

# Project ARCDYN: Exposing Arctic ecosystem change

## Our mission

- The Arctic is one of the fastest warming regions on the planet.
- We know little about how current change affects levels above species – including full communities and ecosystems.
- We resolve community-level change with the help of a unique arctic time series: the arthropod samples from Zackenberg, Northeast Greenland, collected over 18 years.

## The background

- Among arctic organisms, we know the least about the ones making up the largest part.
- The Arctic is dominated by arthropods: insects, spiders and their relatives.
- Arthropods sustain arctic ecological functions: plant pollination, plant consumption and predation – and feeding millions of migratory birds.

## The challenge

- To describe changes in overall biodiversity, in the relative abundances of different organisms, and in their annual rhythms, we need species level information.
- With hundreds of thousands of individuals, the Zackenberg collection offers a formidable hurdle to species-level identification by traditional means.
- To convert this material into numbers, we have brought together a multidisciplinary team.

## The approach

- To convert the samples into a record of arctic community composition, we adopt recent techniques in genetics and statistical modelling.
- Our genetic methods are based on techniques adopted from microbial metagenomics: sequencing total DNA of bulk samples and matching to mitogenomes rather than amplifying single genes, which can result in contamination and loss of abundance information.
- Our statistical techniques are based on drawing on information from all species at once rather than one species at a time (i.e. a multivariate approach to community modelling).

## Expected outcomes

- A unique long-term record of arctic community composition.
- A model system for exploring the biological consequences of past and future arctic change.
- New protocols for the extension and continued use of the existing collections and time series into the future.

## The Collaboration



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Ella ja Georg  
Ehrnroothin säätiö

