

Dr. Leandro de Souza Rosa

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Networks

- LinkedIn: www.linkedin.com/in/lrsr
- Google Scholar: https://scholar.google.com.br/citations?user=y_6cHi4AAAAJ&hl=en
- GitHub: <https://github.com/lrsosa>
- WebOfScience: <https://www.webofscience.com/wos/author/record/S-9345-2019>

Education

The University of São Paulo, Institute of Mathematics and Computer Sciences (ICMC)

Ph.D. in Mathematics and Computer Sciences:

- **Title:** Fast Code Exploration for Pipeline Processing in FPGA Accelerators
 - **Period:** 2014 – May 2019
 - **Grant number:** 2014/14918-2
 - **Institution:** The University of São Paulo – ICMC | São Carlos – SP – Brazil
 - **Supervisor:** Vanderlei Bonato <vbonato@icmc.usp.br>

Bachelor in Computer Engineering | 2009 – 2013

Undergraduate Research Projects:

- **Title:** Co-design of Hardware and Software for the EKF-SLAM in Fixed-Point
 - **Period:** May. 2012 – Nov. 2013
 - **Grant number:** FAPESP 2012/20224-8
 - **Institution:** The University of São Paulo – ICMC | São Carlos – SP – Brazil
 - **Advisor:** Prof. Dr. Vanderlei Bonato <vbonato@icmc.usp.br>
- **Title:** Analysis and Implementation of the Extended Kalman Filter in Fixed-Point for Autonomous Robots Mapping and Localization
 - **Period:** Jun. 2010 – May. 2011
 - **Grant number:** FAPESP 2010/05508-4
 - **Institution:** The University of São Paulo – ICMC | São Carlos – SP – Brazil
 - **Advisor:** Prof. Dr. Vanderlei Bonato <vbonato@icmc.usp.br>
- **Title:** Analysis and Lebesgue Integral
 - **Period:** Jun. 2009 – May. 2010
 - **Grant number:** CNPq 110938/2009 - 7
 - **Institution:** The University of São Paulo – ICMC | São Carlos – SP – Brazil
 - **Advisor:** Prof. Dr. Hildebrando Munhoz Rodrigues <hmr@icmc.usp.br>

Porto University, Department of Electrical and Computer Engineering (ECE)

Exchange student | 2011 – 2012

The University of São Paulo, Faculty of Philosophy, Sciences and Languages (FFCLRP)

(Incomplete) Bachelor in Medical Physics | 2007 – 2009

Undergraduate Research Projects:

- **Title:** Qualitative Analysis of Differential Ordinary Equations and Applications
 - **Period:** Apr. 2008 – Mar. 2009
 - **Grant number:** FAPESP 2008/00012-0
 - **Institution:** The University of São Paulo – FFCLRP | Ribeirão Preto – SP – Brazil
 - **Advisor:** Prof. Dr. Marcelo Rempel Ebert <ebert@ffclrp.usp.br>

Work and Research Experience

Sep. 2021 – Today: Post-Doctoral Researcher

Project Title: Teaching Robots Interactively (TERI)
Institution: Delft University of Technology | Delft - Netherlands
Supervisor: Prof. Dr. Jens Kober <J.Kober@tudelft.nl>
Activities: Developing novel methods for interactively teaching robot manipulation tasks.

Nov. 2019 – Aug. 2021 Post-Doctoral Researcher

Project Title: Event-Driven Perception for Robotics
Institution: Istituto Italiano di tecnologia | Genoa - Italy
Supervisor: Dr. Chiara Bartolozzi <Chiara.Bartolozzi@iit.it>
Activities: Developing traditional and novel algorithms for robotics for event-driven sensors.

Nov. 2016 – Nov. 2017 – Intern Researcher

Project Title: Design Space Exploration on Heterogeneous Systems for High-Performance Applications
Grant number: FAPESP 2016/13327-6
Institution: Imperial College London – Dep. Electrical and Electronic Engineering | London – United Kingdom
Supervisor: Dr. Christos-Savvas Bouganis <christos-savvas.bouganis@imperial.ac.uk>
Activities: Developing novel methods for accelerating high-level synthesis methods.

Dec. 2012 – Apr. 2013 – Intern Researcher

Project Title: A Hardware for the EKF-SLAM using Fixed-Point to Embedded Robotics
Grant number: FAPESP 2012/20224-8
Institution: University of Southern California – Information Science Institute | Arlington – VA – USA
Supervisor: Prof. Dr. Aravind Dasu <aravind.dasu@intel.com>
Activities: Developing novel hardware accelerators for localization and mapping for robotics.

Jun. 2013 – Dec. 2013 – Intern System Tester | Amdocs Brasil Ltda | São Carlos

Activities: Developing and deploying systemic tests. Creating and integrating automatic test frameworks.

Teaching Experience

Delft University of Technology – 2022: Teaching Assistant for MSc courses

Activities: Preparing lessons, assignments, and evaluating the students under Prof. Dr. Jens Kober <J.Kober@tudelft.nl> and Prof. Dr. Julian F. P. Kooij <J.F.P.Kooij@tudelft.nl>
Courses:

- Machine Learning for Robotics, Sep. 2022 – Jan. 2023

The University of São Paulo – 2014 – 2018: Teaching internship for undergraduate courses

Activities: Preparing lessons, assignments, and evaluating the students under Prof. Dr. Vanderlei Bonato <ybonato@icmc.usp.br>
Courses:

- Digital Systems, Jul. 2014 – Dec. 2014
- Electronics for Computer Sciences, Feb. 2015 – Jun. 2015
- Digital Systems, Jul. 2015 – Dec. 2015
- Introduction to Digital Logic, Feb. 2016 – Jun. 2016
- Electronics for Computer Sciences, Feb. 2018 – Jul. 2018
- Embedded Systems Design and Implementation, Jul. 2018 – Dez 2018

Academic Supervision

MSc Thesis

Student: Mariano Ramírez Montero

Title: Learning to segment trajectories from interactive feedback

Period: Aug. 2022 – ongoing

Supervisor: Jens Kober

Publications

Peer Reviewed Journals

- Franzese, G., **de Souza Rosa, L.**, Verburg, T., Peternel, L., Kober, J. (2022). Interactive Imitation Learning of Bimanual Movement Primitives. **[Accepted at]** The Focused Section on Design, Modeling, Learning and Control for Bimanual Manipulation Mechatronics. <https://arxiv.org/abs/2210.16220>
- Glover, A., Dinale, A., **Rosa, L. D. S.**, Bamford, S., & Bartolozzi, C. (2021). IuvHarris: A Practical Corner Detector for Event-cameras. IEEE Transactions on Pattern Analysis and Machine Intelligence. <https://ieeexplore.ieee.org/abstract/document/9652120>
- **de Souza Rosa, L.**, Bouganis, C. S., & Bonato, V. (2021). Non-iterative SDC modulo scheduling for high-level synthesis. Microprocessors and Microsystems, 86, 104334. <https://www.sciencedirect.com/science/article/abs/pii/S0141933121004932>
- **de Souza Rosa, L.**, Bouganis, C. S., & Bonato, V. (2018). Scaling up modulo scheduling for high-level synthesis. IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 38(5), 912-925. <https://ieeexplore.ieee.org/abstract/document/8355998>
- **de Souza Rosa, L.**, Dasu, A., C Diniz, P., & Bonato, V. (2018). A faddeev systolic array for ekf-slam and its arithmetic data representation impact on fpga. Journal of Signal Processing Systems, 90(3), 357-369. <https://link.springer.com/article/10.1007/s11265-017-1243-9>
- **Rosa, L. S.**, Delbem, A. C., Toledo, C. F. M., & Bonato, V. (2016). Design and analysis of evolutionary bit-length optimization algorithms for floating to fixed-point conversion. Applied Soft Computing, 49, 447-461. <https://www.sciencedirect.com/science/article/abs/pii/S156849461630429X>
- **Rosa, L. D. S.**, Toledo, C. F. M., & Bonato, V. (2015). Accelerating floating-point to fixed-point data type conversion with evolutionary algorithms. Electronics Letters, 51(3), 244-246. <https://ietresearch.onlinelibrary.wiley.com/doi/full/10.1049/el.2014.3791>
- **de Souza Rosa, L.**, & Bonato, V. (2013). A method to convert floating to fixed-point EKF-SLAM for embedded robotics. Journal of the Brazilian Computer Society, 19(2), 181-192. <https://link.springer.com/article/10.1007/s13173-012-0092-4>

Peer Reviewed Conferences

- **de Souza Rosa, L.**, Dinale, A., Bamford, S., Bartolozzi, C., & Glover, A. (2022, June). **High-Throughput Asynchronous Convolutions for High-Resolution Event-Cameras**. In 2022 8th International Conference on Event-Based Control, Communication, and Signal Processing (EBCCSP) (pp. 1-8). IEEE. <https://ieeexplore.ieee.org/abstract/document/9845500>
- **de Souza Rosa, L.**, Bonato, V., & Bouganis, C. S. (2018, December). Scaling up loop pipelining for high-level synthesis: A non-iterative approach. In 2018 International Conference on Field-Programmable Technology (FPT) (pp. 62-69). IEEE. <https://ieeexplore.ieee.org/abstract/document/8742308>

Peer Reviewed Books

- Celemin, C., Dattari, R. P., Chisari, E., Franzese, G., **de Souza Rosa, L.**, Prakash, R., Ajanović, Z., Ferraz, M., Valada, A., Kober J. (2022). Interactive Imitation Learning in Robotics: A Survey. **Accepted** by Journal Foundations and Trends® in Robotics. <https://www.nowpublishers.com/article/Details/ROB-072>

Ph.D. Dissertation

- **Rosa, L. D. S.** (2019). **Fast Code Exploration for Pipeline Processing in FPGA Accelerators** (Doctoral dissertation, Universidade de São Paulo). <https://www.teses.usp.br/teses/disponiveis/55/55134/tde-21082019-143417/en.php>

Symposia

- Costa, C. R., de Souza Rosa, L., & Bonato, V. (2018). *Integrando o MetaTrader5 com Aceleradores FPGA via OpenCL Named Pipes*. Anais.

Reviews

Journals

- (12) IEEE Transactions on Instrumentation and Measurement (TIM)
- (3) IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD-ICS)
- (2) IEEE Sensors Journal
- (1) Applied Soft Computing
- (1) International Journal of Embedded Systems
- (1) Microprocessors and Microsystems (MICRO)

Conferences

- (6) International Symposium on Applied Reconfigurable Computing (ARC)
- (1) International Conference on Field Programmable Logic and Applications (FPL)
- (1) Science China Information Sciences (SCIS)

Courses and Workshops

From 26 Nov. 2018 to 07 Dec. 2018

Course: Advanced Workshop on FPGA-based Systems-On-Chip for Scientific Instrumentation and Reconfigurable Computing

Institution: International Centre for Theoretical Physics (ICTP) | Trieste – Italy

Activities: Developing applications for Xilinx SoC, integrating ARM processors, FPGA logic and peripherals.

Programming Languages and Tools

- Hardware Description Languages: VHDL, Verilog, Bluespec, High-Level Synthesis C;
- Modeling and Simulation: Matlab;
- Frameworks for Robotics: YARP, ROS
- Programming: C++, C;
- Scripting: Makefile, CMake, Python, Javascript;
- Compiler Tools: LLVM infrastructure;
- High-Level Synthesis Tools: LegUP, Intel SDK for OpenCL, Vivado;
- Parallel Computing: OpenCL;
- Miscellaneous: Git, LaTeX, Unity,

Languages

- Portuguese – Native
- English – Fluent
- Italian – Fluent