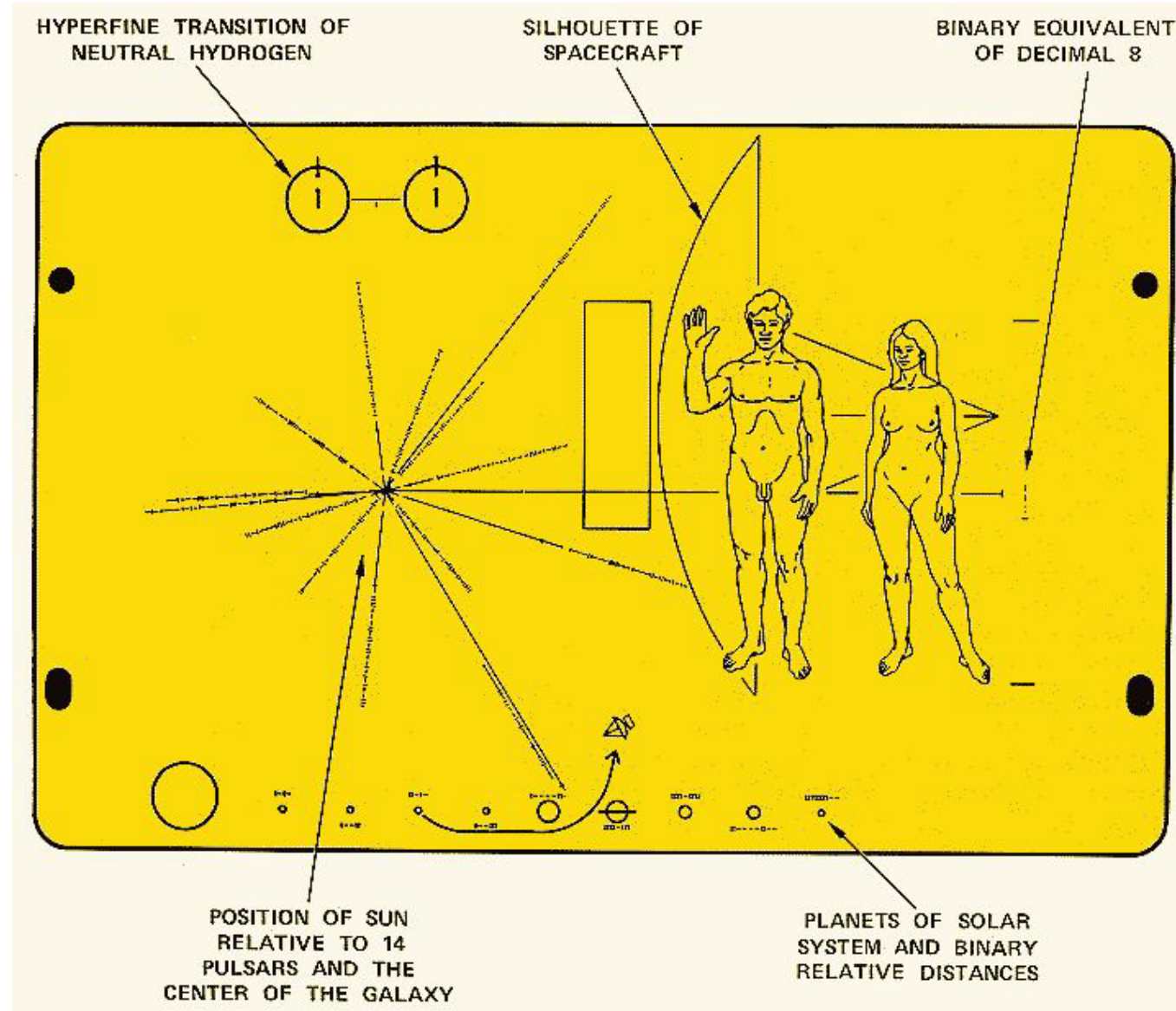




# **BELGIAN POLAR RESEARCH**

Belgian research at the poles | Anthropology & health

“Anthro” stuff





# Look who's talking



- A Belgian military emergency physician, having worked on board of Antarctic vessels (FRA & UK), in summer stations (BEL), in expeditions (FRA), camps (UK) and winter stations (FRA, ITA & UK), during several missions to Antarctica, one of which an overwintering with the British Antarctic Survey during 15 months at Halley VI.
- A psychology and physiology professor (human performance in extreme environments), with more than 20 years of experience in space analogue research, at the Royal Military Academy and the Vrije Universiteit Brussel (currently with the Université de Montréal for an Arctic project).
- The Belgian delegate to the Joint Expert Group on Human Biology and Medicine from SCAR for the last 10 years.

# Who's who?



Serge Lemaitre - RMAH  
Native Arctic populations archeology



Jérémy Rabineau  
Cardiorespiratory physiology



Philippe Peigneux  
Sleep physiology

Martine Van Puyvelde  
Sleep physiology & psychological adaptation

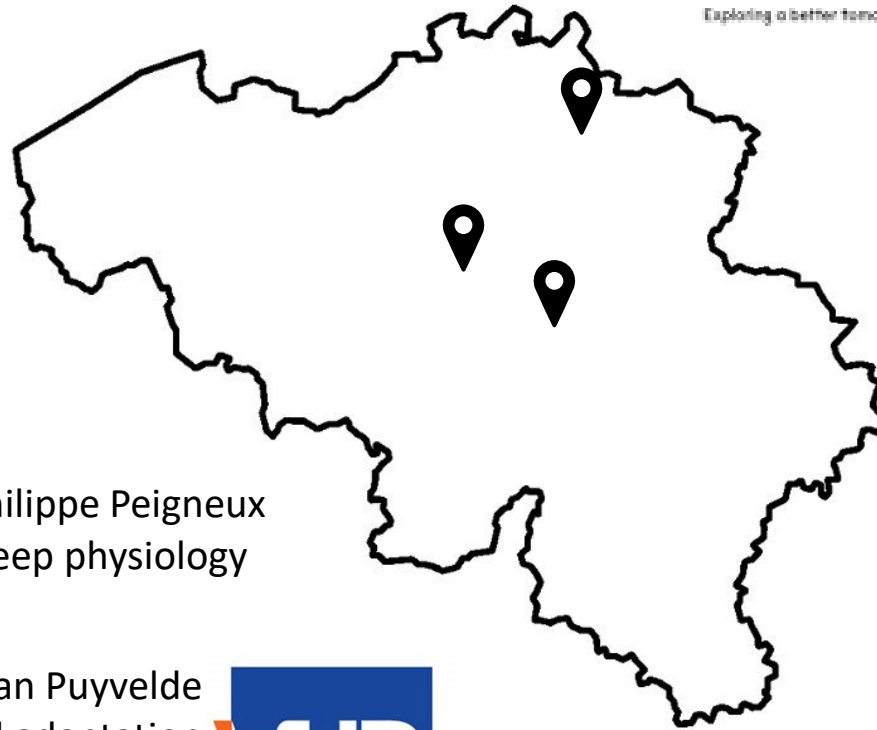


Olivier Mairesse  
Sleep physiology

Jeroen Van Cutsem  
Sleep physiology



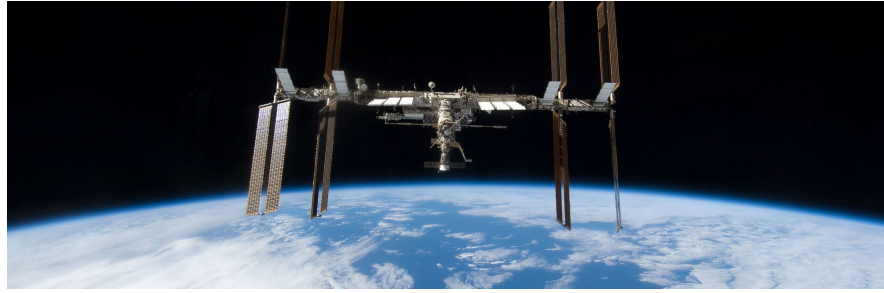
Nathalie Pattyn  
Sleep physiology & remote healthcare



Sarah Baatout  
Radiobiology unit



Frédéric Laugrand  
Laboratoire d'anthropologie prospective



## Environment

e.g. vacuum, microgravity, radiation, no day/night

e.g. no day/night, monotonous landscape, constant light or constant darkness, cold

## Mission

e.g. workload, mission duration, emergencies, isolation for many months

e.g. workload, mission duration, emergencies, isolation for many months

## Habitat

e.g. noise, confinement, LSS, limited resources

e.g. confinement, LSS, limited resources

## Social situation

e.g. small crew, restricted communication with earth

e.g. small crew, restricted communication

# Mapping the different fields for Belgium

	Historical Perspective			Polar?		Study populations	
	Emerging	Mature	National network	Arctic	Antarctic	Native populations in the Arctic	Adaptation of external individuals
<b>Anthropology</b>		X	X	X		X	
<b>Psychological adaptation</b>	X			X	X		X
<b>Sleep &amp; chronobiology</b>		X	X	X	X	X	X
<b>Remote healthcare</b>	X			X	X	X	X
<b>Space Life Sciences</b>		X			X		X

# Mapping the different fields for Belgium

	Historical Perspective			Polar?		Study populations	
	Emerging	Mature	National network	Arctic	Antarctic	Native populations in the Arctic	Adaptation of external individuals
<b>Anthropology</b>		X	X	X		X	
<b>Psychological adaptation</b>	X			X	X		X
<b>Sleep &amp; chronobiology</b>		X	X	X	X	X	X
<b>Remote healthcare</b>	X			X	X	X	X
<b>Space Life Sciences</b>		X			X		X



# Anthropology: content

The first axis analyzes the transformation of interspecific Arctic knowledge, particularly related to hunting (among Inuit) and herding (among Saami). ***The objective is to understand how climate change affects this knowledge and its transmission between Elders and young generations.***







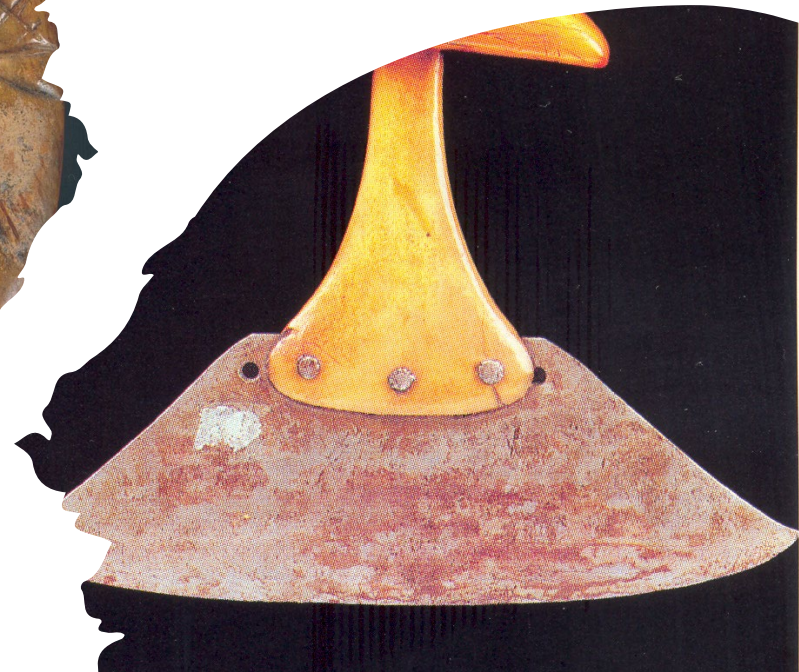
# Anthropology: content

The second axis explores the memories of Inuit and Saami of their experiences of displacement, particularly forced relocations. ***The objective here is to understand how Inuit and Saami populations experience various displacements, which are likely to increase with global warming.***



# Anthropology: content

The third axis documents the Arctic collections preserved in museums in Belgium, where many Oblate missionaries originated. The Royal Museums of Art and History and the Royal Museum of Central Africa in Tervuren store many objects and collections related to Inuit ways of life on the land, before sedentarization. ***This axis aims to examine these little-known collections, which are likely to be of great interest to Inuit and Saami who are anxious to highlight their heritage and history to facilitate the transfer of intergenerational knowledge.***



 UCLouvain

# Anthropology: output

- about 50 peer-reviewed publications
- 20 books edited in Inuktitut, English and French in partnership with the Nunavut Arctic College (Iqaluit)
- creation and participation to 10 art exhibitions
- a solid network, e.g.
  - CIERA in Canada
  - IPSSAS in Denmark and Greenland
- a partnership with the Inuit Studies journal and Inuksiutiit katimajit



# Sleep in Antarctica: Why?



- Frederick Cook
  - American physician of the first ever winterover expedition (Belgica; 1897-1899).
  - Describes a precursor of Seasonal Affective Disorder, including sleep disturbances, and is the first to apply phototherapy.

- Cook Frederick. **Through the first Antarctic night 1898–1899: a narrative of the voyage of the 'Belgica' among newly discovered lands and over an unknown sea about the South Pole, with an appendix containing a summary of the scientific results**, New York: William Heinemann, 1900

- 2017 review on sleep in Antarctica: sleep remains the most potent complaint => potential causes of sleep disturbances?
  1. Lack of photoperiodicity? Would trigger disturbances of the biological clock
  2. Confinement in winter: Lack of physical activity? Less need for recovery?
  3. Long-duration isolation and confinement: psychological effects?

Pattyn, N.; Van Puyvelde, M.; Fernandez-Tellez, H.; Roelands, B. ; Neyt, X. **From the midnight sun to the longest night: sleep in Antarctica.** *Sleep Medicine Reviews*, 2017, DOI: <http://dx.doi.org/10.1016/j.smr.2017.03.001>.

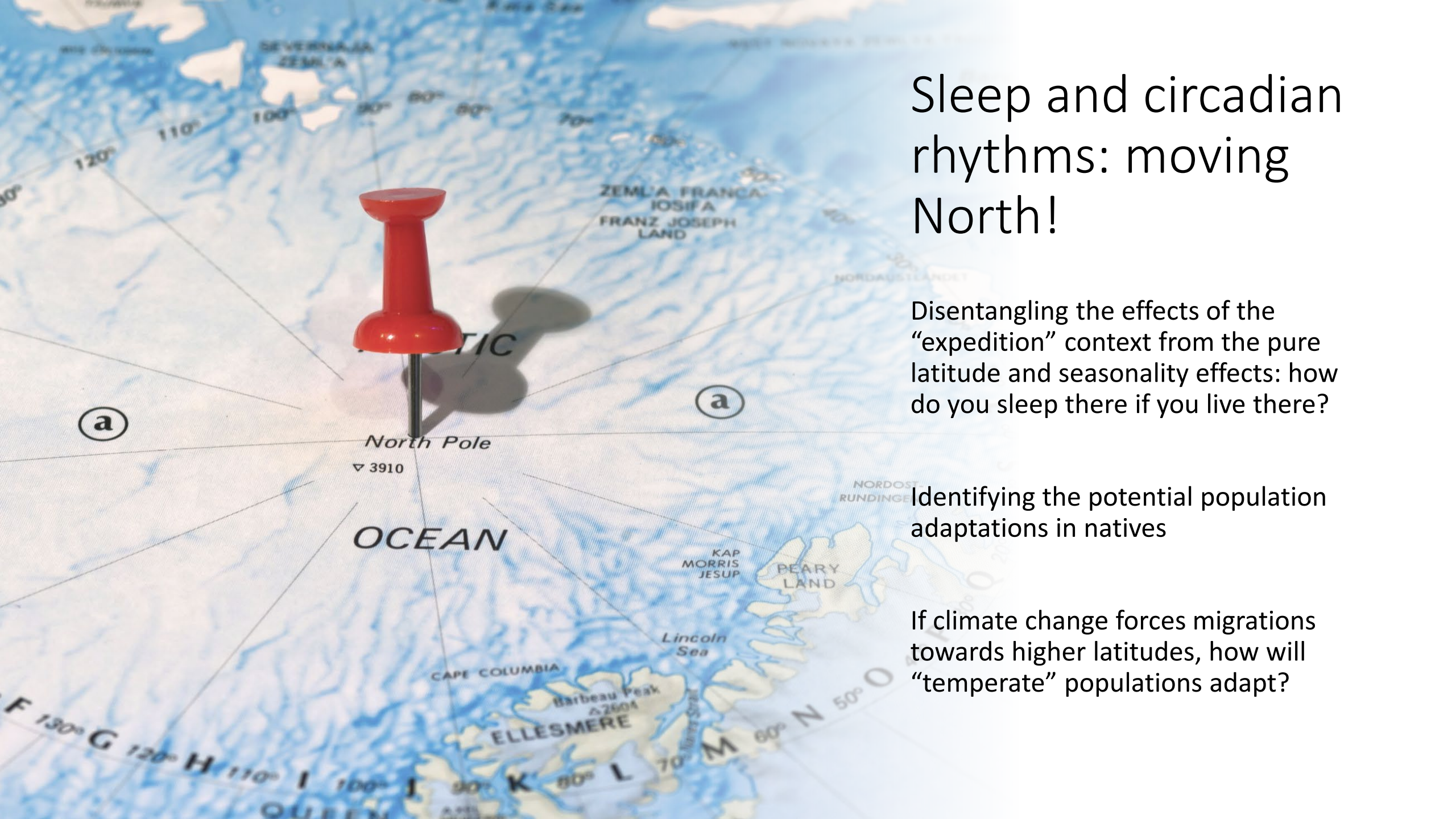


## Sleep and circadian rhythms: content



1. Lack of photoperiodicity? **Yes, but...different biological rhythms respond to different signals**
2. Confinement in winter: lack of physical activity? **No**
3. Long-duration isolation and confinement: psychological effects? **Yes**
4. **There's more to sleep disturbances in Antarctica than chronobiology.**
5. **Individual traits determining sleep architecture: one size does NOT fit all.**
6. **Altitude is more pervasive than isolation and confinement => new track focussing on hypoxia**
7. **Time on station is a significant factor: psychological effect, cumulative stressors...**





# Sleep and circadian rhythms: moving North!

Disentangling the effects of the “expedition” context from the pure latitude and seasonality effects: how do you sleep there if you live there?

Identifying the potential population adaptations in natives

If climate change forces migrations towards higher latitudes, how will “temperate” populations adapt?

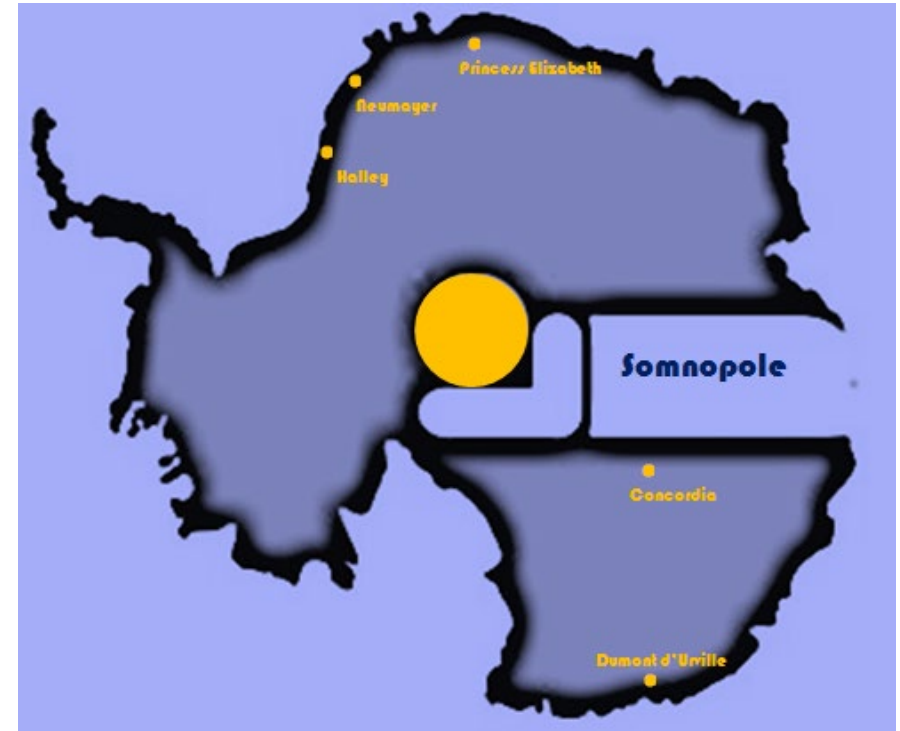


# Sleep and circadian rhythms: output

The largest existing data-set on sleep recordings in Antarctica: 13 years of research, 5 stations

Leader of 3 European projects, partner in 2 others.

Transatlantic network with Canadian partners



# To conclude

Polar regions are

- A still undervalued resource for research underpinning climate migration
- An area where native people regain self-determination and the right to preserve their culture, amidst international tensions vying for resources
- A spaceflight analogue and an amazing natural laboratory for human factors research
- A potential source of knowledge for healthcare innovation: doing more with less

# Sidenote: the anthropology of polar research

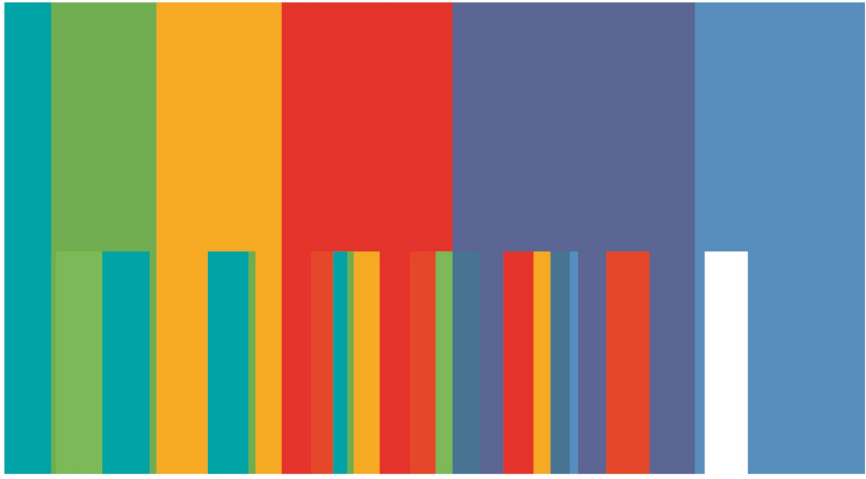
---

Not about the Arctic...

As every nation has the same rights to engage in scientific activities on Antarctic Territory, one way to increase one's "strategic footprint" is the quality of the research...which is basically science diplomacy: scientists being references in their field will be offered collaborative opportunities with other national teams, in other national facilities. Hence, countries aiming to increase their presence heavily support these scientific experts, as this is an indirect way to increase access.

Scientists are opportunistic creatures, trained, grown and selected in a competitive environment, and their behaviour is shaped by simple forces: available means and access to data collection opportunities...





**belspo**

Thank you

