



Europass Curriculum Vitae

Personal information

Surname(s) / First name(s) **Claudino Pereira Lopes, Nuno**
E-mail nuno.lopes@ist.utl.pt
Personal Homepage <http://web.ist.utl.pt/nuno.lopes/>
Nationality Portuguese
Date of birth 03/Aug/1986

Work experience

Dates September 2014 to date
Occupation or position held Researcher
Main activities and responsibilities Compilers & Network Verification
Postdoc researcher until March 2015
Name of employer Microsoft Research Cambridge, UK
Type of business or sector R&D Institution

Dates October 2009 to July 2014
Occupation or position held Junior Researcher
Main activities and responsibilities

- Compiler optimizations
- Software verification

Name of employer INESC-ID, Portugal
Type of business or sector R&D Institution

Dates March 2013 to May 2013
Occupation or position held Internship
Main activities and responsibilities Research in Software Engineering (RiSE) team
Name of employer Microsoft Research Redmond, USA
Type of business or sector R&D Institution

Dates April 2012 to July 2012
Occupation or position held Internship
Main activities and responsibilities LLVM backend team
Name of employer Apple, Inc., USA
Type of business or sector Computers

Dates February 2009 to July 2009
Occupation or position held Internship
Main activities and responsibilities

- Declarative networking
- Distributed software model checking

Name of employer Max Planck Institute for Software Systems (MPI-SWS), Germany
Type of business or sector R&D Institution

Dates September 2007 to September 2008
 Occupation or position held Teaching assistant
 Lectured courses

- Analysis and Synthesis of Algorithms (Spring 2008)
- Operating Systems (Fall 2007)

 Name of employer Instituto Superior Técnico (IST), Portugal
 Type of business or sector University

Dates September 2004 to December 2007
 Occupation or position held Internship
 Main activities and responsibilities

- Robot (AIBO) simulator development
- Robot software development

 Name of employer Institute for Systems and Robotics – Lisbon (ISR), Portugal
 Type of business or sector R&D institution

Education and training

Dates October 2009 to July 2014
 Title of qualification awarded PhD Program in Information Systems and Computer Engineering
 Principal subjects covered Compiler Optimizations
 Name of organisation providing education and training Instituto Superior Técnico (IST) – Universidade de Lisboa
 Level PhD / ISCED 6

Dates September 2007 to October 2009
 Title of qualification awarded Master in Information Systems and Computer Engineering
 Principal subjects covered Distributed Systems, Software Engineering
 Name of organisation providing education and training Instituto Superior Técnico (IST) – Technical University of Lisbon
 Level MSc / ISCED 5 A

Dates September 2004 to July 2007
 Title of qualification awarded Degree in Information Systems and Computer Engineering
 Name of organisation providing education and training Instituto Superior Técnico (IST) – Technical University of Lisbon
 Level BSc / ISCED 5

Personal skills and competences

Mother tongue(s) **Portuguese**

Other language(s)

Self-assessment
European level ()*

English

French

German

| Understanding | | | | Speaking | | | | Writing | |
|---------------|-----------------|---------|-----------------|--------------------|-----------------|-------------------|-----------------|---------|-----------------|
| Listening | | Reading | | Spoken interaction | | Spoken production | | | |
| C2 | Proficient User | C2 | Proficient User | C1 | Proficient User | C1 | Proficient User | C1 | Proficient User |
| A2 | Basic User | A2 | Basic User | A1 | Basic User | A1 | Basic User | A1 | Basic User |
| A1 | Basic User | A1 | Basic User | A1 | Basic User | A1 | Basic User | A1 | Basic User |

(*) *Common European Framework of Reference for Languages*

Artistic skills and competences

- guitar player

Other skills and competences

- Boy scout since 1994

Awards/Distinctions

- Communications of the ACM research highlight, PLDI'15 paper, 2017
- SIGPLAN research highlight, PLDI'15 paper, 2016
- Distinguished paper award, PLDI, 2015
- HVC award for the PLDI'12 paper, 2014
- Best paper award, SPIN Symposium, 2013
- Competition on software verification (SV-COMP), ControlFlowInteger category, 2012, 3rd place
- Best TU Lisbon students award, 2010
- Merit award for top computer engineering students at IST, 2007/2008
- Zend's international PHP 5 programming contest, 2004, 27th place
- Portuguese national robotic contest, 2004, 11th place
- Portuguese national robotic contest, 2003, 1st place

Publications

- N. P. Lopes, D. Menendez, S. Nagarakatte, J. Regehr. Practical Verification of Peephole Optimizations with Alive. *Communications of the ACM*, 61(2):84-91, Feb. 2018.
- H. H. Liu, Y. Zhu, J. Padhye, J. Cao, S. Tallapragada, N. P. Lopes, A. Rybalchenko, G. Lu, L. Yuan. CrystalNet: Faithfully Emulating Large Production Networks. In *Proc. of the 26th Symposium on Operating Systems Principles (SOSP)*, Oct. 2017.
- J. Lee, Y. Kim, Y. Song, C. Hur, S. Das, D. Majnemer, J. Regehr, N. P. Lopes. Taming Undefined Behavior in LLVM. In *Proc. of the 38th annual ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI)*, June 2017.
- N. P. Lopes and J. Monteiro. Automatic Equivalence Checking of Programs with Uninterpreted Functions and Integer Arithmetic. *International Journal on Software Tools for Technology Transfer*, 18(4):359-374, Aug. 2016.
- R. Sinha, M. Costa, A. Lal, N. P. Lopes, S. Rajamani, S. A. Seshia, K. Vaswani. A Design and Verification Methodology for Secure Isolated Regions. In *Proc. of the 37th annual ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI)*, June 2016.
- G. D. Plotkin, N. Bjørner, N. P. Lopes, A. Rybalchenko, G. Varghese. Scaling Network Verification using Symmetry and Surgery. In *Proc. of the 43rd Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)*, Jan. 2016.
- N. P. Lopes, D. Menendez, S. Nagarakatte, J. Regehr. Provably Correct Peephole Optimizations with Alive. In *Proc. of the 36th annual ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI)*, June 2015.
- N. P. Lopes, N. Bjørner, P. Godefroid, K. Jayaraman, G. Varghese. Checking Beliefs in Dynamic Networks. In *Proc. of the 12th USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, May 2015.
- N. Santos and N. P. Lopes. Leveraging Trusted Computing and Model Checking to Build Dependable Virtual Machines. In *Proc. of the 10th Workshop on Hot Topics in System Dependability (HotDep)*, Oct. 2014.
- N. P. Lopes. *Automatic Synthesis of Weakest Preconditions for Compiler Optimizations*. PhD thesis, Instituto Superior Técnico, July 2014.
- N. P. Lopes and J. Monteiro. Weakest Precondition Synthesis for Compiler Optimizations. In *Proc. of the International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI)*, Jan. 2014.
- N. P. Lopes and J. Monteiro. Automatic Equivalence Checking of UF+IA Programs. In *Proc. of the International SPIN Symposium on Model Checking of Software*, July 2013.
- S. Grebenschikov, N. P. Lopes, C. Popeea, A. Rybalchenko. Synthesizing Software Verifiers from Proof Rules. In *Proc. of the 33rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, June 2012.
- S. Grebenschikov, A. Gupta, N. P. Lopes, C. Popeea, A. Rybalchenko. HSF(C): A Software Verifier based on Horn Clauses (Competition Contribution). In *Proc. of the 18th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Mar. 2012.
- N. P. Lopes and A. Rybalchenko. Distributed and Predictable Software Model Checking. In *Proc. of the 12th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI)*, Jan. 2011.
- N. P. Lopes, L. Aksoy, V. Manquinho, J. Monteiro. Optimally Solving the MCM Problem Using Pseudo-Boolean Satisfiability. Technical Report RT/43/2010, INESC-ID, Nov. 2010.
- N. P. Lopes, J. A. Navarro, A. Rybalchenko, A. Singh. Applying Prolog to Develop Distributed

Systems. *Theory and Practice of Logic Programming*, 26th Int'l. Conference on Logic Programming (ICLP'10) Special Issue, 10(4-6):691-707, July 2010.

- N. P. Lopes. *Practical Executable Specifications for Distributed Systems*. Master thesis, Instituto Superior Técnico, Oct. 2009.
- F. Cabecinhas, N. P. Lopes, R. Crisóstomo, L. Veiga. Optimizing Binary Code Produced by Valgrind. Technical Report RT/46/2008, INESC-ID, Aug. 2008.
- N. P. Lopes and P. U. Lima. openSDK: an open-source implementation of OPEN-R. In *Proc. of the 7th International Joint Conference on Autonomous Agents and MultiAgent Systems (AAMAS)*, pages 1207-1210, May 2008.
- L. Iocchi, L. Marchetti, R. Nardi, P. Lima, M. Barbosa, H. Pereira, N. P. Lopes. SPQR + ISocRob RoboCup 2007 Qualification Report. Technical Report, ISR Lisbon, 2007.
- P. Lima, M. Barbosa, J. Esteves, N. P. Lopes, V. d'Orey, H. Pereira. ISocRob-4LL 2006: Team Description Paper. Technical Report, ISR Lisbon, 2006.

Scientific Community Service

- Program Committee: VSTTE'18, EuroLLVM'18, EuroLLVM'17, CGO'17, LLVM'15
- External Review Committee: POPL'17
- Reviewer: FMCAD'14, DAC'14, CAV'14, ESOP'11, PASTE'10

Additional information

- Attended the Oregon Summer School 2008 on "Logic and Theorem Proving in Programming Languages"
- Participated in RoboCup 2007 (Atlanta)
- Google Summer of Code (SoC) mentor (PHP project), 2006-2008
- First aid (2006, 2010) and civil protection (2006) courses
- Open-source contributor since 2003 with the following projects: PHP, LLVM, clang, valgrind, re2c, libgd, libtidy, Lean, Z3.