

# Lucas Nogueira Ribeiro

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**CAREER SUMMARY** Experienced engineer with a multi-disciplinary background in wireless communications, biomedical signal processing, and data science.

**RESEARCH INTERESTS** Data analysis, wireless communications, machine learning, numerical (multi)linear algebra

**EDUCATION** **Federal University of Ceará** – Fortaleza, Brazil  
Ph.D. in Teleinformatics Engineering *October 2019*

**Federal University of Ceará** – Fortaleza, Brazil  
M.Sc. in Teleinformatics Engineering *February 2016*

**University of Nice-Sophia Antipolis** – Nice, France  
M.Sc in Informatics *July 2014*

**Federal University of Ceará** – Fortaleza, Brazil  
B.Sc. in Teleinformatics Engineering *December 2014*

**PROFESSIONAL EXPERIENCE** **Communications Research Laboratory, Technische Universität Ilmenau**  
Ilmenau, Germany *November 2019 – present*

- Postdoctoral fellow
- Leads a research project on transceiver designs for 5G systems in collaboration with an industrial partner
- Advises master students on research projects. The main research topic is the application of machine learning techniques to wireless channel prediction.

**Wireless Telecommunications Research Group**  
Fortaleza, Brazil *March 2016 – October 2019*

- Research assistant
- Developed low-complexity tensor-based beamforming filters for large-scale antenna systems. The proposed methods were implemented in MATLAB and the results were published in conferences and journal papers
- Mentored undergraduate students
- Teaching assistant: digital signal processing and communication systems

**Tendência Edutech**  
Fortaleza, Brazil *December 2018 – November 2019*

- Data analysis consultant
- Developed a dashboard to calculate and analyze the educational indicators of Recife (Brazil). The dashboard automatically downloads education-related

microdata from the official Brazilian statistics database and calculates indicators which help to guide educational policies in Recife. The dashboard is implemented in R and Shiny

**Christian Doppler Laboratory, Technische Universität Wien**

Vienna, Austria

*December 2016 – December 2017*

- Erasmus Mundus visiting researcher
- Research on computationally efficient filter design and energy-efficient transceiver designs for modern mobile communication systems

**I3S Laboratory, University of Nice-Sophia Antipolis**

Nice, France

*March 2014 – July 2014*

- Research intern
- Developed a tensor-based technique for extracting the atrial activity in atrial fibrillation electrocardiograms. Implemented the signal extraction technique in MATLAB and evaluated its performance in an electrocardiogram database obtained from patients with persistent atrial fibrillation.

**SKILLS**

**Technical**

- Python and its data science ecosystem (Pandas, Numpy, Scikit-learn, Keras, Scrapy, ...)
- R (Tidyverse, Shiny), MATLAB, UNIX Shell scripting, C++
- Git, MySQL, Excel, L<sup>A</sup>T<sub>E</sub>X

**Languages**

- English: full professional working proficiency
- French: full professional working proficiency
- German: elementary communication skills
- Portuguese: native speaker

**TEACHING AND  
MENTORING**

**Teacher Assistant**

I have experience as a teacher assistant in the Telecommunications Engineering undergraduate course at the Federal University of Ceará in the digital signal processing and communication systems courses.

## Mentoring

Supervision of undergraduate students at the Federal University of Ceará within the scientific initiation program. The mentoring consisted of guiding the students through advanced signal processing topics, such as beamforming and multilinear algebra.

## PRESENTATIONS

### Tutorials

- [Introduction to digital stenography in Python](#) (in Portuguese)
- [Python crash course](#) (in Portuguese)

### Talks

- Co-authored the keynote “A Tensor perspective to large-scale MIMO array processing” presented at the Workshop on Smart Antennas 2019
- [Tensor processing applied to communications](#) at the [Encontro Anual do Iecom em Comunicações, Redes e Criptografia \(ENCOM\)](#) in 2015
- [Transceiver design for large-scale systems](#) at the [TUM-UFC workshop](#) in 2019

## SCHOLARSHIPS AND AWARDS

- CAPES Doctoral Scholarship *2016 – 2019*
- Erasmus Mundus SMART2 Scholarship *2017*
- CAPES Master Scholarship *2015*
- CAPES BRAFITEC Scholarship *2013 – 2014*
- CNPq Scientific Initiation Scholarship *2010 – 2014*
- Academic Excellence Award, Federal University of Ceará *2014*

## SERVICE

### Journal Referee

- Elsevier Digital Signal Processing
- Circuits, Systems, and Signal Processing
- IEEE Access
- IEEE Transactions on Audio, Speech, and Language Processing
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Communications
- IEEE Transactions on Circuits and Systems II
- IET Signal Processing
- IET Communications
- IET Microwaves, Antennas & Propagation
- IET Radar, Sonar & Navigation

### Conferences and Workshops

- IEEE SAM 2020, technical program committee

- IEEE Globecom 2019, reviewer
- Workshop on Smart Antennas 2019, reviewer
- Symposium on Telecom and Signal Processing (SBRT) 2019, reviewer

## PUBLICATIONS

My academic publications are also listed on [Google Scholar](#).

### Theses

- Doctoral thesis, “[Signal processing methods for large-scale multi-antenna systems](#).” Advised by prof. André L. F. de Almeida and prof. João César M. Mota
- Master’s thesis, “[On supervised multilinear filtering: applications to system identification and antenna beamforming](#),” 2016, Master’s thesis. Advised by prof. André L. F. de Almeida and prof. João César M. Mota
- Master’s thesis, “[Tensor models applied to atrial fibrillation analysis](#).” Advised by prof. Vicente Zarzoso and prof. Gérard Favier
- Bachelor’s thesis, “[Separação cega de fontes: métodos e aplicações](#).” Advised by prof. André L. F. de Almeida and prof. João César M. Mota

### Papers

1. L. N. Ribeiro, S. Schwarz, A. L. F. de Almeida, “[Double-sided massive MIMO transceivers for mmWave Communications](#),” IEEE Access, v. 7, pp. 157667-157679, 2019
2. L. N. Ribeiro, A. L. F. de Almeida, J. C. M. Mota, “[Separable linearly constrained minimum variance beamformers](#),” Signal Processing, v. 158, pp. 15-25, 2019
3. L. N. Ribeiro, A. L. F. de Almeida, J. A. Nossek, J. C. M. Mota, “[Low-complexity separable beamformers for massive antenna array systems](#),” IET Signal Processing, v. 13, pp. 434-442, 2019
4. L. N. Ribeiro, S. Schwarz, M. Rupp, A. L. F. de Almeida, “[Energy efficiency of mmWave massive MIMO precoding with low-resolution DACs](#),” IEEE Journal of Selected Topics in Signal Processing, v. 12, pp. 298-312, 2018
5. L. N. Ribeiro, J. C. M. Mota, A. L. F. de Almeida, “[Processamento Tensorial de sinais aplicado às comunicações](#),” Revista de Tecnologia da Informação e Comunicação, v. 5, pp. 14-18, 2015

### Conference Proceedings

1. L. N. Ribeiro, João C. M. Mota, D. Le Ruyet, E. S. de Cursi, “Channel and message identification on MIMO channels with non-Gaussian noise,” to appear at the 5th International Symposium on Uncertainty Quantification and Stochastic Modeling (Uncertainties), 2020, Rouen, France
2. L. N. Ribeiro, A. L. F. de Almeida, João C. M. Mota, “[Low-rank tensor MMSE equalization](#),” 16th IEEE International Symposium on Wireless Communication Systems (ISWCS), 2019, Oulu, Finland

3. L. N. Ribeiro, A. L. F. de Almeida, N. J. Myers, R. W. Heath Jr., “[Tensor-based estimation of mmWave MIMO channels with carrier frequency offset](#),” 41th International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2019, Brighton, UK
4. L. N. Ribeiro, B. Sokal, A. L. F. de Almeida, J. C. M. Mota, “[Separable least mean squares beamforming](#),” 36th Brazilian Symposium on Telecommunications (SBrT), 2018, Campina Grande, Brazil
5. L. N. Ribeiro, S. Schwarz, M. Rupp, A. L. F. de Almeida, J. C. M. Mota, “[A low-complexity equalizer for massive MIMO systems based on array separability](#),” 25th European Signal Processing Conference (EUSIPCO), 2017, Kos, Greece
6. L. N. Ribeiro, A. L. F. de Almeida, V. Zarzoso, “[Enhanced block term decomposition for atrial activity extraction in atrial fibrillation ECG](#),” 9th IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM), 2016, Rio de Janeiro, Brazil
7. L. N. Ribeiro, A. L. F. de Almeida, J. M. M. Mota, “[Tensor beamforming for multilinear translation invariant arrays](#),” 41st International Conference on Acoustics, Speech, and Signal Processing, 2016 (ICASSP), Shanghai, China
8. L. N. Ribeiro, A. R. Hidalgo-Muñoz, G. Favier, J. C. M. Mota, A. L. F. de Almeida, V. Zarzoso, “[A tensor decomposition approach to noninvasive atrial activity extraction in atrial fibrillation ECG](#),” 23rd European Signal Processing Conference (EUSIPCO), 2015, Nice, France
9. L. N. Ribeiro, A. R. Hidalgo-Muñoz, V. Zarzoso, “[Atrial signal extraction in atrial fibrillation electrocardiograms using a tensor decomposition approach](#),” 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2015, Milan, Italy
10. L. N. Ribeiro, A. L. F. de Almeida, J. M. M. Mota, “[Identification of separable systems using trilinear filtering](#),” IEEE 6th International Workshop on Computational Advances in Multisensor Adaptive Processing (CAMSAP), 2015, Cancún, Mexico
11. L. N. Ribeiro, J. M. M. Mota, A. L. F. de Almeida, “[Trilinear Wiener Filtering: application to equalization problems](#),” 31st Brazilian Symposium on Telecommunications (SBrT), 2013, Fortaleza, Brazil