

Rodrigo Cerqueira Gonzalez Pena

Avenue d'Échallens 112, 1004 Lausanne, Switzerland

Phone: +41 76 542 02 55

Email: rodrigocgp@gmail.com

Website: rodrigo-pena.github.io

GitHub: rodrigo-pena

LinkedIn: rodrigocgpena

Education

École Polytechnique Fédérale de Lausanne (EPFL) *Ph.D. Computer Science* 2019
Lausanne, Switzerland

- Thesis: "On the optimal sampling design for the Graph Total Variation decoder: recovering piecewise-constant graph signals from a few vertex measurements"
- Supervisor: Pierre Vandergheynst

Universidade de Brasília *B.Sc. Electrical Engineering* 2014
Brasília, Brazil

- Thesis: "Video quality metrics with top-down visual attention features"
- 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

I completed there 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 proving recovery guarantees for inverse problems supported on graphs. In particular, I studied vertex-sampling designs that minimize the number of measurements needed for recovery under a graph total-variation decoder. Those decoders can be applied, for example, in predicting class labels of elements of a network.

Fraunhofer-Institut für Digitale Medientechnologie *Visiting Researcher* Mar – Apr 2018
Ilmenau, Germany

I collaborated with specialists in industry applications of machine learning for audio signals. During the visit, I designed a time-dependent, harmonic (in the sense of music theory) similarity measure for song excerpts, building upon work from a former member of 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

I visited the Centre for Vision, Speech and Signal Processing (CVSSP), to learn from their expertise in machine learning for audio signals, in exchange for some of my knowledge of machine learning on graphs. This visit was also promoted and funded by the EU's Marie Curie Initial Training Network "SpaRTaN".

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] Berkay Inan, Milos Cernak, Helmut Grabner, Helena Peic Tukuljac, Rodrigo C. G. Pena, and Benjamin Ricaud. "Evaluating Audiovisual Source Separation in the Context of Video Conferencing". In: *Proc. Interspeech 2019*. 00000. 2019, pp. 4579–4583. DOI: 10/gf9pc3. URL: <http://dx.doi.org/10.21437/Interspeech.2019-2671>.
- [2] Rodrigo Pena, Xavier Bresson, and Pierre Vandergheynst. "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, 2016. 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 M. 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 International 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 the 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 most of the costs of my Ph.D. studies.
- CAPES/Brafitec** Jul 2012
Brazilian government scholarship funding exchange opportunities at French 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	L ^A T _E X, markdown

I am a contributing developer to two Python packages:

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

Languages

English	Fully proficient (C2)
French	Advanced (C1)
Portuguese	Native
Spanish	Intermediate (B1)

Communication

As a Marie Curie ITN fellow, I had access to substantial training on communication skills related to public speaking and science outreach. As a result, I have obtained 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: "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.