Choreographies of Science: Scientific Images as Placeholders[1]

Kerstin Hamilton
Hasselblad Foundation and HDK-Valand, University of Gothenburg

Extended Abstract

Images shape how scientific phenomena and outer space are conceptualised and made knowable. In scientific practice, visualisations often operate as stand-ins or placeholders for phenomena that cannot be directly seen, experienced, or accessed. In this context, a placeholder can be understood as an image that mediates an otherwise unreachable reality. While such images grant access to the unseeable, they also obscure the infrastructures, labour, and negotiations through which they are constructed.

I conceptualise the human and technological interactions that underpin scientific knowledge as the *choreographies of science*: a set of interdependent movements involving people, instruments, data, and computational systems that bring scientific images into being. These processes remain largely invisible in images and knowledges that are presented to the public, yet they underpin the construction of scientific facts and the emergence of knowledge.

My methodology combines site-based observation at the Onsala Space Observatory with collaborative engagement with scientists and technical staff, supplemented by archival research and photographic and moving-image work. Grounded in artistic research, this approach enables attention to the human and technological procedures developed and rehearsed over decades. By focusing on these relational conditions – rather than on the spectacular astronomical objects themselves – I aim to render visible how scientific images and knowledge are produced. The outcomes include photographic series, video works, reworked archival material, and curatorial projects linking historical and contemporary visualisations.

The proposed presentation develops through three interwoven entry points outlined below.

[1] Note on originality: Elements of the research and conceptual framing in this proposal were previously presented at the "Democratization of Space" conference (Linköping University, November 2025) and informed by an article published in *Filter* (Autumn–Winter 2025). Should the proposal be accepted to Helsinki Photomedia, the presentation will be rearticulated as an original contribution, incorporating new photographic work and an expanded conceptual and methodological focus specific to the conference theme.

1. Berenice Abbott's scientific photographs at MIT (1958–1961)

In 1939, photographer Berenice Abbott wrote her photography manifesto, opening with the statement: "We live in a world made by science." She argued that science requires translation and that scientists themselves are not equipped to communicate its complexity. Photography – "science's child" – could, she insisted, serve as a "friendly interpreter" for the public.

Between 1958 and 1961, Abbott's longstanding engagement with science led to a research position at MIT, where she created experimental photographs using optical instruments and laboratory setups. Art historian Terri Weissman describes Abbott's method as closely aligned with scientific experimentation: beginning with a hypothesis, establishing parameters, and testing assumptions through the act of photographing. Weissman's analysis is partly reparative, recovering Abbott as politically engaged, radical and theoretically sophisticated – qualities that were long overlooked.

In this presentation, I activate Abbott's and Weissman's work in relation to present concerns. Abbott's insistence that the opacity of science constitutes a democratic problem remains significant in the post-truth present. If science profoundly shapes everyday life, then the public should arguably be able to understand – or at least gain insight into – the systems through which knowledge is produced. Such insight also strengthens recognition of how scientific facts, unlike "alternative facts," emerge through painstaking, situated processes.

2. The first image of a black hole (2019)

In April 2019, the first image of a black hole was released by the Event Horizon Telescope (EHT) Collaboration. Like Abbott's experiments, the image stretches the boundaries of scientific visibility. Constructed from vast amounts of radio data and processed through advanced algorithms, it is one of the most research-infused images to date.

Where Abbott worked with limited means, the black hole image was produced by an international collaboration of around 250 astronomers, computer scientists, theorists, and engineers working for years towards this one image. The question of whether it should be considered a photograph is not settled. Visually, it resembles one; discursively, it is treated as one. Yet how does one "photograph" a black object on a black background, located more than 50 million light-years away and containing billions of solar masses? To meet this challenge, telescopes across continents were combined into an Earth-sized telescope.

Engineer and computer scientist Katie Bouman notes that the data "tells us only a piece of the story," and that many possible images could align with the measurements carried out. Machine learning was used to complement the telescope data, but with considerable attention to the risk of confirming existing expectations. Questions of visibility, access, and interpretation are particularly acute in this context. Images of space emerge through layers

of instruments, calibration, computation, and modelling. As the black hole image does not point to its subject in a traditional indexical sense, other markers of credibility – scientific protocols, peer review, reproducibility – become essential.

3. Postdoctoral artistic research at Onsala Space Observatory

Abbott's concerns remain relevant: science profoundly shapes contemporary life, yet much of its production remains unseen. In a landscape marked by disinformation and eroding trust in institutions, the opacity of scientific workflows becomes an important site to observe and make visible.

My research is situated within this opacity. The Onsala Space Observatory, founded in 1949, has been part of the global network of institutions shaping our understanding of the universe. It is also the focal point of my postdoctoral project. Scientific knowledge emerges through slow, rigorous processes – experimentation, observation, and verification – rehearsed and refined over years. The choreography of science at Onsala can be traced through daily practices, instrument calibration, maintenance routines, and interdisciplinary collaboration – but also in the archives revealing a past interlaced with the present. While Abbott photographed scientific phenomena directly, I focus on the people, instruments, and frameworks through which such phenomena become knowable.

Closing reflections:

The conference theme *Placeholders* offers a productive lens for examining images of – and in – science, approached through the notion of science as a choreography. Each step taken by the scientist or photographer introduces interpretive layers shaping what can appear. Abbott's images and the 2019 black hole image exemplify this dynamic. In radio astronomy, imaging operates through proxy ecologies, expanding the notion of place from physical coordinates to networked infrastructures and collaborative practices. In this sense, scientific images themselves become placeholders: provisional yet powerful interpretative forms through which scientific knowledge becomes visible, discussable, and open to public engagement. For Abbott, such images – firmly anchored in what she termed "realism" – were essential in democratic societies as prompts for curiosity, understanding, and civic responsibility.

Keywords:

Berenice Abbott, Black hole image (Event Horizon Telescope), Onsala Space Observatory, Choreography of science, Science images + images of science