

TALLES BATISTA RATTIS SANTOS

Confluence Hall 323, Colorado Mesa University
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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

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

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 University.
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 Holz hacker, 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

Published

- 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

Patent pending

- Systems and methods for determining a fluid and tissue volume estimations using electrical property tomography 2020 - Present

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.