

Clémence Prévost

Post-doctoral fellow

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24 years old (born August 11th, 1997)

Education and research

2021–present **Post-doctoral fellow**, CENTRE DE RECHERCHE EN INFORMATIQUE, SIGNAL ET AUTOMATIQUE DE LILLE, CNRS UMR 9189.

- **Topic:** "*Bayesian tensor approaches for inverse problems*".
- **Supervisors:** Pierre CHAINAIS, Professeur des Universités, Université de Lille; Rémy BOYER, Professeur des Universités, Université de Lille.

2018–2021 **PhD in Signal Processing**, CENTRE DE RECHERCHE EN AUTOMATIQUE DE NANCY, CNRS UMR 7039.

- **PhD topic:** "*Multimodal data fusion by low-rank tensor approximations*";
 - **Funding:** Doctoral contract;
 - **Defense:** October 22nd 2021, Faculté des Sciences de Nancy;
 - **Supervisors:** David BRIE, Professeur des Universités, Université de Lorraine; Konstantin USEVICH, Research Fellow CNRS, Université de Lorraine.
 - **Referrees:** Tülay ADALI, Distinguished University Professor, University of Maryland, Baltimore County; Rémy BOYER, Professeur des Universités, Université de Lille.
 - **Attendees:** Mariya ISHTEVA, Assistant Professor, KU Leuven; Alain RICHARD, Professeur des Universités, Université de Lorraine; Jean-Yves TOURNERET, Professeur des Universités, Université de Toulouse.
 - **Guest members:** Pierre COMON, Directeur de recherche CNRS, Université Grenoble-Alpes; Cédric RICHARD, Professeur des Universités, Université Côte d'Azur; Eric CHAUMETTE, Professeur des Universités, ISAE-Supaéro.
 - **Class:** EC Machine Learning (Ecole des Mines de Nancy). *Theoretical and practical course (21h) on machine learning, deep neural networks and probabilistic models.*
 - **Summer school:** 2019 Peyresq summer school. *Theoretical course and talks (21h) information geometry and its applications to signal processing.*
- 2017–2018 **M.Sc. in System engineering**, Université de Lorraine, Nancy, France.
- **M.Sc. thesis:** "*Low-rank structured matrix completion and its application to MRI reconstruction*," under the supervision of David Brie and Konstantin Usevich.

- 2015–2018 **Mechanical and Electrical engineer**, *École Nationale Supérieure d'Electricité et de Mécanique (ENSEM)*, Nancy, France, Digital system engineering (ISN).
- 2013–2015 **CPGE PCSI - PSI***, **Lycée César Baggio, Lille.**, *Preparatory class to French engineering schools. Two years theoretical and practical course with a major in mathematics, physics and engineering..*
- 2013 **French Baccalaureate, Lycée Denis Diderot, Langres, France**, *With honors and a major in mathematics, physics and biology..*

Teaching

- 2021–2022 **Teaching assistant**, IMT Lille Douai, Lille, France.
- **Practical course in “Rgression” (UV SDATA)** : 6h TP. *Linear and polynomial regression using Python and Numpy*
- 2018–2021 **Doctoral teaching assistant**, IUT Nancy-Brabois, Department of Networks and Telecommunications (R&T), Nancy, France.
- **Practical course in “Principle of radio transmisstion” (M2107)** : 16h eq. TD in 2018–2019.
 - **Practical course in “Principle of signal measurements” (M1107)** : 176h eq. TD in total.

Publications

International journals

- “Constrained Cramér-Rao lower bounds for reconstruction problems formulated as coupled canonical polyadic decompositions”, **Prévost, C.**, Usevich, K., Haardt, M., Comon, P. et Brie, D. *Elsevier Signal Processing*, vol. 198 (2022), 108573 .
- “Hyperspectral super-resolution accounting for spectral variability: coupled tensor LL1-based recovery and blind unmixing of the unknown super-resolution image”, **Prévost, C.**, Borsoi R. A., Usevich, K., Brie, D., Bermudez, J .M. et Richard, C. *SIAM Journal on Imaging Sciences* vol. 15.1 (2022), 110-138.
- “Coupled Tensor Decomposition for Hyperspectral and Multispectral Image Fusion with Inter-image Variability”, Borsoi R. A., **Prévost, C.**, Usevich, K., Brie, D., Bermudez, J .M. et Richard, C. *IEEE Journal of Selected Topics in Signal Processing*, vol. 15(3), 702-717.
- “Hyperspectral super-resolution with coupled Tucker approximation: Identifiability and SVD-based algorithms”, **Prévost, C.**, Usevich, K., Brie, D. et Comon, P. *IEEE Transactions on Signal Processing*, vol. 68, p.931-946.

International conferences

- “Multi-frame super-resolution MRI using coupled low-rank Tucker approximation”, **Prévost, C.** et Odille, F. *2022 IEEE European Signal Processing Conference (EUSIPCO)* (preprint hal-03617754).
- “Coupled tensor models accounting for inter-image variability”, Borsoi R. A., **Prévost, C.**, Usevich, K., Brie, D., Bermudez, J .M. et Richard, C. *2021 IEEE Asilomar Conference – Special session on advances in coupled matrix and tensor factorizations with applications to remote sensing*.
- “Cramér-Rao Lower Bounds with random equality constraints”, **Prévost, C.**, Chaumette, E., Usevich, K., Brie, D. et Comon, P. *2020 IEEE ICASSP (International Conference on Acoustics, Speech and Signal Processing)*.
- “Cramér-Rao Bounds in the framework of hyperspectral super-resolution”, **Prévost, C.**, Usevich, K., Haardt, M., Brie, D. et Comon, P., *2019 IEEE CAMSAP (international workshop on Computational Advances in Multi-Sensor Adaptive Processing)*.
- “Coupled tensor low-rank multilinear approximation for hyperspectral super-resolution”, **Prévost, C.**, Usevich, K., Brie, D. et Comon, P. *2019 IEEE ICASSP (International Conference on Acoustics, Speech and Signal Processing)*.

National conference

- “Approches tensorielles couplées pour la fusion aveugle d’images multispectrale et hyperspectrale”, **Prévost, C.**, Usevich, K., Brie, D. et Comon, P. *2019 GRETSI (Colloque francophone de traitement de signal et des images)*.

Submitted and in preparation

- “Fast fusion of hyperspectral and multispectral images: a Tucker approximation approach”, **Prévost, C.**, Chainais, P., et Boyer, R. Soumis à *ICIP 2022* (preprint hal-03617759).
- “On the efficiency of blind and non-blind estimation for coupled LL1 tensor models using the randomly-constrained Cramér-Rao bound”, **Prévost, C.**, Usevich, K., Chaumette E., Brie D. et Comon, P. Soumis à *IEEE TSP* (preprint hal-03504402).

Workshops and invited talks

- **Hyperspectral super-resolution accounting for spectral variability: coupled tensor LL1-based recovery and blind unmixing of the unknown super-resolution image.** 3rd IMA Conference on Inverse Problems from Theory to Application, May 2022.
- **Multimodal data fusion by low-rank tensor approximations: applications in remote sensing.** Invited seminar in Laboratoire d’informatique, signal et image de la Côte d’Opale, March 2022.
- **Multimodal data fusion by low-rank tensor approximations: applications in remote sensing.** S^3 Seminar, Laboratoire des signaux et systèmes, February 2022.

- **Hyperspectral super-resolution accounting for spectral variability: coupled tensor LL1-based recovery and blind unmixing of the unknown super-resolution image.** GdR ISIS meeting on machine learning and data fusion, January 2022.
- **Tensor approaches for hyperspectral super-resolution: an overview of methods.** Invited talk at Centre de Recherche en Informatique, Signal et Automatique de Lille (CRISAL), March 2021.
- **Tensor approaches for hyperspectral super-resolution: an overview of methods.** Invited talk at Laboratoire des Sciences du Numérique de Nantes (LS2N), February 2021.
- **Hyperspectral super-resolution via coupled Tucker decomposition.** Workshop on Low-Rank Models and Applications (LRMA), September 2019.
- **Hyperspectral super-resolution via coupled Tucker decomposition.** Peyresq summer school, July 2019.
- **Hyperspectral super-resolution via coupled Tucker decomposition.** GdR ISIS meeting on tensor decompositions, June 2019.

Community work

- **ENBIS 2018**, Ecole des Mines de Nancy, September 2–6: reception desk, technical chair;
- **IEEE CAMSAP 2019**, Le Gosier, Guadeloupe, December 15–18: reception desk;
- **Reviewer** for 6 international journals: IEEE Transactions on Signal Processing (TSP), IEEE Journal of Selected Topics on Signal Processing (JSTSP), IEEE Transactions on Geoscience and Remote Sensing (TGRS), IET Signal Processing, Elsevier Signal Processing, Geocarto International (Taylor and Francis).

Skills

IT MATLAB and Simulink, \LaTeX , Python, R.

Language French (fluent), english (fluent, TOEIC: 950/990).