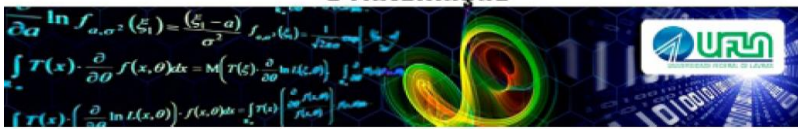
Master of Science

Systems and Automation Engineering

Federal University of Lavras - UFLA
Engineering Department

UNIVERSIDADE FEDERAL DE LAVRAS

Pós Graduação em Engenhari a de Sistemas e Automação



http://www.prpg.ufla.br/esistemas

Systems and Automation Engineering

- Focus on interdisciplinary research on theories, methods, and applications involving modeling, design, implementation, and analysis of physical and virtual systems, e.g. industrial, mechatronic, intelligent, agricultural, and embedded systems
- Research areas
  - Intelligent Systems
  - Automation and Instrumentation

Intelligent Systems

- Topics
  - Artificial Neural Networks
  - Fuzzy Sets and Systems
  - Evolutionary Computation and Optimization
  - Dynamical Systems Identification and Control
  - Pattern Recognition
  - Numeric Methods
  - Evolutionary Hardware
  - Embedded Systems

Automation and Instrumentation

- Topics
  - Signal Processing
  - Image Processing and Machine Vision
  - Signal Statistics
  - Optical Metrology
  - Pattern Recognition
  - Instrumentation
  - Voice and Video Coding
  - Quality Assessment of Voice and Video Signals

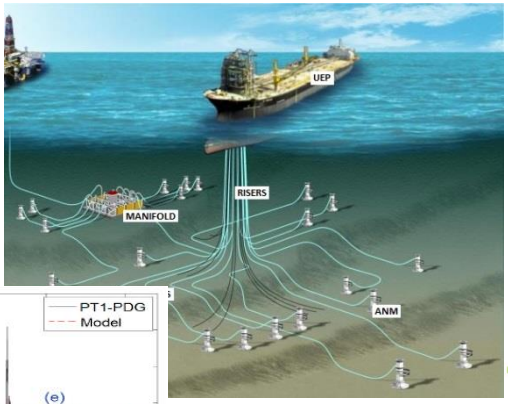
Faculty

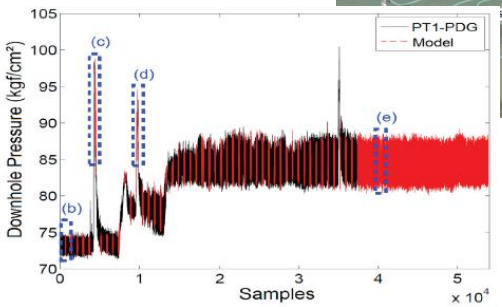
- Intelligent Systems
  - Bruno Henrique Groenner Barbosa (brunohb@ufla.br)
  - Daniel Furtado Leite (daniel.leite@ufla.br)
  - Danton Diego Ferreira (danton@ufla.br)
  - Silvia Costa Ferreira (silvia.ferreira@ufla.br)
  - Tadayuki Yanagi Jr. (yanagi@ufla.br)
  - Wilian Soares Lacerda (lacerda@ufla.br)
- Automation and Instrumentation
  - Daniel Augusto Pereira (danielpereira@ufla.br)
  - Demóstenes Z. Rodriguez (demostenes.zegarra@ufla.br)
  - Felipe Oliveira e Silva (felipe.oliveira@ufla.br)
  - Ricardo Rodrigues Magalhães (ricardorm@ufla.br)
  - Roberto Alves Braga Jr. (robertobraga@ufla.br)
  - Sandro Pereira da Silva (sandro.silva@ufla.br)

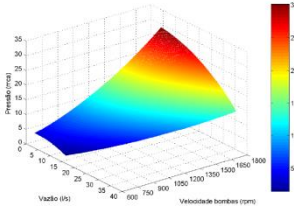
Bruno Henrique Groenner Barbosa

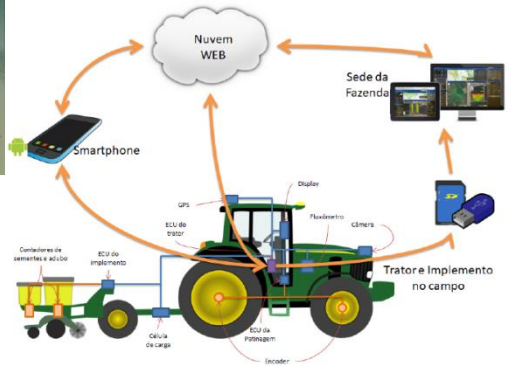
Doc: Electrical Eng. - UFMG, 2009
MSc: Electrical Eng. - UFMG, 2006
BEng: Control and Automation Eng. - UFMG, 2003

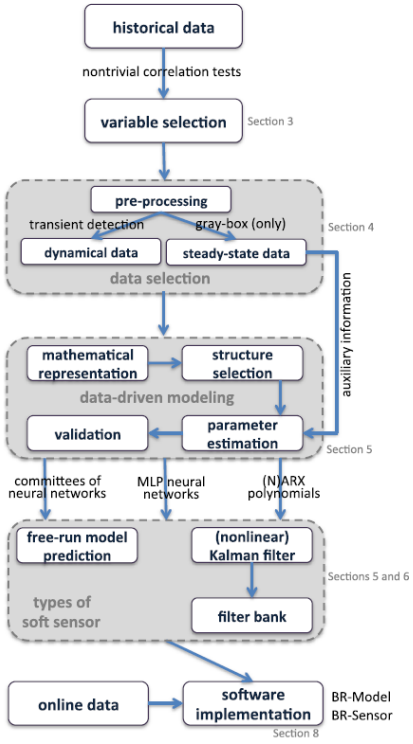
Areas: Modelling of Dynamical Systems and Soft-sensors
Computational Intelligence and Optimization
Pattern Recognition
Systems' Automation



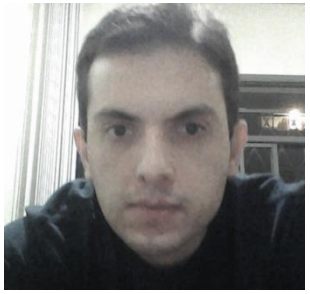






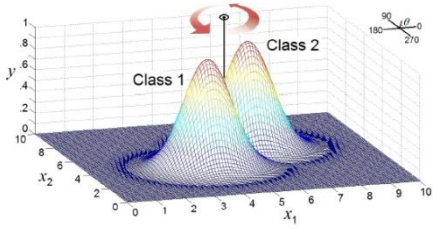


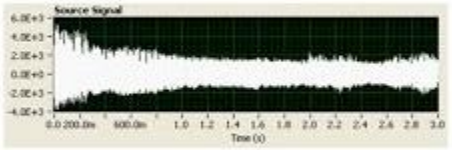
Daniel Furtado Leite

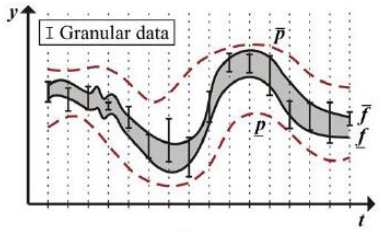


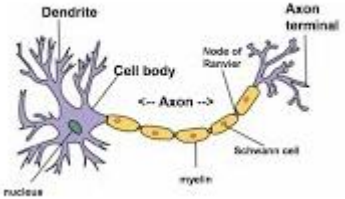
Post-Doc: Learning Systems – University of Ljubljana, Slovenia, 2019
Post-Doc: Intelligent Control – UFMG, 2014
Doc: Electrical Eng. – UNICAMP, 2012
MSc: Electrical Eng. – PUC/MG, 2007
BEng: Control and Automation Eng. – PUC/MG, 2005

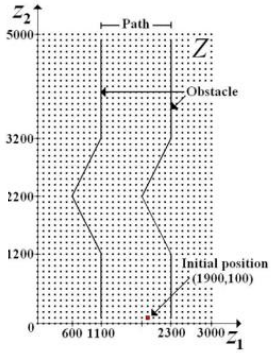
Areas: Dynamical Systems Modeling and Control
General Theory of Uncertainty
Adaptive Neural Networks and Fuzzy Systems
Time Series, Pattern Recognition and Classification

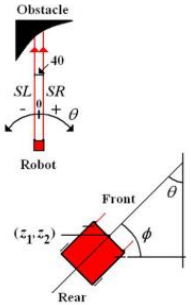








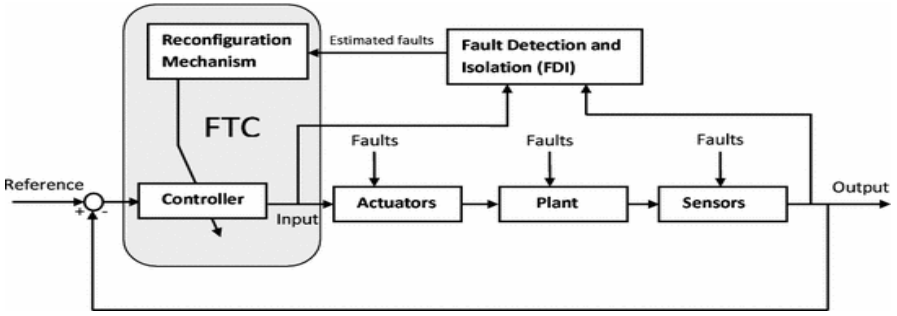




Daniel Augusto Pereira

Post-Doc: Fault Tolerant Control – University of Lille, France, 2017
Doc: Mechanical Eng. – UNICAMP, 2014
MSc: Mechanical Eng. – UNICAMP, 2008
BEng: Automation and Control Eng. – UNICAMP, 2005

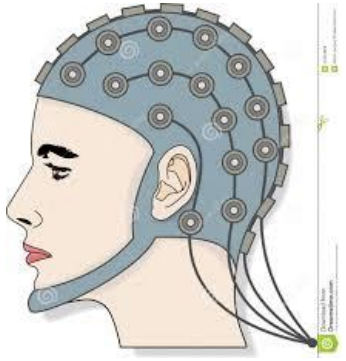
Areas: Control of Dynamical Systems
Fault Diagnosis
Fault Tolerant Control
Active Vibration Control
Structural Health Monitoring

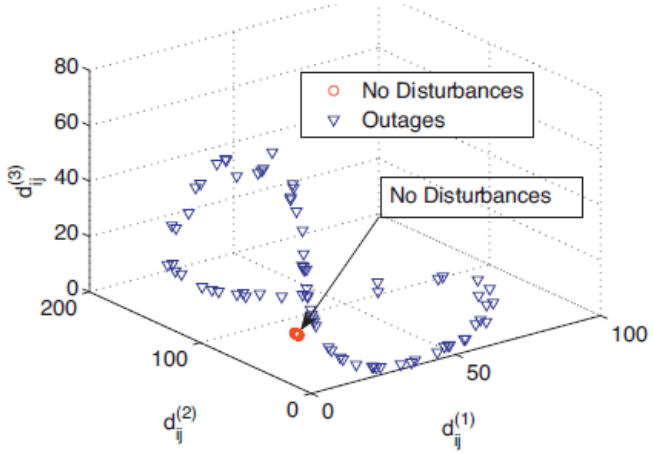


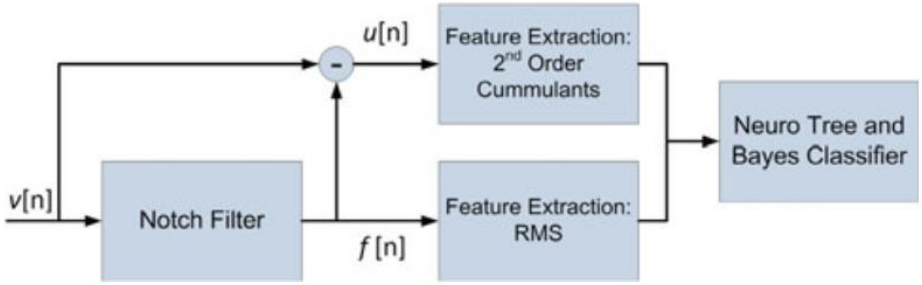
Danton Diego Ferreira

Post-Doc: Signal processing for Smart Grids – UFJF, 2014
Doc: Electrical Eng. - COPPE/Poli/UFRJ, 2010
MSc: Electrical Eng. - UFJF, 2007
BEng: Electrical Eng. - UFSJ, 2000

Areas: Computational Intelligence
Power Quality Monitoring
Biomedical Signals
Pattern Recognition





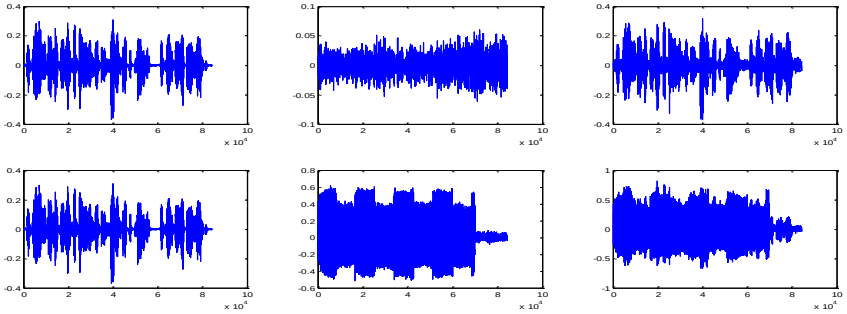


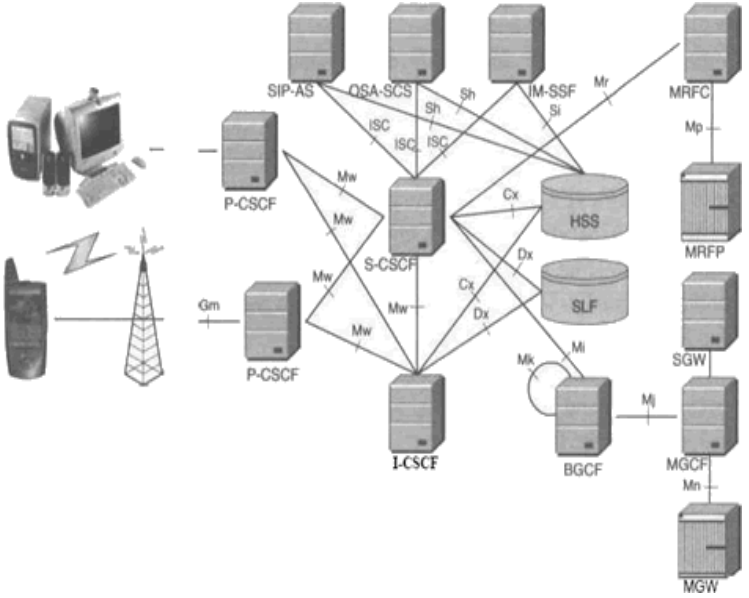
Researchers

Demóstenes Zegarra Rodríguez

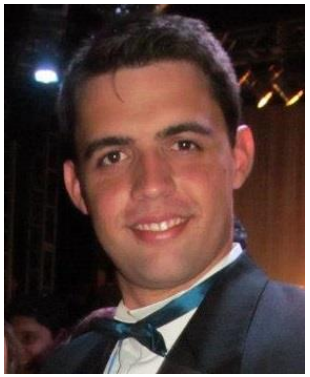
Post-Doc: Q&U Lab – Technical University of Berlin, Germany, 2018
Doc: Electrical Eng. - USP, 2013
MSc: Electrical Eng. - USP, 2009
BEng: Electronic Eng. – PUC/Peru, 2000

Areas of work: Digital Signal Processing
Quality Assessment of Voice and Video Signals
Quality of Experience - QoE
Communication Systems





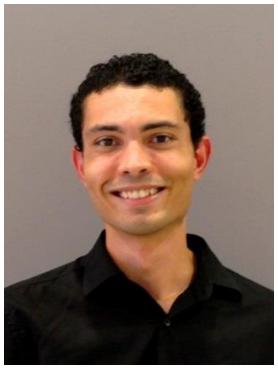
Felipe Oliveira e Silva



Post-Doc: Electrical Eng. – UCR, EUA, 2019
D.Sc.: Aeronautical and Mechanical Eng. – ITA, Brazil, 2016
M.Sc.: Systems Eng. – INSA-CVL, France, 2013
BEng: Automatic Control Eng. – UNIFEI, Brazil, 2012

Areas: Guidance, Navigation and Control (GNC) Systems
Global Navigation Satellite Systems (GNSS)
Sensor Fusion
Instrumentation
Robotics
Hydro-Pneumatic Systems
Precision Agriculture (PA)

Lucas Rocha Vieira
Administrative Assistant



MSc: Administration – UFLA, 2019
Bachelor in Public Administration – UFLA, in progress
Bachelor in Administration – UFLA, 2017

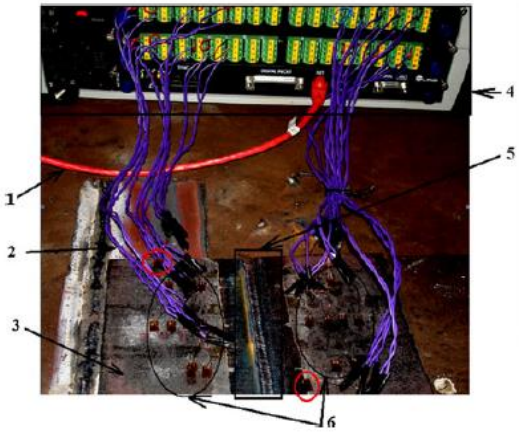
Emails: esis.deg@ufla.br
lucasrvieira@ufla.br

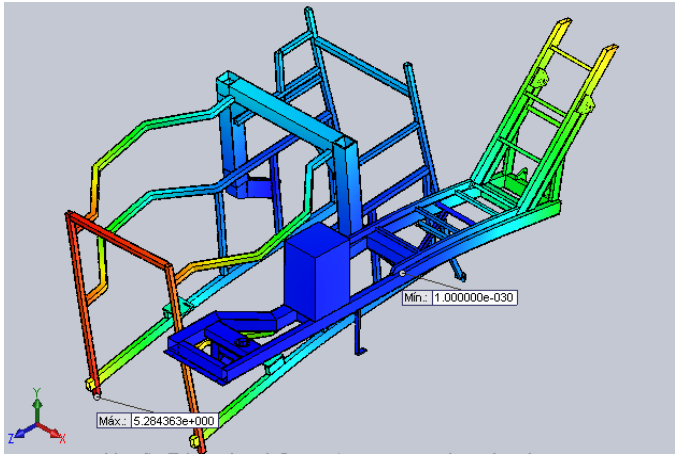
Phone: +55 (35) 3829-1675

Ricardo Rodrigues Magalhães

Post-Doc: Biomechanics – University of Liverpool, UK, 2014
Doc: Industrial Eng - UFBA, 2011
MSc: Mechatronics Eng. - UFBA, 2008
BEng: Mechanical Eng. – CEFET/MG, 2000

Areas: Manufacturing Engineering
Product Development
Finite Elements Modelling
Stress Analysis

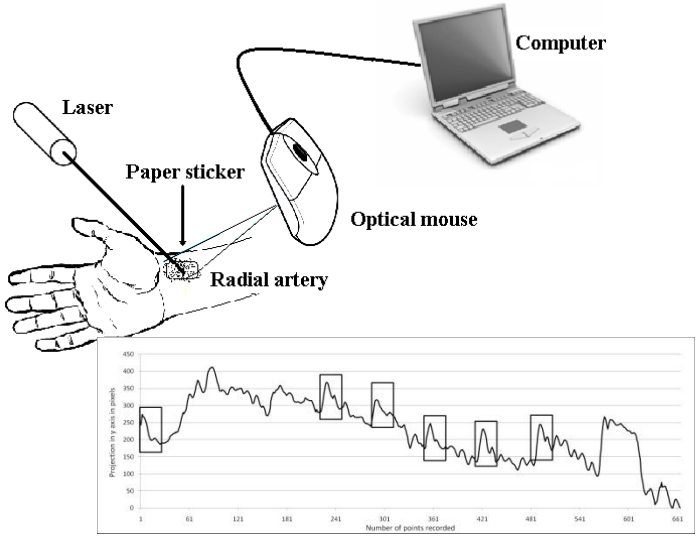


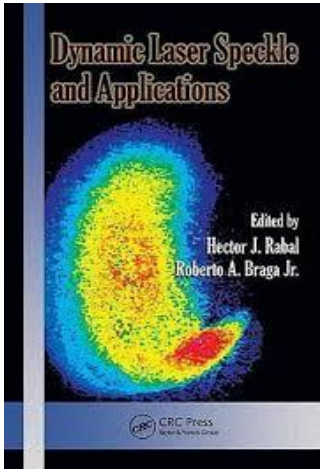


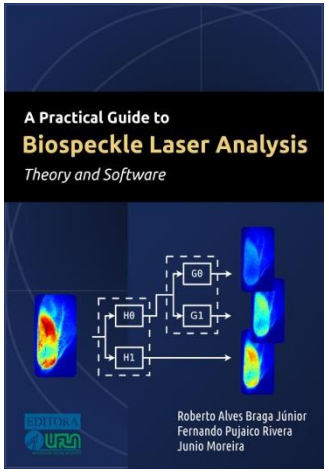
Roberto Alves Braga Júnior

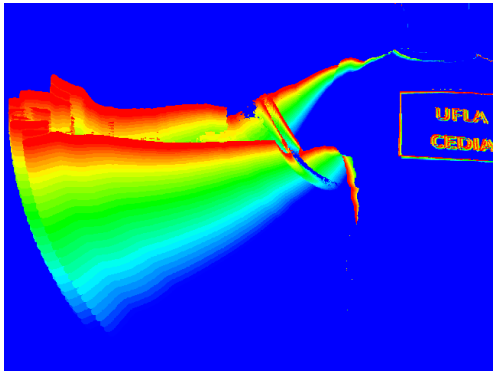
Post-Docs: Image Analysis – BIOSS, Scotland, 2005, 2008 e 2011
Doc.: Agricultural Eng. – UNICAMP, 2000
MSc: Electrical Eng. – UFMG, 1994
BEng: Electrical Eng. – UFMG, 1991

Areas: Optical Metrology
Dynamic Laser Speckle
Interferometry
Signal and Image Analysis









Sandro Pereira da Silva

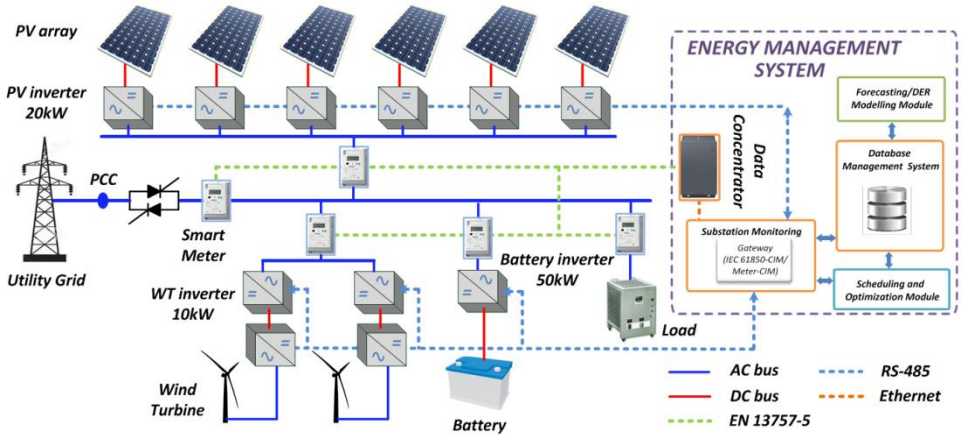
Doc: Mechanical Eng - USP, 2015
MSc: Mechanical Eng. - UFSJ, 2010
Clinical Psychologist – WC, 2007
MBA: Industrial Management – FGV, 2005
Specialist: Production Management – FEI, 2003
BEng: Civil Eng. – UBSP, 2001
23 years industrial experience of P&D

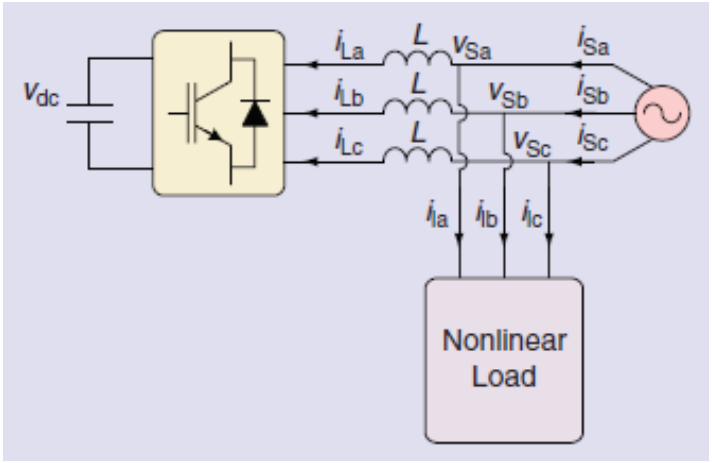
Areas: Manufacturing Engineering
Process and Product Development
Assistive Technology
Intelligent Equipment Development of Biomedical area

Sílvia Costa Ferreira

Doc.: Electrical Eng. – UNIFEI, 2016
MSc: Electrical Eng. – UNIFEI, 2012
BEng: Control and Automation Eng. – UNIFEI, 2011

Areas: Power Electonics and Industrial Control
Signal Processing and Adaptive Filters
Power Quality and Electric Power Systems
Renewable Energy and Distributed Generation Systems

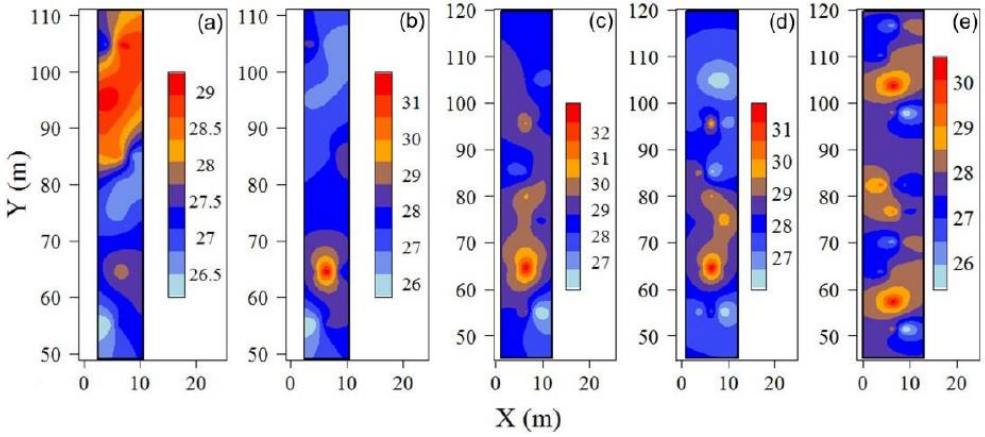




Tadayuki Yanagi Jr

Doc.: Agricultural Eng. – UFV, 2002
MSc: Agricultural Eng. – UFLA, 1995
BEng: Agricultural Eng. – UFLA, 1992

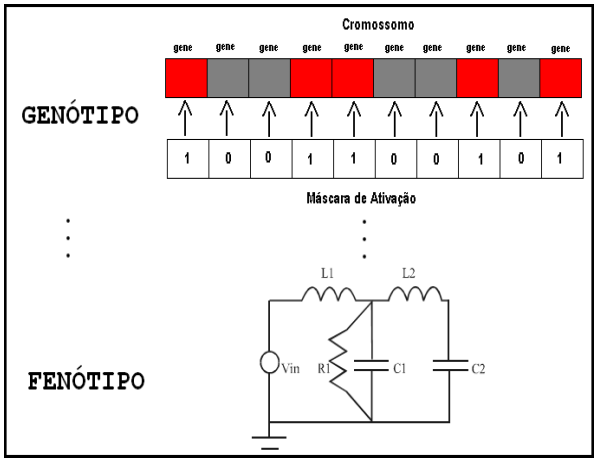
Areas: Rural Buildings
Ambiance
Modelling of Biosystems
Fuzzy Systems and Neural Networks

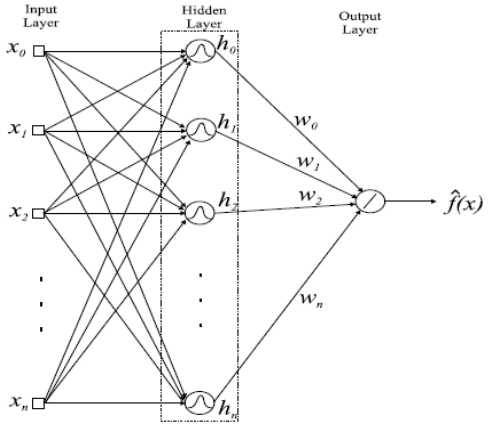


Wilian Soares Lacerda

Doc.: Computer Eng. – UFMG, 2006
MSc: Electrical Eng. – UFMG, 1994
BEng: Electrical Eng. – UFMG, 1991

Areas: Computational Intelligence
Embedded Systems Hardware e Software
Field Programmable Gate Array
Digital and Analogical Electronics





MSc Program Outline

- Usually requires a period from 18 to 24 months
- Comprises 30 credits
  - A credit corresponds to 15 hours of class over a 15-week semester – this excludes unsupervised activities
  - Courses fit into three groups
    - Key
    - Area core
    - Elective

- Key courses (12 credicts)

Course Title	Credits	Semester
Foreign Language	2	First *
Bibliographic Research and Scientific Communication	2	First
Seminars	1	Second
Oriented Project	4	Second
Qualifying Exam	1	Second
Dissertation	2	3rd or 4th

* Should be done in the first semester

- Core courses * (12 credits minimum)

Course Title	Credits	Course Title	Credits
Introduction to Artificial Neural Networks	4	Signal Processing	2
Fuzzy Systems	4	Advanced Signal Processing	2
Evolutionary Computation	4	Computer Vision	4
Pattern Recognition	4	Laser, Applications and Metrology	4
Independent Component Analysis	4	Instrumentation	4
Advanced Navigation Systems	4	Power Quality and conditioning	4
Introdution to the Finite Elements Modelling	4	Power Electronics Applied to Electrical Systems	2
Finite Elements for Stress Analysis	4	Reconfigurable Hardware Projects	4
Vibration Control in Structures	4	Quality Assessment in Multimidia Services	4
Linear Systems Theory	4	Guidance, Navigation and Positioning Systems	4
Dynamical Systems Identification	2	Special Topics in Systems and Automation Engineering	4
Modelling and Simulation Applied to Ambiance	4	Introduction to Dinamical Systems Control	4

* Can be done in any semester

- Elective courses
  - 6 credits maximum
  - Students may enroll in electives in any semester
  - Elective courses are those from other graduate programs of the UFLA