



Mehdi Momen

Animal Geneticist:
Statistical and Quantitative Genetics
April 2020

CONTACT INFORMATION

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RESEARCH INTERESTS

I am an Animal Geneticist, more especially a "Statistical and Quantitative Geneticist", interested in developing and applying novel statistical learning methods to multi-layer OMICS data. My research interests span a broad range of topics including Genomic Prediction and Genome Wide Association analysis. I have extensive experience in both animal and plant systems.

EDUCATION

Shahid Bahonar University Of Kerman (SBUK), Kerman, IRAN

Ph.D., Agricultural Engineering- Animal Science, Animal Breeding and Genetics, Sep 2012 - Apr 2017

- Dissertation: "Predictive ability and sensitivity of Whole Genome Prediction (WGP) statistical Models for Genomic Selection in complex Traits with Additive, Dominance and Epistatic Genetic Architecture."
- Advisors: Ahmad Ayatollahi Mehrgardi & Ali Esmailizadeh

University of Wisconsin-Madison, Madison, Wisconsin, USA

Visiting Ph.D. Student., Animal Breeding and Genetics, Oct 2015 - Jun 2016

- Project: "Development and predictive assessment of whole-genome prediction machines in Genomic selection and Genome-wide association studies."
- Advisor: Daniel Gianola

University of Tehran, Aboureihan Campus, Tehran, IRAN

M.S., Animal Breeding and Genetics, Sep 2007 - May 2010

- Dissertation: "Genetic Analysis of Reproductive and Growth traits In Purebred and Crossbred Lambs from three Iranian Sheep Breeds."
- Advisor: Nasser Emam-Jomea Kashan

Zabol University, Agricultural College, Sistan and Baluchestan Province, IRAN

B.S., Agricultural Engineering- Animal Science, Sep 2003 - May 2007

- Advisor: Nasser Emam-Jomea Kashan

EMPLOYMENT

University of Wisconsin-Madison, Wisconsin, Madison, USA

Research Associate in Bioinformatic and Quantitative Genetics, Nov 2019 - Now

- Advisor: Peter Muir

Virginia Polytechnic Institute and State University, Blacksburg, Virginia, USA

Postdoctoral Research Associate in Statistical and Quantitative Genetics, Nov 2018 - Nov 2019

- Advisor: Gota Morota

Shahid Bahonar University of Kerman (SBUK), Kerman, Iran.

Research Assistant in Statistical Genetics and Genomics, May 2017 - Nov 2018

- Advisor: Ahmad Ayatollahi Mehrgardi & Ali Esmailizadeh

PUBLICATIONS

Preprints

1. Pedro Marcus Pereira Vidigal, **Momen M**, Paulo Mafra de Almeida Costa, Márcio Henrique Pereira Barbosa, Gota Morota, Luiz Alexandre Peternelli. Regional heritability mapping as a tool for screening sequence variation on sugarcane genome
2. Sirous Eydivandi, Goutam Sahana, **Momen M**, Mohammad Hossein Moradi, Anna A Schonherz. Genetic diversity of Iranian indigenous sheep and wild mouflon populations based on whole-genome genotyping (In first revision of *Animal Genetics*, ID: AnGen-20-01-0017).

Journal papers

1. Lauren A. Baker, **Momen M**, Kore Chan, Fernando Brito Lopes, Nathan Bollig, Rory J. Todhunter, Guilherme J.M. Rosa, Emily E. Binversie, Susannah J. Sample, Peter Muir. 2020. Bayesian and machine learning models for Genomic prediction of anterior cruciate ligament rupture in the canine model. (In press *G3: Genes, Genomes, Genetics journal*)
2. Sara Pegolo, **Momen M**, Gota Morota, Guilherme J. M. Rosa, Daniel Gianola, Giovanni Bittante and Alessio Cecchinato. 2020. Structural equation modeling for investigating multi-trait genetic architecture of udder health in dairy cattle (In press *Scientific Reports*, ID: SREP-19-28597).
3. Amiri Roudbar M, Mohammadabadi MR, Ayatollahi Mehrgardi A, Abdollahi Arpanahi R, **Momen M**, Morota G, Brito Lopese F, Gianola D, Rosa J. M. Integration of single nucleotide variants and whole-genome DNA methylation

profiles for classification of rheumatoid arthritis cases from controls. *Heredity* (2020): 1-17. 10.1038/s41437-020-0301-4

4. Samaneh Solaymani, Ahmad Ayatollahi Mehrgardi, Ali Esmailizadeh, Llibertat Tusell, **Momen M**, 2019, Performance of pedigree and various forms of marker derived relationship coefficients in genomic prediction and their correlations. *Journal of Animal Breeding and Genetics*. doi: 10.1111/jbg.12467
5. Toshimi Baba, **Momen M**, Malachy T. Campbell, Harkamal Walia, Gota Morota, 2019, Multi-trait random regression models increase genomic prediction accuracy for a temporal physiological trait derived from high-throughput phenotyping. (Accepted for PLOS One, ID: PONE-D-19-25821R1)
6. **Momen M**, Campbell, MT, Walia, H, Morota, G (2019) Utilizing trait networks and structural equation models as tools to interpret multi-trait genome-wide association studies. *Plant Methods* 15, 107. doi: 10.1002/pld3.80
7. **Momen M**, Campbell MT, Walia H, Morota G. 2019. Predicting longitudinal traits derived from high-throughput phenomics in contrasting environments using genomic Legendre polynomials and B-splines. *G3: Genes, Genomes, Genetics*. doi: 10.1534/g3.119.400346
8. Campbell M T, **Momen M**, Harkamal H, Morota G. 2019. Leveraging breeding values obtained from random regression models for genetic inference of longitudinal traits. *The Plant Genome*. doi: 10.3835/plantgenome2018.10.0075
9. Fazel Y, Esmailizadeh K A, **Momen M**, Assadi Foozi M. 2018. Importance of genotype by environment interaction on genetic analysis of milk yield in Iranian Holstein cows using random regression model. *Animal Production Science*. doi: 10.1071/AN17714
10. **Momen M**, Ayatollahi Mehrgardi A, Amiri Roudbar M, Kranis A, Mercuri Pinto R, Valente B D, Morota G, Rosa G J M, Gianola D. 2018. Including phenotypic causal networks in genome-wide association studies using mixed effects structural equation model. *Frontiers in Genetics*. 9:455. doi: 10.3389/fgene.2018.00455
11. **Momen M**, Gota M. 2018. Quantifying genomic connectedness and prediction accuracy from additive and non-additive gene actions. *Genetics Selection Evolution*. 50:45. doi: 10.1186/s12711-018-0415-9
12. **Momen M**, Ayatollahi Mehrgardi A, Sheikhy A, Kranis A, Tusell L, Morota G, Rosa G J M, Gianola D. 2018. Predictive ability of genome-assisted prediction machines under various statistical genetic architectures. *Scientific Reports*. 8:12309. doi: 10.1038/s41598-018-30089-2
13. **Momen M**, Ayatollahi Mehrgardi A, Sheikhy A, Esmailizadeh Koshkoieh A, Assadi Foozi M, Kranis A, Valente B D, Rosa G J M, Gianola D. 2017. A genome-enabled predictive assessment of genetic correlations between traits in chickens. *Genetics Selection Evolution*. 49: 16 . doi: 10.1186/s12711-017-0290-9
14. **Momen M**, Ayatollahi Mehrgardi A, Sheikhy A, Esmailizadeh A K, Assadi Foozi M. 2016. Predictive Ability of Statistical Genomic Prediction Methods When

Underlying Genetic Architecture of Trait Is Purely Additive. *Iranian Journal of Applied Animal Science (IJAS)*. Volume 6 (Issue 1): **6(4)**:815-822, Volume 6 (Issue 4).doi:

15. **Momen M**, Emam Jomea Kashan N, Sharifi S D, Amiri Roudbar M, Ayatollahi Mehrgardi A. 2015. Fatty acid composition of fat-tail and visceral fat depots from Chaal and Zandi pure lambs and their crosses with Zel (Three Iranian breeds). *Iranian Journal of Applied Animal Science (IJAS)*. **6(1)**: 107-112.

Posters:

1. M. Mohammadpanah, **Momen Mehdi**, H. Gilbert, C. Larzul, M.J. Mercat, A. Mehrgardi and L. Tusell. Additive and dominance genomic parameters for back-fat thickness in purebred and crossbred pigs. The European Federation of Animal Science (EAAP), 26 - 30 August 2019, Ghent, Belgium.
2. Alessio Cecchinato, **Momen Mehdi**, Gota Morota, Guilherme J.M. Rosa, Daniel Gianola, Sara Pegolo. Structural equation models for genome-wide association study (SEMGWAS) of interrelationships among udder health traits in dairy cattle. National Congress of the Animal Science and Production Association (ASPA). 11 - 14 June 2019. Hilton Sorrento Palace, Sorrento, Italy.
3. Pegolo S., **Momen Mehdi**., Morota G., Rosa Guilherme J. M., Gianola D., Bittante G., Alessio C. 2019. Genome-based discovery of trait networks in dairy cattle. The EAAP Annual Meeting, Ghent, Belgium.
4. **Momen M**, Ayatollahi Mehrgardi A, Brito Lopez F, Rosa GJ M, Gianola D. 2016. Combining marker and pedigree information may enhance multiple-trait genome-enabled prediction. 5th International Conference on Quantitative Genetics Madison, Wisconsin, USA.
5. Jabari M, Sharifi F, **Momen M**. 2012. Application of Fuzzy Linear Regression (FLR) in agricultural economic studies. 2012. 1th International conference on Econometrics, Methods and Applications, Azad university of sanandaj, Iran, on 25-27 august 2012.
6. **Momen M**, Kashan NEJ, Sanjari H. 2011. Study of Gut morphological traits in pure and crossbreeds lambs of Zandi with Zel. The 1th national conference on new technologies in agriculture science. Zanzan University, Zanzan province, Iran.
7. Kashan NEJ, **Momen M**, Nasiri Kh. 2011. Simulation experiments for detection of quantitative trait loci (QTLs) in Animal Populations. The 1th national conference on new technologies in agriculture science. Zanzan University, Zanzan province, Iran.
8. Sanjari H, **Momen M**, Kashan NEJ. 2011. Evaluation of the number and homozygosity of sex alleles in honey bee colonies. 2011. The 1th national conference on rearing management of livestock in tropical region. Kerman University, Kerman province, Iran.

9. **Momen M**, Nasiri Kh. 2011. Genetic algorithm simulations for detection of quantitative traits loci effects. The 5th national conference on new ideas in agriculture. Khorasgan azad university unit, Esfahan province, Iran.
10. Vesi A, **Momen M**. 2011. Application of Fuzzy logic in economic improvement of animal production units. 2011. the 5th national conference on new ideas in agriculture. Khorasgan azad university unit, Esfahan province, Iran.
11. **Momen M**, Kashan NEJ, Sharifi SD. 2010. Investigation of fatty acids profile on fat-tail and visceral fats of Zandi pure lambs and their crosses with Zel rams. The 4th national conference in animal science. Tehran University, karaj campus, Iran.
12. **Momen M**, Kashan NEJ, Sharifi SD. 2010. Study of relationship between blood-biochemical traits with carcass traits in pure lambs of Chal and Zandi and their cross with Zel rams. The 4th national conference in animal science. Tehran University, karaj campus, Iran.
13. **Momen M**, Kashan NEJ, Sharifi SD. 2009. Study of growth performance on crossbreed lambs of fat-tailed and tailed sheep breeds, proceeding of The British Society of Animal Science Association conference, Queen's University, Belfast, April, UK
14. Mohseni M, Kashan NEJ, **Momen M**, 2009. Study seasonal and liver/lung condemnation in sheep, cattle and buffalo in khoy abattoir in northwest, Iran, Proceeding of The British Society of Animal Science Association conference, Queen's University, Belfast, April, UK.
15. Mohseni M, Kashan NEJ, **Momen M**, 2009. An abattoir survey of the incidence of liver fluke disease and Hydatidosis in sheep in Khoy abattoir, West Azarbyjan, Iran, Proceeding of the British Society of Animal Science Association conference, Queen's University, Belfast, April, UK.

Books:

1. Baratti Morteza, **Momen Mehdi**. 'Experimental design in agriculture sciences', 2011. Pardazeshgaran Press.
2. **Momen Mehdi**, Mohseni Maysam. 'A Hand book of Animal Science Questions for Undergraduate (B.Sc) Students', 2009, Pardazeshgaran Press.
3. Baratti, Morteza, Shahbazi Ali, **Momen Mehdi** and Zaman Shina. 'A Hand book of Agronomy Questions for Undergraduate (B.Sc) Students', 2009, Pardazeshgaran Press.

PRESENTATIONS

1. Network-Based Genome-Wide Association Analysis Using Structural Equation Models (SEM-GWAS), Comparative Genetic Research Laboratory, School of Veterinary Medicine, University of Wisconsin-Madison. (September 9, 2019)
2. Gain obtained by enriching whole genome prediction machines using genotypic data and bioinformatics initiative tools, Department of Animal Sciences, University of Tehran. (March 6, 2018)

3. The Bayesian controversy in genome-enabled prediction in animal breeding, Department of Animal Sciences, Shahid Bahonar University of Kerman (SBUK). (May 10, 2017)

TEACHING

Graduate courses

- Biostatistics, Quantitative Genetics, and Genomics in Animal Breeding, Statistical Analysis of Large Genomic data, Advance Genetic Prediction, Department of Animal Science, Shahid Bahonar University of University of Kerman, Kerman, Iran (2017-2018).

Undegraduate courses

- Biostatistics and Statistical in Agricultural Research, Department of Animal Science, University of Kerman, Kerman, Iran (2012-2018).
- General Biochemistry, department of agriculture improvement, Payam Noor University, Darab city, Fars province, Iran (2012).
- The basic of plant and animal genetic, department of agriculture improvement, Payam Noor University, Darab city, Fars province, Iran (2011).
- The basic of biotechnology in agricultural sciences, department of agriculture improvement, Payam Noor University, Darab city, Fars province, Iran (2011).
- Biostatistics and Statistical Designs in Agricultural Research as a teacher assistant, Department of Animal Science, University of Tehran, Tehran, Iran (2008).

SKILLS

Statistical and Genetic Software: ASReml, Wombat, BLUPF90, Plink, GCTA, GenSel, MCMCglmm, QTL Cartographer, Grid QTL, GenAIEx, SNPEVG, GVCBLUP, MEGA, and POPGENE

Programming Language: R, SAS, SPSS, C++, and L^AT_EX

JOURNAL REVIEW:

- International Journal of Molecular Sciences(2019-Now)
- BMC Plant Biology(2020-Now)
- Journal of Agricultural Science and Technology (2019-Now)
- Genes Journal (2019-Now)
- Italian Journal of Animal Science (2018-Now)
- Journal of Livestock Science and Technologies (2013-Now)

ADDITIONAL TRAINING

Short courses

- Genomic Selection in Animal and plant breeding. 2016. Instructor: Prof. Mike Goddard. A.B chapman lecture, February 6-8, Madison, Wisconsin, USA
- Genomic Selection in the Era of Genome Sequencing. 2016. Instructor: Ben Hayes. The 5th International Conference on Quantitative Genetics, January 6-8, Madison, Wisconsin, USA.

- Statistical Genetics of Quantitative Traits and Complex Disease. 2016. Instructor: Matt Robinson. The 5th International Conference on Quantitative Genetics, January 8-10, Madison, Wisconsin, USA.
 - Genomic selection methods and analysis of huge genomic data in animal breeding programs and genomics. 2013. Instructor: Rostam Abdolahi-Arpanahi. August 26, Shahid Bahonar University of Kerman, Faculty of Agriculture (SBUK), Kerman, IRAN.
 - Programming and advance data analysis with R software. 2013. Instructor: Rostam Abdolahi-Arpanahi. August 27-28, Shahid Bahonar University of Kerman(SBUK), Faculty of Agriculture, Kerman, IRAN.
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REFERENCES

Prof. Peter Muir,

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University of Wisconsin-Madison*

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<https://www.vetmed.wisc.edu/people/muirp/>

Prof. Daniel Gianola,

*Sewall Wright Professor of Animal Breeding and Genetics
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