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Anderson A. C. Alves

Curriculum Vitae

University of Wisconsin-Madison
Department of Animal and Dairy Sciences
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EDUCATION

2016 – 2019

Ph.D. Animal Breeding and Genetics. Department of Animal Science, Sao Paulo State University, Jaboticabal – SP, Brazil.
Dissertation: Applying machine learning for genomic analysis of reproductive traits in Nellore cattle. ***Advisor:*** Dr. Lucia Galvão de Albuquerque

2014 – 2015

M.S. Animal Science. Department of Animal Science. Federal University of Ceará, Fortaleza - CE, Brazil.
Thesis: Quantitative genetic study of Santa Inês breed sheep performance in agricultural exhibitions. [In Portuguese]. ***Advisor:*** Dr. Raimundo Nonato Braga Lôbo

2009 – 2013

B.S. Animal Science. Department of Animal Science. State University of Vale do Acaraú, Sobral - CE, Brazil.

PROFESSIONAL EXPERIENCE

2021 - Present

Postdoctoral Research Associate
Department of Animal and Dairy Sciences
University of Wisconsin – Madison
Supervisor: Dr. Guilherme J. M. Rosa
Main Responsibilities: Investigating the genetic and genomic basis of novel feed efficiency and feeding behavior traits in commercial broilers. Development and application of efficient statistical learning methods for data-driven supported decisions such as the classification of mortality in broilers and genome-assisted prediction of complex traits. Additional responsibilities: Linux servers' manager, monthly meetings with industry partners, writing manuscripts, R developer, assisting graduate student academic activities and research, and presenting seminars and lectures.

2018 - 2021

Lecturer of basic, technical, and technological education
Federal Institute of Education, Science, and Technology of Maranhão.
Teaching experience –Teaching at the undergraduate level in the following courses: Animal Breeding I, Basic Statistics (B.S. Animal Science), Genetics (B.S. Biology), and Experimental Statistics (B.S. Agronomy). Additional activities: mentoring B.S. research projects, administrative duties, member of the inclusion committee for

people with disabilities.

2016 – 2017	**Graduate Research Assistant** Department of Animal Science. São Paulo State University, Jaboticabal, Brazil. *Research Activities* - Development and application of statistical methods for genomic-based analysis in beef cattle. Meat quality data collecting in Beef cattle. *Teaching experience* - Teaching assistant (B.S. Biology, course: Biostatistics).
2012 – 2013	**Undergraduate Research Assistant** Brazilian Agricultural Research Corporation (EMBRAPA), Embrapa Goats and Sheep, Sobral, Brazil. *Research activities* – Quantitative genetic analysis of milk production traits in dairy goats, data collecting, and management for the Capragene© dairy goat breeding program.

RESEARCH INTERESTS

Development and application of computational and statistical tools to support precision livestock farming and animal breeding

Integration of machine learning and sensor-enabled information to optimize livestock management

Leveraging modern molecular technologies for enhancing farming efficiency and sustainability

RECENT PUBLICATIONS

Peer-reviewed articles

1. Freitas LA, Savegnago RP, **Alves AAC**, Costa RLD, Munari DP, Stafuzza NB, Rosa GJM, Paz CCP (2023) Classification Performance of Machine Learning Methods for Identifying Resistance, Resilience, and Susceptibility to Gastrointestinal Nematode Infections in Sheep. *Animals.* 13(3):374. https://doi.org/10.3390/ani13030374

2. Pinto DL, Selli A, Tulpan D, Andrietta LT, Garbossa PLM, Voort GV, Munro Jasper, McMorris M, **Alves AAC,** Carvalheiro R, Poleti MD, Balieiro JCC, Ventura RV (2023) Image feature extraction via Local Binary Patterns for marbling score classification in beef cattle using tree-based algorithms. *Livestock Science.* 267:105152. doi:10.1016/j.livsci.2022.105152

3. **Alves AAC**, Costa RM, Fonseca LS, Carvalheiro R, Ventura RV, Rosa GJM, Albuquerque LG (2022) A Random Forest-based genome-wide scan reveals fertility candidate genes and potential inter-chromosomal epistatic regions associated with age at first calving in Nellore cattle. *Frontiers in Genetics*. 13:834724. doi:10.3389/fgene.2022.834724

4. Bresolin T, Passafaro TL, Braz CU, **Alves AAC,** Carvalheiro R, Chardulo LAL, Rosa GJM, Albuquerque LG (2022). Investigating potential causal relationships among carcass and meat

quality traits using structural equation model in Nellore cattle. *Meat Science.* 187:108771. doi: 10.1016/j.meatsci.2022.108771

5. **Alves AAC,** Andrietta LT, Lopes RZ, Bussiman FO, Silva FF, Carvalheiro R, Brito LF, Balieiro JCC, Albuquerque LG, Ventura RV (2021) Integrating audio signal processing and deep learning algorithms for gait pattern classification in Brazilian Gaited Horses. *Frontiers in Animal Science* 2:681557. doi: 10.3389/fanim.2021.681557.

6. **Alves AAC**, Espigolan R, Bresolin T, Costa RM, Fernandes Júnior GA, Ventura RV, Carvalheiro R, and Albuquerque LG (2021) Genome-enabled prediction of breeding values for reproductive traits in Nellore cattle using parametric models and machine learning methods. *Animal Genetics* 52(1):32-46. doi: 10.1111/age.13021

7. **Alves AAC**, Costa RM, Bresolin T, Fernandes Júnior GA, Espigolan R, Ribeiro AMF, Carvalheiro R, and Albuquerque LG (2020) Genome-wide prediction for complex traits under the presence of dominance effects in simulated populations using GBLUP and machine learning methods. *Journal of Animal Science* 98:6. doi:10.1093/jas/skaa179

8. Cardoso D, Fernandes-Junior G, Scalez D, **Alves AAC**, Magalhães AFB, Bresolin T, Ventura RV, Li C, Oliveira M, Porto-Neto L, Carvalheiro R, Oliveira HN, Tonhati H, and Albuquerque LG (2020) Uncovering sub-structure and genomic profiles in across-countries subpopulations of Angus cattle. *Scientific Reports* 10:8770. doi:10.1038/s41598-020- 65565-1

9. **Alves AAC**, Pinzon AC, Costa RM, Silva MS, Vieira EHM, Mendonça IB, Viana VSS, and Lôbo RNB (2019) Multiple regression and machine learning-based methods for carcass traits and saleable meat cuts prediction using non-invasive in vivo measurements in commercial lambs. *Small Ruminant Research* 171:49-56. doi: 10.1016/j.smallrumres.2018.12.008

10. Lôbo AMBO, Lôbo RNB, Facó O, Souza V, **Alves AAC**, Costa AC, and Albuquerque MAM (2017) Characterization of milk production and composition of four exotic goat breeds in Brazil. *Small Ruminant Research* 153:9-16. doi: 10.1016/j.smallrumres.2017.05.005

11. **Alves AAC,** Lôbo AMBO, Facó O, Silva LP, and Lôbo RNB (2016) Genetic parameters for the rank of the Santa Inês sheep in agricultural fairs using Bayesian procedures. *Italian Journal of Animal Science* 15:604-609. doi: 10.1080/1828051X.2016.1248866

Forthcoming publications

12. **Alves AAC,** Fernandes AFA, Breen V, Hawken R, Gianola D, Rosa GJM (2023) (Quasi) Multi-task support vector regression with heuristic hyperparameter optimization for whole-genome prediction of complex traits: a case study with carcass traits in broilers. *Genes|Genomes|Genetics.* (Under review)

13. **Alves AAC,** Fernandes AFA, Breen V, Hawken R, Rosa GJM (2023) Monitoring mortality and welfare-culling in group-housed broilers using machine learning algorithms trained with feeding behavior time-series data. *Comput. Electron. Agric.* (In preparation)

14. **Alves AAC,** Fernandes AFA, Lopes FB, Breen V, Hawken R, Rosa GJM (2023) Genetic parameters of feed efficiency and novel feeding behavior traits measured in group-housed broilers using a real-time radio-frequency feeding system. *Poultry Science* (In Preparation)

Book chapter

1. Lôbo AMBO, Lôbo RNB, **Alves AAC,** Facó O (2019) Genetic improvement of goats. In: Selaive- Villarroel AB, Guimarães VP, editors. Goat production in Brazil, 1st edition, Brasilia, Brazil, pp. 279–304. [In Portuguese]

Papers published in proceedings

1. **Alves AAC**, Fernandes AFA, Breen V, Hawken R, Rosa GJM. 2022. (Quasi) Multi-task support vector regression for whole-genome prediction of carcass traits in commercial broilers. In: Proceedings of the 12th World Congress on Genetics Applied to Livestock Production, July 3-8 2022, Rotterdam, The Netherlands.

2. Bresolin, T, Passafaro TL, Lopes FB, **Alves AAC**, Chardulo LAL, Carvalheiro R, Albuquerque LG (2018) Causal relationship among growth, carcass and meat traits using structural equation model in Nelore cattle. In: 11th World Congress on Genetics Applied to Livestock Production, February 7-16, Auckland, New Zealand.

Conference abstracts

1. **Alves AAC**, Fernandes AFA, Lopes F. B., Breen V, Hawken R, Rosa GJM (2022) Prediction of Culling and Mortality Risks in Group-Housed Broilers Using Machine Learning Methods Trained with Time-Series Data of Feeding Behavior Traits. *Journal of Animal Science*, Volume 100, Issue Supplement_3, October 2022, Page 2. https://doi.org/10.1093/jas/skac247.002

2. **Alves AAC**, Fernandes AFA, Lopes F. B., Breen V, Hawken R, Rosa GJM (2022) Genetic Associations between Feeding Behavior and Economic Interest Traits in Group-Housed Broilers. Journal of Animal Science, Volume 100, Issue Supplement_3, October 2022, Pages 9–10. https://doi.org/10.1093/jas/skac247.016

3. Santana TEZ, Veroneze R, **Alves AAC**, Menezes GRO, Rosa GJM (2022) Gaussian Kernel Based on Geographic Information to Model Farm Effects in Genetic Evaluation of Pasture-Raised Beef Cattle. Journal of Animal Science, Volume 100, Issue Supplement_3, October 2022, Page 209. https://doi.org/10.1093/jas/skac247.380

4. Freitas L, Savegnago R, **Alves AAC**, Costa R, Rosa GJM, Paz C (2022) Classification Performance of Multinomial Logistic Regression for Identifying Resistance, Resilience, and Susceptibility to Gastrointestinal Nematode Infections in Sheep. *Journal of Animal Science*, Volume 100, Issue Supplement_3, October 2022, Page 220. https://doi.org/10.1093/jas/skac247.400

5. Ventura RV, Lopes RZ, Andrietta LT, Bussiman F, Balieiro J, Carvalheiro R, Silva FF, Brito L, **Alves AAC**. Audio information retrieval for describing gait patterns in Brazilian horses. In: ASAS Annual 2020 Meeting Abstracts. *Journal of Animal Science*, Volume 98, Issue Supplement_4, November 2020, Page 27. https://doi.org/10.1093/jas/skaa278.048

6. Costa RM, **Alves** AAC, Chud TCS, Bernardes PA, Baldi F, Lôbo RB, Munari DP. Influence of

the genomic information inclusion on the breeding values accuracy in Nellore sires. In: VI Congresso Brasileiro De Recursos Genéticos - VI CBRG, 2020. [In Portuguese]

7. Costa RM; **Alves AAC**, Watanabe RN, Sbardella AP, Chud TCS, Lôbo RB, Munari, DP. Genetic parameters estimate for daily weight gain and carcass traits in Nellore Cattle with and without including genomic information. In: VI Congresso Brasileiro De Recursos Genéticos - VI CBRG, 2020. [In Portuguese]

8. Pinzon AC, Magalhães AFB, Braz CU, Bresolin T, Espigolan R, **Alves AAC**, Fernandes Júnior GA, Carvalheiro R, Albuquerque LG (2017) Genomic selection for age at first calving in Nellore cattle using haplotypes and SNPs. In: XII Simpósio Brasileiro de Melhoramento Animal, June 12-13, Ribeirão Preto-SP. [In Portuguese]

9. Costa RM, Carvajal AB, Sbardella AP, Watanabe RN, **Alves AAC**, Baldi F, Lôbo RB, Munari DP (2017) Genetic parameter estimates for weight gain and age at first calving in Nelore cattle *In* XII Simpósio Brasileiro de Melhoramento Animal, June 12-13, Ribeirão Preto-SP. [In Portuguese]

10. Sousa DR, **Alves AAC**, Pinzon AC, Mota LFM, Costa RM, Silva MS, Lobo RNB (2017) Relationships among carcass, non-carcass traits and commercial meat cuts in undefined breed sheep thought principal component analysis. In: XII Simpósio Brasileiro de Melhoramento Animal, June 12-13, Ribeirão Preto-SP. [In Portuguese]

11. **Alves AAC**, Bresolin T, Espigolan R, Costa RM, Carvalheiro R, Albuquerque LG (2017) Genome-enabled prediction accuracy using support vector machine models in simulated beef cattle populations. In: XII Simpósio Brasileiro de Melhoramento Animal, June 12-13, Ribeirão Preto-SP. [In Portuguese]

TEACHING EXPERIENCE

University of Washington

2022	Teaching assistant:	UW 2022 Summer Institutes. Statistical Genetics (SISG) Module 9: Quantitative Genetics, **Summer 2022**
2022	Teaching assistant:	UW 2022 Summer Institutes. Statistical Genetics (SISG) Module 12: Mixed Model in Quantitative Genetics, **Summer 2022**

University of Wisconsin – Madison

2021	Teaching assistant:	ANSCI 610 Quantitative Genetics, **Fall 2021**

Federal Institute of *Education*, Science, and Technology of Maranhao (IFMA)

2020	Instructor:	Undergraduate course (B.S. Animal Science): Genetics
2020	Instructor:	Undergraduate course (B.S. Animal Science): Experimental Statistics
2019	Instructor:	Undergraduate course (B.S. Agronomy): Experimental Statistics
2019	Instructor:	Undergraduate course (B.S. Agronomy): Statistics
2019	Instructor:	Undergraduate course (B.S. Animal Science): Statistics
2018	Instructor:	Undergraduate course (B.S. Animal Science): Animal Breeding I
2018	Instructor:	Undergraduate course (B.S. Biology): Genetics

Sao Paulo State University

2017	Teaching assistant:	Undergraduate course (B.S. Biology): Biostatistics

Short-Courses and Invited Talks

2022	Invited Talk:	Leveraging RFID technology for unveiling the genetic basis of feed efficiency and novel feeding behavior traits in group-housed broilers. Genomic & Quantitative Genetics Weekly Meeting, September 19th, 2022, Cobb-Vantress, Inc. [online]
2022	Invited Talk:	Statistical pitfalls and their implications for the research reproducibility in animal sciences. Poultry Science Annual Meeting, San Antonio, Texas. July 13th, 2022.
2022	Invited Talk:	Genome-enabled analysis of complex traits with machine learning methods. April 1st, CGIL Seminar W2022, University of Guelph. [online]
2022	Invited Talk:	Feed Efficiency and Novel Feeding Behavior Traits in Broilers, Jan 19th, Cobb Webinar Series, Cobb Vantress, Inc. [online]
2020	Short-course:	Analyzing livestock farming data using R [In Portuguese]. June 2020. In*:* II Mostra de Ciências Agrárias e Meio Ambiente.
2020	Invited Talk:	Machine learning in the animal production: concepts, challenges, and perspectives [In Portuguese]. November 2020. In: Semana Nacional de Ciência e Tecnologia (SNCT) 2020
2018	Short-course:	Basic statistical analysis using the R tool [In Portuguese]. November 2018. In: VIII Semana Nacional de Ciência e Tecnologia.

MENTORING

	Total
Undergraduate Research Projects (Advisor)	**2**
Undergraduate Students (Committee member)	**3**
Graduate Students (Co-advisor)	**1**
Graduate Students Qualifying Exam (Committee member)	**2**

SOFTWARE

- Alves AAC and Rosa GJM. 2022. qmtsvr: (Quasi) Multi-task Support Vector Regression methods. Available at: https://alvesand.netlify.app/qmtsvr_doc.html

- train.nn: A simplified R function for training a Multi-layer Perceptron Neural Network with Gradient Descent optimization and L2-norm regularization for regression analysis. [https://github.com/alvesand/train.nn/blob/main/train.nn%20(R%20function)]

- simdom: An R script for generating simulated datasets with dominance effects using QMSim outputs. [https://github.com/alvesand/simdom/blob/master/simdom]

SERVICE

- **Referee for:** Scientific Reports (1)**,** Small Ruminant Research (8), Acta Agronómica (1), Tropical Animal, Health and Production (1)

SOCIETY MEMBERSHIPS

- American Society of Animal Science (ASAS)

SKILLS

- **Statistical software:** R and Python
- **Programming languages:** R, Python, C++
- **Genetic analysis tools:** BLUPF90 family, QMSim, Cytoscape, String, Genome Data Viewer, GS3, Wombat, Beagle
- **Operational systems:** Linux and Windows

ACADEMIC REFERENCES

Dr. Guilherme Rosa. Professor, Department of Animal and Dairy Sciences, University of Wisconsin – Madison. E-mail: grosa@wisc.edu

Dr. Rachel Hawken. Senior Director of Genetics, Cobb-Vantress, Inc., Springdale, Arkansas, United States. E-mail: Rachel.Hawken@cobbvantress.com

Dr. Lucia Galvão de Albuquerque. Professor, Department of Animal Sciences, Sao Paulo State University E-mail: galvao.albuquerque@unesp.br

GENERAL INFORMATION

Full Name: Anderson Antonio Carvalho Alves

Phone: +1 (608) 960-6325

Date of birth: 01/14/1991

Place of birth: Duque de Caxias, RJ, Brazil

Languages: English, Portuguese (Native)