Lucas Nogueira Ribeiro

Career Summary Experienced research engineer with a multi-disciplinary background in wireless communications, biomedical signal processing, and data science.

Research Interests Wireless communications, antenna optimization, and machine learning

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

Ericsson Antenna Technology Germany GmbH
Rosenheim, Germany *March 2021 – present*

Communications Research Laboratory, Technische Universität Ilmenau
Ilmenau, Germany *November 2019 – January 2021*

- Postdoctoral researcher
- Led a research project on transceiver design for 5G systems in collaboration with an industrial partner
- Advised master students on research projects. The main research topic was 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, ...)
– MATLAB, R (Tidyverse, Shiny), Julia, UNIX shell scripting, C/C++
– Git, MySQL, Excel, LaTeX
– Ansys HFSS, CST microwave studio

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

Scientific supervision of master students at TU Ilmenau on the application of machine learning to wireless channel prediction.

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 steganography 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 Signal Processing Letters
- IEEE Transactions on Audio, Speech, and Language Processing
- IEEE Transactions on Circuits and Systems II
- IEEE Transactions on Communications
- IEEE Transactions on Signal Processing
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Wireless Communications
- IET Signal Processing
- IET Communications

– IET Microwaves, Antennas & Propagation
– IET Radar, Sonar & Navigation
– Frontiers in Communications and Networks

Conferences and Workshops

– European Signal Processing Conference (EUSIPCO) 2021, organized the special session "Signal Processing for Advanced Mobile Communications – Towards 6G" with prof. Stefan Schwarz
– Asilomar Conference on Signals, Systems, and Computers 2020, reviewer
– 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. A. L. F. de Almeida and prof. J. C. M. Mota
– Master's thesis, "On supervised multilinear filtering: applications to system identification and antenna beamforming," 2016, Master's thesis. Advised by prof. A. L. F. de Almeida and prof. J. C. M. Mota
– Master's thesis, "Tensor models applied to atrial fibrillation analysis." Advised by prof. V. Zarzoso and prof. G. Favier
– Bachelor's thesis, "Separação cega de fontes: métodos e aplicações (Blind source separation: methods and applications)." Advised by prof. A. L. F. de Almeida and prof. J. C. 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. D. M. V. Melo, L. T. N. Landau, *L. N. Ribeiro*, M. Haardt, "Time-Instance Zero-Crossing Precoding with Quality-of-Service Constraint," to appear at the 2021 IEEE Statistical Signal Processing Workshop (SSP).
2. *L. N. Ribeiro*, S. Schwarz, M. Haardt, "Low-Complexity Zero-Forcing Precoding for XL-MIMO Transmissions," to appear at EUSIPCO 2021.
3. *L. N. Ribeiro*, S. Schwarz, A. L. F. de Almeida, M. Haardt, "Low-complexity massive MIMO tensor precoding," to appear at 2020 Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, California, USA.
4. D. M. V. Melo, L. T. Landau, *L. N. Ribeiro*, M. Haardt, "Iterative MMSE space-time zero-crossing precoding for channels with 1-bit quantization and oversampling," Proc. 2020 Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, California, USA.
5. *L. N. Ribeiro*, J. C. M. Mota, D. Le Ruyet, E. S. de Cursi, "Channel and message identification on MIMO channels with non-Gaussian noise," Proc. 5th International Symposium on Uncertainty Quantification and Stochastic Modeling (Uncertainties), 2020, Rouen, France.
6. *L. N. Ribeiro*, A. L. F. de Almeida, J. C. M. Mota, "Low-rank tensor MMSE equalization," Proc. 16th IEEE International Symposium on Wireless Communication Systems (ISWCS), 2019, Oulu, Finland.
7. *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," Proc. 41th International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2019, Brighton, UK.
8. *L. N. Ribeiro*, B. Sokal, A. L. F. de Almeida, J. C. M. Mota, "Separable least mean squares beamforming," Proc. 36th Brazilian Symposium on Telecommunications (SBrT), 2018, Campina Grande, Brazil.
9. *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," Proc. 25th European Signal Processing Conference (EUSIPCO), 2017, Kos, Greece.
10. *L. N. Ribeiro*, A. L. F. de Almeida, V. Zarzoso, "Enhanced block term decomposition for atrial activity extraction in atrial fibrillation ECG," Proc. 9th IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM), 2016, Rio de Janeiro, Brazil.
11. *L. N. Ribeiro*, A. L. F. de Almeida, J. M. M. Mota, "Tensor beamforming for multilinear translation invariant arrays," Proc. 41st International Conference on Acoustics, Speech, and Signal Processing, 2016 (ICASSP), Shanghai, China.
12. *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," Proc. 23rd European Signal Processing Conference (EUSIPCO), 2015, Nice, France.
13. *L. N. Ribeiro*, A. R. Hidalgo-Muñoz, V. Zarzoso, "Atrial signal extraction in atrial fibrillation electrocardiograms using a tensor decomposition approach," Proc. 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2015, Milan, Italy.

14. *L. N. Ribeiro*, A. L. F. de Almeida, J. M. M. Mota, "Identification of separable systems using trilinear filtering," Proc. IEEE 6th International Workshop on Computational Advances in Multisensor Adaptive Processing (CAMSAP), 2015, Cancún, Mexico.
15. *L. N. Ribeiro*, J. C. M. Mota, A. L. F. de Almeida, "Trilinear Wiener Filtering: application to equalization problems," Proc. 31st Brazilian Symposium on Telecommunications (SBrT), 2013, Fortaleza, Brazil.

References

Available upon request