# CURRICULUM VITÆ

## NICOLAU LEAL WERNECK

### Personal Data

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### Professional Outline

Electrical engineer specialized in computation, numerical analysis and geometry, and areas such as Computer Vision and Computational Intelligence.

Seeking to work with research and development. Great aptitude for programming and learning new technologies. Interested in science and multidisciplinarity.

Advocate of free software and standards. User of GNU/Linux for 15+ years, and of computers in general since childhood.

### Areas of Interest

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| Practical | Computer Vision / Mobile applications / Parameter estimation / High-Performance Computing / Information extraction. |
| Theoretical | Signal Processing / Pattern Recognition / Machine Learning / Probabilistic modeling. |

### Objectives

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| Practical | Automate. Connect. Hack. Make. Implement demanding number-processing algorithms. Create useful AI and Machine Learning applications. Develop free software and open standards. |
| Theoretical | Use physics and geometry. Explore constraints. Reproduce human abilities with computers and robots. Analyze and synthesize natural entities, *e.g.* music, dance, paintings, furniture, cities. |

### Computer Science Knowledge

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| Platforms | GNU/Linux systems, specially Debian and Arch. |
| Programming | *Native:* Python, C.<br>*Experienced:* Scala, C++, Assembly, bash, Matlab, Prolog.<br>*Beginner:* Haskell, Dash, JavaScript, Lua, LISP, Forth. |
| Libraries | Akka, Numpy, OpenCV, OpenGL, Qt, ALSA. |
| Programs | Emacs, Inkscape, MongoDB, xmonad, mplayer, Apache. |
| Miscellaneous | Spark, Hadoop Streaming, AWS, LaTeX. |

## Human Language Knowledge

*Native:* Portuguese / *Great:* English / *Beginner:* Japanese, French

## Other Knowledge

{Probability,Information,Number,Network} Theory, Optimization, Reinforcement Learning, Cryptography, Cinema, Music, History of art and science, Psycophysics, Do-it-yourself electronics.

## Education

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| 2007–2012 | Doctorate in Electrical Engineering<br>Universidade do Estado de São Paulo — USP<br>*720 hours of classes, mean grade 97.5%.*<br>—Developed a monocular vision method to estimate orientation in a Manhattan world environment. It works with distorted images and uses M-estimation, RANSAC and FilterSQP. |
| 2005–2007 | Masters in Electrical Engineering<br>Universidade Estadual de Campinas — UNICAMP<br>*810 hours of classes, mean grade 96.7%.*<br>—Studied the electric guitar, from its signal production and non-linear dynamics of strings all the way to timbre perception. |
| 1999–2004 | Graduation in Electrical Engineering<br>Universidade Federal de Minas Gerais — UFMG<br>*3,495 hours of classes, mean grade ∼70%.*<br>—Worked at the CEFALA lab with acoustics, speech, Signal Processing, Pattern Recognition and Computer Graphics. |

## Professional Activities

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| **TomTom** | Dutch navigation devices and mapping services company. |
| Q4/2016– | *Position: Senior Software Engineer*<br>—Generation and pre-processing of data, and training neural network models for segmentation problems.<br>—Analysis of panorama images for 3D track estimation. |
| **Osram** | German electronics corporation specialized in lighting. |
| Q4/2015–Q4/2016 | *Position: Postdoc*<br>—Developed a technique to extract identifiable artificial visual landmarks from images.<br>—Modified an existing monocular visual SLAM system to support additional artificial landmarks extracted from images. |
| **Geekie** | Brazilian ed-tech start-up. |
| Q4/2012–Q3/2015 | *Position: Software Engineer, Intelligence team*<br>—Led a small team to develop Bayesian networks related software, including GA based structure learning. Goal was to train networks with 45 hidden variables from millions of input records.<br>—Developed non-linear regression software related to Item Response Theory. Implemented new code to estimate item parameters, making the process more reliable and much faster than what was available to the company before.<br>—Implemented a constrained local search algorithm for the Balanced Incomplete Block Design problem.<br>—Developed tools for problems such as study recommendation to students, log analysis and business analytics. |

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| **Google Inc.** | Books project. |
| Q3/2011 | *Position: Software Engineering intern*<br>—Developed a technique to dewarp pictures of open books by fitting isometric mappings (developable surfaces) to 3D data.<br>—Developed a signal phase estimation method for a scanner. |
| **USP** | LTI/PCS, Dept. of Computer and Digital Systems Engineering. |
| 2007–2011 | *Position: Teaching intern*<br>—Supervision of undergrads on the construction of a Theremin instrument and some mobile robotics and vision projects. |
| **Excegen S.A.** | Brazilian biochemical R&D startup company. |
| Q3–Q4/2004 | *Position: Engineering intern*<br>—Worked with a naïve Bayes classifier with genetic data. |

## Portfolio

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| Journal articles | **Corisco: Robust edgel-based orientation estimation for generic camera models**, *Nicolau Werneck and Anna Helena Reali Costa*. Image and Vision Computing, 2013. `http://dx.doi.org/10.1016/j.imavis.2013.10.004` |
| | **Mapping with monocular vision in two dimensions**, *Nicolau Werneck and Anna Helena Reali Costa*. International Journal of Natural Computing Research 1(4), 2010. `http://dx.doi.org/10.4018/978-1-4666-1574-8.ch022` |
| Event articles | **Speeding up probabilistic inference of camera orientation by function approximation and grid masking**, *Nicolau Werneck and Anna Helena Reali Costa*. 19th WSCG, Czech Republic, 2011. |
| | **Monocular visual mapping with the Fast Hough Transform**, *Nicolau Werneck and Anna Helena Reali Costa*. VI Workshop de Visão Computacional, 2010. |
| | **Medição de acoplamentos entre modos de vibração ortogonais em uma guitarra elétrica**, *Nicolau Werneck and Furio Damiani*. 11th Brazilian Symposium on Computer Music, 2007. |
| Software projects | **akka-mapreduce**, a Scala library based in Akka to create small monolithic applications for in-memory map-reduce analyses, 2015. `http://goo.gl/DseZlr` |
| | **corisco**, a method to estimate camera orientation from a single picture *(doctorate research)*, 2012. `http://goo.gl/0745pQ` |
| | **featherweight**, prototype to demonstrate a method to fit a developable surface to a 3D point cloud in order to dewarp pictures of open books *(internship project)*, 2011. `http://goo.gl/aXsDY` |
| Misc | *A Linux webcam driver patch*, 2010. `http://goo.gl/rZDbk` |
| | *Sequence A140261* on OEIS, 2008. `http://oeis.org/A140261` |

July 2, 2017