Jean-Luc Bouchot

Computational Mathematician
Researcher, Teacher, and Engineer

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jlbouchot.github.io/
https://github.com/jlbouchot/
https://scholar.google.de/citations?user=sXMPbkMAAAAJ

Key achievements and expertise

- Sparse and low-rank approximation
- Image (OCT, MRI) / signal (metagenomics) processing
- Computer vision and machine learning
- French accreditation (26/61, 2017) and Cataluña (2018)
- Programming experience (Python, Jupyter, C++, Java)
- Algorithmic Differentiation and code analysis
- Random sampling and interpolation
- Uncertainty quantification in numerical PDEs

Academic experience

01/24 - Now **Advanced Researcher**, *INRIA Côte d'Azur*, Sophia-Antipolis, France
Research in Algorithmic Differentiation. Ongoing work
- Memory/compute time profiling for better checkpointing of code
- Development of a Julia parser for Source Transform Differentiation
- Problem solving with researchers and industrial partners

10/18-09/22 **Assistant professor of mathematics**, *School of mathematics and statistics, Beijing Institute of Technology*, Beijing, P.R.China
Fundamental research in computational uncertainty quantification in PDEs and sparse approximation.
- Multi-level sampling in high dimensional parameter spaces
- Distributed sensing and sampling and MRI reconstruction

09/14-08/18 **Postdoctoral researcher**, *Chair for Analysis, RWTH Aachen University*, Aachen, Germany
Fundamental research in compressed sensing and its applications.
- Numerical schemes for parametric PDEs and Petrov-Galerkin approximation
- Compressed sensing for convolution operators

11/12-08/14 **Postdoctoral associate and adjunct professor**, *Drexel university*, Philadelphia, PA, USA
Applications of sparsity promoting techniques to problems arising in metagenomic studies.
Greedy approaches to signal processing and information theoretic algorithms.

10/09-09/12 **Research assistant**, *Johannes Kepler University of Linz*, Linz, Austria
Fundamental and industrial research on the discrepancy norm applied to image understanding
Development of digital image processing tools for optical coherence tomography images via structured similarities
Collaboration with the Christian Doppler Labor for Microscopic and Spectroscopic Material Characterization (CDLabor MS MACH)

Industrial experience

08/21-12/23 **Expert**, *Artelys*, Paris, France
Consulting company specialising in operation research and optimisation of power systems. Responsibilities
- Project manager: Combinatorial and robust optimisation of large powersystems (High-performance computing combined with Monte Carlo simulations and combinatorial optimisation)
- Open-source software developement: Dynawo and PowSyBl (Java / C++)
- Combinatorial optimisation and heuristics via knitro MISQP
- Times series analysis for climate normalisation of energy consumption

09/19-02/21 **Algorithm engineer**, *Continental - ASL Electronics and Vision*, Burgess Hill, UK
Technical lead for camera calibration (5 algorithm engineers), part of the sensor fusion team. Responsabilities
- Real-time calibration of embedded extrinsics in multi-camera systems: from prototyping to production code.
- Statistical analysis and data-driven robust parameter estimation
- Multi-modal sensor fusion through Bayesian and Kalman filtering
- Real-time and offline validation of cameras' intrinsics parameters estimation through non linear optimisation.

Research and teaching invitations

Dec. 22 South Eastern Applied Mathematics Society summer school on Modern trends in signal processing
Guest lecturer: compressed sensing and greedy sparse approximation (2 weeks)
Institute of Mathematics *University of the Philippines Diliman*, Manila, PH

July 21	G2S3 Gene Golub SIAM Summer School on the Mathematics of Deep Learning Tutor for numerical optimisation and approximation problems Online	*Stellenbosch University*, ZA
Aug. 19	Special summer program on Mathematics of signal and data processing Guest lecturer: compressed sensing and sparse approximation Institute of Mathematics (1 week)	*Academia Sinica*, Taipei, TW
June 19	Compressed sensing and statistical learning with sparsity Host: Jun Yu (1 week) Department of Mathematics and Mathematical Statistics	*Umeå universitet*, SE
June 19	Compressed sensing and low rank approximation Host: Song Li (1 week) School of Mathematical Sciences	*Zhejiang University*, Hangzhou, CN
April 18	Median and gradient descent for one-bit compressed sensing Host: Bubacarr Bah (2 weeks) Guest lecturer: Mathematical underpinning of Data Sciences, for the AIMS Data Science Workshop AIMS South Africa,	*Stellenbosch University*, ZA
March 18,Aug. 15	Workshops on Applied harmonic analysis and data processing Invited researcher (2x1 week)	*MFO*, Oberwolfach, DE
May-June 15	IRP Approximation and Harmonic Analysis Centre de Recerca Matemàtica (3 weeks, Clay Institute fund),	*Universitat Autònoma de Barcelona*, ES
Jan.-Apr.15	Trimester Program on Mathematics of Signal Processing Hausdorff Research Institute in Mathematics (2 months),	*University of Bonn*, DE
Mar. 15	Weighted compressed sensing, High-dimensional PDEs, uncertainty quantification Host: Christoph Schwab (1 week) Seminar for Applied Mathematics,	*ETH Zurich*, CH
July 14	Compressed sensing, numerical sparse recovery Host: Holger Rauhut (1 week) Chair for Mathematics C (Analysis),	*RWTH*, Aachen, DE
Sept.13,Feb.14	One-bit compressed sensing, Optimization methods for compressed sensing Host: Simon Foucart (3 days, 2 days) Department of Mathematics,	*UGA*, Athens, US
Feb-June 12	Hypercomplex signal processing, Interferometric imaging Host: Swanhild Bernstein (3 months) Department of Applied Functional Analysis,	*TUBAF*, Freiberg, DE
Sept. 11	Distance transforms for image processing, Structural similarities Host: Frédéric Morain-Nicolier (1 month) CReSTIC,	*URCA*, Troyes, FR

Teaching and supervision

Undergraduate courses

- Calculus / Maths 1 & 2 (LSE, 2021-2023)
- Higher mathematics (Analysis/Algebra/Multivariate analysis, RWTH, 2014-2018)
- Numerical analysis 1 & 2 (Drexel, 2014)
- Differential equations for engineers (Drexel, 2013)
- Introductory analysis (Drexel, 2013)

Graduate courses

- Modern regression (BIT, 2021)
- Modern optimization (BIT, 2021)
- Wavelet analysis (BIT, 2020)
- Computational Science Engineering (BIT, 2019)
- Matrix analysis (BIT, 2018)

- Computational mathematical genetics (RWTH, 2018)
- Mathematical foundations of machine learning, (RWTH, 2016)

Supervision

- Marcel Leenings, M.Sc. in Technomathematics, *FH Aachen-Jülich*
  Classification of displacement signals for gesture recognition on mobile devices
- Benjamin Bykowski, M.Sc. in Mathematics, June 15, *RWTH Aachen*
  Weigthed ℓ_1 minimization methods for numerical approximations of parametric PDEs under uncertainty quantification
- Akhil Kapoor, Junior Computer Science, Summer 13, *Drexel University*
  An introduction to compressive sensing

Education

2009–2012 **Ph.D., Industrial mathematics**, *Johannes Kepler University*, Linz, Austria *mit Auszeichnung*
Dissertation: Structures and irregularities in image processing and analysis
Topics: Image and signal processing, Learning theory, Measure theory, Functional analysis
Advisor: E. Peter Klement

2006–2009 **Engineering degree, Applied mathematics and computer science**, *ENSEEIHT*, Toulouse, France
Exchange with the Human Computer Interface department at TU Darmstadt
Master's thesis: Make and model recognition of cars on mobile devices
Topics: Computer vision, Machine Learning, Subspace analysis
Advisor: Géraldine Morin

Publications

google scholar citations as of August 06, 2024

Articles in journals (peer reviewed)

J1 R. Aceska, J.-L. Bouchot, and S. Li. Local sparsity and recovery of fusion frames structured signals. *Signal Processing*, September 2020 (9 citations).

J2 B. Bah, J.-L. Bouchot. Recent development in signal approximation and reconstruction. *Frontiers in Applied Mathematics and Statistics*, March 2020.

J3 J.-L. Bouchot and K. Hamm. Stability and robustness of RBF interpolation. *Sampling Theory in Image and Signal Processing*, 2017 (2 citations).

J4 J.-L. Bouchot, S. Foucart, and P. Hitczenko. Hard thresholding pursuit algorithms: Number of iterations. *Applied and Computational Harmonic Analysis*, September 2016 (65 citations).

J5 J.-L. Bouchot and F. Morain-Nicolier. Scaled-distance-transforms and monotonicity of autocorrelations. *IEEE Signal Processing Letters*, 2014 (1 citation).

J6 J.-L. Bouchot and F. Bauer. Discrepancy norm: Approximation and variations. *Journal of Computational and Applied Mathematics*, 2014.

J7 E. Leiss-Holzinger, U. D. Cakmak, B. Heise, J.-L. Bouchot, E. P. Klement, M. Leitner, D. Stifter, Z. Major. Evaluation of structural change and local strain distribution in polymers comparatively imaged by FFSA and OCT techniques. *eXPRESS Polymer Letters*, 2012 (11 citations).

J8 E. Lughofer, J.-L. Bouchot and A. Shaker. On-Line Elimination of Local Redundancies in Evolving Fuzzy Systems, *Evolving Systems*, 2.3, 2011, 1-23 (129 citations).

Conference proceedings (peer reviewed)

C1 J.-L. Bouchot, B. Bykowski, H. Rauhut, and Ch. Schwab. Compressed sensing petrov-galerkin approximations for parametric PDEs. In *SampTA 15*, 2015 (24 citations).

C2 J.-L. Bouchot and L. Cao. Numerical solution of underdetermined systems from partial linear circulant measurements. In *SampTA 15*, 2015.

C3 J.-L. Bouchot. A generalized class of hard thresholding algorithms for sparse signal recovery. In *Approximation Theory XIV*, 2014 (13 citations).

C4 S. Bernstein, J.-L. Bouchot, M. Reinhardt, and B. Heise. Generalized analytic signals in image processing: Comparison, theory and applications. In *Quaternion and Clifford Fourier Transforms and Wavelets*, Trends in Mathematics, pages 221–246. Springer, 2013 (49 citations).

C5 G. Stübl, J.-L. Bouchot, P. Haslinger, B. Moser. Discrepancy norm as fitness function for defect detection on regularly textured surfaces. In *Joint DAGM (German Association for Pattern Recognition) and OAGM Symposium*, 2012 (16 citations).

C6 J.-L. Bouchot, G. Stübl, B. Moser. A template matching approach based on the discrepancy norm for defect detection on regularly textured surfaces. In 10^{th} *International Conference on Quality Control by Artificial Vision*, 2011 (14 citations).

C7 D. Stifter, E. Leiss-Holzinger, B. Heise, J.-L. Bouchot, Z. Major, M. Pircher, E. Götzinger, B. Baumann, Ch. K. Hitzenberger. Spectral domain polarization sensitive optical coherence tomography at $1.55\mu m$: novel developments and applications for dynamic studies in materials science. In *SPIE BIOS*, 2011 (6 citations).

C8 B. Moser, G. Stübl, J.-L. Bouchot. On a non-monotonicity effect of similarity measures. In *International Workshop on Similarity-Based Pattern Recognition*, 2011 (8 citations).

C9 J.-L. Bouchot, J. Himmelbauer, B. Moser. On autocorrelation based on Hermann Weyl's discrepancy norm for time series analysis. In *International Joint Conference on Neural Networks*, 2010 (4 citations).

Book / chapters contributions (peer reviewed)

B1 R. Aceska, J.-L. Bouchot, and S. Li. Fusion frames and distributed sparsity, In *Contemporary Mathematics*, 2017 (6 citations).

B2 G. Ditzler, Y. Lan, J.-L. Bouchot, and G. L. Rosen. Variable selection to improve classification of metagenomes, In *Encyclopedia of Metagenomics*, 2015 (1 citations).

B3 J.-L. Bouchot, W. Trimble, G. Ditzler, Y. Lan, S. Essinger and G. L. Rosen. Advances in machine learning for processing and comparison of metagenomic data, In *Computational Systems Biology*, 2013 (16 citations).

Work in progress

S1 L. Hascoët, J.-L. Bouchot, S.S. Gaikwad, S.H.K. Narayanan, and J. Hückelheim. Profiling checkpointing schedules in adjoint ST-AD, (peer reviewed) **Accepted for oral presentation**, 8th International Conference on Algorithmic Differentiation, 2024.

S2 J.-L. Bouchot. Weighted block compressed sensing for parametrized function approximation, In preparation, Aug. 2024.

S3 J.-L. Bouchot, H. Rauhut, and Ch. Schwab. A multi-level compressed sensing Petrov-Galerkin appraoch for approximation of high-dimensional PDEs, In preparation, Aug. 2024.

Technical reports

R1 Chammas, M et al. PEPS5 study on the interest of energy storage and of power-to-X, INIS Vol. 54, Issue 19, Report Nb. INIS-FR–23-0405, Available from the INIS Liaison Officer for France, Jan. 2023.

Scientific outreach

Invited seminar talks

ZJU	Sparse approximations of parametric PDEs, School of Mathematical Sciences,	June 18 Hangzhou, CN
NYU	Sampling and reconstruction of high-dimensional phenomena, Department of Data science,	Apr. 18 New York, NY
Paris V	Uncertainty quantification in high-dimensional PDEs via CS, MAP5,	Feb. 18 Paris, FR
Univ. Surrey	My research and its relevance – from compressed sensing to applied mathematics, Department of Mathematics (job talk),	Nov. 17 Guilford, UK
Univ. Victoria	Compressed Sensing: Novel results and applications, Department of Mathematics (job talk),	Nov. 17 Wellington, NZ
INP Toulouse	Parametric function approximation in Hilbert spaces, SPOT Seminar,	Oct. 17 *National Polytechnic Institute*, Toulouse, FR
UTT	Sparse approximations of parametric PDEs, *Université de Technologie de Troyes* (job talk),	May 17 Troyes, FR
URCA	Results in CS and implications for high-dimensional parametric PDEs, Laboratoire de Mathématiques de Reims,	Apr. 17 Reims, FR
Edinburgh	Recovery of sparse signals and applications to parametric PDEs, Department of Mathematics (job talk),	June 16 *University of Edinburgh*, UK
RWTH	Recent advances in one-bit CS and their implications in deep learning, Seminar, Chair C for Mathematics (Analysis)	Dec. 15 *RWTH Aachen*, DE

Inst. Math. de Bourgogne	A multi-level CS Petrov-Galerkin method for parametric PDEs, Séminaire SPOC,	Dec. 15 *Université de Bourgogne*, Dijon, France
U. of Manchester	A multi-level CS Petrov-Galerkin method for parametric PDEs, Numerical analysis and scientific computing seminar,	Nov. 15 *University of Manchester*, UK
Drexel	A multi-level CS Petrov-Galerkin method for parametric PDEs, Analysis seminar,	May 15 *Drexel University*, Philadelphia, PA
RWTH	Overview of quantized CS: bit-depth vs number of measurements, Internal workshop, Chair for Mathematics C (Analysis),	Sept. 14 *RWTH Aachen*, DE
MERL	Signal alignment: an overview leading to new sampling paradigms, *Mitsubishi Electric Research Labs* (job talk),	May 14 Cambridge, MA
UGA	Generalised hard thresholding algorithms for sparse signal recovery Applied analysis seminar,	Sept. 13 *University of Georgia*, Athens, GA
Vanderbilt	Hard Thresholding Pursuit Algorithms Computational analysis seminar,	Sept. 13 *Vanderbilt University*, Nashville, TN
Drexel	Subspace embedding and data analysis Electrical and Computer Engineering Department,	Apr. 13 *Drexel University*, PA
TUBAF	Riesz Transforms in Image Processing Institute for Applied Functional Analysis,	Feb. 12 *TU Freiberg*, Germany
URCA	Signal Analysis with the Discrepancy Norm CReSTIC,	Sept. 11 *University of Reims Champagne-Ardennes*, France
JKU	Characterization and analysis of speckle patterns in OCTs CDLab MS-MACH,	July 11 *JKU*, Linz, Austria

Invited contributions

- *HPC Industry summit*, Berlin, DE, Oct. 23
  Expert panelist: HPC as a Driver for Industrial Innovation
- *Webinar: Superpower for the power grid*, Online, Mar. 23
  Invited talk: Mathematical optimisation and high-performance computing (HPC) for long term power system studies and planning
- *Teratec 2022 Forum*, High performance AI in the industry, Palaiseau, FR, June 22
  Invited talk: Robust optimization in power networks
- *Applied AI Conference - AI in the energy sector*, Online, Mar. 22
  Invited talk: Robust optimization in power networks
- 5^{th} *International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar, and Remote Sensing (CoSeRa)*, Siegen, DE, Sept. 18
  Invited session organizer Mathematical Methods of Compressed Sensing (with G. Kutyniok)
- *SIAM Annual Meeting*, Mini-symposium on *Approximation of high-dimensional systems – Theory and numerical aspects*, Pittsburgh, PA, July 17
  Invited talk: *Cancelled due to scheduling conflicts*
- *Sampling Theory and Applications (SampTA)*, Tallinn, EE, July 17
  Invited session organizer Dynamical Sampling (with A. Aldroubi)
- *SIAM Conference on Computational Science and Engineering*, Atlanta, GA, Feb. 17
  Invited talk: Compressed sensing methods for sparse approximations of high-dimensional parametric PDEs
- *Conférence d'Analyse NUMérique*, Oberlai, FR, May 16
  Invited talk: Méthodes de Galerkin multi-niveaux et développements parcimonieux pour opérateurs elliptiques.
- *SIAM Conference on uncertainty quantification*, Lausanne, CH, Apr. 16
  Invited talk: A multi-level CSPG method for the approximation of parametric PDEs
- *Hausdorff Trimester Program – Seminar series*, Bonn, DE, March 16
  Invited talk: Interpolation of noisy samples with radial basis functions.
- *SIAM Conference on Analysis of Partial Differential Equations*, Scottsdale, AZ, Dec. 15
  Invited talk: A multi-level CSPG method for the approximation of parametric PDEs
- *Approximation Theory 14*, San Antonio, TX Apr. 13
  Invited talk: Progress on Hard Thresholding Pursuit

Contributed conferences

- SIAM Computational Science and Engineering, Fort Worth, USA, Mar. 25
  Session organizer: Recent advances in algorithmic differentiation (with L. Hascoët and U. Naumann).
  Talk: Source transform AD and the Julia language.
- 8^{th} International Conference on Algorithmic Differentiation, Argonne National Lab., Chicago, USA. Sept. 24.
  Talk: Profiling checkpointing schedules in adjoint ST-AD.
- SPARS Workshop, INP-ENSEEIHT, Toulouse, FR, July 19
  Poster: Weighted group sparse compressed sensing for parametric function approximation
- HDDA IX: Perspectives on High-Dimensional Data Analysis, Uppsala university, SE, June 19.
  Talk: MLCSPG: Resolving the curse of dimensionality in parametric PDEs.
- 7^{th} International Symposium on Data Assimilation, RIKEN Center for Computational Science, Kobe, JP. Jan. 19.
  Poster: MLCSPG: An efficient and (provable!) accurate solver for high-dimensional parametric PDEs.
- *South African Numerical and Applied Mathematics (SANUM)*, Stellenbosch, ZA, Apr. 18
  Talk: Compressed sensing, distributed networks, and fusion frames.
- *Biennale SMAI*, La Tremblade, FR, June 17
  Session organizer: Structured signals and sampling (with C. Boyer).
- *Mathematical Optics, Image Modelling and Algorithms 16*, Hannover, DE, June 16
  Talk: Efficient and reliable solutions to high-dimensional parametric PDEs via compressed sensing
- *Conference on Harmonic Analysis and Approximation Theory*, Barcelona, ES, June 16
  Talk: A multi-level compressed sensing Petrov Galerkin method for the approximation of high-dimensional parametric PDEs
- *FEniCS '16*, Oslo, NO, May 16
  Talk: MLCSPG: A fast and efficient approximation method for high-dimensional PDEs.
- 6^{th} *Workshop: High-Dimensional Approximation*, Bonn, DE, Sept. 15
  Talk: A multi-level CSPG method for the approximation of parametric PDEs
- *Workshop: Applied Harmonic Analysis and Sparse Representation*, MFOberwolfach, Aug. 15
- *Sampling Theory and Applications - SampTA 15*, Washington, D.C., May 15
  Talk: CSPG Approximations for Parametric PDEs
  Poster: Numerical Solution of Underdetermined Systems from Partial Linear Circulant Matrices
- *Variational methods in imaging (New Trends in Calculus of Variations)*, Linz, AT, Oct. 14
  Poster: Registration, structural similarities, and monotonicity.
- *UCL-Duke Workshop: Sensing and Analysis of High-Dimensional Data*, London, UK, Sept. 14
  Whiteboard presentation: Hard thresholding pursuit algorithms: The greedy way
- *Mathematical Signal Processing and Phase Retrieval*, Göttingen, DE, Sept. 14
  Talk: Graded HTP: Using a hard tresholding operator in a greedy manner
- *Algorithms for Threat Detection Program Review*, Boulder, CO, March 14
  Talk: Information Theoretic Feature Selection for Data Prediction and Understanding in Metagenomic Studies
  Poster: Predicting Environmental Parameters from Biological Data with Sparse Recovery
- *SIAM Annual meeting*, San Diego, CA, July 13
  Talk: Sparse signal recovery via hard thresholding pursuit algorithms
- *Annual meeting, Canadian Applied and Industrial Math. Society*, Quebec, QC, CA June 13
  Talk: Hard Thresholding Pursuit Algorithms for Sparse Signal Recovery
- *Quality Control by Artificial Vision*, Saint Etienne, FR June 11
  Talk: Defect detection with the discrepancy norm
- *Computer Vision and Machine Learning*, Sampieri, IT July 10
  Poster: Logo localization using the discrepancy norm
- *World Congress on Computational Intelligence*, Barcelona, ES July 10
  Poster: Times series analysis with the discrepancy norm

Attendance

- 13^{th} *International Conference on Sampling Theory and Applications*, Bordeaux, FR, July 19.
- *Uncertainty quantification in computational imaging*, Edinburgh, UK, Apr. 18.
- *Approximating High-dimensional Functions*, Alan Turing Institute, London, UK, Dec. '17
- *LMS Workshop: Variational Methods meet Machine Learning*, Cambridge, UK, Sept. 17
- 4^{th} *International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar, and Remote Sensing*,

Aachen, DE, Sept. 16.
- *Advanced course Constructive approximation and harmonic analysis*, Barcelona, ES, June 16
- *Computational and statistical trade-offs in learning*, IHES Bures-sur-Yvette, FR, Mar. 16
- *Mathematical Image Analysis '16*, Paris, FR, Jan. 16
- *CS and Sparsity: Theory and Applications in Tomography*, Manchester, UK, Nov. 15
- *International Conference on Harmonic Analysis and Applications*, New York, NY, June 15
- *Geometric control and related fields (New Trends in Calc. of Variations)*, Linz, AT, Nov. 14
- *NetCo: New Trends in Optimal Control*, Tours, FR, June 14
- *International Conference on Computational and Harmonic Analysis*, Nashville, TN May 14
- *February Fourier Talk*, College Park, MD, Feb. 14
- *AMS Joint Math Meeting*, Baltimore, MD, Jan. 14
- *February Fourier Talk*, College Park, MD Feb. 13
- *Algorithm for threat detection*, San Diego, CA Nov. 12
- *Mathematical Image Analysis*, Paris, FR Jan. 12
- *ENS/INRIA Visual Recognition and Machine Learning* , Paris, FR June 11

Academic services

- **Recruitments:** W2-Professorship for Mathematics of Data Science; TAs for higher mathematics (RWTH Aachen)
- **Ph.D. Comittee**: Michael Minner (Ph.D. Mathematics, Drexel University, March '16)
- **Reviewer** for various international journals and conferences (including ICML, ICMLA, NeurIPS, COLT, IEEE Transactions on Signal Processing, Signal Processing, IEEE Signal Processing Letters, Journal of Computational Mathematics, Mathematics of Computations, Linear Algebra and Applications, Frontiers in Applied Mathematics and Statistics, Journal of Computational and Applied Mathematics, IEEE Transactions on Neural Networks and Learning Systems, Circuits Systems & Signal Processing)

Miscellanea

- Languages (human)
  - French / English native speaker
  - Spanish B1
  - German C1
  - Mandarin-Chinese, HSK2-3
- Languages (machines)
  - Python, Jupyter, NumPy, SciPy, Numba, Panda; scikit-learn, tensorflow
  - MatLab, optimisation, wavelet, image processing toolboxes; ForTran; Modelica
  - Expert LaTeX; some knowledge of HTML/CSS; some notions of php and javascript
  - C/C++, Java; deployment/production: unit testing, continuous integration and development; R
- Drummer (member / founder of various bands; teacher); Judoka; Marathonian; Sailor