

# RUBEM VASCONCELOS PACELLI

## GENERAL INFORMATION

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Fortaleza, Ceará, Brazil  
Federal University of Ceará (UFC)  
UFC-PPGETI-GPSI

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## CARRER SUMMARY

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Skilled Engineer with academic experience in GNSS Signal Processing and multidisciplinary background in

- Statistical signal processing, system identification, and adaptive filtering.
- Software-defined radio, digital modems, and synchronization techniques.
- Deep learning, pattern recognition, and optimization theory.

## EDUCATION

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**BSc** in Electronics Engineering Jan 2013-Dec 2018  
University of Fortaleza (Unifor) Fortaleza, Brazil

**Msc** in Teleinformatics Engineering Jan 2019-Jun 2021  
Federal University of Ceará (UFC) Fortaleza, Brazil

**PhD** in Teleinformatics Engineering Jul 2021-Present  
Federal University of Ceará (UFC) Fortaleza, Brazil

## EXPERIENCE

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**E1** IRD-UFC research partnership Jun 2019-Dec 2020  
Federal University of Ceará (UFC) Fortaleza, Brazil

- Research on Machine Learning and Statistical Signal Processing.
- Developed a research project in collaboration with the IRD (Research Institute Pour Le Développement, France).

## PROJECTS AND RESEARCH FUNDING

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**Pr1** Research and development of a fully digital modem for Jun 2019-Jun 2021  
satellite communications

Master scholarship from Coordination for the Improvement of Higher Education Personnel (CAPES)

- Fully digital modem for satellite communications, targeting its implementation in FPGAs.
- Design of the logical architecture of the modulator and demodulator.
- Development of synchronization modules for the symbol timing delay and phase offset.

**Pr2** Noncoherent GMSK demodulator for CubeSat systems Feb 2017-Jan 2018

Scientific initiation scholarship from National Council of Scientific and Technological Development (CNPq)

- Development of noncoherent GMSK demodulator for CubeSat systems.

**Pr3** Synchronization in OFDM systems Feb 2016-Jan 2017

Scientific initiation scholarship from National Council of Scientific and Technological Development (CNPq)

- Research on synchronization techniques applied to OFDM systems.

**Pr4** Synchronization of signals with multicarrier Feb 2015-Jan 2016

Scientific initiation scholarship from National Council of Scientific and Technological Development (CNPq)

- Research on synchronization techniques applied to multicarrier systems.

## SKILLS

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### Technical

- Scientific programming languages: Python, Julia, R, MATLAB/Simulink, Octave.
- Deep learning frameworks: PyTorch, TensorFlow, Keras.
- MLOps Tools:
  - Amazon Web Services (AWS) ecosystem: Amazon SageMaker, Elastic Container Service (ECS), Elastic Container Registry (ECR).
  - CI/CD Pipelines: Jenkins, GitHub Actions, Travis CI.
  - Container technologies: Docker, Kubernetes.
  - Data Version Control (DVC).
- Systems programming languages: C, C++, and Assembly.
- GNU/Linux: UNIX Shell scripting, Linux system fundamentals, git.
- Typesetting systems: LaTeX, Typst.

### Languages

- English: Professional working proficiency (TOEFL IBT and Cambridge FCE exams).
- Portuguese: Native speaker.

## TEACHING AND SUPPORT

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- I had experience as an assistant teacher in Digital Communications at UFC during my Doctorate's degree in Teleinformatics Engineering.
- I had experience as an assistant teacher in Digital Signal Processing at UFC during my Master's degree in Teleinformatics Engineering.
- I had experience as an assistant teacher in Control Theory at Unifor during my undergraduate in Electronics Engineering.

## ACADEMIC ACTIVITY AND MEMBERSHIP

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### Associate member

- Brazilian Telecommunications Society (SBrT)

## PUBLICATIONS

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My academic publications are also listed on Google Scholar.

### Theses

- Doctorate's thesis in Teleinformatics Engineering. "Detection, characterization, and forecasting of the equatorial ionospheric scintillation signal on GNSS receive". Advised by Prof. Dr. Felix Dieter Antreich and Prof. Dr. André Lima Ferrer de Almeida.
- Master's thesis in Teleinformatics Engineering. "Coherent and all-digital AFSK modem for TT&C module of CubeSat systems" (in Portuguese). Advised by Prof. Dr. João Cesar Moura Mota and Prof. Dr. Antônio Macilio Pereira de Lucena.
- Graduation's thesis in Electronics Engineering. "Design of a portable charger converter with USB Type-C interface" (in Portuguese). Advised by Prof. Dr. Bruno Ricardo de Almeida.

### Journal Articles

- J1 Pacelli, R. V., Lucena, A. M. P. "Fully digital GMSK modem with noncoherent demodulation" (in Portuguese). Brazilian Journal of Development, vol. 6, n. 4, p. 17988-17996, 2020.
- J2 Pacelli, R. V., Lucena, A. M. P. "Carrier synchronization technique for OFDM communication systems" (in Portuguese). Brazilian Journal of Development, vol. 6, n. 3, p. 14297-14305, 2020.
- J3 Figueiredo, S. S., Lucena, A. M. P., Pacelli, R. V. "Carrier selection technique for OFDM system in time-dispersive channels" (in Portuguese). Brazilian Journal of Development, vol. 6, p. 14318-14324, 2020.
- J4 Pacelli, R. V., Lucena, A. M. P. "OFDM system with frequency and phase estimators for carrier synchronization" (in Portuguese). Revista Tecnologia, vol. 40, n. 1, p. 1-16, 2019.

## Conference Proceedings

- C1 Moreira, N. A., Pacelli, R. V., Silva, Y. C. B., Maciel, T. F., Simoes, I., Mota, J. C. M., Hamida, C., Prado, R. Z., Caillault, E., Kacou, M., Gosset, M. "Convolutional Long-Short-Term Memory Networks (ConvLSTM) for Weather Prediction using Radar and Satellite Images". CBA 2022, p. 1-8, 2022.
- C2 Pacelli, R. V., Mota, J. C. M., Lucena, A. M. P. "All-digital AFSK modem with Viterbi detection for TT&C CubeSat transceiver". XXXVIII Simpósio Brasileiro de Telecomunicações e Processamento De Sinais, p. 1-5, 2022.
- C3 Mourão, J. A., Pacelli, R. V., Lucena, A. M. P. "A technique for frequency synchronization in OFDM modulation" (in Portuguese). XXII Research Initiation Meeting, p. 1-5, 2016.

## Book chapter

- BC1 Pacelli, R. V., Moreira, N. de A., Maciel, T. F., Kacou, M., Gosset, M. "A Data-Based Estimation of Power-Law Coefficients for Rainfall via Levenberg-Marquardt Algorithm: Results from the West African Testbed". Chapter 20 in Proceedings of the 6th International Symposium on Uncertainty Quantification and Stochastic Modelling, p. 190-201, 2023.
- BC2 Pacelli, R. V., Lucena, A. M. P., Araújo, D. C., Mourão, J. A. "Symbol time synchronization in OFDM systems" (in Portuguese). Chapter 18 in Exact and Earth Sciences: Exploration and Qualification of Different Technologies, p. 200-207, 2021.
- BC3 Pacelli, R. V., Lucena, A. M. P. "GMSK modem with noncoherent demodulation and all-digital implementation" (in Portuguese). Chapter 2 in The impacts of studies focused on exact sciences, p. 21-30, 2020.

## PATENTS

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### BR 10 2021 023220 0

- Digital demodulation architecture and coherent detection method for AFSK signals (in Portuguese).
- Status: filed.