



Fernando Pujaico Rivera

Curriculum Vitae

Personal information

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Education

- 2014 **PhD in Electrical Engineering**, *State University of Campinas (UNICAMP)*, Brazil.
Title: Bit-Flipping algorithms for joint decoding of correlated sources in noisy channels.
- 2011 **Master's degree in Electrical Engineering**, *UNICAMP*, Brazil.
Title: Hard-decision decoding algorithms for LDGM codes.
- 2008 **Electronic Engineer**, *National University of Engineering (UNI)*, Peru.
Title: Electrical resistivity tomography applied to the study of roots growth.
- 2006 **Bachelor of science with mention in Electronic Engineering**, *UNI*, Peru.

Areas of expertise

Electronic engineering, information theory, error correcting codes, programing, electronic design, digital signal processing.

Experience

Teaching experience

- November 2016 **short course: Dynamic Speckle Laser in Bio-systems**, Entity: Faculty of Agricultural Engineering, UNICAMP, Brazil.
8 hours
- Second semester 2015 **PEG530 - Laser, applications and metrology**, Engineering Department, UFLA, Brazil.
8 hours
- Second semester 2013 **Teacher training stage: PED C, GL100**, Mathematics I.
Entity: FCA UNICAMP
- First semester 2010 **Teacher training stage: PED C, EE881**, Communications principles.
Entity: FEEC UNICAMP
- 2008 **Teacher, C++ Language**, Level I.
Entity: CCIESAM - UNI. Peru.

Professional experience

- 2015 – 2020 **Postdoctoral**, University of Lavras (UFLA), Brazil.
Engineering department / Applied Instrumentation Development Center to Agriculture (CEDIA)
- 2007 – 2008 **Researcher**, Institute for Research and Development of Civil Engineering Faculty (IIFIC), UNI, Peru.
Type of contract: Labor
Description: Design, construction and data processing of an accelerometer to the Accelerometers National Network of CISMID - II.
- 2006 – 2008 **Researcher**, IIFIC, UNI, Peru.
Type of contract: Labor
Description: Design and construction of a data acquisition system for dynamic testing of piles.

Published works

Books

- 2020 **Métodos numéricos: Problemas não lineares e inversos**, ISBN: 978-65-00-07314-0, 2020, Edição independente.
<https://trucomanx.github.io/metodos.numericos/index.html>
- 2016 **A practical guide to biospeckle laser analysis: theory and software**, ISBN: 978-85-81-27051-7, 2016, Ed. UFLA.
<http://repositorio.ufla.br/jspui/handle/1/12119>

Chapters of Books

- 2019 **Engenharias, ciência e tecnologia 4**, ISBN: 978-85-72-47087-2, 2019, Editora Atena.
DOI:10.22533/at.ed.87219310127

Articles published in magazines

- 2022 **Smart Agricultural Technology**, DOI: 10.1016/j.atech.2022.100062 .
Title: "Optical and Portable Equipment for Characterizing Soil Roughness".
- 2022 **Maderas-Cienc Tecnol**, DOI: 10.4067/s0718-221x2022000100413 .
Title: "Particle image velocimetry technique and ultrasound method to obtain the modulus of elasticity of Bertholletia excelsa wood".
- 2022 **Scientia Agricola**, DOI: 10.1590/1678-992X-2020-0297 .
Title: "Particle image velocimetry and digital image correlation for determining the elasticity modulus in wood".

- 2021 **Maderas-Cienc Tecnol**, <http://revistas.ubiobio.cl/index.php/MCT/article/view/4860>.
Title: "Particle image velocimetry technique for analysis of retractibility in woods of *Pinus elliottii*".
- 2020 **Brazilian Journal of Development**, DOI: 10.34117/bjdv6n5-072.
Title: "Use of particle image velocimetry (PIV) to study the modulus of elasticity of plywood panels".
- 2020 **Brazilian Journal of Development**, DOI: 10.34117/bjdv6n5-069.
Title: "Use of the velocimetry technique by particle images (PIV) for the study of deformations in *pinus oocarpa* wood panels".
- 2020 **Brazilian Journal of Development**, DOI: 10.34117/bjdv6n5-074.
Title: "Use of the Particle Imaging Velocimetry (PIV) technique to obtain the deformation map in *Pinus Oocarpa* wood panels".
- 2020 **Optics And Laser Technology**, DOI: 10.1016/j.optlastec.2020.106221.
Title: "Illumination dependency in dynamic laser speckle analysis".
- 2019 **Computers and Electronics in Agriculture**, DOI: 10.1016/j.compag.2019.105050.
Title: "Development of an optical technique for characterizing presence of soil surface crusts".
- 2019 **CERNE**, DOI: 10.1590/01047760201925022633.
Title: "Particle image velocimetry for estimating the young's modulus of wood specimens".
- 2019 **Optik**, DOI: 10.1016/j.ijleo.2019.02.055.
Title: "Viability of biospeckle laser in mobile devices".
- 2019 **CERNE**, DOI: 10.1590/01047760201925012619.
Title: "Displacement measurement in sawn wood and wood panel beams using particle image velocimetry".
- 2019 **Computers and Electronics in Agriculture**, DOI: 10.1016/j.compag.2019.01.051.
Title: "Sound as a qualitative index of speckle laser to monitor biological systems".
- 2018 **Theoretical and Applied Engineering**, DOI: 10.31422/taae.v2i2.5.
Title: "The use of particle image velocimetry for displacement measurements in steel columns subjected to buckling".
- 2018 **Optics and Laser Technology**, DOI: 10.1016/j.optlastec.2018.07.006.
Title: "Diode laser reliability in dynamic laser speckle application: Stability and signal to noise ratio".
- 2018 **Journal of Food Measurement and Characterization**, DOI: 10.1007/s11694-018-9839-8.
Title: "Measurement of water activities of foods at different temperatures using biospeckle laser".
- 2018 **Engenharia Agrícola**, ISSN:0100-6916, DOI: 10.1590/1809-4430-eng.agric.v38n2p159-165/2018.
Title: "Analysis of elasticity in woods submitted to the static bending test using the particle image velocimetry (PIV) technique".
- 2017 **Journal of Biomedical Optics**, DOI: 10.1117/1.JBO.22.4.045010.
Title: Dynamic laser speckle analyzed considering inhomogeneities in the biological sample.
- 2017 **Optics Communications**, DOI: 10.1016/j.optcom.2017.03.015.
Title: Selection of statistical indices in the biospeckle laser analysis regarding filtering actions.
- 2014 **IEEE Communications Letters**, DOI: 10.1109/LCOMM.2014.2377237.
Title: Optimal Rate for Joint Source-Channel Coding of Correlated Sources Over Orthogonal Channels.

Articles published in annals of events

- 2015 **I Congresso Mineiro de Engenharia e Tecnologia, Brasil**, http://www.eventos.ufla.br/comet/ANAIS_COMET_2015_1ed_FINAL.pdf.
Title: "Diferenciação da Crosta Superficial do Solo por Meio de Técnicas Óticas"
- 2013 **XXXI Brazilian Telecommunications Symposium, Brasil**, DOI: 10.14209/sbrt.2013.95, <http://gestao.sbrt.org.br/simposios/artigo/visualizar/a/145>.
Title: "Algoritmo Para Decodificação e Fusão De Dados Correlacionados Em Redes De Sensores Sem Fio".
- 2012 **XXX Brazilian Telecommunications Symposium, Brasil**, <http://gestao.sbrt.org.br/simposios/artigo/visualizar/a/432>.
Title: "Algoritmos de Decodificação Abrupta para Códigos LDGM".
- 2011 **XXIX Brazilian Telecommunications Symposium, Brasil**.
Title: "Decodificação Iterativa Conjunta Fonte-Canal".
- 2007 **XVII National Congress of Engineering, Mechanical, Electrical and Allied, Peru**.
Title: "Tomógrafo de Resistividad Eléctrica Aplicado al Estudio del Crecimiento de los Tubérculos de la Papa".

Professor adviser

Joint supervisor

- 2017 **Study of trajectories reconstruction based on low cost inertial sensors and applied to terrestrial mobility context**, *Ribeiro, Eduardo Zampieri*, Master's degree in Systems Engineering and Automation, UFLA.
<http://repositorio.ufla.br/handle/1/28225>
- 2016 **Development of an optic technique for characterizing the presence of superficial crust of the soil**, *Barreto, Bianca Batista*, Master's degree in Agricultural Engineering, UFLA.
<http://repositorio.ufla.br/jspui/handle/1/11903>
- 2020 **Digitalização da coluna por meio da visão monocular com projeção de luz estruturada**, *Ribeiro, Elisângela*, Phd degree in Agricultural Engineering, UFLA.
<http://repositorio.ufla.br/handle/1/43483>
- 2020 **Optical and portable equipment to characterize soil roughness conditions**, *Barreto, Bianca Batista*, Doutorado em Engenharia Agrícola, Universidade Federal de Lavras.
<http://repositorio.ufla.br/jspui/handle/1/46056>

Participation in stalls completion work

Doctoral's degree

- 2016 **Digitization of physical deformations of the soil through a digital camera**, *Participation in stalls of Diego Eduardo Costa Coelho*, Dissertation defense of post-graduation program agricultural engineering.
UFLA. Ordinance CPGSS/PRPG Nro 987/2016 de 23/11/2016.
- 2020 **Digitalização da coluna por meio da visão monocular com projeção de luz estruturada**, *Participation in stalls of Elisângela Ribeiro*, Dissertation defense of post-graduation program agricultural engineering.
UFLA. Ordinance PRPG Nro 726/2020 de 14/08/2020.

Master's degree

- 2017 **Low cost inertial sensor-based trajectory generation: Application in intelligent transport systems**, *Chairman of the stall of Eduardo Zampieri Ribeiro*, Dissertation defense of post-graduation program in system and automation engineering .
UFLA. Ordinance CPGSS/PRPG Nro 563/2017 de 11/10/2017.
- 2015 **Influence of laser intensity in the biospeckle activity map**, *Participation in stalls of Renan Oliveira Reis*, Dissertation defense of post-graduation program in system and automation engineering .
UFLA. Ordinance CPGSS/PRPG Nro 655/2015 of 13/07/2015.

Doctoral's degree qualification

- 2019 **Participation in the evaluation committee of Elisângela Ribeiro**, Qualification exam of post-graduation program in agricultural engineering.
Universidade Federal de Lavras.
- 2019 **Participation in the evaluation committee of Bianca Batista Barreto**, Qualification exam of post-graduation program in agricultural engineering.
Universidade Federal de Lavras.
- 2016 **Participation in the evaluation committee of Rodrigo Allan Pereira**, Qualification exam of post-graduation program in agricultural engineering.
UFLA.

Master's Degree Qualification

- 2018 **Participation in the evaluation committee of Thiago Juvenal Ribeiro**, Qualification exam of post-graduation program in agricultural engineering.
UFLA.
- 2018 **Participation in the evaluation committee of Dione Weverton Dos Reis Araújo**, Qualification exam of post-graduation program in system and automation engineering.
UFLA.
- 2016 **Participation in the evaluation committee of Eduardo Zampieri Ribeiro**, Qualification exam of post-graduation program in system and automation engineering.
UFLA.

Complementary Training

Complementary Training Courses

- 2020 **Introdução à Ciência da Computação com Python Parte 2**, 7 weeks, <http://coursera.org/verify/DH6VVXCQEBHP>.
an online non-credit course authorized by USP and offered through Coursera.
- 2020 **Introdução ao Desenvolvimento de Aplicativos Android**, 5 weeks, <http://coursera.org/verify/N3YXYEYLFT3U>.
an online non-credit course authorized by Unicamp and offered through Coursera.
- 2020 **Object detection**, 6 weeks, <http://coursera.org/verify/FQA75P2H8JLS>.
an online non-credit course authorized by Universitat Autònoma de Barcelona and offered through Coursera.
- 2020 **Machine Learning**, 11 weeks, <http://coursera.org/verify/TLNHXEJP22ZB>.
an online non-credit course authorized by Stanford University and offered through Coursera.
- 2020 **Machine Learning for All**, 20 Horas, <http://coursera.org/verify/CZE8NBUCW87H>.
An online non-credit course authorized by University of London and offered through Coursera.

Presentations

- 2013 **Algorithm for decoding and fusion of correlated data in wireless sensor networks.**
XXXI Brazilian Telecommunications Symposium, Brazil
- 2012 **Hard-decision decoding algorithms for LDGM codes.**
XXX Brazilian Telecommunications Symposium, Brazil
- 2011 **Iterative source-channel joint decoding.**
XXIX Brazilian Telecommunications Symposium, Brazil

Languages

- Spanish Native language
- Portuguese Read good, write good, understands good, speak good
- English Read good, Write reasonably, Understands reasonably, Speaks little

Free software projects

- 2015 – Actual **Bio-Speckle Laser Tool Library**, <http://www.nongnu.org/bsltl/>.
This package is a set of functions, written in M-code, for the digital processing of images of a bio-speckle analysis. The library is designed to be used in OCTAVE or MATLAB. You can find functions to calculate: Co-occurrence matrix, THSP, AVD, inertia moment, Fujii, GD, PTD, etc.
- 2015 – Actual **PDS-IT Package**, <http://trucomanx.github.io/pdsit-pkg>.
This package is a set of functions, written in M-code, for to work with digital signal processing and information theory in OCTAVE or MATLAB. You can find functions for: Entropy for binary sources, Joint entropy for binary sources, bit error rate in the CEO problem, etc.
- 2014 – Actual **PDS Project Library in Java**, <http://pdsplibj.sourceforge.net/>.
It is a set of libraries, written in Java language, For the digital signal processing. You can find libraries for: Random variables, vectors, matrices, digital filters, digital sources, particle image velocimetry, etc.
- 2014 – Actual **LDPC Tools**, <https://launchpad.net/ldpc-tools>.
It is a set of programs, written in C language, for to work with low density parity check matrices.
- 2011 – Actual **PDS Project Library**, <http://www.nongnu.org/pdsplibrary/>.
It is a set of libraries, written in C language, for the digital signal processing. You can find libraries for: Random variables, complex numbers, vectors, matrices, FFT, digital filters, digital sources, neural networks, etc.

Computer languages

- C C language
- M-code MATLAB/OCTAVE language
- C++ C++ language
- Java Java language
- LaTeX LaTeX language
- Python Linguagem Python
- Java/Android Development of Android applications

Interests

- Photography
- Running
- Ocarinas maker
- C language

- Dance

- Raw food