Swarm Robotics in Natural Habitat Reconstruction

# Project Brief

55% of the world’s GDP, an estimated US$58 trillion, is dependent on nature or its services, and yet over the last 50 years we have seen a 73% decline in wildlife populations, mainly due to habitat destruction led by climate change, and the agriculture industry. With rising CO2 levels, the projected net loss of the tundra is predicted between 45-71% by the end of the century, an environment that is home to indigenous peoples, a vast array of wildlife, valuable resources and the permafrost. There is limited scalable success with local restoration efforts, but we can not wait for top-down policy changes or climate efforts: we must resort to technological intervention. This project aims to first evaluate existing measures for habitat protection/reconstruction in arctic environments, identifying key drawbacks. We would then hope to evaluate the utility of swarm robotics in addressing these problem areas, taking practical, technical, environmental and ecological, economic and human (ethical) factors to build a specification and inform a final design.

# Potential Directions

* Water pool extraction from surface melting on the permafrost (slowing thawing)
* Recontouring in the tundra following abandonment of decommissioned mining sites (bryophyte seedling transplantation)
* Building more robust spark-to-ignition prediction models for preventing wildfires (lighting rod installation, buffer zone creating, controlled burns etc.)