LUCAS CARVALHO CORDEIRO

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CAREER SUMMARY

- **Core competency** in algorithms, software engineering, formal methods, automated program verification and synthesis, software testing, security, and embedded & cyber-physical systems.

- 167 **reviewed publications**, including 40 journal papers, 127 workshop/conference contributions, and 3 book chapters; h-index 27, **Best Paper Award** at SBESC'15 and SAC'08, **Distinguished Paper Award** at ICSE'11, **Most Influential Paper Award** at ASE'23, **Best Tool Paper Award** at SBSeg'23, and 46 **awards from the Intl. Competitions on Software Verification (SV-COMP) and Testing (Test-Comp)** at TACAS/FASE 2012-2024.

- **Director** of Business Engagement and Innovation in the Department of Computer Science at the University of Manchester, UK.

- **Director** of the ARM Centre of Excellence at the University of Manchester, UK.

- **Leader** of the Systems and Software Security Research Group at the University of Manchester, UK.

- **Leader** of the Software Security and Automated Reasoning theme in the Advanced Computer Science MSc program at the University of Manchester, UK.

- **Developer** of BMCLua, CBMC, DepthK, DSValidator, DSSynth, DSVerifier, ESBMC, ESBMC-GPU, ESBMC^{QtOM}, JBMC, Map2Check, STB225, and XMPM.

- Active **international research collaborations** with the University of Oxford (UK), University of Southampton (UK), University of Stellenbosch (South Africa), Federal University of Minas Gerais (Brazil), Federal University of Viçosa (Brazil), and Federal University of Roraima (Brazil).

- Proven track record of securing **research funding** from government agencies such as the British Council, CAPES, CNPq, EPSRC, FAPEAM, Royal Society, UKRI, and industrial funding from Intel, Motorola, Nokia Institute of Technology, and Samsung (**career total over USD13,104,745**).

- **Supervised** 5 PhD theses, 31 MSc dissertations, 30 final year projects, 6 scientific initiations, and 10 internships.

- **Affiliated** with the Formal Methods Group at the University of Manchester (UK) and the Postgraduate Program in Electrical Engineering (PPGEE) and Informatics (PPGI) at the Federal University of Amazonas (Brazil).

- URL of **Google Scholar** (https://scholar.google.com/citations?user=Lje1SFgAAAAJ&hl=en&oi=ao) and **DBLP** (http://dblp.uni-trier.de/pers/hd/c/Cordeiro:Lucas_C=) pages.

PROFESSIONAL EXPERIENCE

The University of Manchester   May 2018 - Present
Full Professor   *Kilburn Building University of Manchester, Oxford Rd, Manchester M13 9PL*

· Continue working on formal methods, automated verification, program synthesis, and security.
· Develop and deliver undergraduate and graduate modules on algorithms, formal methods, and security.
· Leader of the Software Security and Automated Reasoning theme in the Advanced Computer Science MSc program.
· Leader of the Systems and Software Security Research Group.[1]
· Leader of the Trusted Digital Systems Cluster at the Centre for Digital Trust and Society (from May/2018 to September/2022).

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[1] https://www.cs.manchester.ac.uk/research/expertise/systems-and-software-security/

- Director of Business Engagement and Innovation in the Department of Computer Science at the University of Manchester, UK.
- Director of the ARM Centre of Excellence.[2]
- Leader of a research team with four Research Assistants, seven Ph.D. students, six M.Sc. students, and six B.Sc. students.
- I co-lead the development of the UoM's application for an NCSC Certification of Master's Degrees Incorporating Cyber-Security for the MSc in ACS with Security Pathway. Together with a colleague, we guided and coordinated the efforts of over ten academics;
- I act as a mentor of the New Academic Programme (NAP) to support recently joint academics to develop their teaching and research skills;
- I served as an advisor to a Ph.D. cohort comprising roughly 50 students (September/2021-August/2024).
- Coordinator of public engagement to promote the Department of Computer Science in public events (May/2018-August/2023).
- Member of the EPSRC Peer Review Full College.

University of Oxford / Diffblue
Researcher / Research Engineer

July 2016 - April 2018
Wolfson Building, Parks Rd, Oxford OX13QD, UK

- Extended an existing abstract interpretation framework for simplifying and verifying (*goto*) programs.
- Developed tools to synthesize, verify, and validate digital control systems with uncertainties.
- Implemented features related to the CounterExample Guided Inductive Synthesis (CEGIS) framework.
- Extended the CProver framework to support exception handling and the Java standard libraries.
- Fixed issues in different components of the CProver framework (*e.g.*, coverage, slice).
- Assistance in the supervision of post-graduate students working on related projects.
- Participation in regular meetings with colleagues and industrial partners in Oxford.

Federal University of Amazonas
Assistant Professor

September 2009 - June 2016
Gen. Rodrigo Octávio, 6200, Coroado I, 69080-900, Manaus, Brazil

- Leader of the Systems and Software Verification Research Group.
- Continued work on ESBMC, which is an award-winning SMT-based context-bounded model checker for C programs.
- Continued work on program verification, developed approaches to verify C/C++ programs via mathematical induction, discrete-time systems (digital filters and controllers), and the Lua programming language.
- Developed and delivered undergraduate and graduate modules on algorithms, software verification, real-time systems, digital systems, and embedded systems.
- Course Leader of Electrical Engineering from 2011 to 2015, including the sub-areas of Electronics, Telecommunications, and Electric Power Systems.
- Leader of a research team with three Ph.D. students, two M.Sc. students, and two B.Sc. students.
- Secured competed research funding from Samsung, Nokia Institute of Technology, CNPq, FAPEAM, British Council, and Royal Society.

R&D Center for the Industrial Pole of Manaus (CT-PIM)
Set-top Box Software Engineer

March 2007 - September 2008
R. Salvador, 391, Adrianópolis, 69057-040, Manaus, Brazil

- Development of the Linux drivers for the ISDB-T (Brazilian market) tuner and DVB-T (European market) tuner and demodulator silicon chips.
- Port of an ATSC-T (US market) tuner driver to a digital TV platform (Set-top Box).
- Development and integration of the DVB-S2 tuner used in satellite applications into the Linux user space.
- Port of an IPTV middleware, development of software applications, and a Video on Demand portal for the Set-top Boxes of NXP.

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[2] https://www.cs.manchester.ac.uk/arm-coe/

- Conception and implementation of automated unit and functional tests for the Linux device drivers via unit test framework tools and shell scripts (test automation).
- Coach customers to develop/customize software applications in digital TV platforms.
- Involved in several activities related to IP Set-top Box development at NXP semiconductors from San Jose (USA) and Southampton (England).

BenQ-Siemens Eletroeletrônica S.A
Software Engineer

January 2005 - March 2007

R. Jutaí, 661 - Distrito Industrial, Manaus, 69075-130, Brazil

- Requirements definition, project planning, and tracking focused on features of the linuX Mobile Phone Manager (XMPM). The features under coordination included GPRS, help system, connectivity, software installation, phone settings, localization, and internationalization.
- Responsible for following-up progress and status of the features developed by different partners (deliverables, integration status, test status, defects, and change requests) and reporting status to the project leader.
- Configuration management planning, change management, version and release management, build management, and bug tracking process of the linuX Mobile Phone Manager (XMPM) project for generations 75 and 85 of Siemens Mobile Phones.

Institut fuer Automatisierungs- und Softwaretechnik
Trainee

September 2003 - March 2004

Pfaffenwaldring 47, 70550 Stuttgart, Germany

- Microcontroller programming, development, and implementation of interface circuits for hardware transducers.
- Integration of a real-time operating system (uCOS-II) and a bluetooth based communication into the microcontroller M16C from Renesas.
- Design and modeling of electronic circuits with the Eagle tool.

CONSULTANCY

Technology Innovation Institute (TII)
Consultant/Advisor

October 2022 - June 2023

Masdar City, Abu Dhabi, UAE

- Serve as a consultant of the Digital Security Unit.
- Act as an advisor in the Digital Security Unit research programs.
- Contribute to the building and refinement of the strategy and road map of the Digital Security Unit.
- Advise the Digital Security Unit towards meeting KPIs that contribute to the research center's success by increasing the number of research papers, patents, key project deliverables with demonstrable output, and university collaborations.

EDUCATION

University of Southampton
May 2011

Ph.D. in Computer Science.
Thesis title: *SMT-Based Bounded Model Checking of Multi-threaded Software in Embedded Systems*.
Supervisor: Prof. Dr. Bernd Fischer.
Scholarship holder of ORSAS/ECS.

Federal University of Amazonas
October 2007

M.Sc. in Informatics.
Dissertation title: *An Agile HW/SW Development Methodology for Embedded Systems*.
Supervisor: Prof. Dr. Raimundo S. Barreto.

Federal University of Amazonas
December 2004

B.Sc. in Electrical Engineering.
Project title: *Developing Real-Time Applications with LEGO Mindstorms*.
Scholarship holder of CAPES/DAAD from 03/2003 to 03/2004 to attend the MSc course on Information Technology

classes at the University of Stuttgart (Germany).
Overall GPA: 8.313

RESEARCH GRANTS

My research primarily addresses the challenge of enhancing the security/safety of both software and AI systems. I am actively involved in conceiving, building, and assessing automated formal reasoning systems designed to fortify these systems against potential security vulnerabilities in an ever-evolving digital landscape. My objective is to provide developers/engineers with improved tools that empower them to create software and AI systems that are safe and secure in today's interconnected digital world.

1. "*AI Trust in Complex Software: Requirements, Understanding, and Certification*", BAE Systems, 2024-2025, GBP 300,000 (or USD 380,000) in collaboration with Dr. Youcheng Sun, Prof. Caroline Jay, and Dr. Suzanne Embury from the University of Manchester, UK **(Co-Investigator & WP leader)**.

2. "*Source Code Security with FuSeBMC-AI*", Cyber security academic startup accelerator programme 2024-25: phase 2, Innovate UK, 2024-2025, GBP 60,000 (or USD 75,000) in collaboration with Prof. Richard Allmendinger from the University of Manchester, UK **(Co-Investigator & WP leader)**.

3. "*Source Code Security with FuSeBMC-AI*", Cyber security academic startup accelerator programme 2024-25: phase 1, Innovate UK, 2024, GBP 31,500 (or USD 40,200) in collaboration with Prof. Richard Allmendinger from the University of Manchester, UK **(Co-Investigator & WP leader)**.

4. "*SECCOM: Securing composable hardware platforms*", DSTL (Defence Science & Technology Laboratory), Engineering & Physical Sciences Research Council (EPSRC), 2023-2026, GBP 1,031,720 (or USD 1,313,271) in collaboration with Prof. John Goodacre and Dr. Bernardo Magri from the University of Manchester, UK **(Co-Investigator & WP leader)**.

5. "*SWPERFI: Artificial Intelligence Techniques for Software Performance Analysis and Optimization*, Motorola Mobility, 2023-2025, BRL 4,492,346 (or USD 912,299) in collaboration with Dr. Rosiane de Freitas, Dr. Raimundo Barreto, and Dr. Vandermi Silva from the Federal University of Amazonas, Brazil, **(Co-Investigator & WP leader)**.

6. "*AICodeRepair: Towards Self-Healing AI Code with Large Language Models and Formal Verification*, GCHQ Government Communications Headquarters, 2023-2024, GBP 75,380 (or USD 93,156) in collaboration with Dr. Mustafa O. Mustafa **(Principal Investigator)**.

7. "*Bounded Model Checking for Verifying and Testing Ethereum Consensus Specifications*", Ethereum Foundation, 2023-2024, USD 114,680 in collaboration with Dr. Youcheng Sun from the University of Manchester, UK **(Co-Investigator & WP leader)**.

8. "*Using Artificial Intelligence/Machine Learning to assess source code in Escrow*", UKRI Impact Acceleration Account, 2023-2024, GBP 86,339 (or USD 104,702) **(Principal Investigator)**.

9. "*Develop and Evaluate a Model Checker Based Code Analysis Framework for Smart Contracts*, LatticeX Foundation Ltd, 2022-2026, GBP 70,000 (or USD 86,560) **(Principal Investigator)**.

10. "*Soteria - Demonstrating the Security Capabilities of the Morello System in the ecommerce Vertical Industrial Segment*" over the call for "ISCF digital security by design: technology enabled business-led demonstrator", 2021-2024, GBP 2,647,375.00 (or USD 3,603,355) in collaboration with Prof. Mikel Lujan, Dr. Konstantin Korovin, Dr. Giles Reger, Dr. Christos Kotselidis, Dr. Elvira Uyarra, Dr. Richard Allmendinger, and Dr. Pierre Olivier from the University of Manchester (UK) **(Co-Investigator)**.

11. "*ELEGANT: sEcure and seamLess EdGe-to-cloud ANalyTics*", EU over the call for " Software Technologies", 2021-2023, EU 586,500 (or USD 687,084) in collaboration with Dr. Christos Kotselidis from University of Manchester (UK) **(Co-Investigator)**.

12. "*EnnCore: End-to-End Conceptual Guarding of Neural Architectures*", EPSRC over the call for "Security for all in an AI-enabled society", 2021-2024, GBP 2,151,950 (or USD 2,660,817) in collaboration with Prof. Gavin Brown,

Prof. Mikel Lujan, Dr. Mustafa Mustafa, Dr. Andre Freitas from University of Manchester (UK) and Dr. Xiaowei Huang from University of Liverpool (UK) **(Principal Investigator)**.

13. "*SCorCH: Secure Code for Capability Hardware*", EPSRC over the call for "ISCF Digital Security by Design", 2020-2023, GBP 1,300,000 (or USD 1,627,593) in collaboration with Dr. Konstantin Korovin, Dr. Mustafa Mustafa, Dr. Olivier Pierre, and Dr. Giles Reger from University of Manchester (UK) and Prof. Daniel Kroening from University of Oxford (UK) **(Co-Investigator & WP leader)**.

14. "*Formal Verification of Firmware*", Intel Corporation, 2021-2024, GBP 66,000.00 (or USD 89,292) **(Principal Investigator)**.

15. "*ARM Centre of Excellence at the University of Manchester*", Arm Ltd. 2017-2021, GBP 250,000 (or USD 335,712) in collaboration with Prof. Gavin Brown, Prof. Mikel Lujan, Dr. David Jackson **(Principal Investigator)**.

16. "*Developing Critical Mass in Cybersecurity*", UK Research and Innovation – Early Career Researchers, 2018-2020, GBP 65,108 (or USD 83,481) in collaboration with Dr. Giles Reger from University of Manchester (UK) **(Principal Investigator)**.

17. "*Counterexample-Guided Optimization Applied to the Daily Schedule of the Electrical Power Systems using Satisfiability Modulo Theories*", National Centre for Scientific and Technological Development, 2018-2021, BRL60,000 (or USD15,114) in collaboration with Prof. Erlon Finardi from Federal University of Santa Catarina (Brazil) **(Principal Investigator)**.

18. "*Investigation and Development of Verification Algorithms of Embedded Software in Unmanned Aerial Vehicles using Machine Learning*, Amazonas State Research Funding Agency, 2017–2018, BRL 87,400 (or USD 22,812) in collaboration with Prof. João Edgar Chaves Filho from Federal University of Amazonas (Brazil) **(Co-Investigator & WP leader)**.

19. "*Support for Scientific Production of the Research Group on Software and Systems Verification*", Amazonas State Research Funding Agency, 2017–2018, BRL16,992 (or USD 5,168) **(Principal Investigator)**.

20. "*DSVerifier: A Bounded Model Checking Tool to Verify Digital Systems with Uncertainties*", EPSRC Impact Acceleration Account, 2016-2017, GBP 8,462 (or USD 11,141) in collaboration with Prof. Daniel Kroening from University of Oxford (UK) **(Co-Investigator & WP leader)**.

21. "*Verification of C/C++ Programs Based on Multi-Core Processors*", Nokia Institute of Technology, 2014-2016, BRL451,231 (or USD171,594) **(Principal Investigator)**.

22. "*Hardware and Software Verification Based on Mathematical Induction for Embedded Systems*", Amazonas State Research Funding Agency, 2014-2016, BRL249,853 (or USD95,014) **(Principal Investigator)**.

23. "*SMT-based Bounded Model Checking of Multi-threaded Programs*", British Council, 2014-2015, GBP3,000 (or USD4,554) **(Principal Investigator)**.

24. "*Continuous Verification of C++ Programs Using SMT-based Bounded Model Checking*", Nokia Institute of Technology, 2011-13, BRL287,631 (or USD109,380) **(Principal Investigator)**.

25. "*SMT-Based Bounded Model Checking Timed LTL Properties for Embedded Software*", Royal Society International Exchange Grant, 2011-13. GBP11,600 (or USD17,609) in collaboration with Prof. Bernd Fischer from University of Southampton (UK) **(Co-Investigator)**.

26. "*Verification of Temporal Properties in Embedded Software using Satisfiability Modulo Theories*", National Centre for Scientific and Technological Development, 2013-2016, BRL14,000 (or USD5,324) **(Principal Investigator)**.

27. "*Research and training of human resources, at undergraduate and graduate courses, in the areas of industrial automation, software development for mobile devices, and digital TV*"; Samsung / Institute of Development in Informatics, 2013-2016, BRL7,190,550 (or USD2,734,414) in collaboration with Dr. Cícero Costa, Dr. Marly Costa, Dr. João Chaves Filho, Dr. Vicente Lucena Jr., Dr. Andre Cavalcante, and Dr. Waldir Sabino Jr. from Federal University of Amazonas (Brazil) **(Co-Investigator)**.

PUBLICATIONS - JOURNAL ARTICLES

1* Matos Jr, J. B. P., de Lima Filho, E. B., Bessa, I., Manino, E., Song, X., **Cordeiro, L. C.** "Counterexample Guided Neural Network Quantization Refinement". In *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, v. 43(4), pp. 1121–1134, 2024.

2 Dantas, V., da Silva Jr., W., **Cordeiro, L. C.**, Carvalho, C.: "A comprehensive review of model compression techniques in machine learning". In *Appl. Intell.*, v.54(22), pp. 11804–11844, 2024.

3 Alshmrany, K., Aldughaim, M., Bhayat, A., **Cordeiro, L. C.**: "FuSeBMC v4: Improving Code Coverage with Smart Seeds via BMC, Fuzzing and Static Analysis". In Formal Aspects Comput., v.36(2), 2024.

4 Ferrag, M., Ndhlovu, M., Tihanyi, N.,**Cordeiro, L. C.**, Debbah, M., Lestable, T., Thandi, N.: "Revolutionizing Cyber Threat Detection With Large Language Models: A Privacy-Preserving BERT-Based Lightweight Model for IoT/IIoT Devices". In *IEEE Access*, v.12, pp. 23733–23750, 2024.

5 Ferrag, M. A., Friha, O., Kantarci, B., Tihanyi, N., **Cordeiro, L. C.**, Debbah, M., Hamouda, D., Al-Hawawreh, M., Choo, K-K. R. "Edge Learning for 6G-enabled Internet of Things: A Comprehensive Survey of Vulnerabilities, Datasets, and Defenses". In *IEEE Communications Surveys and Tutorials*, v.25(4), pp. 2654–2713, 2023.

6 Manino, E., Bessa, I., **Cordeiro, L. C.** "Towards Global Neural Network Abstractions with Locally-exact Reconstruction". In *Neural Networks*, v. 165, p. 344–357, 2023.

7 Izumi, F., Filho, E., **Cordeiro, L.C.**, Maia, O., Fabricio, R., Farias, B., Silva, A. "A Fuzzing-Based Test-Creation Approach for Evaluating Digital TV Receivers via Transport Streams". In *Software Testing, Verification and Reliability*, v33(1), pp. 1–30, 2023.

8 Cavalcante, T., Bessa, I., Lima Filho, E., **Cordeiro, L. C.**, "Formal Synthesis of Non-fragile State-Feedback Digital Controllers Considering Performance Requirements for Step Response". In *Scientific Reports*, **12**, 15429 (2022).

*9 Monteiro, F., Gadelha, M., **Cordeiro, L. C.**, "Model Checking C++ Programs". In *Software Testing, Verification and Reliability*, v32(1), pp. 1–30, 2022.

10 Aljaafari, F., Menezes, R., Manino, E., Shmarov, F., Mustafa, M., **Cordeiro, L.**, "Combining BMC and Fuzzing Techniques for Finding Software Vulnerabilities in Concurrent Programs". *IEEE Access*, v. 10, pp. 121365–121384, 2022.

11 Gadelha, M., Menezes, R., **Cordeiro, L. C.** "ESBMC 6.1: Automated Test Case Generation using Bounded Model Checking". In *International Journal on Software Tools for Technology Transfer*, v.23(6), pp. 857–861, 2021.

12 Alhawi, O., Rocha, H., Gadelha, M., **Cordeiro, L. C.**, Batista, E., "Verification and Refutation of C Programs based on *k*-Induction and Invariant Inference". In *International Journal on Software Tools for Technology Transfer*, v.23(2), pp. 115–135, 2021.

13 de Olveira, R., Guimaraes, F., de Lucena, M., **Cordeiro, L. C.**, de Lima Filho, E., de Lucena Jr., V., "Hardware Update through Digital TV Signals". In *Electronics*, v.10(24), pp. 1-20, 2021.

14 Cavalcante, A., Bessa, I., de Lima Filho, E. **Cordeiro, L. C.**, "Formal Non-fragile Verification of Step Response Requirements for Digital State-Feedback Control Systems". In *Journal of Control, Automation and Electrical Systems*, v.31(3), pp. 1-21, 2020.

*15 Abate, A., Bessa, I., **Cordeiro, L.**, David, C., Kesseli, P., Kroening, D., Polgreen, E., "Automated Formal Synthesis of Provably Safe Digital Controllers for Continuous Plants". In *Acta Informatica*, v.57(1), pp. 223–244, 2020.

16 **Cordeiro, L. C.**, De Lima Filho, E. B., Bessa, I. V., "A Survey on Automated Symbolic Verification and its Application for Synthesizing Cyber-Physical Systems". In *IET Cyber-Physical Systems: Theory and Applications*, v.5(1), pp. 1–24, 2020.

17 Trindade, A. and **Cordeiro, L. C.**, "Automated Formal Verification of Stand-alone Solar Photovoltaic Systems". In *Solar Energy*, v.193, pp. 684-691, 2019.

*18 Chaves, L. C., Ismail, H. I., Bessa, I. V., **Cordeiro, L. C.**, De Lima Filho, E. B., "Verifying Fragility in Digital Systems with Uncertainties using DSVerifier v2.0". In *Journal of Systems and Software*, v.153, pp. 22-43, 2019.

*19 Chaves, L., Bessa, I., Ismail, H., Frutuoso, A., **Cordeiro, L. C.**, de Lima Filho, E. B., "DSVerifier-Aided Verification Applied to Attitude Control Software in Unmanned Aerial Vehicles". In *IEEE Trans. Reliability*, v.67(4), pp. 1420–1441, 2018.

20 Farias, A. O., Queiroz, G. A. C., Bessa, I. V., Medeiro, R. L. P., **Cordeiro, L. C.**, Palhares, R. M., "Sim3Tanks: A Benchmark Model Simulator for Process Control and Monitoring". In *IEEE Access*, v.6, pp. 62234–62254, 2018.

21 Araújo, R., Ribeiro, A., Bessa, I. V., **Cordeiro, L. C.**, Chaves Filho, J. E., "Counterexample Guided Inductive Optimization based on Satisfiability Modulo Theories". In *Science of Computer Programming*, v.165, pp. 3–23, 2018.

22 **Cordeiro, L. C.**, Kroening, D., Schrammel P., "Benchmarking of Java Verification Tools at the Software Verification Competition (SV-COMP)," In *Software Engineering Notes*, v.43(4), pp. 1–5, ACM, 2018.

23 Monteiro, F. R., Alves, E. H., Silva, I., Ismail, H. I., **Cordeiro, L. C.**, de Lima Filho, E. B., "ESBMC-GPU: A Context-Bounded Model Checking Tool to Verify CUDA Programs". In *Science of Computer Programming*, v.152, pp. 63–69, 2018.

24 Trindade, A. B., Degelo, R. F., dos Santos, E. G., Ismail, H. I., da Silva, H. C., **Cordeiro, L. C.**, "Multi-Core Model Checking and Maximum Satisfiability Applied to Hardware-Software Partitioning". In *International Journal of Embedded Systems*, v.9(6), pp. 570-582, 2017.

*25 Pereira, P., Albuquerque, H., Silva, I., Marques, H., Rodrigues, F., Ferreira, R. S., **Cordeiro, L. C.**, "SMT-Based Context-Bounded Model Checking for CUDA Programs". In *Concurrency and Computation: Practice and Experience*, v.29(22), pp. 1-20, 2017.

26 Lucena Filho, W. C., **Cordeiro, L. C.**, Silva Junior, W. S., Carvalho, C. B., "A Power Control and Anticolision Mechanism for RFID Systems". In *IEEE Latin America Transactions*, v. 15(10), pp. 1933-1940, 2017.

*27 Alves, E. H. S., **Cordeiro, L. C.**, Lima Filho, E. B., "A Method to Localize Faults in Concurrent C Programs". In *Journal of Systems and Software*, v.132, pp. 336–352, 2017.

*28 Sousa, F. R. M., Garcia, M. A. P., **Cordeiro, L. C.**, Lima Filho, E. B., "Bounded Model Checking of C++ Programs based on the Qt Cross-Platform Framework". In *Software Testing, Verification and Reliability*, v.27(3), pp. 1–24, 2017.

29 Bessa, I. V., Ismail, H. I., Palhares, R., **Cordeiro, L. C.**, Chaves Filho, J. E., "Formal Non-Fragile Stability Verification of Digital Control Systems with Uncertainty". In *IEEE Transactions on Computers*, v.66(3), pp. 545–552, 2017.

30 Sousa, F. R., Januario, F. A., **Cordeiro, L. C.**, Lima Filho, E. B., "BMCLua: A Translator for Model Checking Lua Programs". In *Software Engineering Notes*, v.42(3), pp. 1–11, 2017.

*31 Gadelha, M. Y. R., Ismail, H. I., **Cordeiro, L. C.**, "Handling Loops in Bounded Model Checking of C Programs via k-Induction". In *International Journal on Software Tools for Technology Transfer*, v.19(1), pp. 97–114, 2017.

32 Abreu, R. B., Gadelha, M. Y. R., **Cordeiro, L. C.**, Lima Filho, E. B., Silva Jr., W. S., "Bounded Model Checking for Fixed-Point Digital Filters". In *Journal of the Brazilian Computer Society*, v.22(1), pp. 1–20, SBC, 2016.

33 Bessa, I. V., Ismail, H. I., **Cordeiro, L. C.**, Chaves Filho, J. E., "Verification of Fixed-point Digital Controllers using Direct and Delta Forms Realizations". In *Design Automation for Embedded Systems*, v.20(2), pp. 95–126, 2016.

34 Trindade, A., **Cordeiro, L. C.**, "Applying SMT-based Verification to Hardware/Software Partitioning in Embedded Systems". In *Design Automation for Embedded Systems*, v.20(1), pp. 1–19, 2016.

*35 Morse, J., **Cordeiro, L. C.**, Nicole, D., Fischer, B. "Model Checking LTL Properties over C Programs with Bounded Traces". In *Journal of Software and Systems Modeling, Springer*, v.14(1), pp. 65–81, 2015.

36 Morse, J., **Cordeiro, L. C.**, Nicole, D., Fischer, B., "Applying Symbolic Bounded Model Checking to the 2012 RERS Greybox Challenge". In *Intl. Journal on Software Tools for Technology Transfer* (Print), v.16(5), pp. 519–529, 2014.

37 Rosa, R., Lucena Jr., V., **Cordeiro, L. C.**, Chaves Filho, J., "Dynamic and Automated Product Derivation for Consumer Electronics Software Applications". In *IEEE Transactions on Consumer Electronics*, v.59(4), pp. 883–891, 2013.

*38 **Cordeiro, L. C.**, Fischer, B., and Marques-Silva, J. P. "SMT-Based Bounded Model Checking for Embedded ANSI-C Software". In *IEEE Transactions on Software Engineering*, v.38(4), pp. 957–974, 2012.

39 Freitas, M., Valenzuela, V., Gadelha, M., Silva Junior, W., **Cordeiro, L. C.**, and Lucena Junior, V. "A Distributed Extension of the Hybrid PRS System using Video Processing to Command a Robot via Bluetooth". In *Intl. Journal of Computer Science and Network Security*, v.12, pp. 29–35, 2012.

40 **Cordeiro, L. C.**, Melo Junior, A., Paz Jr. D., Paz, E., Souza F., Alkmin J., Aragão, A., and Campelo, N. "Mapas de Isorresistividades Elétricas Aparentes do Solo Superficial da Cidade de Manaus". In *Revista Brasileira de Geociências*, 2004.

PUBLICATIONS - CONFERENCE CONTRIBUTIONS

1. Pirzada, M., Reger, G., Bhayat, A., **Cordeiro, L. C.** "LLM-Generated Invariants for Bounded Model Checking Without Loop Unrolling". In 39th IEEE/ACM International Conference on Automated Software Engineering (ASE), pp. 1395–1407, 2024. **ACM SIGSOFT Distinguished Paper Award**.

2. Farias, B., Menezes, R., de Lima Filho, E., Sun, Y., **Cordeiro, L. C.**: "ESBMC-Python: A Bounded Model Checker for Python Programs". In 33rd ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), pp. 1836–1840, 2024.

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99. **Cordeiro, L. C.** and Fischer, B., "Verifying Multi-threaded Software using SMT-based Context-Bounded Model Checking". In *Proc. ACM/IEEE 33rd International Conference on Software Engineering (ICSE)*, v. 1, pp. 331-340, 2011. **ACM SIGSOFT Distinguished Paper Award**.

100. **Cordeiro, L. C.**, Fischer, B., and Marques-Silva, J., "Continuous Verification of Large Embedded Software using SMT-Based Bounded Model Checking". In *Proc. 17th IEEE Intl. Conf. and Workshops on Engineering of Computer-Based Systems, (ECBS)*, pp. 160-169, 2010.

101. **Cordeiro, L. C.**, "SMT-Based Bounded Model Checking for Multi-threaded Software in Embedded Systems". In *Proc. ACM/IEEE 32nd International Conference on Software Engineering (ICSE), Doctoral Symposium*, v.2., pp. 373-376, 2010.

102. **Cordeiro, L. C.**, Fischer, B., Chen, H., and Marques-Silva, J., "Semiformal Verification of Embedded Software in Medical Devices Considering Stringent Hardware Constraints". In *Proc. 6th IEEE Intl. Conf. on Embedded Software and Systems (ICESS)*, pp. 396-403, 2009.

103. **Cordeiro, L. C.**, Fischer, B., and Marques-Silva, J., "SMT-Based Bounded Model Checking for Embedded ANSI-C Software". In *Proc. 24th IEEE/ACM Intl. Conf. on Automated Software Engineering (ASE)*, pp. 137-148, 2009.

104. **Cordeiro, L. C.**, Mar, C., Valentin, E., Cruz, F., Patrick, D., Barreto, R. S., and Lucena Junior, V., "A Platform-Based Software Design Methodology for Embedded Control Systems: An Agile Toolkit". In *Proc. 15th IEEE Intl.*

Conf. and Workshops on the Engineering of Computer Based Systems (ECBS), pp. 408-417, 2008.

105. Cruz, F., Barreto, R., Cordeiro, L., and Maciel, P. "ezRealtime: A Domain-Specific Modeling Tool for Embedded Hard Real-Time Software Synthesis". *In Proc. Design, Automation and Test in Europe (DATE)*, pp. 1510-1515, 2008.

106. Teófilo, M., Cordeiro, L., Barreto, R., and Pereira, J. "Mandos: A User Interaction Method in Embedded Applications for Mobile Telephony". In *Proc. 1st IEEE International Conference on Advances in Computer-Human Interaction (ACHI)*, pp. 271-276, 2008.

107. Cruz, F., Barreto, R., **Cordeiro, L. C.**, and Maciel, P., "Towards a Model-Driven Engineering Approach for Developing Embedded Hard Real-Time Software". In *Proc. 23rd ACM Symposium on Applied Computing (SAC)*, pp. 308-314, 2008. **ACM SIGAPP Best Paper Award**.

108. **Cordeiro, L. C.**, Barreto, R., and Oliveira, M., "Towards a Semiformal Development Methodology for Embedded Systems". In *Proc. 3rd Intl. Conf. on Evaluation of Novel Approaches to Software Engineering (ENASE)*, pp. 5-12, 2008.

109. **Cordeiro, L. C.**, Barreto, R., Barcelos, R., Oliveira, M., Lucena Junior, V., and Maciel, P., "Agile Development Methodology for Embedded Systems: A Platform-Based Desing Approach". *In Proc. 14th IEEE Intl. Conf. and Workshop on the Engineering of Computer Based Systems (ECBS)*, pp.195-202, 2007.

110. **Cordeiro, L. C.**, Becker, C., and Barreto, R., "Applying Scrum and Organizational Patterns to Multi Site Software Development". In *Proc. 6th Latin American Conference on Pattern Languages of Programming (SugarLoafPlop)*, pp. 46-67, 2007.

111. **Cordeiro, L. C.** and Louzado, D. "Aplicando Padrões de Gerência de Configuração de Software em Projetos Geograficamente Distribuídos". In *Proc. 5th Latin American Conference on Pattern Languages of Programming (SugarLoafPlop)*, pp. 207-221, 2005.

112. Alkmin J., de Melo Junior, A., da Paz, E., Campelo, N., Souza, F., **Cordeiro, L. C.**, Carvalho, J., and Aragão, A. "Comparação entre mapas de isorresistividades elétricas aparentes do solo superficial de Manaus, a partir de séries de dados completos e estatísticos". In *1st Regional Symposium of Brazilian Geophysical Society*, 2004.

113. Alkmin J., de Melo Junior, A., da Paz, E., Campelo, N., Souza, F., **Cordeiro, L. C.**, Carvalho, J., and Aragão, A. "Malhas de Aterramento do Sistema Elétrico da Manaus Energia: um Estudo de Caso". In *Second Conf. on Technological Innovation in Energy*, 2003.

PUBLICATIONS - REVIEWED SHORT-PAPER CONTRIBUTIONS

1. Izumi, F., De lima filho, E. B., **Cordeiro, L. C.**, Maia, O., Fabrício, R., Farias, B., Silva, A.: "A fuzzing?based test?creation approach for evaluating digital TV receivers via transport streams". In *17th IEEE International Conference on Software Testing, Verification and Validation*, pp. 1, 2024.

2. Gervasoni, N., Lubinets, M., Jain, R., **Cordeiro, L. C.**, "MISOFuzz: A Modular Infrastructure for Scalable Fuzzing Orchestration". In: *4th Workshop on Cooperative Software Verification* (COOP), pp. 1–2, 2023.

3. Oliveira S., Conceicao, A., Lima Filho, E., **Cordeiro, L. C.**, "Evaluation of Ginga's CC-Web-Service Module". In *IEEE International Conference on Consumer Electronics* (ICCE-TW), pp. 1–2, 2023.

4. Monteiro, F. R., Garcia, M. A. P., **Cordeiro, L. C.**, De Lima Filho, de Lima Filho, E. B., "Bounded model checking of C++ programs based on the Qt cross-platform framework (journal-first abstract)," In *33rd ACM/IEEE International Conference on Automated Software Engineering* (ASE) p. 954, 2018.

5. Abate, A., Bessa, I., Cattaruzza, D., **Cordeiro, L. C.**, Cristina, D., Kesseli, P., Kroening, D., Polgreen, E., "Safe, Automated and Formal Synthesis of Digital Controllers for Continuous Plants," In *7th Workshop on Synthesis*, SYNT'18, pp. 1, 2018.

6. Gadelha, M. Y. R., Morse, J., **Cordeiro, L. C.**, Nicole, D., "Using clang as a Frontend on a Formal Verification Tool". In *European LLVM Developers Meeting* (EuroLLVM), pp. 1, 2018.

7. Souza, A. S., **Cordeiro, L. C.**, Januário, F. A. P. "Verificação de Programas Multi-Threads Baseados no Framework Multiplataforma Qt". In *IV Regional Meeting of Engineering* (ENCOENG), pp. 131–140, 2016.

8. **Cordeiro, L. C.** and Lima Filho, E. B., "SMT-Based Context-Bounded Model Checking for Embedded Systems: Challenges and Future Trends". In *Software Engineering Notes*, v.41(3), pp. 1–6, ACM, 2016.

9. Rodrigues, F. S., **Cordeiro, L. C.**, Lima Filho, E. B., "Verificação de Programas C++ Baseados no Framework Multiplataforma Qt". In *IV Regional Meeting of Computer and Information Systems* (ENCOSIS), pp. 181–190, 2015.

10. Lima, M. S., Silva, E. S., **Cordeiro, L. C.**, "Verificação de Modelos Aplicada aos Filtros Espaciais em Processamento Digital de Imagens". In *IV Regional Meeting of Computer and Information Systems* (ENCOSIS), pp. 136–145, 2015.

11. Rocha, H., **Cordeiro, L. C.**, Barreto, R., and Netto, J., "Exploiting Safety Properties in Bounded Model Checking for Test Cases Generation of C Programs". *In Proc. 4th Brazilian Workshop on Systematic and Automated Software Testing (SAST)*, pp.121-130, 2010.

12. **Cordeiro, L. C.** and Fischer, B., "Bounded Model Checking of Multi-threaded Software using SMT solvers". *In 8th Intl. Workshop on Satisfiability Modulo Theories (SMT)*, 2010.

13. **Cordeiro, L. C.**, Mar, C., Valentin, E., Cruz, F., Patrick, D., Barreto, R., and Lucena Junior, V. "An Agile Development Methodology Applied to Embedded Control Software under Stringent Hardware Constraints". In *Software Engineering Notes*, ACM, v.33, pp. 24, 2008.

14. **Cordeiro, L. C.**, Barreto, R., Barcelos, R., Oliveira, M., Lucena Junior, V., and Maciel, P. "TXM: An Agile HW/SW Development Methodology for Building Medical Devices". In *Software Engineering Notes*, ACM, v.32, pp. 28, 2007.

PUBLICATIONS - BOOK CHAPTERS

1. Brenguier, R., **Cordeiro, L. C.**, Kroening, D., Schrammel, P.: "JBMC: A Bounded Model Checking Tool for Java Bytecode". In: Automatic Software Verification (SV-COMP Book), Springer, 2023 (to appear).

2. Gadelha, M., Monteiro, F., **Cordeiro, L. C.**, Nicole, D., and Fischer, B. "ESBMC: An Efficient SMT-based Software Model Checker". In: Automatic Software Verification (SV-COMP Book), Springer, 2023 (to appear).

3. Rocha, H. O., Ismail, H. I., **Cordeiro, L. C.**, Barreto, R. S. "Model Checking Embedded C Software Using *k*-Induction and Invariants". In: *Embedded Software Verification and Debugging*, Markus Winterholer; Djones Lettnin. (Org.), 1ed., v. 1, pp. 159–182, Springer, 2017.
DOI:10.1007/978-1-4614-2266-2_7

TEACHING

I created and organized course materials, including slides, directed reading materials, quizzes, instructional videos, and formative/summative assessments, and successfully delivered the following courses face-to-face or remotely.

Undergraduate level

· *Algorithms and Data Structures*, University of Manchester, UK, since 2020 (300+ students).
· *First-Year Tutorial*, University of Manchester, UK, since 2020 (6+ students).
· *Second-Year Tutorial*, University of Manchester, UK, since 2020 (6+ students).
· *Algorithms and Imperative Programming*, University of Manchester, UK, from 2018 to 2019 (280+ students).
· *Computer Organization and Design*, Federal University of Amazonas, Brazil, from 2013 to 2015 (30+ students).
· *Advanced Programming*, Federal University of Amazonas, Brazil, 2011, 2013 (15+ students).
· *Real-Time Programming*, Federal University of Amazonas, Brazil, from 2011 to 2015 (30+ students).
· *Computer Networks*, Federal University of Amazonas, Brazil, 2009 (20+ students).
· *C++ Programming*, Federal University of Amazonas, Brazil, 2008 (20+ students).

· *Introduction to Algorithms*, Federal University of Amazonas, Brazil, 2007 (50+ students).

Graduate level

· *Software Security*, University of Manchester, UK, since 2020 (40+ students).
· *Verification of Software and Systems*, Federal University of Amazonas, Brazil, since 2021 (10+ students).
· *Real-Time Systems*, Federal University of Amazonas, Brazil, since 2021 (10+ students).
· *Verification of Software and Systems*, Federal University of Amazonas, Brazil, from 2014 to 2016 (15+ students).
· *Algorithms for Automation and Systems*, Federal University of Amazonas, Brazil, from 2013 to 2015 (30+ students).
· *Real-Time Systems*, Federal University of Amazonas, Brazil, from 2011 to 2013 (10+ students).
· *Design and Analysis of Algorithms*, Federal University of Amazonas, Brazil, 2011 (20+ students).
· *Embedded Systems and Linux for Digital TV*, Baptist Superior College of Amazonas, Brazil, 2008 (10+ students).

SUPERVISIONS

Ph.D. Students (current)

1 Fatima Abacha (2023-2026). *Secure Sharing of Dynamic Data via Privacy-Preserving Distributed Learning Framework* (co-supervisor).

2 Taohong Zhu (2023-2026). *Software Testing with Large Language Models (LLMs)* (co-supervisor).

3 Tong Wu (2022-2025). *Hybrid Fuzzing Concurrent Software using Model Checking and Machine Learning* (main supervisor).

4 Rafael Menezes (2021-2024). *Formal Verification of Firmware* (main supervisor).

5 Kunjian Song (2021-2024). *Formal Verification of CHERI-C++ Programs* (main supervisor).

6 Mohannad Aldughaim (2020-2023). *Bounded Model Checking of Software Using Interval Methods via Contractors* (main supervisor).

7 6. Kamil Erdayandi (2020-2024). *A Privacy-Preserving and Accountable Billing Protocol for Peer-to-Peer Energy Trading Markets* (co-supervisor).

8 Xidan Song (2020-2023). *Architectures for Symbolic Bounded Model Checking of Software using Multi-core Processors and Clusters* (co-supervisor).

9 Erickson Alves (2019-2023). *Verifying Implementations of Neural Networks using Fixed- and Floating-Point Arithmetic* (main supervisor).

10 João Matos Júnior (2019-2023). *Black-box Differential Approach for Adversarial Input Generation* (main supervisor).

Ph.D. Students (graduated)

1 Fatimah Aljaafari (2019-2023). *Black-Box Cooperative Verification Framework For Finding Software Vulnerabilities in Concurrent Programs* (main supervisor), first position as a lecturer at the King Faisal University, Saudi Arabia.

2 Kaled Alshmrany (2018-2023). *Efficient Hybrid Fuzzing for Detecting Vulnerabilities and Achieving High Coverage in Software* (main supervisor), first position as a Faculty Member at the Institute of Public Administration (IPA), Saudi Arabia.

3 Tolijan Trajanovski (2018-2023). *Countering IoT Botnets* (co-supervisor), first position as a chief security officer for Amazon.

4 Mokanarangan Thayaparan (2018-2023). *Differentiable Constraint-based Solvers for Explanation-based Multi-hop Inference* (co-supervisor), first position as NLP engineer at AstraZeneca, Cambridge, UK.

5 Alessandro Bezerra Trindade (2015-2020). *Automated Verification of Stand-alone Solar Photovoltaic Systems: Optimal Sizing and Project Validation* (main supervisor), first position as lecturer at UFAM.

6 Herbert de Oliveira Rocha (2012-2016). *Verification of Software Systems Based on Code Transformation using Bounded Model Checking* (co-supervisor), first position as lecturer at UFRR.

MPhil Student (graduated)

1. Omar Alhawi (2018-2021). *Automatic Detection and Repair of Software Vulnerabilities in Unmanned Aerial Vehicles*, main supervisor, first position as cyber-security expert at the Greater Manchester Police.
2. Florin-Gabriel Blanaru (2021-2022)

M.Sc. Students (graduated)

1. Zhou, Z. (2022-2023) *The ESBMC-based Approach to Security Verification in Linux Kernel Programs*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
2. Cheng, Z. (2022-2023) *Develop and Evaluate a Security Analyzer for Finding Vulnerabilities in Java programs*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
3. Li, X. (2022-2023) *Safety Verification of CUDA and Deep Neural Networks*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
4. Hong, H. (2022-2023) *Verifying Quantized Neural Networks using SMT-Based Model Checking*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
5. Li, M. (2021-2022) *Incremental Bounded Model Checking using Machine Learning Techniques*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
6. Young, J. (2021-2022) *Verifying Binarised Neural Networks using SMT-Based Model Checking*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
7. Wu, C. (2021-2022) *Fuzzing a Software Verifier*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
8. Sena, L. (2020-2022) *Automated Verification and Refutation of Quantized Neural Networks*. M.Sc. Electrical Engineering, Federal University of Amazonas. First position as a Java Backend Developer at ELO (main supervisor).
9. Lu. Y. (2020-2021) *Scaling up Bounded-Model-Checking for Internet of Things devices*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
10. He, H. (2020-2021). *Incremental Bounded Model Checking using Machine Learning Techniques*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
11. Wang, S. (2020-2021). *Develop and Evaluate a Security Analyzer for Finding Vulnerabilities in Java programs*. M.Sc. in Advanced Computer Science, University of Manchester. First position as a Java backend developer in an internet financial company (main supervisor).
12. Wu, T. (2020-2021). *Develop and Evaluate a Security Analyzer for Finding Vulnerabilities in Java programs*. M.Sc. in Advanced Computer Science, University of Manchester (main supervisor).
13. Song, K. (2020-2021). *SMT-Based Bounded Model Checking for Solidity Smart Contracts*. M.Sc. in Advanced Computer Science, University of Manchester. He is pursuing his Ph.D. in Computer Science at the University of Manchester (main supervisor).
14. Matulevicius, N. (2020-2021). *Verifying Information Flow Security for Blockchain-based Smart Contracts*. M.Sc. in Advanced Computer Science, University of Manchester. First position as a Full-Stack Web Dev at All Media Lithuania (main supervisor).
15. Menezes, R. (2018-2021). *Automatic Generation of Test Cases using Bounded Model Checking* (supervisor). M.Sc. in Informatics, Federal University of Amazonas. He is pursuing his Ph.D. in Computer Science at the University of Manchester (main supervisor).
16. Vi L. Tan (2019-2020). *Security Analyser Tool for Finding Vulnerabilities in Java Programs*. M.Sc. in Advanced Computer Science, University of Manchester. First position as a software developer at Paradox Interactive (main supervisor).
17. Sousa, F. (2020). *Formal Verification to Ensuring the Memory Safety of C++ Programs*. M.Sc. in Informatics, Federal University of Amazonas. First position as software engineer at Amazon Web Service (main supervisor).
18. Alkhamissi, S. (2019). *Finding Software Vulnerabilities in Unmanned Aerial Vehicles*. M.Sc. in Advanced Computer Science, University of Manchester. First position as teaching assistant at King Abdulaziz University (main supervisor).
19. Cavalcante, T. (2019). *Verification and Synthesis of Static State Feedback Controllers with Formal Guarantees of Non-Fragile Performance*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as software engineer at Intera Tecnologia (main supervisor).

20 Albuquerque, H. (2019). *An Optimization Approach Guided by Counterexamples using SAT and SMT Solvers*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as software engineer at Samsung (main supervisor).

21 Pereira, P. (2019) *SMT-Based Context-Bounded Model Checking for CUDA Programs*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as IT coordinator / full stack developer at WebRota (main supervisor).

22 Alves, E. (2018). *A Method to Localize Faults in Concurrent C Programs*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as software engineer at Samsung (main supervisor).

23 Chaves, L. (2018). *Formal Verification Applied to Attitude Control Software of Unmanned Aerial Vehicles*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as software engineer at CESAR (main supervisor).

24 de Melo, R. (2017). *Model Checking Embedded C Software using k-Induction and Invariants*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as software engineer at Samsung (main supervisor).

25 Garcia, M. (2016). *Bounded Model Checking of C++ Programs based on the Qt Cross-Platform Framework*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as software engineer at Samsung (main supervisor).

26 Ismail, H. (2015). *Applying Model Checking to Digital Controllers Implemented in Fixed-Point Processors*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as software engineer at ST Microelectronics (main supervisor).

27 Januário, F. (2015). *Verification of Lua Programs in Digital TV Interactive Applications*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as lecturer at FUCAPI (main supervisor).

28 Trindade, A. (2015). *Applying SMT-based Verification to Hardware/Software Partitioning in Embedded Systems*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as lecturer at UFAM (main supervisor).

29 Abreu, R. (2014). *Verifying Fixed-Point Digital Filters using SMT-Based Bounded Model Checking*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as system engineer at Nokia Institute of Technology (main supervisor).

30 Gadelha, M. (2013). *Induction-Based Verification for C++ Programs*. M.Sc. in Electrical Engineering, Federal University of Amazonas. First position as lecturer at FUCAPI (main supervisor).

PROFESSIONAL ACTIVITIES

Technical Program Committee (TPC) Member

· *27th International Conference on Fundamental Approaches to Software Engineering*, Luxembourg, April 6-11, 2024.
· *IEEE Secure Development Conference*, USA, October 18-20, 2023.
· *32nd International Joint Conference on Artificial Intelligence*, Macao, August 19-25, 2023.
· *17th International Symposium on Theoretical Aspects of Software Engineering*, UK, July 4-6, 2023.
· *IEEE Secure Development Conference*, USA, October 18-20, 2022.
· *31st International Joint Conference on Artificial Intelligence*, Austria, July 23-29, 2022.
· *11th Brazilian Symposium on Computing Systems Engineering*, Online, November 22-25, 2021.
· *30th International Joint Conference on Artificial Intelligence*, Canada, August 21-26, 2021.
· *10th Brazilian Symposium on Computing Systems Engineering*, Online, November 23-27, 2020.
· *13th International Workshop on Numerical Software Verification*, USA, July 19, 2020.
· *The 42nd International Conference on Software Engineering*, New Ideas and Emerging Results, South Korea, May 23-29, 2020.
· *9th Brazilian Symposium on Computing Systems Engineering*, Brazil, November 19-22, 2019.
· *The 34th IEEE/ACM International Conference on Automated Software Engineering*, USA, November 11-15, 2019.
· *The 34th ACM Symposium on Applied Computing, Software Verification and Testing*, Cyprus, April 8-12, 2019.
· *VIII Workshop of Theses and Dissertations of CBSoft*, Brazil, September 17-21, 2018.
· *19th Symposium on High Performance Computing Systems*, Brazil, October 1-3 2018.
· *8th Brazilian Symposium on Computing Systems Engineering*, Brazil, November 6-9, 2018.
· *8th Latin-American Symposium on Dependable Computing*, Brazil, October 8-10, 2018.

- *VII Workshop of Theses and Dissertations of CBSoft*, Brazil, September 18-22, 2017.
- *7th Brazilian Symposium on Computing Systems Engineering*, Brazil, November 7-10, 2017.
- *10th International Workshop on Numerical Software Verification*, Germany, July 22-23 2017.
- *24th Intl. SPIN Symposium on Model Checking of Software*, USA, July 13-15, 2017.
- *International Conference on Management Engineering, Software Engineering and Service Sciences*, China, Jan 14-16, 2017.
- *6th Brazilian Symposium on Computing Systems Engineering*, Brazil, November 1-4, 2016.
- *38th Intl. Conference on Software Engineering*, USA, May 14 - 22, 2016.
- *22nd Intl. SPIN Symposium on Model Checking of Software*, South Africa, August 24-26, 2015.

Competition chair

- *Intel Embedded Systems Contest* of the 6th Brazilian Symposium on Computing Systems Engineering, João Pessoa, PB, Brazil, November 1-4, 2016.

Jury committee member

- *Intl. Competition on Software Testing* of the Intl. Conf. on Fundamental Approaches to Software Engineering (FASE), 2020.
- *Intl. Competition on Software Verification* of the Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), (2013, 2014, 2016, 2017, 2019, and 2021).

Co-organizer/session organizer

- *Automated Formal Reasoning for Trustworthy AI Systems*, Manaus, Brazil, December 5th, 2023.
- *Security for all in an AI enabled society*, Manchester, UK, July 4th, 2023.
- *XXII Brazilian Symposium on Information and Computational Systems Security*, Santa Maria, SC, Brazil, September 12-15, 2022.
- *3rd ISSNIP Biosignals and Biorobotics Conference*, Manaus, AM, Brazil, January 9-11, 2012.

Reviewer for major journals and conferences

- IEEE Transactions on Software Engineering, IEEE Transactions on Reliability, IEEE Transactions on Dependable and Secure Computing, ACM Computing Surveys, IEEE Software, Formal Aspects of Computing, Science of Computer Programming, Journal of Systems and Software, Formal Methods in System Design, The Computer Journal, Philosophical Transactions of the Royal Society of London, International Journal of Computational Science and Engineering, International Journal on Software Tools for Technology Transfer, and LNCS Transactions on Computational Science.
- LICS 2017, ASE 2015, CAV 2014, ASE 2013, and ISMVL 2010.

AWARDS

These awards are a recognition of outstanding achievements in software engineering, formal methods, and computer security. For instance, the Most Influential Paper Award at ASE'23 highlights a paper's long-lasting impact on academia/industry, inspiring further research and industry standards. Winning international competitions like SV-COMP and Test-Comp demonstrates our exceptional expertise in software security, consistently outperforming others. When the community honors us with the best paper awards, it acknowledges our work as a distinguished and influential contribution to the field. These awards collectively emphasize our consistent excellence, showcasing our unwavering dedication to advancing software engineering, formal methods, and computer security in research and practical applications.

1. Distinguished paper award at the *39th IEEE/ACM International Conference on Automated Software Engineering (ASE 2024*, ACM Special Interest Group on Software Engineering (SIGSOFT).

2. Three gold and three silver medals in the *6th Intl. Competition on Software Testing (Test-Comp) at the 27th Intl. Conf. on Fundamental Approaches to Software Engineering (FASE'24)*, European Joint Conference on Theory and Practice of Software (ETAPS).

3. One silver medal in the *13th Intl. Competition on Software Verification (SV-COMP) at the 30th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'24)*, European Joint Conference on Theory and Practice of Software (ETAPS).

4. Most Influential Paper Award at the *38th IEEE/ACM International Conference on Automated Software Engineering (ASE 2023)*.

5. Three gold and three bronze medals in the *5th Intl. Competition on Software Testing (Test-Comp) at the 26th Intl. Conf. on Fundamental Approaches to Software Engineering (FASE'23)*, European Joint Conference on Theory and Practice of Software (ETAPS).

6. One gold medal in the *12th Intl. Competition on Software Verification (SV-COMP) at the 29th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'23)*, European Joint Conference on Theory and Practice of Software (ETAPS).

7. Best Tool Paper Award at *23rd Brazilian Symposium on Information and Computational Systems Security (SBSeg'23)*, Brazilian Computing Society (SBC).

8. Three gold medals in the *4th Intl. Competition on Software Testing (Test-Comp) at the 25th Intl. Conf. on Fundamental Approaches to Software Engineering (FASE'22)*, European Joint Conference on Theory and Practice of Software (ETAPS).

9. One silver medal in the *11th Intl. Competition on Software Verification (SV-COMP) at the 28th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'22)*, European Joint Conference on Theory and Practice of Software (ETAPS).

10. One gold and one bronze medal in the *3rd Intl. Competition on Software Testing (Test-Comp) at the 24th Intl. Conf. on Fundamental Approaches to Software Engineering (FASE'21)*, European Joint Conference on Theory and Practice of Software (ETAPS).

11. One bronze medal in the *10th Intl. Competition on Software Verification (SV-COMP) at the 27th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'21)*, European Joint Conference on Theory and Practice of Software (ETAPS).

12. One silver and one bronze medal in the *9th Intl. Competition on Software Verification (SV-COMP) at the 26th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'20)*, European Joint Conference on Theory and Practice of Software (ETAPS).

13. One bronze medal in the *2nd Intl. Competition on Software Testing (Test-Comp) at the 23rd Intl. Conf. on Fundamental Approaches to Software Engineering (FASE'20)*, European Joint Conference on Theory and Practice of Software (ETAPS).

14. One gold and one bronze medal in the *8th Intl. Competition on Software Verification (SV-COMP) at the 25th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'19)*, European Joint Conference on Theory and Practice of Software (ETAPS).

15. One silver and two bronze medals in the *7th Intl. Competition on Software Verification at the 24th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'18)*, European Joint Conference on Theory and Practice of Software (ETAPS).

16. One silver and one bronze medal in the *6th Intl. Competition on Software Verification at the 23th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'17)*, European Joint Conference on Theory and Practice of Software (ETAPS).

17. Productivity in Research Grant from the National Council for Scientific and Technological Development (CNPq), 2016.

18. One gold and one silver medal in the *5th Intl. Competition on Software Verification at the 22th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'16)*, European Joint Conference on Theory and Practice of Software (ETAPS).

19. Best paper award in the *V Brazilian Symposium on Computing Systems Engineering*, Brazilian Computer Society (SBC), 2015.

20. Two gold and two bronze medals in the *4th Intl. Competition on Software Verification at the 21st Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'15)*, European Joint Conference on Theory and Practice of Software (ETAPS).

21. One gold medal in the *3rd Intl. Competition on Software Verification at the 20th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'14)*, European Joint Conference on Theory and Practice of Software (ETAPS).

22. Two silver and three bronze medals in the *2nd Intl. Competition on Software Verification at the 19th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'13)*, European Joint Conference on Theory and Practice of Software (ETAPS).

23. Two gold and one bronze medals in the *1st Intl. Competition on Software Verification at the 18th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'12)*, European Joint Conference on Theory and Practice of Software (ETAPS).

24. Distinguished paper award at the *33rd International Conference on Software Engineering (ICSE'11)*, ACM Special Interest Group on Software Engineering (SIGSOFT).

25. Best paper award in the *23rd ACM Symposium on Applied Computing: Track on Real-Time Systems (SAC'08)*, ACM Special Interest Group on Applied Computing (SIGAPP).

26. ORSAS Graduate Fellowship, *Overseas Research Students Awards Scheme* (ORSAS).

PH.D. EXAMINATIONS

I acted as an External Examiner for the Ph.D. candidates:

1. Yiqun Chen. *On More Effective Performance Testing*, 2023. Lancaster University, UK.

2. Prantik Chatterjee. *Efficient Verification And Testing Of Software Systems Using Proofs Of Unsatisfiability And Multiverse Analysis*, 2023. Indian Institute of Technology Kanpur, India.

3. Luis Gustavo Araujo Rodriguez. *Mechanisms to Improve Fuzz Testing for Message Brokers*, 2023. Universidade de São Paulo, Brazil.

4. Siok Wah Tay. *A Two-Level Communication-Based Access Control Framework for the Internet Of Things*, 2022. University of Manchester, UK.

5. Chao Peng. *Automated Testing for GPU Kernels*, 2021. University of Edinburgh, UK.

6. Luca DI STEFANO. *Modelling and Verification of Multi-Agent Systems via Sequential Emulation*, 2020. Gran Sasso Science Institute, Italy.

7. Vasileios Klimis. *Abstractions and Optimisations for Model-Checking Software-Defined Networks*, 2020. University of Essex, UK.

8. Eduardo Bezerra Valentin. *Scheduling Hard Real-Time Tasks in Heterogeneous Multiprocessor Platforms subject to Energy and Temperature Constraints*, 2017. Universidade Federal do Amazonas, Brazil.

9 José Ricardo da Silva Dias. *Métodos de Controle de Fluxo de Entrada para Sistemas Modelados por Grafos de Eventos Temporizados*, 2014. Universidade Federal de Minas Gerais, Brazil.

INVITED TUTORIALS

1 Cordeiro, L. C., "Securing Software Systems: Exploring Automated Testing, Verification, and Synthesis Strategies". In 8th School of Theoretical Computer Science and Formal Methods (ETMF'23) (invited tutorial), 2023.

2 Cordeiro, L. C., "Security of Software Systems with Applications on the Internet of Things". In the Summer School on Service-Based and Cloud Robotics (PERSEO) (invited tutorial), 2022.

INVITED TALKS

1 Cordeiro, L. C., "An Exploration of Automated Software Testing, Verification, and Repair Strategies using ESBMC and ChatGPT". University of Lancaster, UK (invited talk), 2023.

2 Cordeiro, L. C., "An Exploration of Automated Software Testing, Verification, and Repair Strategies using ESBMC and ChatGPT". In 8th International Workshop on CPAchecker (CPAchecker'23) (invited talk), 2023.

3 Cordeiro, L. C., "Security of Software Systems with Applications on the Internet of Things". In 48th Wireless World Research Forum (WWRF) (invited talk), 2022.

4 Cordeiro, L. C., "Exploiting the SAT Revolution for Automated Software Verification: Report from an Industrial Case Study". In 10th Latin-American Symposium on Dependable Computing (LADC) (invited talk), 2021.

5 Cordeiro, L. C., "Exploiting the SAT Revolution for Automated Software Verification: Report from an Industrial Case Study". In IARCS Verification Seminar Series (invited talk), 2021.

6 Cordeiro, L. C., "Automated Software Verification and Synthesis in Unmanned Aerial Vehicle" in the Digital Trust & Security Guest Lecture Series and the Aerospace Research Institute at the University of Manchester (invited talk), 2018.

PERSONAL

Citizenship: Brazilian and Portuguese.

Languages: Portuguese (native), English (native standard), and German (high-school level).