

# Carlos Lassance

Research Scientist on Information Retrieval

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## Professional Experiences

11/2020- **Research Scientist**, Naverlabs Europe, Grenoble.

Research Scientist at Naver Labs Europe, on the Neural Search project. Mainly working on information retrieval with sparse neural retrievers. Most notably: The consolidation of SPLADE as an effective and efficient sparse neural retriever and improving the efficiency of learned representations for retrieval. This led to winning both tracks of the WSDM CUP 23 - MIRACL

10/2017- **Ph.D. Graphs for Deep Learning Latent Representations**, IMT Atlantique - BrAIn, Brest.

10/2020 Ph.D. program in the intersection of Graph Signal Processing (GSP) and Machine Learning. During this three years period, I've interned at the Mila research lab in Montreal for one year and was a visiting scholar at the Universities of Rochester (USA) and Adelaide (Australia).

01/2017- **Internship**, PUC-Rio - Learn, Rio de Janeiro.

07/2017 Development of an asset allocation robot as a micro-service using Flask, deployed via Amazon cloud and integrated with Amazon Redshift database for BTG Pactual (Brazilian Investment Bank)

10/2015- **Research Engineer**, IMT Atlantique - Neucod, Brest.

09/2016 Development of clique-based associative memories in CUDA and of Deep Neural Networks (DNNs) for handwritten digit identification with Theano

03/2015- **Internship**, Centrale-Supelec - Inria - CIDRE, Rennes.

09/2015 Development of a proof-of-concept Android application and driver for NFC identification with distance bounding protocols for defense against man-in-the-middle NFC attacks

## Teaching Experiences

IMT-Atlantique 27.5 hours of teaching for the Algorithmics and Discrete Mathematics course, 21 hours of teaching for the Artificial Intelligence course and 7.5 hours of teaching for the Deep Learning course.

Mooc Creation of jupyter notebook exercises for the Advanced Algorithmics and Graph Theory with Python course on edX (<https://www.edx.org/course/advanced-algorithmics-and-graph-theory-with-python>)

PUC-Rio Teaching assistant for the databases course for 5 semesters, creation of 3 tutorials for the the Machine Learning course and worked on the creation of *Pandas* exercises for the Applied Computing course

## Ph.D. Graphs for Deep Learning Latent Representations

- Goal Better understand the intermediate representations of DNNs and use that knowledge to improve them.
- Most relevant projects
- Matching CNN without priors about data (IEEE DSW2018 [arxiv.org/pdf/1802.09802](https://arxiv.org/pdf/1802.09802));
  - Increasing the robustness of DNNs (Colaboration with USC. Under journal review: [arxiv.org/abs/1805.10133](https://arxiv.org/abs/1805.10133));
  - Evaluating robustness of DNNs (Colaboration with Mila and USC. IEEE DSW2019 [arxiv.org/abs/1909.05095](https://arxiv.org/abs/1909.05095));
  - Neural network compression with graph distillation (Colaboration with Mila and USC, ICASSP2020);
  - Improving visual based localization with graphs (Colaboration University of Adelaide. Submitted to IROS2020);
  - Graph topology inference benchmarks for ML (Colaboration University of Rochester. Submitted to MLSP2020).

## Formation

2017-2020 **Ph.D.**, IMT Atlantique (Télécom Bretagne), Brest, Title: Graphs for Deep Learning Latent Representations.

2010-2017 **BSc/MEng in Computer Engineering**, PUC-Rio/Télécom Bretagne, Double degree.

2014-2015 **MSc in Informatics**, Télécom Bretagne, Track: Mobile and Communicating Object-Based Systems.

## Technical and Linguistic Skills

Programming • Python • SQL • Git

Frameworks • Pytorch • transformers • Pandas • Numpy • scikit-learn • TensorFlow • Flask

Languages • Portuguese: Native • English: Fluent • French: Fluent

## Interests

Others Soccer, Basketball, Video-games