

## ISAE Creativity Award 2018

### Prof. Per Jensen

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Prof. Per Jensen was given the [2018 ISAE Creativity Award](#) for his innovative work on the links between epigenetics, domestication, and stress.

Per Jensen (Pelle) comes from a background in applied ethology, but has for a number of years worked on the genetic basis for behavioural variation. Behavioural genetics is one of the least travelled roads in applied ethology, and Pelle's work on epigenetics, stress and domestication, using dogs and chickens as models, has improved our knowledge on these issues immensely.

He has put forward the idea that epigenetic variation may have been a substrate for selection during domestication. Epigenetics refers to chemical modifications of DNA, which do not change the base-pair sequence. Such modifications affect how genes are expressed and can occur as a response to stress, mediated by steroid hormones. Domestication, in this context, offers an interesting framework of rapid evolutionary changes caused by well-defined selection pressures. His argument, that '*greatly improved understanding of domestication may be gained from extending the field of behaviour genetics to also include epigenetics*' has been a rally-cry for more, and different, research into the processes involved in domestication.

Pelle's group have been among the strong proponents of using epigenetic tools as an alternative to other, more commonly used stress measures, such as cortisol, as epigenetics makes it possible to evaluate past exposure to long-term stress (Pétille et al., 2017). Working on the interphase between epigenetics and behaviour has allowed Pelle to investigate genomic aspects of welfare. '*The field of animal welfare, which, among others, concerns the way in which animals respond to environmental challenges associated with stress, will also benefit substantially by including new perspectives from epigenetic insights*' (Jensen, 2015).

Recently, working with human-directed social behaviours in dogs, Pelle's group found strong associations between genes affecting social disorders in humans (Autism and ADHD) and those affecting dog sociability and inter-species communication (Persson *et al.*, 2016). Not only does this advance our understanding of dog domestication, it also introduces the dog as a novel model for human social disorders.

Pelle has an excellent ability to convey the complexities of epigenetics to audiences from different background. Tackling the issues of epigenetics and genomics from the angle of applied animal behaviour, has given rise to new ways to apply the science of epigenetics. His embracing both domestication and stress in this endeavour has given rise to synergies that would not otherwise have come to light.

## Selected publications

- Jensen, P.** (2013). Transgenerational epigenetic effects on animal behavior. *Progress in Biophysics & Molecular Biology* 113, 447-454. DOI: 10.1016/j.pbiomolbio.2013.01.001
- Jensen, P.** (2014). Behaviour epigenetics - the connection between environment, stress and welfare. *Applied Animal Behaviour Science* 157, 1-7. DOI: 10.1016/j.applanim.2014.02.009
- Jensen, P.** (2015). Adding 'epi-' to behaviour genetics: implications for animal domestication. *Journal of Experimental Biology* 218, 32-40. DOI: 10.1242/jeb.106799
- Natt, D., Rubin, C.-J., Wright, D., Johnsson, M., Belteky, J., Andersson, L., **Jensen, P.** (2012). Heritable genome-wide variation of gene expression and promoter methylation between wild and domesticated chickens. *BMC Genomics* 13, 59. DOI: 10.1186/1471-2164-13-59
- Persson, M.E., Wright, D., Roth, L.S.V., Batakis, P., **Jensen, P.** (2016). Genomic regions associated with interspecies communication in dogs contain genes related to human social disorders. *Scientific Reports* 6, 33439. DOI: 10.1038/srep33439
- Pértille, F., Brantsæter, M., Nordgreen, J., Coutinho, L.L., Janczak, A.M., **Jensen, P.**, Guerrero-Bosagna, C. (2017). DNA methylation profiles in red blood cells of adult hens correlate with their rearing conditions. *Journal of Experimental Biology* 220, 3579-3587. DOI: 10.1242/jeb.157891