

International research project Cultures of the Cryosphere investigates cultures of artificial cold

Artificial cold shapes the world we live in.

We cool our food, buildings, medicines, tissues, blood, and data. Yet most of us remain as unaware of our dependence on this technology — historically speaking, a recent invention — as we are of its energy and environmental costs. Refrigeration systems already account for 20 percent of global energy demand, and that figure is rising at an alarming rate.

This research project sets out to provide the first comprehensive account of artificial cold as a global cultural phenomenon. Cooling and freezing technologies have become indispensable across an extraordinarily wide range of human activity: food, healthcare, reproduction, housing, telecommunications, scientific research, and economic productivity. The result is a worldwide system of cold chains, cold-storage facilities, and air-conditioned spaces — an essential yet largely overlooked infrastructure we call the ‘artificial cryosphere’.

Our international team examines how this infrastructure of artificial cooling is interwoven with cultural practices, ideas, and values — what we term ‘cryogenic cultures’. How did we come to depend so thoroughly on artificial cold? And what alternatives might exist? Given the rapidly growing global demand for cooling technology, the project also seeks forward-looking, sustainable solutions.

How do we research cryogenic cultures?

Our fieldwork is centred on four regions currently experiencing some of the most severe warming on the planet: Eastern Australia (Sydney), Western India (Mumbai), Central Europe (Frankfurt am Main), and the southern United States (New Orleans). In each location, we conduct case studies across key domains of artificial cold — from air conditioning and food cold chains to biomedical cryopreservation and the ‘hunger for cold’ of data centres.

To analyse our findings, we draw on an interdisciplinary toolkit spanning the social sciences, cultural history, philosophy, computer science, geography, and the ethics of technology.

What do we aim to achieve?

- We are building a digital atlas of the cryosphere — the first global visualisation of cold chains, air-conditioning infrastructure, bio-banks, and data centres.
- Through interviews, computational text analysis, and historical research, we analyse and compare cultural patterns of thought and behaviour around artificial cold.
- In an archive of cryogenic cultures, we collect alternative, forgotten, overlooked, and innovative technologies and practices that may point the way toward more sustainable approaches to cooling.
- All scientific findings will be published in peer-reviewed, open-access journals, accompanied by a series of popular science publications.
- Our aim is to put an urgent and underexamined issue firmly on the public agenda.

°CryoCultures

Who we are

The project team of approximately 30 researchers is drawn from several German and Australian institutions:

Technical University of Darmstadt — Prof. Dr Alexander Friedrich, Institute of Philosophy

University of Duisburg-Essen — Dr Stefan Höhne, Institute for Advanced Study in the Humanities

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University of Paderborn — Prof. Dr Suzana Alpsancar, Heinz Nixdorf Institute for Technology Ethics

University of Hamburg — Prof. Dr Chris Biemann, Department of Computer Science

Martin Luther University Halle-Wittenberg — Prof. Dr Boris Michel, Institute of Geography

Institute for Social-Ecological Research (ISOE), Frankfurt am Main — Dr Thomas Friedrich, Social Science Climate Adaptation Research

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Cultures of Artificial Cold

12 Theses on Refrigerated Life in the 21st Century



1. Cooling is an invisible condition of modern life.

Cold technology is as fundamental to the modern world as the internet, money, or electricity – yet nearly invisible. Without cooling, no supermarkets, no hospitals, no data center: Artificial cold is the silent foundation of modernity.

2. We live cryogenically — producing cold and produced by it.

Modern industrial societies ceaselessly generate artificial cold – and are, in turn, its product. This structural dependence makes them cryogenic cultures: social formations that cannot function without the constant work of cooling.

3. Without continuous cooling, social life collapses.

Artificial cold enables billions of people to be supplied with food, medical products, the internet, transport, energy, and air conditioning. As critical infrastructure, its total failure would bring daily life to a standstill. The cold chain must never be interrupted!

4. 'Fresh' is not a natural state.

Nothing seems more natural than being 'fresh'. Yet what 'freshness' means is the result of a complex web of cooling technologies, legal norms, and marketing promises, logistics and everyday knowledge: the product of historical regimes of freshness.

5. The artificial cryosphere: an eternal winter, invisible.

Cold stores, cold chains, air-conditioning systems, cryobanks and data centres form a global network of temperature-controlled environments – the artificial cryosphere: a space without seasons, an eternal winter, a 'third pole'.

6. A new mastery of time.

Artificial cold has radically altered the temporality of life: from the detachment of our diet and way of life from the rhythm of the seasons, to the suspension of biological processes through low temperatures, and the decoupling of reproduction from natural cycles, to latency-free data processing and real-time communication.

7. A new power over life.

Industrial cold technology has given rise to a new form of biopolitical control: cryopower. From cryopreserved embryos to deep-frozen organs: artificial cold turns living matter into a resource, making it widely available for any purpose.

8. A thermally vicious cycle: cooling is heating up our world.

Air-conditioners protect against heat – and intensifies it at the same time. Their waste heat raises urban temperatures by up to 2.5 °C. Globally, the cooling sector is driving global warming through energy consumption and refrigerant emissions. The hotter it gets, the more we cool – the more we cool, the hotter it gets.

9. The cloud is a gigantic fridge.

The cooling requirements of data centres for cloud computing, streaming, social media, and artificial intelligence are among the fastest-growing energy consumers worldwide. Every AI query heats up a data centre somewhere. A sustainable digitalisation strategy requires regulation of energy demand.

10. Cooling is blowing the global energy budget.

The cooling sector already accounts for over 20% of global electricity consumption. Extending Western-style cooling to everyone would multiply that figure five-fold. If we want to break the thermal vicious cycle, we must understand the cultural roots of cooling consumption.

11. Cooling poverty costs lives.

Those who suffer most from the lack of cooling are precisely those who contribute least to rising temperatures: regions and people who are being subjected to heat due to the excessive use of cooling technology in industrialised countries. The poor, the elderly, and the sick in the Global South and in the hot zones of wealthy cities are the first to fall victim to increasing heatwaves. Access to cooling is not a question of comfort, but of justice.

12. Cooling differently is possible — and necessary.

Passive architecture, innovative technologies, the circular economy, greening and changes in consumption patterns can help break the thermal vicious cycle. The first step is awareness: our use of artificial cooling is not a law of nature. Even if never consciously made, it is a cultural choice. We can change it.