Related programmes and teams
Data science for science and humanities
Research Engineering
AI for science and government (ASG)

"Understanding why our IceNet system outperforms physics-based climate models will provide new insights for the climate research community, helping us to better simulate and predict our planet's future."

Scott Hosking
Senior Research Fellow at The Alan Turing Institute and co-leader of the British Antarctic Survey AI Lab

Forecasting Arctic sea ice coverage

The Arctic is warming twice as fast as the rest of the world, resulting in a devastating decline in summer sea ice coverage to around half of that four decades ago. This puts the future of local ecosystems and indigenous communities in doubt, and has knock-on effects for the entire climate system. When ice melts, for instance, the reflectivity ('albedo') of the region decreases, meaning that less sunlight is reflected back to space, and the planet warms up even faster.

In order to identify where Arctic sea ice will disappear next, and where conservation efforts are most needed, researchers make forecasts of sea ice coverage. However, the interplay between ice, atmosphere and ocean in this region is so complex that physics-based models struggle to make accurate forecasts beyond a few weeks in

advance. Now, a collaboration between the Turing and the Artificial Intelligence Lab at the British Antarctic Survey has developed an alternative, data-driven deep learning system that takes sea ice forecasting to the next level.

Their **IceNet system**, trained on over 30 years of observational climate data plus more than 2,000 years of simulated data from computational climate models, predicts monthly average Arctic sea ice coverage with accuracies of up to 97%. It can forecast sea ice coverage up to six months ahead, and outperforms the leading physics-based model at forecasts of two months and longer. The researchers are now planning to make IceNet available as an open source web tool, so that conservationists have access to an early warning system for sea ice loss.