



# ***Arctic Ark – project investigates human-animal adaptations to the Arctic environment***

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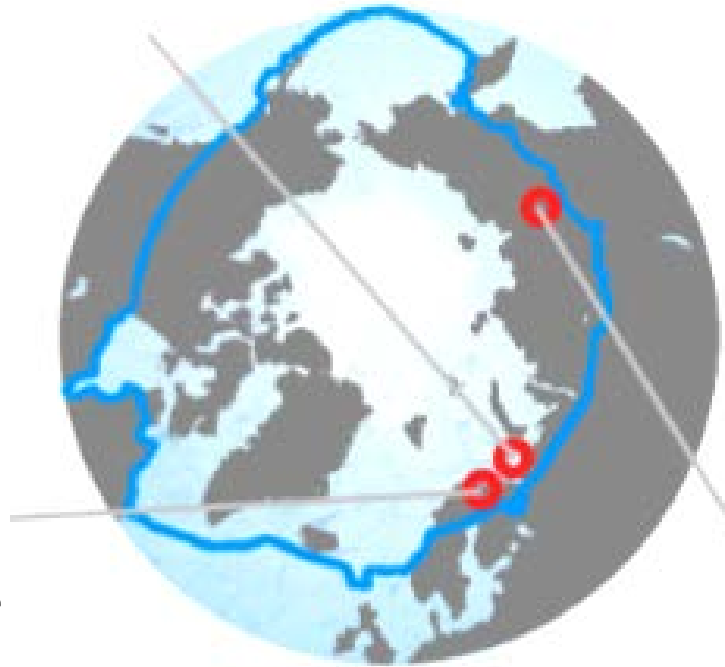
In the Arctic, traditional animal husbandry is based almost exclusively on reindeer (*Rangifer tarandus*) but in Lapland, northern Russia and Siberia also other locally adapted animals, namely cattle (*Bos taurus*) and horse (*Equus caballus*) are used for food production and other societal and cultural needs.

## Arkhangelsk

- Kholmogor cattle
- Mezen horse
- Nenets reindeer

## Finnish Lapland

- Northern Finncattle
- Finnhorse
- Fennoscandian reindeer



## Yakutia

## Eveno-Bytantaj

- Yakutian cattle
- Yakutian horse
- Evenki and Even reindeer

**Reindeer has the longest adaptation history  
(but the shortest domestication history) among the 3 species  
and can be considered native to the Arctic.**







## Tracking the origins of Yakutian horses and the genetic basis for their fast adaptation to subarctic environments

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# Interdisciplinarity for bold questions

See ArcArk poster "interdisciplinary methods"



we contribute to the age-old debate to what extent humans and animals are determined by their genetic heritage and by their culturally characterized socialization

Our methods:  
interdisciplinarity  
is a challenge but  
also a big  
opportunity that  
promises  
completely new  
insights. See our  
methods poster:

## Arctic Ark: Human cultural & animal genetic resources in Arctic socio-ecological systems



## Interdisciplinary methods in the Arctic Ark project for the study of Arctic Human-animal adaptation

**Overarching question: how can we identify the significance of culture and of nature in Arctic adaptation processes?**



**Overall aim:** identify and understand the role of biological, cultural, social and ecological elements in unique livelihoods that base on a close partnership between humans and pastoral animals in the Arctic



Disciplines involved in the Arctic Ark project and their roles:

**Social anthropology:** human culturally specific practices in animal selection, breeding, keeping and handling. **Main question:** how do people help animals to adapt in the Arctic, and how do animals help people to survive and flourish there?

**Genetics:** gene-expressions, mutations, other structural variations in the genome of Arctic domesticated pastoral animals. Main question: which genes are responsible for adaptation in the Arctic, and how many copies of such important genes does the genome contain?

**Biology:** morphological, physiological and metabolic adaptations across species and field sites. Main question: what is the role of adipose tissue for animal survival and adaptation to Arctic environments?

**Legal studies:** norms, subsidies, policies and other regulations of Arctic pastoral animal resources. **Main question:** how do local norms and practices interact with state conservation measures in supporting unique Arctic human-animal livelihoods?

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**Interdisciplinarity taken seriously:**

- **Problem:** frequently, research uses disciplines only under one roof without true processes of cross fertilisation.
- **Solution:** in Arctic Ark, we design research and carry out fieldwork jointly with social and natural scientists at the same place and time with the same people.
- **Hypothesis:** through joint design, joint field experience and data collection in close partnership with the animal-keepers, we achieve a new level of interdisciplinary integration, which makes results even more relevant for maintaining Arctic Cultural – and Genetic diversity
- **Result:** state agencies have started gathering our team's input on how to better adapt conservation legislation to not only to biological, but also to socio-ecological systems' needs



Paragraph 26: The new Yukulta draft has more imagery, culture, making other students describe.





# Field work is done in collaboration





A photograph of a man with glasses and a fur hat looking at a reindeer behind a wooden fence in a snowy field. The reindeer has a thick white coat and a long white mane. The background shows a snowy landscape with trees and a wooden fence.

## Genomics studies

- Whole-genome sequencing
- *de novo* sequencing of reindeer genome
- Gene expression studies





**Other omics studies**

- **Metagenomics**
- **Metabolomics**

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# Anthropology: socio-cultural ecological systems

**Overarching fieldwork question:** through what special characteristics do animals help humans to survive in this harsh environment, how do humans assist animals in their Arctic adaptation, and how do state measures facilitate preservation of human-animal livelihoods



**Animal-diversity:** compare among field sites which animal occupies which social niche, prestige, and socio-economic function for supporting pastoral livelihood in the Arctic?





**Local participation: field work**



First results: see ArcArk posters “Finnish Lapland”, and “Eveno-Bytantay”





# In Collaboration



ARKTINEN TUTKIMUSOHJELMA  
ARCTIC RESEARCH PROGRAMME



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*Photos: Juha Kantanen, Anu Osva, Päivi Soppela, Florian Stammer*