LUCAS CARVALHO CORDEIRO

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CAREER SUMMARY

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

- **92 reviewed publications**, including 22 journal papers, 70 workshop/conference contributions, and 1 book chapter; h-index 15, **Best Paper Award** at SBC SBESC'15 and ACM SAC'08, **Distinguished Paper Award** at ACM ICSE'11, and 20 awards from the international competition on software verification (SV-COMP) 2012-2018.

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

- Active **international research collaborations** with University of Bristol (UK), University of Southampton (UK), University of Cambridge (UK), University of Stellenbosh (South Africa), Federal University of Minas Gerais (Brazil), Federal University of Viçosa (Brazil), and Federal University of Roraima (UFRR).

- Proven track record of securing **research funding** from Samsung, Nokia Institute of Technology, CNPq, FAPEAM, British Council, and Royal Society (career total in excess of BRL8,286,83 or USD3,149,030).

- **Supervised** one PhD thesis, eight MSc dissertation, fourteen final year project, six scientific initiations, and ten internships.

- **Research team leader** (one PhD and five MSc students), acted as course leader of Electrical/Electronic Engineering from 2011 to 2015.

- 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

University of Oxford / Diffblue   July 2016 - Present
Researcher / Research Engineer   *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 / CETELI   September 2009 - Present (unpaid leave)
Adjunct Professor / Researcher   Gen. Rodrigo Octávio, 6200, Coroado I, 69080-900, Manaus, Brazil

· 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 one Ph.D. student, four M.Sc. students, and four 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)   March 2007 - September 2008
Set-top Box Software Engineer   *R. Salvador, 391, Adrianpolis, 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.
- 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   January 2005 - March 2007
Software Engineer   *R. Juta, 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   September 2003 - March 2004
Trainee   *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.

EDUCATION

University of Southampton *May 2011*
Ph.D. in Computer Science.
Thesis: *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: *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: *Developing Real-Time Applications with LEGO Mindstorms.*
Scholarship holder of CAPES/DAAD from 03/2003 to 03/2004, in order to attend classes of the MSc
on Information Technology at the University of Suttgart (Germany).
Overall GPA: 8.313

GRANTS

1. *"Support for Scientific Production of the Research Group on Software and Systems Verification"*,
   Amazonas State Research Funding Agency, 2017-2018, BRL16,992 (or USD5,168).

2. *"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.

3. *"Verification of C/C++ Programs Based on Multi-Core Processors"*, Nokia Institute of Technol-
   ogy, 2014-2016, BRL451,231 (or USD171,594).

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

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

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

7. *"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.

8. *"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).

9. *"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 collabo-
   ration 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.

PUBLICATIONS - JOURNAL ARTICLES

1 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*, 2017 (to appear). DOI:10.1016/j.scico.2017.10.004.

2 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, 2017. DOI:10.1016/j.scico.2017.09.005.

3 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.

*4 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.

5 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.

*6 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.

*7 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.

8 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.

9 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.

*10 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.

11 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.

12 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.

13 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.

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

*15 Morse, J., Cordeiro, L., 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.

16 Morse, J., Cordeiro, L., 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.

17 Rosa, R., Lucena Jr., V., Cordeiro, L., 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.

*18 Cordeiro, L., 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.

19 Freitas, M., Valenzuela, V., Gadelha, M., Silva Junior, W., Cordeiro, L., 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.

20 Cordeiro, L., 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.

21 Cordeiro, L., 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.

22 Cordeiro, L., 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 Cordeiro, L., Kesseli, P., Kroening, D., Schrammel, P., Trtik, M. "JBMC: A Bounded Model Checking Tool for Verifying Java Bytecode". In 30th International Conference on Computer Aided Verification (CAV), pp 1-6, 2018 (to appear).

2 Chaves, L., Bessa, I. V., Cordeiro, L. C., Kroening, Daniel. "DSValidator: An Automated Counterexample Reproducibility Tool for Digital Systems". In *21st ACM International Conference on Hybrid Systems: Computation and Control* (HSCC), pp. 1–6, 2018 (to appear).

3 Menezes, R., Rocha, H., Cordeiro, L. C., Barreto, R. S. "Map2Check using LLVM and KLEE". In *24th International Conference on Tools and Algorithms for the Construction and Analysis of Systems* (TACAS), pp. 1–4, 2018 (to appear).

*4 Abate, A., Bessa, I.; Cattaruzza, D., Cordeiro, L., David, C., Kesseli, P., Kroening, D., Polgreen, E. "Automated Formal Synthesis of Digital Controllers for State-Space Physical Plants". In *29th International Conference on Computer-Aided Verification* (CAV), LNCS 10426, pp. 462–482, 2017.

5 Chaves, L., Bessa, I., Cordeiro, L., Kroening, D., Lima Filho, E. "Verifying Digital Systems with MATLAB". In *26th ACM SIGSOFT International Symposium on Software Testing and Analysis* (ISSTA), pp. 388–391, 2017.

*6 Abate, A., Bessa, I., Cattaruzza, D., Cordeiro, L., David, C., Kesseli, P., Kroening, D. "Sound and Automated Synthesis of Digital Stabilizing Controllers for Continuous Plants". In *20th ACM International Conference on Hybrid Systems: Computation and Control* (HSCC), pp. 197–206, 2017.

7 Rocha, W., Rocha, H., Ismail, H., Cordeiro, L., Fischer, B. "DepthK: A *k*-Induction Verifier Based on Invariant Inference for C Programs (Competition Contribution)". In *23th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems* (TACAS), LNCS 10206, pp. 360–364, 2017.

8 Mello, D., Freitas, M., Cordeiro, L. C., Silva Junior, W. S., Bessa, I. V., Lima Filho, E. B., Clavier, L. "Verification of Magnitude and Phase Responses in Fixed-Point Digital Filters". In: *35th Brazilian Symposium on Telecommunications and Signal Processing* (SBrT), pp. 1-5, 2017.

9   Amoedo, D. A., Melo, W. C., Cordeiro, L. C., Lima Filho, E. B., da Silva Jnior, W. S., Carvalho, C. B. "Classificação Automática de Modulações Mono e Multiportadoras utilizando Método de Extração de Características e Classificadores SVM". In: *35th Brazilian Symposium on Telecommunications and Signal Processing* (SBrT), pp. 1-5, 2017.

*10   Abate, A., Bessa, I., Cattaruzza, D., Chaves, L., Cordeiro, L., David, C., Kesseli, P., Kroening, D., Polgreen, E. "DSSynth: An Automated Digital Controller Synthesis Tool for Physical Plants". In *32nd IEEE/ACM International Conference on Automated Software Engineering* (ASE), pp. 919–924, 2017.

11   Araújo, R., Ribeiro, A., Bessa, I. V., Cordeiro, L. C., Chaves Filho, J. E. "Counterexample-Guided Inductive Optimization Applied to Mobile Robots Path Planning". In *14rd Latin American Robotics Symposium* (LARS), pp. 1–8, 2017.

12   Albuquerque, H., Araújo, R., Bessa, I., Cordeiro, L. C., Lima Filho, E. B. "OptCE: A Counterexample-Guided Inductive Optimization Solver". In *XX Brazilian Symposium on Formal Methods* (SBMF), LNCS 10623, pp. 125-141, 2017.

13   Gadelha, M. Y. R., Cordeiro, L. C., Nicole, D. "Encoding floating-points using the SMT theory in ESBMC: An empirical evaluation over the SV-COMP benchmarks". In *XX Brazilian Symposium on Formal Methods* (SBMF), LNCS 10623, pp. 91–106, 2017.

14   Cavalcante, T. R. F., Bessa, I. V., Cordeiro, L. C. "Planning and Evaluation of UAV Mission Planner for Intralogistics Problems". In: *VII Brazilian Symposium on Computing Systems Engineering* (SBESC), pp. 9-16, 2017.

15   Rocha, H. O., Cordeiro L. C., Barreto, R. S. "Hunting Memory Bugs in C Programs with Map2Check (Competition Contribution)". In *22th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems* (TACAS), LNCS 9636, pp. 934–937, 2016.

16   Araujo, R., Bessa, I. V., Cordeiro, L. C., Chaves Filho, J. E. "SMT-based Verification Applied to Non-convex Optimization Problems". In *VI Brazilian Symposium on Computing Systems Engineering* (SBESC), pp. 1-8, 2016.

17   Pereira, P. A., Albuquerque, H., Marques, H., Silva, I., Carvalho, C. B., Santos, V., Ferreira, R. S., Cordeiro, L. C. "Verifying CUDA Programs using SMT-Based Context-Bounded Model Checking". In *31st ACM Symposium on Applied Computing* (SAC), Software Verification and Testing, pp. 1648–1653, 2016.

18   Garcia, M. A., Sousa, F. R., Cordeiro, L. C., Lima Filho, E. B. "ESBMC^{QtOM}: A Bounded Model Checking Tool to Verify Qt Applications". In *23rd International SPIN symposium on Model Checking of Software* (SPIN), LNCS 9641, pp. 97–103, 2016.

19   Pereira, P. A., Sousa, F. R., Cordeiro, L. C., Costa Filho, C. F. F., Costa, M. G. F. "Complementary Training Programme for Electrical and Computer Engineering Students Through an Industrial-Academic Collaboration". In *46th Annual Frontiers in Education Conference* (FIE), pp. 1–9, 2016.

20   Ismail, H. I., Bessa, I. V., Cordeiro, L. C., Chaves Filho, J. E., Lima Filho, E. B. "DSVerifier: A Bounded Model Checking Tool for Digital Systems". In *Proc. 22nd International SPIN Symposium on Model Checking of Software* (SPIN), LNCS 9232, pp. 126-131, 2015.

21   Rocha, H. O., Barreto, R. S., Cordeiro, L. C., "Memory Management Test-Case Generation of C Programs using Bounded Model Checking". In *Proc. 13th International Conference on Software Engineering and Formal Methods* (SEFM), LNCS 9276, pp. 251-267, 2015.

22   Trindade, A. B., Ismail, H. I., Cordeiro, L. C. "Multi-Core Model Checking to Hardware-Software Partitioning in Embedded Systems". In *Proc. V Brazilian Symposium on Computing Systems*

Engineering (SBESC), pp. 102–105, 2015.

23 Alves, E. H. S., Cordeiro, L. C., Lima Filho, E. B. "Fault Localization in Multi-Threaded C Programs using Bounded Model Checking". In *Proc. V Brazilian Symposium on Computing Systems Engineering* (SBESC), pp. 96–101, 2015.

24 Rocha, H., Ismail, H. I., Cordeiro, L. C., Barreto, R. S. "Model Checking Embedded C Software using k-Induction and Invariants". In *Proc. V Brazilian Symposium on Computing Systems Engineering* (SBESC), pp. 90–95, 2015. **SBC Best Paper Award**.

25 Sousa, F. R. M., Cordeiro, L. C., Lima Filho, E. B., "Bounded Model Checking of C++ Programs Based on the Qt Framework". In *Proc. IEEE 4th Global Conference on Consumer Electronics* (GCCE), pp. 179–180, 2015.

26 Pereira, P. A., Albuquerque, H., Marques, H., Silva, I., Santos, V., Carvalho, C. B., Ferreira, R. S., Cordeiro, L. C. "Verificação de Kernels em Programas CUDA usando Bounded Model Checking". In *Proc. XV Brazilian Symposium on High-Performance Computing* (WSCAD-SSC), pp. 24–35, 2015.

27 de Oliveira, R., Cordeiro, L., Lucena Jr., V. "Hardware Reconfiguration Based on Broadcast Digital TV Signal". In *Proc. IEEE International Conference on Consumer Electronics (ICCE)*, pp. 624-626, 2015.

*28 Morse, J., Ramalho, M., Cordeiro, L., Nicole, D., Fischer, B. "ESBMC v1.22 (Competition Contribution)". In *Proc. 20th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), LNCS 8413*, pp. 405-407, 2014.

29 Bessa, I., Abreu, R., Cordeiro, L., Chaves Filho, J. "SMT-Based Bounded Model Checking of Fixed-Point Digital Controllers". In *Proc. 40th Annual Conference of the IEEE Industrial Electronics Society (IECON)*, pp. 295-301, 2014.

30 Rosa, R., Cordeiro, L., Lucena Jr., V. "A Secondary Screen Architecture to Accurately Capture Viewers' Interactions in an iTV Environment". In *Proc. IEEE 3rd Global Conference on Consumer Electronics (GCCE)*, pp. 264-265, 2014.

31 Januário, F., Cordeiro, L., Lima Filho, E., Lucena Jr., V. "BMCLua: Verification of Lua Programs in Digital TV Interactive Applications". In *Proc. IEEE 3rd Global Conference on Consumer Electronics (GCCE)*, pp. 707-708, 2014.

32 Trindade, A., Cordeiro, L. "Aplicando Verificação de Modelos para o Particionamento de Hardware/Software". In *4th Brazilian Symposium on Computing Systems Engineering (SBESC)*, pp. 1-6, 2014.

33 Januário, F., Cordeiro, L., Lima Filho, E., Lucena Jr., V. "BMCLua: Verificação de Programas Lua em Aplicações Interativas de TV Digital". In *4th Brazilian Symposium on Computing Systems Engineering (SBESC)*, pp. 1-6, 2014.

34 Bessa I., Ismail, H., Cordeiro, L., Chaves Filho, J. "Verification of Delta Form Realization in Fixed-Point Digital Controllers Using Bounded Model Checking". In *4th Brazilian Symposium on Computing Systems Engineering (SBESC)*, pp. 49-54, 2014.

35 Ramalho, M., Cordeiro L., Cavalcante, A., Lucena Jr, V. "Verificação Baseada em Indução Matemática de Programas C/C++". In *3rd Brazilian Symposium on Computing Systems Engineering (SBESC)*, 2013.

36 Silva, V. Cordeiro L., Lucena Jr, V. "Verificação de Aplicações AmI Usando Java PathFinder". In *3rd Brazilian Symposium on Computing Systems Engineering (SBESC)*, 2013.

37 Abreu, R., Cordeiro, L., Lima Filho, E. "Verifying Fixed-Point Digital Filters using SMT-Based Bounded Model Checking". *In 31st Brazilian Symposium on Telecommunications (SBrT)*, 2013. DOI:10.14209/sbrt.2013.57

38 Januario, F., Cordeiro, L., Lima Filho, E. B. "Verificação de Códigos Lua Utilizando BMCLua". In *31st Brazilian Symposium on Telecommunications (SBrT)*, 2013. DOI:10.14209/sbrt.2013.92

39 Freitas, M., Ramalho, M., Cordeiro, L., Silva Jr., W., Lima Filho, E. "Verificação de Propriedades de Filtros Digitais Implementados com Aritmética de Ponto Fixo". In *31st Brazilian Symposium on Telecommunications (SBrT)*, 2013. DOI:10.14209/sbrt.2013.226

40 Ramalho, M., Freitas, M., Sousa, F., Marques, H., Cordeiro, L., and Fischer, B. "SMT-Based Bounded Model Checking of C++ Programs". In *Proc. 20th IEEE Intl. Conf. and Workshops on Engineering of Computer-Based Systems (ECBS)*, pp. 147-156, 2013.

*41 Morse, J., Cordeiro, L., Nicole, D., and Fischer, B. "Handling Unbounded Loops with ESBMC 1.20 (Competition Contribution)". In *Proc. 19th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), LNCS 7795*, pp. 621-624, 2013 **(won the Bronze Medal in the overall ranking)**.

42 Cohen, D., Barreto, R. , Oliveira, H., and Cordeiro, L. "A Car Racing Based Strategy for the Dynamic Voltage and Frequency Scaling Technique". In *Proc. 21st IEEE Intl. Symp. on Industrial Electronics (ISIE)*, pp. 774-779, 2012.

*43 Cordeiro, L., Morse, J., Nicole, D., and Fischer, B. "Context-Bounded Model Checking with ESBMC 1.17 (Competition Contribution)". In *Proc. 18th Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), LNCS 7214*, pp. 533-536, 2012 **(won the Bronze Medal in the overall ranking)**.

44 Lima, F., Cordeiro, L., and Souza, R. "Sistema de Monitoramento a Distância para Unidade de Célula a Combustível". In *8th Brazilian Congress of Energy Planning (CBPE)*, 2012.

45 Rocha, H., Barreto, R., Cordeiro, L., and Dias-Neto, A. "Understanding Programming Bugs in ANSI-C Software Using Bounded Model Checking Counter-Examples". In *Proc. 9th Intl. Conf. on Integrated Formal Methods (iFM). LNCS 7321*, pp. 128-142, 2012.

46 Caldas, R., Barreto, R., Cordeiro, L., and Campos, S. "A Formal Method for Modeling, Verification and Synthesis of Embedded Reactive Systems". In *Proc. Intl. Conf. on Applied Computing (AC)*, pp. 379-386, 2011.

47 Morse, J., Cordeiro, L., Nicole, D., and Fischer, B. "Context-Bounded Model Checking of LTL Properties for ANSI-C Software". In *Proc. 9th Intl. Conf. on Software Engineering and Formal Methods (SEFM), LNCS 7041*, pp. 302-317, 2011.

48 Lucena Junior, V., Neto, J., Chaves Filho, J. E., Silva Junior, W., and Cordeiro, L. "Gift Young Engineers: An Extra-Curricular Initiative for Updating Computer and Electrical Engineering Courses". In *Proc. 41st ASEE/IEEE Frontiers in Education Conference (FIE)*, pp. 1-6, 2011.

49 Barreto, R., Cordeiro, L., and Fischer, B. "Verifying Embedded C Software with Timing Constraints using an Untimed Model Checker". In *Proc. Brazilian Symposium on Computing System Engineering (SBESC)*, pp. 89-100, 2011.

*50 Cordeiro, L. 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.**

51 Cordeiro, L., 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.

52 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.

53 Cordeiro, L., 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.

*54 Cordeiro, L., 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.

55 Cordeiro, L., 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.

56 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.

57 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.

58 Cruz, F., Barreto, R., Cordeiro, L., 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**.

59 Cordeiro, L., 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.

60 Cordeiro, L., 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.

61 Cordeiro, L., 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.

62 Cordeiro, L. 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.

63 Alkmin J., de Melo Junior, A., da Paz, E., Campelo, N., Souza, F., Cordeiro, L., 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.

64 Alkmin J., de Melo Junior, A., da Paz, E., Campelo, N., Souza, F., Cordeiro, L., 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 WORKSHOP CONTRIBUTIONS

1 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.

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

3 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.

4 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.

5 Rocha, H., Cordeiro, L., 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.

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

PUBLICATIONS - BOOK CHAPTERS

1. 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

Undergraduate level
· *Computer Organization and Design*, Federal University of Amazonas, from 2013 to 2015.
· *Advanced Programming*, Federal University of Amazonas, 2011, 2013.
· *Real-Time Programming*, Federal University of Amazonas, from 2011 to 2015.
· *Computer Networks*, Federal University of Amazonas, 2009.
· *C++ Programming*, Federal University of Amazonas, 2008.
· *Introduction to Algorithms*, Federal University of Amazonas, 2007.

Graduate level
· *Verification of Software and Systems*, Federal University of Amazonas, from 2014 to 2016.
· *Algorithms for Automation and Systems*, Federal University of Amazonas, from 2013 to 2015.
· *Real-Time Systems*, Federal University of Amazonas, from 2011 to 2013.
· *Design and Analysis of Algorithms*, Federal University of Amazonas, 2011.
· *Embedded Systems and Linux for Digital TV*, Baptist Superior College of Amazonas, 2008.

STUDENTS

Ph.D. Students (current)
· Alessandro Bezerra Trindade (2015-2019). *Applying SMT-based Verification to HW/SW Partitioning for Embedded Systems with Many Cores* (supervisor).

M.Sc. Students (current)
· Adriana Silva de Souza (2017-2019). *Verifying Multi-threaded Software Based on the Qt Cross-Platform Framework*.

- Thiago Rodrigo Flix Cavalcante (2017-2019). *Counterexample-Guided Inductive Synthesis of Digital Controllers for Physical Plants.*
- Erickson Higo da Silva Alves (2017-2019). *A Method to Localize Faults in Concurrent C Programs.*
- Phillipe Arantes Pereira (2016-2018). *SMT-Based Context-Bounded Model Checking for CUDA Programs.*
- Higo Ferreira Albuquerque (2016-2018), *Indoor Transportation System Applied to Intralogistics using Unmanned Aerial Vehicles with Optimal Planning Mission.*

Ph.D. Students (graduated)

- 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.

M.Sc. Students (graduated)

- Lennon Corrêa Chaves (2018). *Formal Verification Applied to Attitude Control Software of Unmanned Aerial Vehicles*, first position as software engineer at CESAR.
- Raimundo Williame Rocha de Melo (2017). *Model Checking Embedded C Software using k-Induction and Invariants*, first position as software engineer at Samsung.
- Mário Angel Praia Garcia (2016). *Bounded Model Checking of C++ Programs based on the Qt Cross-Platform Framework.*
- Hussama Ibrahim Ismail (2015). *Applying Model Checking to Digital Controllers Implemented in Fixed-Point Processors*, first position as software engineer at FPF.
- Francisco de Assis Pereira Januário (2015). *Verification of Lua Programs in Digital TV Interactive Applications*, first position as lecturer at FUCAPI.
- Alessandro Bezerra Trindade (2015). *Applying SMT-based Verification to Hardware/Software Partitioning in Embedded Systems*, first position as lecturer at UFAM.
- Renato Barbosa Abreu (2014). *Verifying Fixed-Point Digital Filters using SMT-Based Bounded Model Checking*, first position as system engineer at Nokia Institute of Technology.
- Mikhail Yasha Ramalho Gadelha (2013). *Induction-Based Verification for C++ Programs*, first position as lecturer at FUCAPI.

PROFESSIONAL ACTIVITIES

Program committee member

- *VII Workshop of Theses and Dissertations of CBSoft*, Fortaleza, CE, Brazil, September 18-22, 2017.
- *7th Brazilian Symposium on Computing Systems Engineering*, Curitiba, PR, Brazil, November 7-10, 2017.
- *10th International Workshop on Numerical Software Verification*, Heidelberg, Germany, July 22-23 2017.
- *24nd Intl. SPIN Symposium on Model Checking of Software*, Santa Barbara, CA, United States, July 13-15, 2017.
- *International Conference on Management Engineering, Software Engineering and Service Sciences*, Wuhan, China, Jan 14-16, 2017.
- *6th Brazilian Symposium on Computing Systems Engineering*, João Pessoa, PB, Brazil, November 1-4, 2016.
- *38th Intl. Conference on Software Engineering*, Austin, TX, USA, May 14 - 22, 2016.
- *22nd Intl. SPIN Symposium on Model Checking of Software*, Stellenbosch, 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 Verification* of the Intl. Conf. on Tools and Algorithms for the Construction and Analysis of Systems, (2013, 2014, 2016, and 2017).

Co-organizer/session organizer

- *3rd ISSNIP Biosignals and Biorobotics Conference*, Manaus, AM, Brazil, January 9-11, 2012.

Reviewer for major journals and conferences

- 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, and LNCS Transactions on Computational Science.
- LICS 2017, ASE 2015, CAV 2014, ASE 2013, and ISMVL 2010.

AWARDS

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).

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).

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

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).

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

Two gold and two bronze medals in the *4th Intl. Competition on Software Verification at the 21th 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).

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).

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).

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).

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

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

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

PERSONAL

Citizenship: Brazilian and Portuguese.

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