

CURRICULUM VITAE

Weronika Klecel, PhD

Evolutionary genomics · Population genetics · Computational phenotyping

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Profile

Evolutionary genomicist and quantitative geneticist studying how inbreeding, demography and environment shape the health and persistence of small equid populations. Combines longitudinal field data, population and pedigree genomics, computer vision and open-source research software. Current work centres on free-living Sable Island horses and comparative conservation genomics.

Research focus

Evolutionary and conservation genomics: Genomic pedigrees, runs of homozygosity and longitudinal fitness data in small, isolated populations.

Population history and breeding systems: Founder contributions, bottlenecks and diversity change reconstructed from pedigrees, genomes and long-term records.

Computational phenotyping: Markerless pose estimation, laser photogrammetry and reproducible R/Python/HPC workflows for scalable morphology and locomotion traits.

Academic and research appointments

OCT 2025–PRESENT Postdoctoral Associate, Poissant Lab — *Faculty of Veterinary Medicine, University of Calgary, Canada*

Inbreeding and fitness in more than 800 genotyped Sable Island horses; genomic pedigrees and ROH integrated with survival, reproduction, morphology, parasites and microbiome data.

MAR–AUG 2025 Guest Postdoctoral Fellow, Poissant Lab — *University of Calgary, Canada*

Developed a 26-landmark, two-laser deep-learning workflow for contact-free morphometry and completed the 2025 Sable Island field campaign.

JUN 2024–SEP 2025 Research and Teaching Assistant — *Warsaw University of Life Sciences, Poland*

Teaching in genetics, genomics and bioinformatics; student project supervision; analytical and manuscript support.

SEP 2023–FEB 2024 Visiting PhD Student, Brooks Equine Genetics Lab — *University of Florida, USA*

Built a 16-landmark computer-vision pipeline from more than 1,000 videos; developed kinematic and morphometric traits and HPC workflows; led refinedLDC.

NOV–DEC 2022 NAWA PROM Visiting PhD Fellow, CAGT — *University of Toulouse, France*

Equine evolutionary genomics, whole-genome analysis and continuing collaboration with Prof. Ludovic Orlando.

MAR–APR 2022 Visiting PhD Student — *National Research Institute of Animal Production, Poland*

Mitochondrial diversity, phylogenetics and bioinformatic analysis.

OCT 2020–SEP 2024 PhD Researcher — *Warsaw University of Life Sciences, Poland*

Population structure, pedigree diversity, conformation and movement in Purebred Arabian horses.

Education

AWARDED FEB 2025 PhD, Animal Science and Fisheries — *Warsaw University of Life Sciences*
Population structure, conformation and movement of Purebred Arabians; research completed 2024.

2020 MSc, Animal Science — distinction; first in class — *Warsaw University of Life Sciences*
Racing performance in Thoroughbreds and Purebred Arabians.

2019 Engineer degree (BSc equivalent), Animal Science — first in class — *Warsaw University of Life Sciences*
Animal breeding, genetics and conservation.

Selected research contributions and open outputs

refineDLC: Lead developer of an open-source Python package for validated post-processing of DeepLabCut outputs, including architecture, implementation, validation, documentation, examples and user support. [Code](#)

Validation dataset: Open data supporting the refineDLC publication and reproducible evaluation. [Zenodo](#)

Equine precision phenotyping: DeepLabCut tracking of 16 landmarks from more than 1,000 videos, with automated segment lengths, joint angles, speed, stride length and stride frequency; extended to 26 landmarks and two laser-calibration points for Sable Island imagery.

Population-scale resources: Curated more than 12,000 Polish Arabian pedigree records and works with a 19-year Sable Island resource spanning more than 1,500 identified horses.

Publications

Peer-reviewed journal articles

1. Stefaniuk-Szmukier, M., **Klecel, W.**, Szmatoła, T., & Ropka-Molik, K. (2026). Associations of genetic variants in the PPARD gene to racing performance in pigeons (*Columba livia*). *Developmental Biology*, 530, 260–264. [DOI](#)
2. **Klecel, W.**, Rahael, H., & Brooks, S. A. (2025). refineDLC: An advanced post-processing pipeline for DeepLabCut outputs. *Biology Methods and Protocols*, 10(1), bpaf084. [DOI](#)
3. **Klecel, W.**, Kloch, M., Wojciechowska, M., Gajewska, M., & Martyniuk, E. (2024). Population structure and genetic diversity of Polish Arabian horses based on pedigree data. *animal*, 18(5), 101148. [DOI](#)
4. Gmel, A. I., Lamas, L. P., Rosa, T. V., Stefaniuk-Szmukier, M., **Klecel, W.**, Martin-Giménez, T., Cruz, A. M., Weishaupt, M. A., & Neuditschko, M. (2024). Shape and joint angle data for seven European horse breeds and their repeatability. *Data in Brief*, 56, 110799. [DOI](#)
5. Gmel, A. I., Haraldsdóttir, E. H., Serra-Bragança, F., Lamas, L. P., Rosa, T. V., Stefaniuk-Szmukier, M., **Klecel, W.**, Neuditschko, M., & Weishaupt, M. A. (2024). Inertial sensor data of horses from four breeds at walk and trot in hand on a straight line. *Data in Brief*, 55, 110764. [DOI](#)
6. **Klecel, W.**, Drobik-Czwaro, W., & Martyniuk, E. (2023). Judging the Arabian Beauty: What are the relationships between different scoring categories?. *Journal of Equine Veterinary Science*, 123, 104247. [DOI](#)
7. Myćka, G., **Klecel, W.**, Stefaniuk-Szmukier, M., Jaworska, J., Musiał, A. D., & Ropka-Molik, K. (2022). Mitochondrial whole D-loop variability in Polish Draft horses of Sztumski subtype. *Animals*, 12(15), 1870. [DOI](#)
8. **Klecel, W.**, & Martyniuk, E. (2021). From the Eurasian steppes to the Roman circuses: A review of early development of horse breeding and management. *Animals*, 11(7), 1859. [DOI](#)

Peer-reviewed conference proceedings

9. Siwek, M., Bee, G., Debernardis, R., **Klecel, W.**, Kozłowski, K., Martyniuk, E., Pszczoła, M., Wolc, A., Yalcin, S., & Żarski, D. (2026). The NEW network: Young researchers and the global science community. *Proceedings of the 13th World Congress on Genetics Applied to Livestock Production*, contribution 2471.
10. **Klecel, W.**, Drobik-Czwaro, W., & Martyniuk, E. (2021). Factors influencing racing performance in Polish Thoroughbreds and Purebred Arabian horses. *Journal of Equine Veterinary Science*, 100, 103499.

Preprint

- 11. Klecel, W., Drobik-Czwaro, W., & Martyniuk, E. (2022).** Female Factor: The influence of dams on the racing performance of Purebred Arabians and Thoroughbreds. *SSRN Electronic Journal (preprint)*. DOI

Selected presentations

AUG 2026 15th Havemeyer Horse Genome Workshop — poster — Lexington, USA

Level of genomic inbreeding does not affect reproductive performance and multivariate morphology in a closed Straight Egyptian Arabian mare population.

SEP 2024 87th Polish Society of Animal Production Symposium — oral — Siedlce, Poland

Precision phenotyping system for conformation and locomotion traits in various livestock species.

MAY 2024 14th Havemeyer Horse Genome Workshop — oral — Caen, France

Employing deep neural networks for precision phenotyping of selected kinematic traits in Arabian horses: Pilot heritability and inbreeding analyses.

JAN 2024 31st Plant and Animal Genome Conference — poster — San Diego, USA

Phenotypic correlations between selected kinematic traits in Arabian horses: Preliminary results and possible genetic background.

OCT 2023 UF/IFAS Graduate Student Symposium — poster — St Augustine, USA

Utilising deep neural networks to assess quality of movement in the Arabian horse.

SEP 2022 86th Polish Society of Animal Production Congress — oral — Kraków, Poland

Relationships between elements of the scoring system in Arabian horse shows.

JUN 2021 Equine Science Society International Symposium — oral — Virtual

Factors influencing racing performance in Polish Thoroughbreds and Purebred Arabian horses; third place, Genetics Graduate Student Competition.

Fellowships, funding and distinctions

2026 Finalist, University of Calgary Postdoc Research Slam

2025–2027 University of Calgary Postdoctoral Excellence Fellowship

2023, 2025 Warsaw University of Life Sciences Rector's Mobility WFS Fellowships

2024 USDA Agricultural Genome to Phenome Initiative Travel Grant

2022 NAWA PROM Fellowship for international research mobility

2021 Polish Society of Animal Production Best Master's Thesis Award

2021 Third place, Equine Science Society Genetics Graduate Student Competition

2020–2024 Warsaw University of Life Sciences Doctoral School Scholarship

2017–2020 Warsaw University of Life Sciences Rector's Scholarships for academic excellence — three awards

Teaching and supervision

University teaching: Approximately 300 contact hours for around 180 students at Warsaw University of Life Sciences (2021–2025). Courses included Bioinformatic Analyses in Genomics; Population Genetics and Breeding Methods; Animal Breeding and Genetics; and Breeding Policy and Legislation.

Defended research projects: Primary supervision and project mentorship across two MSc and two BSc projects: inbreeding depression in a small Arabian herd; dairy-cattle conformation and locomotion; AI comparison of equine kinematics; and deep-learning detection of rearing in mice (2024–2026).

Mentoring: Fulbright Buddies programme and informal support in computer vision, R/Python and HPC workflows for students at Warsaw University of Life Sciences and the University of Florida.

Leadership and professional service

TERM BEGINS SEP 2026 Incoming Vice-President Operations, Postdoctoral Association Executive Committee — *University of Calgary*

Elected for the 2026–27 term; operations, continuity and practical improvements to Executive workflows.

APR–AUG 2026 Member-at-Large, Postdoctoral Association Executive Committee — *University of Calgary*
Postdoctoral representation, governance and professional-development planning.

MAR 2025–PRESENT Member, Postdoctoral Planning Group — *Faculty of Veterinary Medicine, University of Calgary*
Faculty-level postdoctoral development and community building.

2024 Doctoral representative, Senate Commission for International Cooperation — *Warsaw University of Life Sciences*

Represented doctoral perspectives in internationalisation and policy discussions.

2017–2020 Elected class president — three terms — *Warsaw University of Life Sciences*
Cohort representation, communication and coordination.

Peer review: Ad hoc reviewer for animal, Journal of Animal Science and Biotechnology, and PLOS ONE.

Field, industry and stakeholder experience

JUL 2025; JUL–AUG 2026 Sable Island field research — *Nova Scotia, Canada*

Population surveys, individual identification, laser photogrammetry, non-invasive sampling, traceability and field data integrity.

2019–2021 Stud Manager, Regina Arabians Stud — *Poland*

Breeding operations, records, logistics, staff and stakeholder communication.

2018–2020 Office Manager, Polish Arabian Horse Breeders Association — *Poland*

Administration and communication with breeders across Poland.

2014–2018 Exercise Rider and Groom, Służewiec Racecourse — *Warsaw, Poland*

Training, racing, welfare and daily horse management.

Technical competencies

Quantitative and population genetics: Linear, logistic and multivariate models; pedigree and founder analysis; inbreeding and ROH; relatedness; population structure.

Genomics and bioinformatics: Genotype quality control; multimodal data integration; SNP-array and targeted-sequencing workflows; PLINK, Bowtie2 and GATK.

Programming and reproducibility: R, Python, Bash, Git/GitHub and Linux; scripted workflows, version control, validation, documentation and reproducible figures.

Computer vision: DeepLabCut training and evaluation; landmark tracking; image and video curation; morphometric and kinematic phenotypes.

High-performance computing: Bash and Slurm; job design, resource allocation, troubleshooting and large genomic, image and video datasets.

Laboratory and field: DNA extraction, RT-PCR, electrophoresis, non-invasive sampling, laser photogrammetry, population surveys and sample traceability.

Languages: Polish (native); English (full professional); French, Spanish, Portuguese and Italian (limited).