Curriculum Vitae

Antônio Horta Ribeiro

September 12, 2022

Current Position:
Postdoctoral Fellow
Uppsala University
Department of Information Technology,
Division of Systems and Control

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Academic Positions

Postdoctoral Fellow *Fev. 2021 - Now*
Department of Information Technology, Uppsala University Uppsala, Sweden
I am working under the supervision of Thomas Schön on the intersection of machine learning, signal processing, and control theory.

Postdoctoral Associate *Mar. 2020 - Fev. 2021*
Department of Computer Science, UFMG Belo Horizonte, Brasil
I worked on developing new machine learning algorithms and studying its application to engineering and health care. My position was funded by the Brasilian Agency CAPES, through the institutional internalization program (PRINT).

Education

Ph.D., Electrical Engineering *Aug. 2017 - Mar. 2020*
Universidade Federal de Minas Gerais (UFMG) Brazil
I was supervised by Luis Antonio Aguirre and co-supervised by Thomas B. Schon. I stayed one year, from Sept. 2018 to Sept. 2019, as a guest doctoral student at Uppsala University (Sweden). My Thesis won the award of Best thesis in the Electrical Engineering department and also the best thesis in Engineering and Physical Sciences in the University.

M.Sc., Electrical Engineering *Jan. 2016 - Jul. 2017*
Universidade Federal de Minas Gerais (UFMG) Brazil
I was supervised by Luis Antonio Aguirre. I completed 25 credits the equivalent 375 hours in class and my grade pointed average was 5.0 out of 5.0.

B.S.E., Electrical Engineering *Jan. 2016 - Jul. 2017*
Universidade Federal de Minas Gerais (UFMG) Brazil
I completed a total of 240 credits (3600 class-hours). And obtained a grade pointed average 4.91 out of 5.00. That is the weighted average of my letter grade (A = 5; B = 4; C = 3; D = 2; E = 1; F = 0) according to the course number of credits.

Additional work experience

Software Developer *May. 2017 - Aug. 2017*
Google Summer of Code Scipy
I have successfully completed Google Summer of Code program under the mentorship of Matt Haberland, Nikolay Mayorov and Ralf Gommers. My project was the implementation of an interior-point solver for large-scale nonlinear programming problems. The result is the method trust-contr, now openly available as part of the open source scientific library SciPy, in Python.

Hardware Team Intern *Jan. 2015 - Dec. 2015*
Invent Vision Belo Horizonte, Brazil

I was part of the hardware development team and worked designing FPGA-based cameras. The major project I have worked on while there was the design and implementation of a stereo camera.

Undergraduate Researcher *Jun. 2013 - Jan. 2015*
Research and development project with Petrobras Oil Company, UFMG Belo Horizonte, Brazil
I worked on the development of methods for identification of oil well mathematical models under the supervision of Professor Luis Antonio Aguirre. My position was funded by the Petrobras Oil Company through the Christiano Ottoni Foundation (FCO) in the modality bolsa de iniciação científica.

Awards

Benzelius award *2022*
Royal Society of Sciences in Uppsala Sweden
I was awarded the Benzelius Award (Benzeliusbelöningarna) due to my 'contributions to fundamental method development in machine learning and control technology, as well as its use to solve important problems in cardiology'. The prize is awarded yearly by the Royal Society of Sciences in Uppsala (Kungliga Vetenskaps-Societeten i Uppsala): the oldest of the royal academies in Sweden, founded in 1710. Named after Erik Benzelius, the prize is awarded to young researchers and comes with the amount of 25000 kronors.

Best Ph.D. Thesis in Engineering and Physical Sciences *2021*
Universidade Federal de Minas Gerais Belo Horizonte, Brazil
My Ph.D. thesis was awarded the best Ph.D. thesis defended in 2020 in engineering and physical sciences at the Universidade Federal de Minas Gerais (UFMG), Brazil. In portuguese: Grande Premio de Teses na área de ciências exatas e da terra e engenharias.

Best Ph.D. Thesis in Electrical Engineering *2021*
Universidade Federal de Minas Gerais Belo Horizonte, Brazil
My thesis was awarded the best Ph.D. thesis defended in 2020 in the Department of Electrical Engineering at the Universidade Federal de Minas Gerais (UFMG), Brazil. The thesis was then forwarded to compete with the thesis from all other Engineering and Physical Sciences departments at the university (where it was also awarded the best thesis, see the award above).

Young Author Award (Honorable Mention) *2021*
19th IFAC Symposium on System Identification Online
I have been one of the three finalists of the Young Author Award with the paper 'Beyond Occam's Razor in System Identification: Double-Descent when Modeling Dynamics'.

Best Poster Award *2019*
SciLifeLab Science Summit Uppsala, Sweden
I have been awarded the best poster award for the work 'Automatic Diagnosis of Short-Duration 12-Lead ECG using a Deep Convolutional Network'.

Travel Award *2018*
Machine Learning for Health (ML4H) Workshop at NeurIPS Montreal, Canada
I have been awarded the travel award for the work 'Automatic Diagnosis of Short-Duration 12-Lead ECG using a Deep Convolutional Network' and had my expenses covered by the award.

Scholarships

CAPES-PRINT *2020-2021*
CAPES Brazil
I have been granted a scholarship from the Brasilian Agency CAPES for internacionalization.

Split-site Ph.D. Scholarship *2019*
CNPq Brazil
I have been granted a scholarship from the Brasilian Agency CNPq for staying one year of my Ph.D. in Uppsala University, Sweden.

Ph.D. Scholarship *2018-2020*
CNPq Brazil
I have been granted a scholarship from the Brasilian Agency CNPq during my doctoral studies.

M.S. Scholarship *2016-2017*
CAPES BRAZIL
I have been granted a scholarship from the Brasilian Agency CAPES during my master studies.

Supervision

Ph.D. students, co-supervisor

Daniel Gedon *Aug. 2019 - Aug. 2024 (estimated)*
UPPSALA UNIVERSITY, SWEDEN
Disentangled Representation Learning in Self-Supervised Models

M.Sc. students, supervisor

Oscar Larsson *Feb. 2022 - July 2022*
UPPSALA UNIVERSITY, SWEDEN
Generation and Detection of Adversarial Attacks in the Power Grid

Theogene Habineza *Jan. 2022 - June 2022*
UPPSALA UNIVERSITY, SWEDEN
Deep Learning-Based Risk Prediction of Atrial Fibrillation Using the 12-lead ECG

M.Sc. students, subject reviewer

Christie Courtnage *Jan. 2022 - June 2022*
UPPSALA UNIVERSITY, SWEDEN
An extension to Semi-Supervised Learning using Shapley Value Data Valuation

Meenal Pathak *Feb. 2022 - Apr. 2022*
UPPSALA UNIVERSITY, SWEDEN
Automated Accounting using Machine Learning

Teaching

Advanced Probabilistic Machine Learning *Fall - 2022*
COURSE RESPONSIBLE - MSC LEVEL, 125 STUDENTS, 5 + 2.5 CREDITS UPPSALA UNIVERSITY, SWEDEN
Artificial Intelligence and Machine Learning *Spring - 2022*
TEACHING ASSISTENT - PHD LEVEL, 94 STUDENTS, 6 CREDITS WASP GRADUATE SCHOOL, SWEDEN
Advanced Probabilistic Machine Learning *Fall - 2021*
LECTURER - MSC LEVEL, 125 STUDENTS, 5 + 2.5 CREDITS UPPSALA UNIVERSITY, SWEDEN
The unreasonable effectiveness of overparameterized machine learning models *Fall - 2021*
COURSE ORGANIZER - PHD LEVEL, 13 STUDENTS, 3 CREDITS UPPSALA UNIVERSITY, SWEDEN
Deep Learning *Spring - 2021*
TEACHING ASSISTANT - PHD LEVEL, 54 STUDENTS, 5 + 3 CREDITS UPPSALA UNIVERSITY, SWEDEN
Engenharia de Controle (Control Engineering) *2nd - 2016*
TEACHING ASSISTANT - BSC LEVEL, 50 STUDENTS, 6 CREDITS UNIVERSIDADE FEDERAL DE MINAS GERAIS, BRAZIL
Controle Digital (Digital Control) *2nd - 2016*
TEACHING ASSISTANT - BSC LEVEL, 40 STUDENTS, 4 CREDITS UNIVERSIDADE FEDERAL DE MINAS GERAIS, BRAZIL

Professional activity

Peer reviewing: journal papers

IEEE Transactions on Automatic Control (2021), *Heart* (2021), *IEEE Transactions on Instrumentation and Measurement* (2021), *International Journal of System Science* (2021), *Proceedings of the National Academy of Sciences (PNAS)* (2020), *Automatica* (2020), *IEEE Transactions on Biomedical Engineering* (2020), *IEEE Control Systems*

Letters (L-CSS) (2020), *Systems and Control Letters* (2020), *Chaos, Solutions and Fractals* (2020), *Chest* (2020), *Journal of Electrocardiology* (2020), *Journal of Control, Automation and Electrical Systems* (2015-2018),

Peer reviewing: conference papers

Learning for Dynamics and Control (L4DC) (2022), *International Conference on Artificial Intelligence and Statistics (AISTATS)* (2022), *IFAC Symposium on System Identification (SysId)* (2021), *Learning for Dynamics and Control (L4DC)* (2021), *European Control Conference (ECC)* (2021), *IEEE Conference on Decision and Control (CDC)* (2020), *IFAC World Conference* (2020), *American Control Conference* (2018), *International Conference on Modelling, Identification and Control* (2017), *IFAC World Conference* (2017),

Expert assignments

ELLIS (European Laboratory for Learning and Intelligent Systems) PhD Program: Recruitment evaluator *2020*
Co-chair at the session 'Parameter Estimation 1' at the 19th IFAC Symposium on System Identification *2021*

External examiner in Ph.D. and M.Sc. defenses

Najmeh Fayyazifar , Level: Ph.D. *2022*
Edith Cowan University, Australia
Deep learning and neural architecture search for cardiac arrhythmias classification

Thiago de Almeida Ushikoshi , Level: M.Sc. *2022*
Universidade Federal de Minas Gerails, Brazil
Learning Nonlinear Dynamics With Echo State Networks

Invited talks

Universities

University of British Columbia, Canada @ Christos Thrampoulidis group (Online) *June 2022*
Overparameterized Linear Regression under Adversarial Attacks

University of Luxembourg @ Systems Control Group, LCSB (Online) *March 2022*
Deep Neural Networks for Automatic ECG Analysis

Techinion, Israel @ AIMLab group (Online) *March 2021*
Artificial intelligence for ECG classification and prediction of the risk of death

Conferences

International Congress on Electrocardiology (Online) *April 2021*
Artificial intelligence for ECG classifcation and prediction of the risk of death

Open source contributions

Scipy team member *2017 - 2021*
I was one of the SciPy development team members. SciPy is one of the core scientific libraries in Python and I was invited to the core team for having contributed with the implementation of signal filters and optimization method. My GitHub account: https://github.com/antonior92 contain a complete list of my open-source contributions.

Additional education

Mini-course on Nonlinear System Identification 2019
Eindhoven University of Technology The Netherlands
I took part on the 3 days mincourse on nonlinear system identification to take place on Eindhoven University of Technology.

Probabilistic Graphical Models Specialization 2018
COURSERA (STANFORD) ONLINE
I have successfully completed the 3 online courses about probabilistic graphical models, titled 'Representation', 'Inference', 'Learning'.

Deep Learning Specialization 2018
COURSERA (DEEPLEARNING.AI) ONLINE
I have successfully completed the 5 online courses about deep learning offered in Coursera, 'Neural Networks and Deep Learning', 'Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization', 'Structuring Mechine Learning Projects', 'Convolutional Neural Networks', 'Sequence Models'.

Languages

Portuguese (mother tongue)
English (fluent)
Spanish (intermediate knowledge)
Swedish (elementary knowledge)

Language certificates

Certificate in Advanced English (Council of Europe Level C1) - Cambridge English Language Assessment, 2014

Publication List

ORCID: 0000-0003-3632-8529
DBLP: 202/1699
SCOPUS ID: 57191699148 — Citations: 7577, h-index: 7, Documents: 23 (2022-09-12)
Google Scholar: Antonio H. Ribeiro — Citations: 13126, h-index: 10, i10-index: 12 (2022-09-12)

Preprints

[P1] **Antônio H. Ribeiro** and Thomas B. Schön. "Overparameterized Linear Regression under Adversarial Attacks". In: *arXiv:2204.06274* (Apr. 2022). arXiv: 2204.06274.

[P2] **Antônio H. Ribeiro**, Dave Zachariah, and Thomas B. Schön. "Surprises in Adversarially-Trained Linear Regression". In: *arXiv:2205.12695* (May 2022). arXiv: 2205.12695.

[P3] Veer Sangha, Arash A. Nargesi, Lovedeep S. Dhingra, Bobak J. Mortazavi, **Antônio H. Ribeiro**, Cynthia A. Brandt, Edward J. Miller, Antonio Luiz P. Ribeiro, Eric J. Velazquez, Harlan M. Krumholz, and Rohan Khera. "Detection of Left Ventricular Systolic Dysfunction from Electrocardiographic Images". In: *medRxiv* (June 2022). DOI: 10.1101/2022.06.04.22276000.

[P4] Eran Zvuloni, Jesse Read, **Antônio H. Ribeiro**, Antonio Luiz P. Ribeiro, and Joachim A. Behar. "On Merging Feature Engineering and Deep Learning for Diagnosis, Risk-Prediction and Age Estimation Based on the 12-Lead ECG". In: *arXiv:2207.06096* (July 2022). arXiv: 2207.06096.

[P5] Stefan Gustafsson, Daniel Gedon, Erik Lampa, **Antônio H. Ribeiro**, Martin J. Holzmann, Thomas B. Schön, and Johan Sundstrom. "Artificial Intelligence-Based ECG Diagnosis of Myocardial Infarction in High-Risk Emergency Department Patients". In: *SSRN* (June 2021). DOI: 10.2139/ssrn.3857655.

Journal Papers

[J1] Veer Sangha, Bobak J. Mortazavi, Adrian D. Haimovich, **Antônio H. Ribeiro**, Cynthia A. Brandt, Daniel L. Jacoby, Wade L. Schulz, Harlan M. Krumholz, Antonio Luiz P. Ribeiro, and Rohan Khera. "Automated Multilabel Diagnosis on Electrocardiographic Images and Signals". In: *Nature Communications* 13 (2022), p. 1583. DOI: 10.1038/s41467-022-29153-3.

[J2] Shany Biton, Sheina Gendelman, **Antônio H Ribeiro**, Gabriela Miana, Carla Moreira, Antonio Luiz P Ribeiro, and Joachim A Behar. "Atrial Fibrillation Risk Prediction from the 12-Lead ECG Using Digital Biomarkers and Deep Representation Learning". In: *European Heart Journal - Digital Health* (2021). ISSN: 2634-3916. DOI: 10.1093/ehjdh/ztab071.

[J3] Emilly M. Lima, **Antônio H. Ribeiro**, Gabriela MM Paixão, Manoel Horta Ribeiro, Marcelo M. Pinto Filho, Paulo R. Gomes, Derick M. Oliveira, Ester C. Sabino, Bruce B. Duncan, Luana Giatti, Sandhi M. Barreto, Wagner Meira, Thomas B. Schön, and Antonio Luiz P. Ribeiro. "Deep Neural Network Estimated Electrocardiographic-Age as a Mortality Predictor". In: *Nature Communications* 12 (2021). DOI: 10.1038/s41467-021-25351-7.

[J4] Gabriela M. M. Paixão, Emilly M. Lima, Paulo R. Gomes, Derick M. Oliveira, Manoel H. Ribeiro, Jamil S. Nascimento, **Antonio H. Ribeiro**, Peter W. Macfarlane, and Antonio L. P. Ribeiro. "Electrocardiographic Predictors of Mortality: Data from a Primary Care Tele-Electrocardiography Cohort of Brazilian Patients". In: *Hearts* 2.4 (Dec. 2021), pp. 449–458. DOI: 10.3390/hearts2040035.

[J5] Wagner Meira Jr, Antonio L. P. Ribeiro, Derick M. Oliveira, and **Antonio H. Ribeiro**. "Contextualized Interpretable Machine Learning for Medical Diagnosis". In: *Communications of the ACM* (2020). DOI: 10.1145/3416965.

[J6] Gabriela M. M. Paixão, Luis Gustavo S. Silva, Paulo R. Gomes, Emilly M. Lima, Milton P. F. Ferreira, Derick M. Oliveira, Manoel H. Ribeiro, **Antonio H. Ribeiro**, Jamil S. Nascimento, Jéssica A. Canazart, Leonardo B. Ribeiro, Emelia J. Benjamin, Peter W. Macfarlane, Milena S. Marcolino, and Antonio L. Ribeiro. "Evaluation of Mortality in Atrial Fibrillation: Clinical Outcomes in Digital Electrocardiography (CODE) Study". In: *Global Heart* 15.1 (July 2020), p. 48. ISSN: 2211-8179. DOI: 10.5334/gh.772.

[J7] **Antônio H. Ribeiro**, Manoel Horta Ribeiro, Gabriela M. M. Paixão, Derick M. Oliveira, Paulo R. Gomes, Jéssica A. Canazart, Milton P. S. Ferreira, Carl R. Andersson, Peter W. Macfarlane, Wagner Meira Jr., Thomas B. Schön, and Antonio Luiz P. Ribeiro. "Automatic Diagnosis of the 12-Lead ECG Using a Deep Neural Network". In: *Nature Communications* 11.1 (2020), p. 1760. DOI: 10.1038/s41467-020-15432-4. arXiv: 1904.01949.

[J8] **Antônio H. Ribeiro**, Koen Tiels, Jack Umenberger, Thomas B. Schön, and Luis A. Aguirre. "On the Smoothness of Nonlinear System Identification". In: *Automatica* 121 (Nov. 2020), p. 109158. DOI: 10.1016/j.automatica.2020.109158. arXiv: 1905.00820.

[J9] Pauli Virtanen, Ralf Gommers, Travis E. Oliphant, Matt Haberland, Tyler Reddy, David Cournapeau, Evgeni Burovski, Pearu Peterson, Warren Weckesser, Jonathan Bright, Stéfan J. van der Walt, Matthew Brett, Joshua Wilson, K. Jarrod Millman, Nikolay Mayorov, Andrew R. J. Nelson, Eric Jones, Robert Kern, Eric Larson, C. J. Carey, İlhan Polat, Yu Feng, Eric W. Moore, Jake VanderPlas, Denis Laxalde, Josef Perktold, Robert Cimrman, Ian Henriksen, E. A. Quintero, Charles R. Harris, Anne M. Archibald, **Antônio H. Ribeiro**, Fabian Pedregosa, Paul van Mulbregt, and SciPy 1.0 Contributors. "SciPy 1.0–Fundamental Algorithms for Scientific Computing in Python". In: *Nature Methods* 17.3 (2020), pp. 261–272. DOI: 10.1038/s41592-019-0686-2. arXiv: 1907.10121.

[J10] Gabriela M. M. Paixão, Emilly M. Lima, Paulo R. Gomes, Milton P. Ferreira, Derick M. Oliveira, Manoel Horta Ribeiro, **Antônio H. Ribeiro**, Jamil Nascimento, Jéssica A. Canazart, Gustavo Cardoso, Leonardo B. Ribeiro, and Antonio Luiz P. Ribeiro. "Evaluation of Mortality in Bundle Branch Block Patients from an Electronic Cohort: Clinical Outcomes in Digital Electrocardiography (CODE) Study". In: *Journal of Electrocardiology* (Sept. 2019). ISSN: 0022-0736. DOI: 10.1016/j.jelectrocard.2019.09.004.

[J11] Antonio Luiz P. Ribeiro, Gabriela M. M. Paixão, Paulo R. Gomes, Manoel Horta Ribeiro, **Antônio H. Ribeiro**, Jéssica A. Canazart, Derick M. Oliveira, Milton P. Ferreira, Emilly M. Lima, Jermana Lopes de Moraes, Nathalia Castro, Leonardo B. Ribeiro, and Peter W. MacFarlane. "Tele-Electrocardiography and Bigdata: The CODE (Clinical Outcomes in Digital Electrocardiography) Study". In: *Journal of Electrocardiology* (Sept. 2019). ISSN: 0022-0736. DOI: 10/gf7pwg.

[J12] **Antônio H. Ribeiro** and Luis A. Aguirre. ""Parallel Training Considered Harmful?": Comparing Series-Parallel and Parallel Feedforward Network Training". In: *Neurocomputing* 316 (Nov. 2018), pp. 222–231. ISSN: 0925-2312. DOI: 10.1016/j.neucom.2018.07.071.

Conference Papers

[C1] Johannes N. Hendriks, Fredrik K. Gustafsson, **Antônio H. Ribeiro**, Adrian G. Wills, and Thomas B. Schön. "Deep Energy-Based NARX Models". In: *Proceedings of the 19th IFAC Symposium on System Identification (SYSID) - IFAC-PapersOnLine* 54.7 (2021), pp. 505–510. DOI: 10.1016/j.ifacol.2021.08.410. arXiv: 2012.04136.

[C2] **Antonio H. Ribeiro** and Thomas B. Schon. "How Convolutional Neural Networks Deal with Aliasing". In: *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, 2021, pp. 2755–2759. DOI: 10.1109/ICASSP39728.2021.9414627.

[C3] **Antônio H. Ribeiro**, Johannes N. Hendriks, Adrian G. Wills, and Thomas B. Schön. "Beyond Occam's Razor in System Identification: Double-Descent When Modeling Dynamics". In: *Proceedings of the 19th IFAC Symposium on System Identification (SYSID) - IFAC-PapersOnLine*. Vol. 54. Elsevier, 2021, pp. 97–102. DOI: 10.1016/j.ifacol.2021.08.341. arXiv: 2012.06341.

[C4] Derick M. Oliveira, **Antônio H. Ribeiro**, João A. O. Pedrosa, Gabriela M.M. Paixao, Antonio Luiz P. Ribeiro, and Wagner Meira Jr. "Explaining End-to-End ECG Automated Diagnosis Using Contextual Features". In: *Machine Learning and Knowledge Discovery in Databases. European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD)*. Vol. 12461. Lecture Notes in Computer Science}. Ghent, Belgium: Springer, Sept. 2020, pp. 204–219. DOI: 10.1007/978-3-030-67670-4_13.

[C5] **Antônio H. Ribeiro**, Koen Tiels, Luis A. Aguirre, and Thomas B. Schön. "Beyond Exploding and Vanishing Gradients: Attractors and Smoothness in the Analysis of Recurrent Neural Network Training". In: *Proceedings of the 23rd International Conference on Artificial Intelligence and Statistics (AISTATS), PMLR*. Vol. 108. 2020, pp. 2370–2380. arXiv: 1906.08482.

[C6] Carl Andersson, **Antônio H. Ribeiro**, Koen Tiels, Niklas Wahlström, and Thomas B. Schön. "Deep Convolutional Networks in System Identification". In: *Proceedings of the 58th IEEE Conference on Decision and Control (CDC)* (Sept. 2019), pp. 3670–3676. DOI: 10.1109/CDC40024.2019.9030219. arXiv: 1909.01730.

[C7] **Antonio H. Ribeiro** and Luis A. Aguirre. "Lasso Regularization Paths for NARMAX Models via Coordinate Descent". In: *2018 Annual American Control Conference (ACC)*. June 2018, pp. 5268–5273. ISBN: 2378-5861. DOI: 10.23919/ACC.2018.8430924.

[C8] **Antônio H. Ribeiro** and Luis A. Aguirre. "Shooting Methods for Parameter Estimation of Output Error Models". In: *Proceedings of the 20th IFAC World Congress. IFAC-PapersOnLine* 50.1 (July 2017), pp. 13998–14003. ISSN: 2405-8963. DOI: 10.1016/j.ifacol.2017.08.2421.

[C9] **Antônio H. Ribeiro** and Luis A. Aguirre. "Selecting Transients Automatically for the Identification of Models for an Oil Well". In: *Proceedings of the 2nd IFAC Workshop on Automatic Control in Offshore Oil and Gas Production. IFAC-PapersOnLine* 48.6 (2015), pp. 154–158. DOI: 10.1016/j.ifacol.2015.08.024.

Workshop Papers and Conference Extended Abstracts

[W1] Daniel Gedon, Stefan Gustafsson, Erik Lampa, **Antônio H. Ribeiro**, Martin J. Holzmann, Thomas B. Schön, and Johan Sundström. "ResNet-based ECG Diagnosis of Myocardial Infarction in the Emergency Department". In: *Machine Learning from Ground Truth: New Medical Imaging Datasets for Unsolved Medical Problems Workshop at NeurIPS*. 2021.

[W2] Daniel Gedon, **Antônio H. Ribeiro**, Niklas Wahlström, and Thomas B. Schön. "First Steps Towards Self-Supervised Pretraining of the 12-Lead ECG". In: *Computing in Cardiology (CinC)*. Vol. 48. Sept. 2021, pp. 1–4. DOI: 10.23919/CinC53138.2021.9662748.

[W3] Johannes N. Hendriks, Fredrik K. Gustafsson, **Antônio H. Ribeiro**, Adrian G. Wills, and Thomas B. Schön. "Deep Energy-Based NARX Models". In: *Workshop on Nonlinear System Identification* (2021).

[W4] **Antonio H Ribeiro** and Thomas B Schön. "Overparametrized Regression Under L2 Adversarial Attacks". In: *Workshop on the Theory of Overparameterized Machine Learning (TOPML)*. Apr. 2021.

[W5] **Antônio H. Ribeiro**, Johannes N. Hendriks, Adrian G. Wills, and Thomas B. Schön. "Beyond Occam's Razor in System Identification: Double-Descent When Modeling Dynamics". In: *Workshop on Nonlinear System Identification*. 2021.

[W6] Derick M Oliveira, **Antonio H Ribeiro**, Joao A O Pedrosa, Gabriela M M Paixao, Antonio L Ribeiro, and Wagner Meira Jr. "Explaining Black-Box Automated Electrocardiogram Classification to Cardiologists". In: *2020 Computing in Cardiology (CinC)*. Vol. 47. 2020. DOI: 10.22489/CinC.2020.452.

[W7] **Antonio H Ribeiro**, Daniel Gedon, Daniel Martins Teixeira, Manoel Horta Ribeiro, Antonio L Pinho Ribeiro, Thomas B Schon, and Wagner Meira Jr. "Automatic 12-Lead ECG Classification Using a Convolutional Network Ensemble". In: *2020 Computing in Cardiology (CinC)*. 2020. DOI: 10.22489/CinC.2020.130.

[W8] **Antonio H Ribeiro**, Carl Andersson, Koen Tiels, Niklas Wahlstrom, and Thomas B Schon. "Deep Convolutional Networks Are Useful in System Identification". In: *Workshop on Nonlinear System Identification* (2019).

[W9] Gabriela Paixao, Luis Gustavo Silva e Silva, Paulo R. Gomes, Milton Ferreira, Derick Oliveira, Manoel Horta Ribeiro, **Antonio H. Ribeiro**, Jamil Nascimento, Gustavo Cardoso, Rodrigo Araujo, Bruno Santos, Jessica Canazart, Leonardo Ribeiro, and Antonio L. Ribeiro. "Clinical Outcomes in Digital Electrocardiography: Evaluation of Mortality in Atrial Fibrillation (Code Study)". In: *Circulation. Abstracts from American Heart Association's.* 138.Suppl_1 (Nov. 2018), A16594–A16594.

[W10] **Antônio H. Ribeiro**, Manoel Horta Ribeiro, Gabriela Paixão, Derick Oliveira, Paulo R. Gomes, Jéssica A. Canazart, Milton Pifano, Wagner Meira Jr., Thomas B. Schön, and Antonio Luiz Ribeiro. "Automatic Diagnosis of Short-Duration 12-Lead ECG Using a Deep Convolutional Network". In: *Machine Learning for Health (ML4H) Workshop at NeurIPS* (2018). arXiv: 1811.12194.

National Conference Papers (in Portuguese)

[N1] **Antônio H. Ribeiro** and Luis A. Aguirre. "Relaçoes Estáticas de Modelos NARX MISO e Sua Representaçao de Hammerstein". In: *XX Congresso Brasileiro de Automática*. 2014.

Thesis

[T1] **Antônio H. Ribeiro**. "Learning Nonlinear Differentiable Models for Signals and Systems: With Applications". PhD thesis. Belo Horizonte, Brazil: Universidade Federal de Minas Gerais, 2020.

[T2] **Antônio H. Ribeiro**. "Recurrent Structures in System Identification". MSc Dissertation. Belo Horizonte, Brazil: Universidade Federal de Minas Gerais, 2017.

[T3] **Antonio H. Ribeiro**. "Implementação de Uma Câmera Estéreo". BSc Thesis. Belo Horizonte, Brazil: Universidade Federal de Minas Gerais, Dec. 2015.

Selected papers: contribution and relevance

Bellow the list of my five most relevant publications to the moment with contribution and relevance statement.

[J7] "Automatic Diagnosis of the 12-Lead ECG Using a Deep Neural Network" (2020)

Relevance: It was a pioneering work on the use of deep neural networks for the analysis of 12-lead ECGs. We made the implementation and the datasets available and thousands of researchers downloaded them. According to Google Scholar, it was cited more than 150 times in less than two years.
Contribution: I contributed to all aspects of the work, including its conception, implementation and analysis. I also presented intermediary results in conferences.

[J3] "Deep Neural Network Estimated Electrocardiographic-Age as a Mortality Predictor" (2021)

Relevance: We use artificial intelligence to deal with a task predicting age from the ECG. We have shown that the ECG predicted age is a good predictor of risk and is related to mortality risk. The work points to the fact that even normal ECG contains additional information for risk assessment and machine learning might be a useful tool for extracting this information.
Contribution: I am co-first author together with Emilly and Gabriella (equal contribution). I contributed to the implementation of all machine learning algorithms, the conception of the work, and the writing. They contributed respectively with the statistical and the medical analysis.

[J8] "On the Smoothness of Nonlinear System Identification" (2020)

Relevance: We study the challenges of parameter estimations for nonlinear dynamical systems. We show how regions of the parameter space could easily become hard to navigate due to the system's instability or chaos. We propose as a solution to it a method called multiple shooting, which divides the problem into smaller and well-behaved subproblems.
Contribution: I contributed to the implementation, writing, mathematical development and analysis.

[C5] "Beyond Exploding and Vanishing Gradients: Attractors and Smoothness in the Analysis of Recurrent Neural Network Training" (2020)

Relevance: In this paper, which complements and extends the previous one, we discuss how regions of the parameter space could become hard to navigate due to the system's unstability or chaos. We discuss this problem in recurrent neural networks and the role of dynamic attractors in storing information in these models.
Contribution: I contributed with the implementation, writing, mathematical development and analysis.

[J12] ""Parallel Training Considered Harmful?": Comparing Series-Parallel and Parallel Feedforward Network Training" (2018)

Relevance: It was the first journal publication of my Ph.D. It studied the computational challenges and asymptotic properties of estimators with recurrence in their architecture. It shows how recurrent structures can be better for certain types of noise contamination. It also presents an analysis of the computational cost of the approach.
Contribution: I contributed with the implementation, writing, mathematical development and analysis.