

ANSC30030 *Animal Genomics*: Student Project (2020-21)

Peer-reviewed scientific journal paper assignment (30% of overall grade)

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Student project assignments updated 12:00 Tuesday 17th November 2020

Assignment information and instructions

- **30% of the overall grade** for the ANSC30030 module [note: special circumstances for 2020-21]
- Deadline for submission: **23:59 (midnight) on Friday 11th December 2020**
- Mode of submission: electronically as a **Microsoft Word (.doc or .docx)** or **Adobe Acrobat (.pdf)** file via the UCD Brightspace eLearning system. Other file formats will not be accepted.
- Format of the assignment
 - **Three A4 pages** with 2.5 cm margins and 1.5 line spacing.
 - Include the paper details in the title and your name and student number.
 - You must include the following statement at the beginning of your project (no quotes):
 - **“Note: I (Full name and student number) have read and fully understand the UCD Library Guidelines on Plagiarism, the Official UCD Policy on Plagiarism and the UCD Briefing for Students on Academic Integrity and Plagiarism”**
 - 12-point Times New Roman font should be used for the body text of the assignment.
 - One figure or table from the paper can be included in your assignment by copying and pasting from Adobe Reader. The figure or table should not take up more than half an A4 page and make sure you include a figure or table legend.
 - You can cite up to five additional peer-reviewed publications relevant to the research work described your assigned paper. Include the details of these in a bibliography at the end of your assignment.
 - Reviewing and summarising some of the papers may require you to access supplementary information associated with the research work. Supplementary information files can be accessed directly from the journal webpage for the paper. You will find the supplementary information listed in the paper with instructions for how to access it (normally a link on the paper page on the journal website).
- PDF versions for each of the suggested (and assigned) research papers are available at the following URL in the format **first_author_et_al.(year).pdf** (e.g. Bloggs_et_al.(2000).pdf).

www.dropbox.com/sh/uskliwj926pivft/AACSnNvqlZ8ZdXaBz_TzTzR4a?dl=0

[Note: you can save a copy of the PDF file to the hard drive of your computer from within your web browser]

Assignment description

The purpose of this assignment is to review and summarise a single peer-reviewed scientific paper from the animal (livestock and companion) or general vertebrate genomics literature. You should pitch your assignment as if you were explaining the research work to a scientifically literate lay audience (*e.g.* your ANSC30030 classmates) in a magazine article. You should bear the following points in mind when reviewing and summarising the research work:

- Make sure you understand the background to the research – you may need to do some additional reading to familiarise yourself with the research topic.
- What is the scientific problem or question/s being addressed by the research work?
- Are the experiment/s described designed to test a particular scientific hypothesis or hypotheses?
- How was the research work conducted? What methods were used? What animal population/s?
- What are the key findings of the research work?
- Why is the research work important for the particular scientific field? (Cattle genomics, pig genomics, sheep genomics, equine genomics, evolutionary genomics etc.).
- What are the practical applications for the research work?
- Can the experimental or study methods described in the paper be easily replicated by other scientists?
- Remember that the Internet is a powerful resource to help you with your assignment but maintain a critical perspective on information you retrieve that is not obtained from the peer-reviewed scientific literature.

Plagiarism avoidance

Ensure that you are familiar with the *UCD Library Guidelines on Plagiarism*, the *Official UCD Policy on Plagiarism* and the *UCD Briefing for Students on Academic Integrity and Plagiarism* at the following links:

www.ucd.ie/library/students

libguides.ucd.ie/academicintegrity/internetciting

www.ucd.ie/governance/resources/policypage-plagiarismpolicy

2020 UCD Policy on Plagiarism (PDF):

www.dropbox.com/s/9yg2lu6yt8cvt3x/UCD_Student_Plagiarism_Policy.pdf?dl=0

UCD Student Conduct with information about plagiarism: www.ucd.ie/secca/studentconduct

Note: all assignments will be checked for plagiarism using the UCD eLearning Brightspace *Urkund Originality Checker* system. Further information about the *Urkund Originality Checker* system is available at the following link: www.orkund.com

UCD information about the *Urkund Originality Checker* system:

www.ucd.ie/itservices/ourservices/educationaltechnologies/virtualllearning-brightspace/brightspaceinstructors/assessments/orkund

Late submission of coursework

There is an official UCD policy on late submission of coursework that you need to be aware of. The policy can be accessed at the following link: www.ucd.ie/governance/resources/policypage-latesubmissionofcoursework

2020 UCD Policy on Late Submission of Coursework (PDF):

www.dropbox.com/s/9yg2lu6yt8cvt3x/UCD_Student_Plagiarism_Policy.pdf?dl=0

Coursework submitted up to 10 working days past the due date will be graded but a grade penalty will be applied.

Coursework submitted at any time up to and including 5 working days after the due date will have the grade awarded reduced by one grade point (for example, from B- to C+).

Coursework submitted more than 5 working days but up to and including 10 working days after the due date will have the grade reduced by two grade points (for example, from B- to C).

Coursework received more than 10 working days after the due date will not be accepted or graded.

Note: there is a form for late submission of coursework due to exceptional extenuating circumstances that is available at the following link:

www.ucd.ie/governance/resources/policypage-latesubmissionofcoursework

Name	Primary Major	Paper reference
Abbott Jennifer	Animal Science	Hayes B.J., et al. (2016) Genomic heritabilities and genomic estimated breeding values for methane traits in Angus cattle. <i>J. Anim. Sci.</i> 94 , 902-8.
Barry Aideen	Animal Science	Morin P.A., et al. (2010) Complete mitochondrial genome phylogeographic analysis of killer whales (<i>Orcinus orca</i>) indicates multiple species. <i>Genome Res.</i> 20 , 908-16.
Brady Caoimhe	Animal Science	Bermingham M.L., et al. (2014) Genome-wide association study identifies novel loci associated with resistance to bovine tuberculosis. <i>Heredity (Edinb)</i> 112 , 543-51.
Bryan Kelleher Eoin	Animal Science	Zhan S., et al. (2020) Genomic landscape and genetic manipulation of the black soldier fly <i>Hermetia illucens</i> , a natural waste recycler. <i>Cell Res.</i> 30 , 50-60.
Byrne Kevin	Animal Science (Teagasc/IT Tra	Simonti C.N., et al. (2016) The phenotypic legacy of admixture between modern humans and Neandertals. <i>Science</i> 351 , 737-41.
Byrne Seamus	Animal Science	Wasser S.K., et al. (2018) Combating transnational organized crime by linking multiple large ivory seizures to the same dealer. <i>Science advances</i> 4 , eaat0625.
Cahill Micheal	Animal Science	Onteru S.K., et al. (2012) A whole-genome association study for pig reproductive traits. <i>Anim. Genet.</i> 43 , 18-26.
Callaghan Viola	Animal Science	Finno C.J., et al. (2015) <i>SERPINB11</i> frameshift variant associated with novel hoof specific phenotype in Connemara ponies. <i>PLoS Genet.</i> 11 , e1005122.
Carr John	Animal Science	Burga A., et al. (2017) A genetic signature of the evolution of loss of flight in the Galapagos cormorant. <i>Science</i> 356 .
Charles Martha	Animal Science	Albert F.W., et al. (2012) A comparison of brain gene expression levels in domesticated and wild animals. <i>PLoS Genet.</i> 8 , e1002962.
Claxton Stephen	Animal Science	Druet T., et al. (2014) Selection in action: dissecting the molecular underpinnings of the increasing muscle mass of Belgian Blue Cattle. <i>BMC Genomics</i> 15 , 796.
Creegan Luke	Animal Science	Gou X., et al. (2014) Whole-genome sequencing of six dog breeds from continuous altitudes reveals adaptation to high-altitude hypoxia. <i>Genome Res.</i> 24 , 1308-15.

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Cullen Brian	Animal Science	Ní Leathlobhair M., et al. (2018) The evolutionary history of dogs in the Americas. <i>Science</i> 361 , 81-5.
Darcy Niamh	Animal Science	Cadiou E., et al. (2009) Coat variation in the domestic dog is governed by variants in three genes. <i>Science</i> 326 , 150-3.
De Monge Keeva	Animal Science - Equine	Blott S.C., et al. (2014) A genome-wide association study demonstrates significant genetic variation for fracture risk in Thoroughbred racehorses. <i>BMC Genomics</i> 15 , 147.
Dolan Claire	Animal Science	Browett S., et al. (2018) Genomic characterisation of the indigenous Irish Kerry cattle breed. <i>Front. Genet.</i> 9 , 51.
Donaghy Therese	Animal Science	Miller W., et al. (2012) Polar and brown bear genomes reveal ancient admixture and demographic footprints of past climate change. <i>Proc. Natl. Acad. Sci. U. S. A.</i> 109 , E2382-90.
Donnelly Sarah	Animal Science	Derks M.F.L., et al. (2017) A systematic survey to identify lethal recessive variation in highly managed pig populations. <i>BMC Genomics</i> 18 , 858.
Doran Rachel	Animal Science - Equine	McGivney B.A., et al. (2020) Genomic inbreeding trends, influential sire lines and selection in the global Thoroughbred horse population. <i>Sci. Rep.</i> 10 , 466.
Eviston Jeremy	Animal Science - Equine	Axelsson E., et al. (2013) The genomic signature of dog domestication reveals adaptation to a starch-rich diet. <i>Nature</i> 495 , 360-4.
Gaffney Mahony Emma	Animal Science - Equine	Der Sarkissian C., et al. (2015) Evolutionary genomics and conservation of the endangered Przewalski's horse. <i>Curr. Biol.</i> 25 , 2577-83.
Gallagher Rebecca	Animal Science	Auvray B., et al. (2014) Genomic prediction of breeding values in the New Zealand sheep industry using a 50K SNP chip. <i>J. Anim. Sci.</i> 92 , 4375-89.
Garvey Micheal	Animal Science	Daetwyler H.D., et al. (2014) Whole-genome sequencing of 234 bulls facilitates mapping of monogenic and complex traits in cattle. <i>Nat. Genet.</i> 46 , 858-65.
Geoghegan Ciara	Animal Science	Berkowicz E.W., et al. (2012) Single nucleotide polymorphisms in the imprinted bovine insulin-like growth factor 2 receptor gene (<i>IGF2R</i>) are associated with body size traits in Irish Holstein-Friesian cattle. <i>Anim. Genet.</i> 43 , 81-7.
Gill Oliver	Animal Science	Purfield D.C., et al. (2015) Genome-wide association study for calving performance using high-density genotypes in dairy and beef cattle. <i>Genet Sel Evol</i> 47 , 47.

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Gillen Anna	Animal Science	Banlaki Z., et al. (2017) DNA methylation patterns of behavior-related gene promoter regions dissect the gray wolf from domestic dog breeds. <i>Mol. Genet. Genomics</i> 292 , 685-97.
Halion Adam	Animal Science	Enard D. & Petrov D.A. (2018) Evidence that RNA viruses drove adaptive introgression between Neanderthals and modern humans. <i>Cell</i> 175 , 360-71 e13.
Hamilton Shane	Animal Science	Neff M.W., et al. (2004) Breed distribution and history of canine <i>mdr1-1Delta</i> , a pharmacogenetic mutation that marks the emergence of breeds from the collie lineage. <i>Proc. Natl. Acad. Sci. U. S. A.</i> 101 , 11725-30.
Harkin Eilis	Animal Science - Equine	Bryan K., et al. (2017) Equine skeletal muscle adaptations to exercise and training: evidence of differential regulation of autophagosomal and mitochondrial components. <i>BMC Genomics</i> 18 , 595.
Jordan Smith Alanna	Animal Science - Equine	Boyko A.R., et al. (2014) Genomic analysis establishes correlation between growth and laryngeal neuropathy in Thoroughbreds. <i>BMC Genomics</i> 15 , 259.
Keyes Aisling	Animal Science	Pendleton A.L., et al. (2018) Comparison of village dog and wolf genomes highlights the role of the neural crest in dog domestication. <i>BMC Biol.</i> 16 , 64.
Lanigan Simon	Animal Science	Adams H.A., et al. (2016) Identification of a nonsense mutation in <i>APAF1</i> that is likely causal for a decrease in reproductive efficiency in Holstein dairy cattle. <i>J. Dairy Sci.</i> 99 , 6693-701.
Lavin Tony	Animal Science	Clop A., et al. (2006) A mutation creating a potential illegitimate microRNA target site in the myostatin gene affects muscularity in sheep. <i>Nat. Genet.</i> 38 , 813-8.
Losty Peter	Animal Science	Proudfoot C., et al. (2015) Genome edited sheep and cattle. <i>Transgenic Res.</i> 24 , 147-53.
Lynch Emma	Animal Science	Murchison E.P., et al. (2014) Transmissible dog cancer genome reveals the origin and history of an ancient cell lineage. <i>Science</i> 343 , 437-40.
Maher Neil	Animal Science	Doran A.G., et al. (2014) Whole genome association study identifies regions of the bovine genome and biological pathways involved in carcass trait performance in Holstein-Friesian cattle. <i>BMC Genomics</i> 15 , 837.
Maher Rhiannon	Animal Science - Equine	Librado P., et al. (2017) Ancient genomic changes associated with domestication of the horse. <i>Science</i> 356 , 442-5.

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Makarewicz Zuzanna	Animal Science - Equine	Gmel A.I., <i>et al.</i> (2019) Genome-wide association studies based on equine joint angle measurements reveal new QTL affecting the conformation of horses. <i>Genes</i> 10 .
McCarthy Timothy	Animal Science	Jiang P., <i>et al.</i> (2012) Major taste loss in carnivorous mammals. <i>Proc. Natl. Acad. Sci. U. S. A.</i> 109 , 4956-61.
Mc Dermott Andrea	Animal Science - Equine	Farries G., <i>et al.</i> (2018) Genetic contributions to precocity traits in racing Thoroughbreds. <i>Anim. Genet.</i> 49 , 193-204.
Mc Donald Sean	Animal Science	Koufariotis L., <i>et al.</i> (2014) Regulatory and coding genome regions are enriched for trait associated variants in dairy and beef cattle. <i>BMC Genomics</i> 15 , 436.
Mc Guigan Cormac	Animal Science	Tollis M., <i>et al.</i> (2019) Return to the sea, get huge, beat cancer: an analysis of Cetacean genomes including an assembly for the humpback whale (<i>Megaptera novaeangliae</i>). <i>Mol. Biol. Evol.</i> 36 , 1746-63.
Mc Guinness Katie	Animal Science - Equine	Bower M.A., <i>et al.</i> (2012) The genetic origin and history of speed in the Thoroughbred racehorse. <i>Nat. Commun.</i> 3 , 643.
Mc Nally Michelle	Animal Science - Equine	Hill E.W., <i>et al.</i> (2010) A sequence polymorphism in <i>MSTN</i> predicts sprinting ability and racing stamina in Thoroughbred horses. <i>PLoS ONE</i> 5 , e8645.
Murphy Palmer Lucy	Animal Science - Equine	Brard S. & Ricard A. (2015) Genome-wide association study for jumping performances in French sport horses. <i>Anim. Genet.</i> 46 , 78-81.
Murphy Elizabeth	Animal Science	Signer-Hasler H., <i>et al.</i> (2012) A genome-wide association study reveals loci influencing height and other conformation traits in horses. <i>PLoS ONE</i> 7 , e37282.
Ni Threasaigh Fiona	Animal Science	Beja-Pereira A., <i>et al.</i> (2003) Gene-culture coevolution between cattle milk protein genes and human lactase genes. <i>Nat. Genet.</i> 35 , 311-3.
Nic Aoidh Cassandra	Animal Science - Equine	Petersen J.L., <i>et al.</i> (2013) Genome-wide analysis reveals selection for important traits in domestic horse breeds. <i>PLoS Genet.</i> 9 , e1003211.
Nulty Alexander	Animal Science	Ortega M.S., <i>et al.</i> (2016) Use of single nucleotide polymorphisms in candidate genes associated with daughter pregnancy rate for prediction of genetic merit for reproduction in Holstein cows. <i>Anim. Genet.</i> 47 , 288-97.
O Connor Tadhg	Animal Science	Barendse W., <i>et al.</i> (2007) A validated whole-genome association study of efficient food conversion in cattle. <i>Genetics</i> 176 , 1893-905.

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O Dowd Caoimhe	Animal Science	Prufer K., et al. (2012) The bonobo genome compared with the chimpanzee and human genomes. <i>Nature</i> 486 , 527-31.
O Dwyer Niamh	Animal Science	Binns M.M., et al. (2010) Identification of the myostatin locus (<i>MSTN</i>) as having a major effect on optimum racing distance in the Thoroughbred horse in the USA. <i>Anim. Genet.</i> 41 Suppl 2, 154-8.
O Loughlin Kennedy Sophie	Animal Science	Alves J.M., et al. (2019) Parallel adaptation of rabbit populations to myxoma virus. <i>Science</i> 363 , 1319-26.
O Neill Isabel	Animal Science - Equine	Hauswirth R., et al. (2012) Mutations in <i>MITF</i> and <i>PAX3</i> cause "Splashed White" and other white spotting phenotypes in horses. <i>PLoS Genet.</i> 8 , e1002653.
O Reilly Laragh	Animal Science	Ottoni C., et al. (2017) The palaeogenetics of cat dispersal in the ancient world. <i>Nature Ecology & Evolution</i> 1 , 0139.
O Shea Murphy Eliza	Animal Science	Finlay E.K., et al. (2012) A genome wide association scan of bovine tuberculosis susceptibility in Holstein-Friesian dairy cattle. <i>PLoS ONE</i> 7 , e30545.
O Sullivan Michael	Animal Science	Hill E.W., et al. (2012) <i>MSTN</i> genotype (g.66493737C/T) association with speed indices in Thoroughbred racehorses. <i>J. Appl. Physiol.</i> 112 , 86-90.
Pierce Ryan	Animal Science	Fariello M.I., et al. (2014) Selection signatures in worldwide sheep populations. <i>PLoS ONE</i> 9 , e103813.
Plunkett Clodagh	Animal Science	Akey J.M., et al. (2010) Tracking footprints of artificial selection in the dog genome. <i>Proc. Natl. Acad. Sci. U. S. A.</i> 107 , 1160-5.
Powell Eva	Animal Science - Equine	McGivney B.A., et al. (2019) A genomic prediction model for racecourse starts in the Thoroughbred horse. <i>Anim. Genet.</i> 50 , 347-57.
Prendergast John	Animal Science	Sahana G., et al. (2014) Genome-wide association study using high-density single nucleotide polymorphism arrays and whole-genome sequences for clinical mastitis traits in dairy cattle. <i>J. Dairy Sci.</i> 97 , 7258-75.
Quinn Aoife	Animal Science	Eusebi P.G., et al. (2020) Aggressive behavior in cattle is associated with a polymorphism in the <i>MAOA</i> gene promoter. <i>Anim. Genet.</i> 51 , 14-21.
Reddin Maryanne	Interim Agriculture	Han H., et al. (2020) Selection in Australian Thoroughbred horses acts on a locus associated with early two-year old speed. <i>PLoS ONE</i> 15 , e0227212.

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Rigney Paul	Animal Science	Meredith B.K., et al. (2012) Genome-wide associations for milk production and somatic cell score in Holstein-Friesian cattle in Ireland. <i>BMC Genet</i> 13 , 21.
Russell Ciara	Animal Science - Equine	Fritz K.L., et al. (2012) Genetic mapping of recurrent exertional rhabdomyolysis in a population of North American Thoroughbreds. <i>Anim. Genet.</i> 43 , 730-8.
Ryan David	Animal Science	Naderi S., et al. (2020) Assessing selection signatures within and between selected lines of dual-purpose black and white and German Holstein cattle. <i>Anim. Genet.</i> 51 , 391-408.
Sheridan Eoin	Animal Science	Hoff J.L., et al. (2017) Candidate lethal haplotypes and causal mutations in Angus cattle. <i>BMC Genomics</i> 18 , 799.
Thompson Laura	Animal Science	Luo F., et al. (2016) Analysis of genes that influence sheep follicular development by different nutrition levels during the luteal phase using expression profiling. <i>Anim. Genet.</i> 47 , 354-64.
Walsh Karen	Animal Science	Rolf M.M., et al. (2012) Genome-wide association analysis for feed efficiency in Angus cattle. <i>Anim. Genet.</i> 43 , 367-74.
Woods Hannah	Animal Science	Ortega M.S., et al. (2016) Use of single nucleotide polymorphisms in candidate genes associated with daughter pregnancy rate for prediction of genetic merit for reproduction in Holstein cows. <i>Anim. Genet.</i> 47 , 288-97.