

TALLES BATISTA RATTIS SANTOS

Confluence Hall 323, Colorado Mesa University
+1(970)248-5104 ◊ Talles.Santos@colorado.edu

EDUCATION

- Polytechnic School of the University of São Paulo, Poli-USP, Brazil Feb 2015 - Dec 2019
Ph.D. in control engineering and mechanical automation
Department of Mechanical Engineering, Poli-USP
-Title in English: *Development and use of anatomical and physiological prior information to estimate electrical impedance tomography images*
- Polytechnic School of the University of São Paulo, Poli-USP, Brazil Feb 2012 - Feb 2015
M.S. degree in control engineering and mechanical automation
Department of Mechanical Engineering, Poli-USP
-Title in English: *Control test of bovine pericardium with electrical impedance tomography*
- Federal University of Minas Gerais, UFMG, Brazil Jul 2006 - Dec 2011
Bachelor in Electrical Engineering
Department of Electrical Engineering, UFMG

RELEVANT SKILLS AND INTERESTS

- Advanced programming experience in C/C++, Matlab/Octave, Shell Script and Python.
- Advanced experience designing and prototyping electronics in medical devices.
- Developed new signal processing techniques using statistical methods.
- Open Source Enthusiast
-Linux user
- Fluent in Portuguese.
- Advanced (speaking, reading, writing) in English.

TEACHING EXPERIENCE

LECTURES (FULL COURSE)

- Fall 2023
 - Introduction to Probability Theory (ECEN-3810). Offered at Colorado Mesa Univ.
 - Control Systems Analysis (ECEN-4138). Offered at Colorado Mesa Univ.
 - Intro to Digital Filtering (ECEN-4632). Offered at Colorado Mesa Univ.
- Spring 2023
 - Introduction to Probability Theory (ECEN-3810). Offered at Colorado Mesa Univ.
 - Introduction to Digital Filtering (ECEN-4632). Offered at Colorado Mesa Univ.
 - Control Systems Lab. (ECEN-4638). Offered at Colorado Mesa Univ.

- Fall 2022
 - Linear Systems (ECEN-3300). Offered at Colorado Mesa Univ.
 - Control Systems Analysis (ECEN-4138). Offered at Colorado Mesa Univ.

GUEST LECTURES

- Sensores, Atuadores e Problemas Inversos Bayesianos em Medicina (PME5240). Escola Politécnica da Universidade de São Paulo, Poli-USP, Brasil 2016
 -Title in English: *Sensors, Actuators and Bayesian inverse problems in medicine. Polytechnic School of the University of São Paulo, Poli-USP, Brazil.*

Guest lectures:

- Lecture on Bayesian inference applied to EIT (50 minutes).
- Lecture on the Schur Complement properties applied to EIT (50 minutes).
- Lecture on the EIT systems (50 minutes).

- Introdução à Biomecânica. Escola Politécnica da Universidade de São Paulo, Poli-USP, Brasil 2016

-Title in English: *Introduction to biomechanics. Polytechnic School of the University of São Paulo, Poli-USP, Brazil.*

Guest lectures:

- Lecture on the EIT technique (50 minutes).

- Sensores, Atuadores e Problemas Inversos Bayesianos em Medicina (PME5240). Escola Politécnica da Universidade de São Paulo, Poli-USP, Brasil 2014
 -Title in English: *Sensors, Actuators and Bayesian inverse problems in medicine. Polytechnic School of the University of São Paulo, Poli-USP, Brazil.*

Guest lectures:

- Lecture on Bayesian inference applied to EIT (50 minutes).

WORKING EXPERIENCE

- Colorado Mesa University (CMU) 2022 - Present
 Instructor, CMU/CU Boulder Engineering Partnership Program
 - CU Boulder faculty teaching at Electrical and Computer Engineering Program at Colorado Mesa Univ.
 Reference: Nathan McNeill, Director of CMU-CU Boulder Eng. Partnership Programs.
- Timpel Medical 2016 - 2022
 Research and Development Engineer
 - Improvement of the Timpel EIT system (Enlight 1800™).
 - Development and improvement of reconstructions algorithms used to EIT difference images.
 - FDA application process of the EIT system (Enlight 1800™) and its features.
 Timpel Medical, Rua Simão Álvares, 356, Pinheiros, São Paulo-SP, Brazil, 05.417-020.
 Reference: Rafael Holzhacker, chief executive.

RESEARCH EXPERIENCE

- Colorado State University (CSU), Department of Mathematics 2020 - 2022
Postdoctoral Research Fellow
 - Development and use of prior information to improve the spatial resolution of EIT images.
 - Development of new clinical applications using EIT.
 - Provide on-site support for the EIT hardware system, including making upgrades and repairs.Electrical Impedance Tomography laboratory (EIT lab), Department of Mathematics at CSU.
Advisor: Prof. Jennifer L. Mueller.
- Laboratório de Engenharia Ambiental e Biomédica (LAB) 2012 - 2019
Graduate student researcher
 - Development of image reconstruction algorithms and instrumentation relating to EIT.*Laboratório de Engenharia Ambiental e Biomédica*, Polytechnic School of the University of São Paulo.
Advisor: Prof. Raul G. Lima.
- Electrical Impedance Tomography laboratory (EIT lab) Sep 2013 - Mar 2014
Visiting research associate
 - Development of the *active complex electrode (ACE1) EIT system* for thoracic images.Electrical Impedance Tomography laboratory (EIT lab), Department of Mathematics at CSU.
Advisor: Prof. Jennifer L. Mueller.

PUBLICATIONS

Selected Publications

- SANTOS, T. B. R. ; NAKANISHI, R. M. ; KAIPIO, J. P. ; MUELLER, J. L. ; LIMA, R. G. . Introduction of Sample Based Prior into the D-Bar Method Through a Schur Complement Property. *IEEE TRANSACTIONS ON MEDICAL IMAGING*, v. 39, p. 4085-4093, 2020.
- MARTINS, T. de C. ; SATO, A. K. ; MOURA, F. S. de ; CAMARGO, E. D. L. B. de ; SILVA, O. L. ; SANTOS, T. B. R. ; ZHAO, Z. ; MÖELLER, K. ; AMATO, M. B. P. ; MUELLER, J. L. ; LIMA, R. G. ; TSUZUKI, M. de S. G. . A review of electrical impedance tomography in lung applications: Theory and algorithms for absolute images. *ANNUAL REVIEWS IN CONTROL*, v. 48, p. 442-471, 2019.
- MELLENTHIN, M. M. ; MUELLER, J. L. ; CAMARGO, E. D. L. B de ; MOURA, F. S. de ; SANTOS, T. B. R. ; LIMA, R. G. ; HAMILTON, S. J. ; MULLER, P. A. ; ALSAKER, M. . The ACE1 Electrical Impedance Tomography System for Thoracic Imaging. *IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT*, v. 68, p. 3137-3150, 2019.

- NAKANISHI, R. M. ; SANTOS, T. B. R. ; AMATO, M. B. P. ; LIMA, R. G. . A Measure of Prior Information of a Pathology in an EIT Anatomical Atlas. 17th International Conference on Electrical Bioimpedance (pp.173-180), 2019.
- HAMILTON, S J ; MUELLER, J L ; SANTOS, T R . Robust computation in 2D absolute EIT (a-EIT) using D-bar methods with the exp approximation. Physiological Measurement, v. 39, p. 064005, 2018.
- SANTOS, T. B. R. ; CAMARGO, E. D. L. B. de ; MUELLER, J. L. ; LIMA, R. G. . Introduction of statistical priors into the D-bar method for electrical impedance tomography. In: 2018 International Applied Computational Electromagnetics Society Symposium (ACES), 2018, Denver. p. 1.
- SANTOS, T. B. R. ; SILVA, O. L. ; CAMARGO, E. D. L. B. DE ; MOURA, F. S. de ; BARBOSA, M. P. ; LIMA, R. G. . “Development of a test bench for quality control test of bovine pericardium with electrical impedance tomography”, in 7th International Conference and Medical Sciences, Belo Horizonte. Proceedings of the 7th International Conference and Medical Sciences, 2012.

PATENTS

- Systems and methods for determining a fluid and tissue volume estimations using electrical property tomography. Patent Number 11605162. 2023

CONFERENCE PRESENTATIONS

Mini-symposium speaker

- “D-bar reconstructions of human ventilation EIT data with a statistical prior applied through a Schur complement property”, Online Oral presentation at 21st International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT 2021), NUI, Galway-Ireland, 2021.
- “The use of the approximation error method and Bayesian inference to introduce anatomical and physiological prior information into D-bar algorithms”, Oral presentation at SIAM Conference on Imaging Science, Bologna-Italy, 2018.
- “Introduction of statistical priors into the D-bar method for electrical impedance tomography”, Oral presentation at International Applied Computational Electromagnetics Society Symposium (ACES), Denver-USA, 2018.
- “The Use of the Approximation Error Method and Bayesian Inference to Introduce Anatomical and Physiological Prior Information into EIT Reconstruction Algorithms”, Oral presentation at SIAM Conference on Imaging Science, Albuquerque-USA, 2016.