Nils Laurent

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Background

2022-2023	**Gipsa-lab** (France): Post-doc, supervised by **Nicolas Le-Bihan** (Gipsa-lab), **Salem Said** (LJK) and **Florent Bouchard** (L2S), on *geometrical machine learning: new approaches beyond Riemannian geometry - application to the Stiefel manifold*.
2022	**LJK, MSTII, Grenoble INP** (France): PhD thesis, supervised by **Sylvain Meignen** (LJK), co-supervised by **Bertrand Rivet** (GIPSA-Lab) and **Julie Fontecave-jallon** (TIMC-IMAG) on *time-frequency analysis of noisy multicomponent signals*.
2019	**ENSIMAG** (France): **Engineering degree** with applied mathematics specialization in *modeling, calculus and simulation*. Apprenticeship at Kalray on code coverage for custom processor architecture.
2016	**IUT Lyon 1** (France): **Two-year university degree** in computer science.
2014	**Sundsgården** (Sweden): Culture and communication studies, **camaraderie award**.
2013	**Pierre Desgranges** (France): **Baccalaureate** of a vocational high school in electronic and numerical systems, specialized in telecommunication and networking.

Doctoral research

Published articles,

[1] N Laurent and S Meignen. A new adaptive technique for multicomponent signals reassignment based on synchrosqueezing transform. In *2022 30th European Signal Processing Conference (EUSIPCO)*, pages 2136–2140. IEEE, 2022.

[2] Nils Laurent, Marcelo A Colominas, and Sylvain Meignen. On local chirp rate estimation in noisy multicomponent signals: With an application to mode reconstruction. *IEEE Transactions on Signal Processing*, 70:3429–3440, 2022.

[3] Nils Laurent and Sylvain Meignen. A novel ridge detector for nonstationary multicomponent signals: development and application to robust mode retrieval. *IEEE Transactions on Signal Processing*, 69:3325–3336, 2021.

[4] Nils Laurent, Sylvain Meignen, Julie Fontecave-Jallon, and Bertrand Rivet. A novel algorithm for heart rate estimation based on synchrosqueezing transform. In *2021 29th European Signal Processing Conference (EUSIPCO)*, pages 1286–1290. IEEE, 2021.

[5] Nils Laurent and Sylvain Meignen. A novel time-frequency technique for mode retrieval based on linear chirp approximation. *IEEE Signal Processing Letters*, 27:935–339, 2020.

Accepted articles,

* Sylvain Meignen, Nils Laurent and Thomas Oberlin. One or Two Ridges? An Exact Mode Separation Condition for the Gabor Transform. *IEEE Signal Processing Letters*.

Submitted articles,

* Juan M. Miramont, François Auger, Marcelo A. Colominas, Nils Laurent, and Sylvain Meignen. Unsupervised classification of the spectrogram zeros. *IEEE Transactions on Signal Processing*.

* N. Laurent, S. Meignen, M. A. Colominas, J. M. Miramont and F. Auger. A Novel Approach Based on Voronoï cells to Classify Spectrogram Zeros of Multicomponent Signals. *ICASSP 2023*.

Teaching

Incoming teachings at University Grenoble Alpes (UGA).

* System and programming, Bash and C, 40.5 hours, L1 (1st year undergraduates)

During my thesis (2020-2022), at Ensimag engineering school and at UGA. They represent a total of 132.25 hours.

* Teaching assistant: Lebesgue integration, Fourier, norms and Banach spaces at **Ensimag**, 37 hours, L3 (3rd year undergraduates).

* Lab work supervisor: numerical analysis at **Ensimag**, 6 hours, L3

* Lecturer: continuity, Taylor expansions, numerical methods at **Ensimag** for the apprentices, 48.75 hours, L3

* Lecturer: limits and asymptotic analysis at **UGA**, 22.5 hours, L1

* Lab work supervisor: image processing at **UGA**, 18 hours, L1

Studies

Teaching	**Preparation of a thesis label** *research and teaching in higher education*.
Mathematics	**Applied mathematics** : Image processing, level sets, optimal transport, data assimilation, finite elements, calculus of variations, rendering and animation, geometric modeling, computer vision.
Computer science	**Theoretical** : Automatic code analysis, complexity theory, language theory. **Systems** : Operating systems, GPU and HPC computing, networking, databases. **Languages** : Matlab, Python, C, LaTeX, HTML, CSS, JavaScript, C++, SQL.
Languages	**French** : native. **Swedish** : everyday language, I regularly speak with my Swedish family. **English** : everyday language, reading/writing articles, B2 at TOEIC in 2019.

Service

* Developed DAO team website `https://dao.imag.fr/`

* Organizer and animator of an event in Pierre Desgranges high school (in France) to introduce methodologies, theoretical concepts and prepare for higher education.

My experience in Sweden

I had this experience in 2013-2014 after high school, it helped me to think about my future and reinforced the fact that I wanted to do more theoretical studies. Here is an overview of what I did when I was in Sweden at that time:

Courses at Sundsgården	Literature, history, mathematics, English, biological and environmental science.
Self-taught	Integration, Taylor expansions, numerical integration, computer languages (C++, Python)