren (co-supervisor, 25%)

Funding: SONDRRA

Publications: 3 journal papers and 3 international conferences (best student paper at EUSIPCO 2022)

- **Bruno Meriaux** (co-supervisor, 30%), SONDRRA, defended the 05/10/2020 (36 months)

Title: “*Robust adaptive signal processing without secondary data*”

Co-supervisors: P. Forster (director, 10%), M.N. El Korso (co-supervisor, 25%), C. Ren (co-supervisor, 35%)

Funding: 1/2 DGA grant completed by SONDRRA

Publications: 3 journal papers and 5 international conferences

- **Gordana Drašković** (co-supervisor, 30%), L2S, defended the 27/09/2019 (36 months)

Title: “*Robust estimation analysis for signal and image processing*”

Co-supervisors: F. Pascal (director, 40%), F. Tupin (co-supervisor, 30%)

Funding: DigiCosme grant, Paris-Saclay

Publications: 2 journal papers and 1 international conference

- **Rayen Ben Abdallah** (co-supervisor, 35%), LEME, defended the 4/11/2019 (36 months)
Title: “*Statistical signal processing exploiting low-rank priors with applications to detection in Heterogeneous Environment*”
Co-supervisors: D. Lautru (director, 30%), M.N. El Korso (co-supervisor, 35%)
Funding: University Paris Nanterre, ED 139
Publications: 2 journal papers and 3 international conferences

Master’s degree students

- **Douba Jafuno**, M2 Sciences Sorbonne Université, March-September 2021
Topic : “Feature selection for EEG signals classification”
Co-supervisors: L. Boubchir, M.N. El Korso
- **Hugo Brehier**, ENSAI Master’s degree, March-September 2020
Topic : “Robust sparse PCA”
Co-supervisors: M.N. El Korso
- **Bruno Meriaux**, ENS Paris Saclay Master’s degree, April-September 2017
Topic : “Robust estimation of structured scatter matrices”
Co-supervisors: P. Forster, M.N. El Korso, C. Ren
- **Taha Essalih**, Ecole Centrale Marseille Master’s degree, April-September 2017
Topic: “Robust calibration of large radio-interferometers”
Co-supervisors: M.N. El Korso, Rémi Flamary, Franck Iutzeler

Publications

In the following list of publications, underlined authors are interns/Ph.D. students I supervised, and *underlined-italics* authors are students I worked with (not as supervisor). A switch back to the standard typography means that the work was conducted after their graduation.

Papers can be found on [\[my website\]](#) or [\[my scholar page\]](#)

Book chapters

- [B2] F. Bouchard, **A. Breloy**, A. Collas, A. Renaux, G. Ginolhac, “The Fisher-Rao geometry of CES distributions,” Springer (to appear), 2024
- [B1] A. Mian, G. Ginolhac, J.P. Ovarlez, **A. Breloy**, F. Pascal, “An overview of covariance-based change detection methodologies in multivariate SAR image time series,” ISTE WILEY, 2021

Machine learning conferences

- [MLC1] A. Hippert Ferrer, F. Bouchard, A. Mian, T. Vayer, **A. Breloy**, “Learning graphical factor models with Riemannian optimization,” in ECML-PKDD, 2023.

Signal processing journals

- [J24] H. Brehier, **A. Breloy**, C. Ren, G. Ginolhac, “Through the wall radar imaging via Kronecker-structured Huber-type RPCA,” in Signal Processing, vol. 214, 2024.
- [J23] H. Vu, **A. Breloy**, F. Brigui, Y. Yan, G. Ginolhac, “Robust phase linking in InSAR,” in IEEE Trans. on Geoscience and Remote Sensing (TGRS), vol 61, 2023.
- [J22] A. Collas, **A. Breloy**, C. Ren, G. Ginolhac, J-P. Ovarlez, “Riemannian optimization for non-centered mixture of scaled Gaussian distributions,” in IEEE Trans. on Sig. Proc, vol. 71, 2023.

- [J21] Y. Mhiri, M.N. El Korso, **A. Breloy**, P. Larzabal, “Multifrequency array calibration in presence of radio frequency interferences,” in *Signal Processing*, 2022.
- [J20] E. Ollila, **A. Breloy**, “Regularized tapered sample covariance matrix,” in *IEEE Trans. on Sig. Proc.*, vol. 70, 2022.
- [J19] A. Hippert Ferrer, M.N. El Korso, **A. Breloy**, G. Ginolhac, “Robust low-rank covariance matrix estimation with a general pattern of missing values,” in *Signal Processing*, vol. 195, 2022
- [J18] A. Collas, F. Bouchard, **A. Breloy**, G. Ginolhac, C. Ren, J.P. Ovarlez, “A Riemannian Geometry for Probabilistic PCA with Compound Gaussian Signals,” in *IEEE Trans. on Sig. Proc.*, vol. 69, 2021
- [J17] A. Hippert Ferrer, M.N. El Korso, **A. Breloy**, G. Ginolhac, “Robust mean and covariance matrix estimation under heterogeneous mixed-effects model with missing values,” in *Signal Processing*, vol. 188, 2021
- [J16] **A. Breloy**, G. Ginolhac, Y. Gao, F. Pascal, “MIMO Filters based on Robust Rank-Constrained Kronecker Covariance Matrix Estimation,” in *Signal Processing*, vol. 187, 2021
- [J15] **A. Breloy**, S. Kumar, Y. Sun, D.P. Palomar, “Majorization-Minimization on the Stiefel Manifold with application to Robust Sparse PCA,” in *IEEE Trans. on Sig. Proc.*, vol. 69, 2021
- [J14] F. Bouchard, **A. Breloy**, G. Ginolhac, A. Renaux, F. Pascal, “A Riemannian Framework for Low-Rank Structured Elliptical Models,” in *IEEE Trans. on Sig. Proc.*, vol. 69, 2021
- [J13] B. Mériaux, C. Ren, **A. Breloy**, M. N. El Korso, P. Forster, “Mismatched Robust Estimation of Kronecker Product of Linearly Structured Scatter Matrices,” in *IEEE Trans. on Sig. Proc.*, vol. 69, 2021
- [J12] A. Mian, A. Collas, **A. Breloy**, G. Ginolhac, J-P. Ovarlez, “Robust Low-rank Change Detection for Multivariate SAR Image Time Series,” in *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 13, 2020
- [J11] A. Bouiba, M. N. El Korso, **A. Breloy**, P. Forster, M. Hamadouche, M. Lagha, “Two dimensional robust source localization under non-Gaussian noise,” in *Circuits, Systems & Signal Processing*, 2020.
- [J10] R. Ben Abdallah, **A. Breloy**, M. N. El Korso, D. Lautru, “Bayesian Signal Subspace Estimation with Compound Gaussian Sources,” in *Signal Processing*, vol. 167, 2020.
- [J9] G. Drašković, **A. Breloy**, F. Pascal, “On the performance of robust plug-in detectors using M-estimators,” in *Signal Processing*, vol. 167, 2020
- [J8] G. Drašković, **A. Breloy**, F. Pascal, “On the asymptotics of Maronna’s robust PCA,” in *IEEE Trans. on Sig. Proc.*, vol. 67, no. 19, 2019.
- [J7] B. Mériaux, C. Ren, M. N. El Korso, **A. Breloy**, P. Forster, “Robust estimation of structured scatter matrices in (mis)matched models,” in *Signal Processing*, vol. 165, 2019.
- [J6] R. Ben Abdallah, A. Mian, **A. Breloy**, A. Taylor, M. N. El Korso, D. Lautru, “Detection Methods Based on Structured Covariance Matrices for Multivariate SAR Images Processing,” in *IEEE Geoscience and Remote Sensing Letters*, vol. 16, no. 7, 2019.
- [J5] B. Mériaux, C. Ren, M. N. El Korso, **A. Breloy**, P. Forster, “Asymptotic Performance of Complex M -Estimators for Multivariate Location and Scatter Estimation,” in *IEEE Signal Processing Letters*, vol. 26, no. 2, 2019.
- [J4] **A. Breloy**, G. Ginolhac, A. Renaux, F. Bouchard, “Intrinsic Cramér–Rao Bounds for Scatter and Shape Matrices Estimation in CES Distributions,” in *IEEE Signal Processing Letters*, vol. 26, no. 2, 2019.
- [J3] **A. Breloy**, G. Ginolhac, F. Pascal, P. Forster, “Robust Covariance Matrix estimation in Low-Rank Heterogeneous Context”, *IEEE Trans. on Sig. Proc.*, vol. 64, no. 22, 2016.
- [J2] Y. Sun, **A. Breloy**, P. Babu, D.P. Palomar, F. Pascal, G. Ginolhac, “Low-Complexity Algorithms for Low Rank Clutter Parameters Estimation in Radar Systems”, *IEEE Trans. on Sig. Proc.*, vol. 64, no. 8, 2016.
- [J1] **A. Breloy**, G. Ginolhac, F. Pascal, P. Forster, “Clutter Subspace Estimation in Low Rank Heterogeneous Noise Context,” in *IEEE Trans. on Sig. Proc.*, vol. 63, no. 9, 2015.

Signal processing international conferences

- [C36] A. Collas, T. Vayer, R. Flamary, **A. Breloy**, “Entropic Wasserstein Component Analysis,” *MLSP*, 2023.

- [C35] H. Vu, **A. Breloy**, F. Brigui, Y. Yan, G. Ginolhac, “Covariance fitting based InSAR Phase Linking,” IGARSS, 2023
- [C34] H. Brehier, **A. Breloy**, M.N. El Korso, s. Kumar, “Robust and globally sparse PCA via Majorization-Minimization and variable splitting,” ICASSP 2023.
- [C33] Y. Mhiri, M.N. El Korso, **A. Breloy**, P. Larzabal, “A Robust EM Algorithm for Radio Interferometric Imaging in The Presence of Outliers,” SiPS 2022.
- [C32] H. Brehier, **A. Breloy**, C. Ren, I. Hinostroza, G. Ginolhac, “Robust PCA for Through-the-Wall Radar Imaging,” EUSIPCO 2022.
- [C31] A. Collas, **A. Breloy**, G. Ginolhac, C. Ren, J-P Ovarlez, “Robust Geometric Metric Learning”, EUSIPCO 2022. (🏆 Best student paper award!)
- [C30] H. Vu, F. Brigui, **A. Breloy**, Y. Yan, G. Ginolhac, “A New Phase Linking Algorithm for Multi-temporal InSAR based on the Maximum Likelihood Estimator,” IGARSS 2022.
- [C29] A Collas, F. Bouchard, G. Ginolhac, **A. Breloy**, C. Ren, J-P. Ovarlez, “On the use of geodesic triangles between Gaussian distributions for classification problems,” ICASSP 2022.
- [C28] F. Bouchard, **A. Breloy**, A. Mian, G. Ginolhac, “On-line Kronecker product structured covariance estimation with Riemannian geometry for t -distributed data”, EUSIPCO 2021.
- [C27] Y. Mhiri, M. N. El Korso, L. Bacharach, **A. Breloy**, P. Larzabal, “Expectation-Maximization based direction of arrival estimation under a mixture of Noise”, EUSIPCO 2021.
- [C26] A. Collas, F. Bouchard, **A. Breloy**, C. Ren, G. Ginolhac, J-P. Ovarlez, “A Tyler-type estimator of location and scatter leveraging Riemannian optimization,” IEEE ICASSP 2021
- [C25] F. Bouchard, **A. Breloy**, G. Ginolhac, A. Renaux, “A Riemannian approach to blind separation of t -distributed sources,” EUSIPCO 2020
- [C24] B. Mériaux, C. Ren, **A. Breloy**, M. N. El Korso, and P. Forster, “Efficient estimation of Kronecker product of linear structured scatter matrices under t -distribution,” EUSIPCO 2020
- [C23] F. Bouchard, **A. Breloy**, G. Ginolhac, F. Pascal, “Riemannian framework for robust covariance matrix estimation in spiked models,” IEEE ICASSP 2020
- [C22] F. Bouchard, **A. Breloy**, A. Renaux, G. Ginolhac, “Riemannian geometry and Cramér-Rao bound for blind separation of Gaussian sources,” IEEE ICASSP 2020.
- [C21] **A. Breloy**, E. Ollila, F. Pascal, “Spectral Shrinkage of Tyler’s M-Estimator of Covariance Matrix,” IEEE CAMSAP 2019.
- [C20] B. Mériaux, C. Ren, **A. Breloy**, M. N. El Korso, P. Forster, “Modified Sparse Subspace Clustering for Radar Detection in Non-Stationary Clutter,” IEEE CAMSAP 2019.
- [C19] R. Ben Abdallah, A. Breloy, M. N. El Korso, D. Lautru, “Bayesian Robust Signal Subspace Estimation in Non-Gaussian Environment,” EUSIPCO 2019.
- [C18] R. Ben Abdallah, **A. Breloy**, A. Taylor, M. N. El Korso, D. Lautru, “Signal Subspace Change Detection in Structured Covariance Matrices,” EUSIPCO 2019.
- [C17] B. Mériaux, C. Ren, **A. Breloy**, M. N. El Korso, P. Forster, J.-P. Ovarlez, “On the Recursions of Robust COMET Algorithm for Convexly Structured Shape Matrix,” EUSIPCO 2019.
- [C16] A. Mian, **A. Breloy**, G. Ginolhac, J-P. Ovarlez, “Robust Low-rank Change Detection for SAR Image Time Series,” IEEE IGARSS 2019.
- [C15] B. Mériaux, C. Ren, M.N. El Korso, **A. Breloy**, P. Forster, “Efficient Estimation of Scatter Matrix with Convex Structure under t -distribution”, IEEE ICASSP 2018.
- [C14] **A. Breloy**, M. N. El Korso, A. Panahi, H. Krim, ”Robust Subspace Clustering for Radar Detection,” EUSIPCO 2018.
- [C13] B. Mériaux, C. Ren, M. N. El Korso, **A. Breloy**, P. Forster, “Robust-COMET for Covariance Estimation in Convex Structures: Algorithm and Statistical Properties,” IEEE CAMSAP 2017.
- [C12] R. Ben Abdallah, **A. Breloy**, M. N. El Korso, D. Lautru, H. Ouslimani, “Minimum Mean Square Distance

Estimation of Subspaces in presence of Gaussian sources with application to STAP detection”, International Conference on New Computational Methods for Inverse Problems (NCMIP), IOP publishing in the series ”Journal of Physics : Conference Series,” 2017.

[C11] Q. Hoarau, **A. Breloy**, G. Ginolhac, A.M. Atto, J.M. Nicolas, “A subspace approach for shrinkage parameter selection in undersampled configuration for regularized Tyler estimators,” IEEE ICASSP 2017.

[C10] G. Drašković, F. Pascal, **A. Breloy**, J-Y. Tournet, “New asymptotic properties for the Robust ANMF,” IEEE ICASSP 2017.

[C9] T. Bao, **A. Breloy**, M.N. El Korso, K. Abed-Meraim, H.H. Ouslimani, “Performance analysis of direction-of-arrival and polarization estimation using a non-uniform linear COLD array,” Seminar on Detection Systems: Architectures and Technologies 2017.

[C8] **A. Breloy**, Y. Sun, P. Babu, G. Ginolhac, D.P. Palomar, “Robust Rank Constrained Kronecker Covariance Matrix Estimation,” IEEE Asilomar Conference on Signals, Systems, and Computers 2016.

[C7] **A. Breloy**, Y. Sun, P. Babu, D.P. Palomar, F. Pascal, G. Ginolhac, “A robust signal subspace estimator,” IEEE Workshop on Statistical Signal Processing 2016.

[C6] **A. Breloy**, Y. Sun, P. Babu, D.P. Palomar, “Low-Complexity Algorithms for Low Rank Clutter Parameters Estimation in Radar Systems,” EUSIPCO, 2016.

[C5] J-P. Ovarlez, F. Pascal, **A. Breloy**, “Asymptotic Detection Performance Analysis of the Robust Adaptive Normalized Matched Filter,” IEEE CAMSAP 2015.

[C4] **A. Breloy**, G. Ginolhac, F. Pascal, P. Forster, “Robust estimation of the clutter subspace for a low rank heterogeneous noise under high clutter to noise ratio assumption,” IEEE ICASSP 2014.

[C3] **A. Breloy**, G. Ginolhac, F. Pascal, P. Forster, “CFAR property and robustness of the low rank adaptive normalized matched filters detectors in low rank compound Gaussian context,” IEEE SAM 2014.

[C2] **A. Breloy**, L. Le Magoarou, G. Ginolhac, F. Pascal, P. Forster, “Numerical performances of low rank STAP based on different heterogeneous clutter subspace estimators,” International RADAR Conf. 2014.

[C1] **A. Breloy**, L. Le Magoarou, G. Ginolhac, F. Pascal, P. Forster, “Maximum likelihood estimation of clutter subspace in non-homogeneous noise context,” EUSIPCO 2013.

Signal processing national conferences (GRETSI)

[FC20] A. Hippert-Ferrer, F. Bouchard, A. Mian, T. Vayer, **A. Breloy**, “Optimisation Riemannienne pour l’apprentissage de graphes structurés,” GRETSI 2023.

[FC19] H. Brehier, **A. Breloy**, C. Ren, G. Ginolhac, “Atténuation robuste du fouillis mural en imagerie radar à travers murs par optimisation Riemannienne,” GRETSI 2023.

[FC18] Y. Mhiri, M.N. El Korso, A. Breloy, P. Larzabal, “Imagerie radio-interférométrique robuste par dépliement neuronal,” GRETSI 2023.

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[FC2] A. Breloy, G. Ginolhac, F. Pascal, P. Forster, “Estimation Robuste de la Matrice de Covariance en contexte Hétérogène Rang Faible,” GRETSI 2015.

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Teaching activities at University Paris Nanterre (2016-2023)

Synthesis

Degrees: I mostly teach for the first and second years of D.U.T. (referred to as B.U.T. since 2021) of the Electrical engineering (GEII) department (I.U.T. de Ville d'Avray). I am also involved in several courses for Master's degree (E2SC) and the FIPMECA formation (engineering degree) at UFR SITEC of Ville d'Avray.

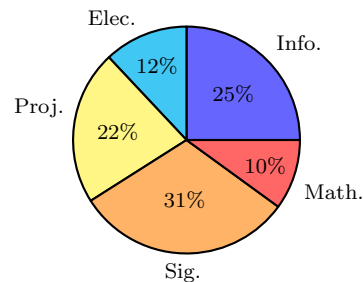
Courses: My courses consist mostly in practicals (TP) and supervised group work (TD). I also supervise several student projects with various formats: individual or group projects, either autonomous or fully supervised on a series of practicals.

Topics : My teachings concern analog electronics, programming, microcontrollers, and digital signal processing. Below is a list of the courses I was involved in

- **Analog Electronics** (1st and 2nd year D.U.T GEII).
- **C/C++/Matlab programming** (1st and 2nd year D.U.T GEII).
- **Mathematics of signal analysis** (1st and 2nd year D.U.T GEII).
- **Microcontrollers, embedded systems** (1st year D.U.T GEII).
- **Digital signal processing** (2nd year D.U.T GEII, FIPMECA, M2-E2SC).
- **Automation, Control theory** (2nd year, D.U.T GEII).
- **Probability and statistics** (2nd year D.U.T GEII, M2-E2SC).
- **Statistical signal processing** (M2-E2SC).
- **Students projects**
 - 1st year **D.U.T. GEII** (semi-autonomous, ~ 30h)
 - * Labyrinth challenge (robotC programming, LEGO-NXT)
 - * Line tracking robot challenge (arduino programming)
 - 2nd year **D.U.T. GEII** (semi-autonomous, ~ 4h/week for 8 months)
 - * GEII Robotics cup, organized by Cachan I.U.T..
 - * BB-8 robot prototype.
 - * Arduino Due Guitar Pedal.
 - **M2-E2SC and FIPMECA, Travaux d'Etude et Recherche, TER** (autonomous, ~ 70h)
 - * Shazam algorithm.
 - * "Audio beat tracking" (IEEE signal processing cup 2017)
 - * Audio sources localization.
 - * PCA for genome-data.

Synthesis: In order to shorten the exposition, my teaching hours are simply reported below:

Teaching service synthesis				
Year	CM	TD	TP	Total (eqTD)
2015-2016	26	55.5	229.5	324 h
2016-2017	0	79	148	227 h
2017-2018	4	108	168	282 h
2018-2019	8	115	201	328 h
2019-2020	0	64.5	179.5	244 h
2020-2021	0	50	92	142 h + 1/2 CRCT
2021-2022	5	47	178	232 h



Administrative responsibilities

Head of UFR SITEC Master 1 “Embedded systems and communications” (EESC) (2022-2023) [\[link\]](#)

This formation represents the following volume:

- ~22 students/promotion (including apprenticeship and work-study programs)
- 552h courses/year for ~15 teacher and researchers involved.

The whole Master’s diploma is co-directed. I am in charge of the following main tasks for the M1:

- Recruiting (EeF, Mon Master platforms)
- Schedule (sequencing coordination, rooms, teachers, external/temporary teachers, etc.)
- Supervision of internships and apprentices
- Organizing defenses and jurys

Other notable investments (pedagogy)

- **C programming and algorithmic:** responsible of the D.U.T./B.U.T.’s 1st year module, re-wrote the courses and practical materials 2 times (most recently in 2020 for the B.U.T. reform), proposed several mini-projects, programmed MCQs for the online course support.
- **Student’s project initiator for:**

2nd year **D.U.T. GEII** (semi-autonomous, ~ 4h/week for 8 months)

- BB-8 robot: prototype conception, PCBs routing, arduino UNO programming (continued 3 years)
- Arduino guitar pedal: circuit conception, arduino DUE programming (started in 2021)

M2-E2SC and FIPMECA, *Travaux d’Etude et Recherche*, TER (autonomous, ~ 70h)

I propose 1~2 TER per year (cf. above for subjects). Projects generally consist in selected papers/algorithms analysis, and experimental validation on Python/Matlab.