Rodrigo Cerqueira Gonzalez Pena

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Education

École Polytechnique Fédérale de Lausanne (EPFL) *Ph.D. Computer Science* 2019
Lausanne, Switzerland
Working at the Signal Processing Laboratory 2 (LTS2), on machine learning and compressed sensing techniques for signals living on graphs.
- Thesis supervisor: Pierre Vandergheynst

Universidade de Brasília *B.Sc. Electrical Engineering* 2014
Brasília, Brazil
I specialized in Signal Processing, completing a thesis project on saliency-based quality metrics for images and videos.
- Thesis supervisor: Mylène C.Q. Farias

École Nationale Supérieure d'Électronique, Informatique, Télécommunications, Mathématique et Mécanique de Bordeaux (ENSEIRB-MATMECA) *Exchange Student* 2012–2013
Bordeaux, France
Funded by a scholarship awarded by the Brazilian government. At ENSEIRB-MATMECA, I completed the second year of the French Engineering Schools system.

Research Experience

École Polytechnique Fédérale de Lausanne (EPFL) *Ph.D. thesis* 2015–2019
Lausanne, Switzerland
I focused on how to provide recovery guarantees for inverse problems supported on graphs. In particular, I studied the construction of random vertex-sampling designs that allow recovering the underlying network signal by minimizing its graph total-variation. Possible applications include learning class labels of elements of a network.

Fraunhofer-Institut für Digitale Medientechnologie *Visiting Researcher* Mar-Apr 2018
Ilmenau, Germany
Collaborating with specialists in industry applications of machine learning for audio signals. I designed a time-dependent harmonic (in the sense of music theory) similarity measure for song excerpts, building upon work from a past Master's student at the institute. The visit was promoted and funded by the EU's Marie Curie Initial Training Network "SpaRTaN".

University of Surrey *Visiting Researcher* Jan–Mar 2017
Guildford, United Kingdom
Visiting the Centre for Vision, Speech and Signal Processing (CVSSP). The goal was to learn from their expertise in machine learning for audio signals, while trading some of my knowlegde of machine learning on graphs. This visit was also promoted and funded by the EU's Marie Curie Initial Training Network "SpaRTaN".

Laboratoire de l'Intégration du Matériau au Système (IMS) *Intern* Jun 2013
Bordeaux, France
I implemented a robust fuzzy k-means algorithm targeted at clustering image texture patches.

Teaching Experience

École Polytechnique Fédérale de Lausanne (EPFL) *Teaching Assistant* 2015–2018
Lausanne, Switzerland

- *EE-558 A Network Tour of Data Science*

  Fall 2018. Master's-level, project-oriented course. I helped curate, guide, and evaluate the projects of 46 teams of 4 students.
- *MICRO-310 Signals and Systems I*

  Fall 2015–2017. Bachelor's level course. I helped design and organize exercise sessions for 150+ students each semester. Eventually, I prepared and presented mini-lectures at these sessions. I also partially prepared and corrected their final exams.
- *MICRO-311 Signals and Systems II*

  Spring 2017–2018. Bachelor's level course. Similar class size and responsibilities as MICRO-310. The difference was only in content: MICRO-311 focuses on the analysis of discrete-time, shift-invariant systems, whereas MICRO-310 dwells on the continuous-time version.

École Polytechnique Fédérale de Lausanne (EPFL) *Project Supervisor* 2016–2019
Lausanne, Switzerland

- *"Audiovisual Source Separation Using Neural Networks"*

  Master thesis, B. Inan, 2019 (co-supervised with B. Ricaud, H. Peic Tukuljac and researchers from Logitech).
- *"Audio Blind Source Separation for Noise Reduction"*

  Master thesis, V. Pollet, 2019 (co-supervised with B. Ricaud, H. Peic Tukuljac and researchers from Logitech).
- *"Graph Representation of Music Database"*

  Master thesis, H. Parmantier and A. Basille, 2016 (co-supervised with K. Benzi).

Publications

Conference Proceedings

[1] **Pena, Rodrigo**, Bresson, Xavier, and Vandergheynst, Pierre. **2016**. "Source localization on graphs via ℓ_1 recovery and spectral graph theory". In: *2016 IEEE 12th Image, Video, and Multidimensional Signal Processing Workshop (IVMSP)*. Bordeaux, France: IEEE. ISBN: 978-1-5090-1929-8. DOI: 10.1109/IVMSPW.2016.7528230.

Conferences/Workshops

Invited

Signal Processing with Adaptive Sparse Structured Representations (SPARS) *Poster Presenter* — Jul 2019
Toulouse, France

Applied Machine Learning Days (AMLD) *Speaker / Facilitator* — Jan 2019
Lausanne, Switzerland
I co-organized, with Michaël Defferard, a full-day session on learning and processing over networks. We designed interactive Python notebooks for the 50+ attendees, and supplemented the section with lecture slides for explaining theoretical concepts.

graphSIP: Traitement du signal sur graphes - Applications aux nuages de points 3D et en neuroscience *Speaker* — Sep 2018
Aussois, France
I presented two, one-hour lectures for researchers interested in applying graph signal processing to their problems. I talked about spectral clustering, Laplacian eigenmaps, and graph learning.

IEEE 12th Image, Video, and Multidimensional Signal Processing Workshop (IVMSP) *Poster Presenter* — Jul 2016
Bordeaux, France

Attended

13th Iternational Conference on Sampling Theory and Applications (SampTA) — Jul 2019
Bordeaux, France

Conference on Learning Theory (COLT) — Jul 2018
Stockholm, Sweden

Concentration of Measure and its Applications (Cargèse International School) — May 2018
Cargèse, France

Signal Processing with Adaptive Sparse Structured Representations (SPARS) — Jun 2017
Lisbon, Portugal

Awards and Honors

Best student paper award — Jul 2016
IEEE 12th Image, Video, and Multidimensional Signal Processing Workshop (IVMSP)

Outstanding student in graduating class — Sep 2014
Awarded by the professors of the Electrical Engineering department at Universidade de Brasília.

Grants and Fellowships

Marie Curie Initial Training Network (ITN) *Early Stage Researcher Fellow* — Jul 2015
European Union's Seventh Framework Programme (FP7- PEOPLE-2013-ITN) grant agreement 607290 SpaRTaN, covering the Ph.D. salary as well as travel and training costs.

CAPES/Brafitec — Jul 2012
Brazilian government scholarship funding exchange opportunities at Frech engineering schools.

Service

Reviewer

- IEEE Transactions on Signal Processing
- IEEE GlobalSIP

Skills

Programming

Scientific Computing	Python (numpy, matplotlib, scikit-learn, pandas), Matlab
Version Control	git
Writing	LaTeX, markdown

I am a contributing developer to two Python packages managed by the Signal Processing Laboratory 2 (LTS2) at EPFL:

- `pygsp`, containing useful tools for *graph signal processing*, and
- `pyunlocbox`, implementing optimization solvers based on *proximal-splitting algorithms*.

Languages

English	Fully proficient
French	Fully proficient
Portuguese	Native
Spanish	Intermediate

Communication

As a Marie Curie Initial Training Network fellow, I had access to substantial training on communication skills related to public speaking and science outreach. As a consequence, I have harnessed basic skills on

- design and data visualization,
- effective use of body language,
- on-camera speaking,

Teaching

I have attended two workshops at EPFL's Teaching Support Centre while a Ph.D. student: "Teaching Toolkit" and "Presenting and explaining in class". Together with my teaching assistant experience, these workshops helped me assimilate strategies for

- teaching one-to-one effectively,
- organizing exercise sections,
- structuring a lecture.

Personal Details

Married, 28, Brazilian citizenship.