

**Francisco Peñagaricano, PhD**

Assistant Professor, Quantitative Genomics  
 Department of Animal and Dairy Sciences, UW-Madison

<http://fpenagaricano-lab.org>

**EDUCATIONAL BACKGROUND**

<b>Institution</b>	<b>Field of Study</b>	<b>Degree</b>	<b>Year</b>
University of Wisconsin-Madison	Animal Science	PhD	2014
University of Wisconsin-Madison	Statistics	MS	2014
Universidad de la República (Uruguay)	Animal Science	MS	2010
Universidad de la República (Uruguay)	Biochemistry	BS	2009
Universidad de la República (Uruguay)	Biology	BS	2005

**PROFESSIONAL EXPERIENCE**

<b>Institution</b>	<b>Position</b>	<b>Dates</b>
University of Wisconsin-Madison	Assistant Professor	Aug. 2020 - present
University of Florida	Assistant Professor	Feb. 2015 – Aug. 2020
University of Wisconsin-Madison	Graduate Research Assistant	Sep. 2010 - Dec. 2014

**AREAS OF SPECIALIZATION**

- Dairy Cattle Breeding, Genetics and Genomics
- Computational Biology and Bioinformatics
- Environmental and Nutritional Genomics

**RESEARCH INTERESTS**

My research interests are in quantitative genomics and computational biology. My research program focuses on the development and application of methods to dissect the genetic basis of relevant traits in livestock. We typically combine large, nationwide phenotypic datasets or field experiments, with high throughput genomic technologies, and advanced methods to elucidate the connection between genome and phenome. Our research involves gene mapping, gene-set analysis, genomic prediction, methylome and transcriptome analysis, multi-omics data integration, and network modeling.

**PUBLICATIONS**

**Full List of Publications:** <http://fpenagaricano-lab.org/publications/>

[Google Scholar](#) statistics (Jan 31, 2022): citations = 2150; h-index = 26; i10-index = 51

**Book Chapters**

- JE Koltjes and **F Peñagaricano** (2019) Linking Genotype to Phenotype: Functional Annotation as a Tool to Advance Dairy Cattle Breeding. In: *Advances in Breeding of Dairy Cattle*. pp 383-407. Burleigh Dodds Science Publishing.
- **F Peñagaricano** (2019) Genetics and Genomics of Dairy Cattle. In: *Animal Agriculture: Challenges, Innovations, and Sustainability*. pp 101-119. Elsevier.
- **F Peñagaricano**, A De Vries, and DT Bennink (2017) Genomic Selection and Reproductive Technologies to Optimize Herd Replacements. In: *Large Dairy Herd Management*, 3er ed. pp 379-388. ADSA® Foundation.

- GJM Rosa, VPS Felipe, and **F Peñagaricano** (2016) Applications of Graphical Models in Quantitative Genetics and Genomics. In: *Systems Biology in Animal Production and Health*, Vol. 1. pp 95-116. Springer International Publishing.

### Refereed Publications (since 2020)

- CM Sheftel, L Liu, SL Field, SR Weaver, CM Vezina, **F Peñagaricano**, and LL Hernandez (2022) Impact of fluoxetine treatment and folic acid supplementation on the mammary gland transcriptome during peak lactation. *Frontiers in Pharmacology* (in press)
- JR Vinyard, **F Peñagaricano**, and AP Faciola (2022) The effects of course format, sex, semester, and institution on student performance in an undergraduate animal science course. *Translational Animal Science* (in press)
- LC Novo, L Cavani, P Pinedo, P Melendez, and **F Peñagaricano** (2022) Genomic analysis of visceral fat accumulation in Holstein cows. *Frontiers in Genetics* 12: 803216.
- T Martins, M Sponchiado, FACC Silva, E Estrada-Cortés, PJ Hansen, **F Peñagaricano**, and M Binelli (2022) Progesterone-dependent and -independent modulation of luminal epithelial transcription to support pregnancy in cattle. *Physiological Genomics* 54: 71–85.
- L Cavani, MB Poindexter, CD Nelson, JEP Santos, and **F Peñagaricano** (2022) Gene mapping, gene-set analysis, and genomic prediction of postpartum blood calcium in Holstein cows. *Journal of Dairy Science* 105: 525-534.
- L Liu, R Amorín, P Moriel, N DiLorenzo, PA Lancaster, and **F Peñagaricano** (2021) Maternal methionine supplementation during gestation alters alternative splicing and DNA methylation in bovine skeletal muscle. *BMC Genomics* 22: 780.
- LFM Mota, S Pegolo, T Baba, G Morota, **F Peñagaricano**, G Bittante, and A Cecchinato (2021) Comparison of single-breed and multi-breed training populations for infrared predictions of novel phenotypes in Holstein cows. *Animals* 11: 1993.
- MA Mezera, W Li, L Liu, R Meidan, F Peñagaricano, and MC Wiltbank (2021) Effect of natural pre-luteolytic prostaglandin F2 $\alpha$  pulses on the bovine luteal transcriptome during spontaneous luteal regression. *Biology of Reproduction* 105: 1016-1029.
- HA Pacheco, M Battagin, A Rossoni, A Cecchinato, and **F Peñagaricano** (2021) Evaluation of bull fertility in Italian Brown Swiss dairy cattle using cow field data. *Journal of Dairy Science* 104: 10896-10904.
- EA Palmer, **F Peñagaricano**, M Vedovatto, RA Oliveira, SL Field, J Laporta, and P Moriel (2021) Effects of maternal gestational diet on muscle transcriptome of beef calves following a vaccine-induced immunological challenge. *PLoS ONE* 16: e0253810.
- A Sigdel, RS Bisinotto, and **F Peñagaricano** (2021) Genes and pathways associated with pregnancy loss in dairy cattle. *Scientific Reports* 11: 13329.
- R Abdollahi-Arpanahi, HA Pacheco, and **F Peñagaricano** (2021) Targeted sequencing reveals candidate causal variants for dairy bull subfertility. *Animal Genetics* 52: 509-513.

- SL Field, MG Marrero, L Liu, **F Peñagaricano**, and J Laporta (2021) Histological and transcriptomic analysis of adipose and muscle of dairy calves supplemented with 5-hydroxytryptophan. *Scientific Reports* 11: 9665.
- LFM Mota, S Pegolo, T Baba, **F Peñagaricano**, G Morota, G Bittante, and A Cecchinato (2021) Evaluating the performance of machine learning methods and variable selection methods for predicting difficult-to-measure traits in Holstein dairy cattle using milk infrared spectral data. *Journal of Dairy Science* 104: 8107-8121.
- T Baba, S Pegolo, LFM Mota, **F Peñagaricano**, G Bittante, A Cecchinato, and G Morota (2021) Integrating genomic and infrared spectral data improves the prediction of milk protein composition in dairy cattle. *Genetics Selection Evolution* 53: 29.
- P Fan, CD Nelson, D Driver, MA Elzo, **F Peñagaricano**, KC Jeong (2021) Host genetics exerts lifelong effects upon hindgut microbiota and its association with bovine growth and immunity. *The ISME Journal* 15: 2306–2321.
- LF Brito, N Bedere, F Douhard, HR Oliveira, M Arnal, **F Peñagaricano**, AP Schinckel, CF Baes, and F Miglior (2021) Genetic selection of high-yielding dairy cattle towards sustainable farming systems in a rapidly changing world. *Animal* 15: 100292.
- M Nehme Marinho, R Zimpel, **F Peñagaricano**, and JEP Santos (2021) Assessing feed efficiency in early and mid-lactation and its associations with performance and health in Holstein. *Journal of Dairy Science* 104: 5493-5507.
- L Liu, R Amorín, P Moriel, N DiLorenzo, PA Lancaster, and **F Peñagaricano** (2020) Differential network analysis of bovine muscle reveals changes in gene coexpression patterns in response to changes in maternal nutrition. *BMC Genomics* 21: 684.
- E Jara, **F Peñagaricano**, C Menezes, L Tardiz, G Rodons, A Iriarte, and E Armstrong (2020) Transcriptomic analysis of eyelid pigmentation in Hereford cattle. *Animal Genetics* 51: 935-939.
- JD Leal Gutierrez, FM Rezende, J Reecy, L Kramer, **F Peñagaricano**, and RG Mateescu (2020) Whole genome sequence data provides novel insights into the genetic architecture of meat quality traits in beef. *Frontiers in Genetics* 11: 538640.
- FM Rezende, M Haile-Mariam, JE Pryce, and **F Peñagaricano** (2020) Across-country genomic prediction of bull fertility in Jersey dairy cattle. *Journal of Dairy Science* 103: 11618-11627.
- JP Nani and **F Peñagaricano** (2020) Whole-genome homozygosity mapping reveals candidate regions affecting bull fertility in US Holstein cattle. *BMC Genomics* 21: 338.
- A Sigdel, L Liu, R Abdollahi-Arpanahi, I Aguilar, and **F Peñagaricano** (2020) Genetic dissection of reproductive performance of dairy cows under heat stress. *Animal Genetics* 51: 511-520.
- N Gross, **F Peñagaricano**, and H Khatib (2020) Integration of whole-genome DNA methylation with RNA sequencing data to identify markers for bull fertility. *Animal Genetics* 51: 502-510.
- R Abdollahi-Arpanahi, D Gianola, and **F Peñagaricano** (2020) Deep learning versus parametric and ensemble methods for genomic prediction of complex phenotypes. *Genetics Selection Evolution* 52: 12.

- H Louvandini, PS Corrêa, R Amorín, L Liu, EH Ieda, CR Jimenez, SM Tsai, CM McManus, and **F Peñagaricano** (2020) Gestational and lactational exposure to gossypol alters the testis transcriptome. *BMC Genomics* 21: 59.
- FS Lima, FT Silvestre, **F Peñagaricano**, and WW Thatcher (2020) Early genomic prediction of daughter pregnancy rate is associated with improved reproductive performance in Holstein dairy cows. *Journal of Dairy Science* 103: 3312-3324.
- HA Pacheco, FM Rezende, and **F Peñagaricano** (2020) Gene mapping and genomic prediction of bull fertility using sex chromosome markers. *Journal of Dairy Science* 103: 3304-3311.
- MR Carvalho, C Aboujaoude, **F Peñagaricano**, JEP Santos, TJ DeVries, BW McBride, and ES Ribeiro (2020) Associations between maternal characteristics and health, survival, and performance of dairy heifers from birth through to first lactation. *Journal of Dairy Science* 103: 823-839.

### INVITED PRESENTATIONS (selected)

- *Uterine environment and fetal programming: an omics perspective*. XIII Symposium, REDBIO, Argentina. June 2021.
- *Genomic dissection and prediction of bull fertility*. Beef Improvement Federation Research Symposium and Convention, Des Moines, Iowa. June 2021.
- *Impact of genomics on dairy cattle breeding: progress, challenges, and perspectives*. First Meeting AgroGenomics, Uruguay. March 2021.
- *Making effective dairy sire selection decisions*. Brazilian Embryo Technology Society, Annual Meeting. December 2020.
- *Genomic testing in dairy cattle*. American Society of Animal Science, Southern Section Extension, Livestock Genetics and Genomics Webinar Series. November 2020.

### GRANTS

#### Selected Grants Awarded

Role	Agency	Grant Area	Total Award (Lab Allocation)
CoPI	USDA-NIFA	Control and dynamics of fertility to estrus in beef cows	\$650,000 (\$102,000)
PI	Dairy Innovation Hub	Innovative solutions for a sustainable improvement of dairy cow fertility	\$50,000 (\$50,000)
PI	American Jersey Cattle Association	Revisiting the relationship between type traits, inbreeding, and longevity in Jersey cattle	\$36,000 (\$36,000)
CoPI	Foundation for Food and Agriculture Research	Feed efficiency in dairy cattle	\$2,000,000 (\$323,087)
CoPI	USDA-NIFA	Dairy cow genome, rumen microbiome and feed efficiency	\$500,000 (\$235,422)
PI	American Jersey Cattle Association	Genetics of Jersey bull fertility (3)	\$78,344 (\$78,344)

**MENTORING****Summary Mentoring Since 02/2015**

<b>ITEM</b>	<b>Total</b>
Graduate Students (Chair)	10
Graduate Students (Committee)	20
Postdoctoral Researchers	6
International Visiting Scholars	15

**TEACHING**

- *Design and Analysis of Biological Studies*: this 4-credit course focuses on basic concepts of linear and generalized linear models, analysis of variance, and experimental design.
- *Concepts in Genomics*: this 3-credit course seeks to expose students to current and emerging topics in genomics, including genome annotation, gene mapping, and genomic prediction.
- International *5-day short courses* (Iowa State, Australia, Brazil, El Salvador, Italy, Uruguay)

**AWARDS**

- 2019 Excellence Award for Assistant Professors, University of Florida
- 2018 Mentor of the Year Award, UF Animal Science Graduate Student Association

**PROFESSIONAL SERVICE**

- 2022-up-to-date **Editorial Board** - Journal of Dairy Science
- 2020-up-to-date **Associate Editor** - *Animal: The International Journal of Animal Biosciences*
- 2020-up-to-date **Associate Editor** - *Frontiers in Genetics* (section *Livestock Genomics*)
- 2018-up-to-date **Associate Editor** - *BMC Genomics*
- 2013-up-to-date **Ad-hoc Reviewer** - *Animal Genetics*, *BMC Genetics*, *BMC Genomics*, *Frontiers in Genetics*, *G3: Genes Genomes Genetics*, *Genetics*, *Genetic Selection Evolution*, *Journal of Animal Breeding and Genetics*, *Journal of Animal Science*, *Journal of Dairy Science*, *PLoS Genetics*, *PLoS ONE*, *Scientific Reports*, among others.