

ILLUMINATION OF SNOW
– THE CREATION OF ENVIRONMENTALLY ENGAGED VIDEOS

An exploration of projection mapping and light art on snow sculptures integrated into the environment to illuminate consequences of climate change in Arctic regions.

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Master's thesis

Arctic Art and Design

Autumn 2021

University of Lapland

University:

University of Lapland

Faculty:

Faculty of Art and Design

Degree, program:

Master of Arts (Art and Design), Arctic Art and Design

Type of thesis:

Master's thesis

Author:

Johanna Kurpat

Title:

Illumination of snow – the creation of environmentally engaged videos

Subtitle:

An exploration of projection mapping and light art on snow sculptures integrated into the environment to illuminate consequences of climate change in Arctic regions.

Month, Year:

November, 2021

Number of Pages:

103

Keywords:

Environmentally engaged art, video, audiovisual media, arctic art and design, projection mapping, light art, snow sculpture, environmental art, practice-led research, artistic expression, climate change

ABSTRACT

The following study aims to find out how light on snow can be used artistically to create environmentally engaged videos that illuminate consequences of climate change in Arctic regions. The research strategy was a practice-led research in the field of Arctic Art and Design in which experimentation, exploration, observation and self-reflection were essential parts. In addition, qualitative interviews with artists helped to gain valuable insights and influenced the process. The master's thesis consists of a detailed description of the research process and a discussion of the collected data in which I refer to literature and previous research in relevant fields. During creative practice I did several experiments with projection mapping technology, artificial lights but also natural light sources that illuminated snow sculptures that were integrated into the environment. The created installations were captured through video and photography which were used to produce environmentally engaged videos. The results show possible solutions of how to create effective videos with the use of light on snow to illuminate site-specific consequences of climate change. Thereby, the sensory experience of the artistic practice but also of the winter environment of Lapland were decisive factors of the study. Relevant research data that lead to further discussion and have the potential to create an effective outcome are the integration of snow sculptures into the environment, the interaction with nature sounds and ambient sounds of the environment, the collaboration with nature, the creation of a non-human-centered perspective and the experimentation with different light forms. All these components can not only help to highlight site-specific consequences of climate change in a sensitive way, they also have the potential to create emotions and empathy with non-human lifeforms and non-living elements of nature such as snow, lichen or reindeer. Moreover, creative practices in natural environments and with the use of technology seems to lead to a contemplation about the use of energy and the carbon-footprint of the artist. Produced videos were shared on social media channels and I submitted one video to short film festivals and a selection of photographs to a photography competition to gain a wide audience.

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1. INTRODUCTION

1.1 Illumination of snow

The title of my thesis is *Illumination of snow*, whereby I highlighted the word *lumi* which is the Finnish word for snow. I illuminated snow, literally but also figuratively – illumination can not only stand for lighting something, it can also be seen as intellectual enlightenment.

Light art such as projection mapping is an interesting technology to use in an Arctic area where the darkness is dominating during the winter season. For light art and video projections darkness is an advantage so that there is a lot of time to explore light on snow surfaces. The value of light on snow can be observed by looking at natural light interactions and optical phenomena. A simple example is when the sky is cloudy and the natural light situation is diffuse, less details and less contrast will be visible on the snow surface. In this case, a snow sculpture or just a natural snow formation will look gray and flat. On the other hand, when the sun gets through the clouds, there will be shadows and sunlight on the snow which will create more contrast and depth. Bright light can reveal structures and details of the snow surface that would not be seen in a diffuse light or darkness.

Projection mapping on snow sculptures combined with environmental art can be a new approach to create environmentally engaged videos that deal with the topic climate change. Through projections of moving images it is possible to make a static snow sculpture move or more correctly simulate movement. This notion of movement can help to communicate a certain issue, express emotions or tell a story. Projection mapping offers a lot of possibilities that can be explored. Images and videos can be projected on all kind of objects and everywhere, in a landscape or in urban space, and it can be interactive. Because I'm studying in Lapland which is popular for a great amount of snow during the winter season I decided to explore video projections and light art on snow. Snow, with its white surface is a good object to project on, but not only the suitable surface is why I see great value of projecting light on snow – in Arctic and Subarctic environments snow and ice are important elements of the ecosystem. First impacts of climate change are visible in Arctic regions and the environment is transforming right now. The water temperatures are higher, permafrost is melting, there is less snow and more freezing rain in the winter and glaciers and polar caps are melting at an

alarming rate which will cause rising sea-levels and floods in low-lying costal areas (Demos, 2016, p. 81). A wide range of severe consequences is linked to climate change, for example the increase of invasive species in fragile ecosystems and biodiversity loss (Demos, 2016, p. 82). Simultaneously, the lifestyle of indigenous communities is threatened due to the decline of reindeer population and new parasites and diseases that occur among unique fish species because of warmer water temperatures (Demos, 2016, p. 84). During my research process I found interest in what is underneath the snow, for example lichens that are foraged by reindeer. Turunen et al. (2009) explain that reindeer might have problems to get enough food during the winter. As a consequence of climate change there is more precipitation during the winter which can lead to ice crusts on top of the surface, deeper snow, and molds. Reindeer can have problems getting through the ice or thick snow cover so that they cannot reach the vegetation. Moreover, the lichens and shrubs that they find may be covered with mold (Turunen et al., 2009, p. 813). Because the conditions of snow and ice are playing an important role in Arctic and Subarctic regions projecting light on snow to illuminate a current issue can be valuable.

Examples in which projectors were used to send out environmentally engaged messages to the world are already present in some artworks. For instance, the artist David Buckland projected the words *Burning ice* onto a wall of a glacier (Buckland, 2005–2009) and Greenpeace recently created an emotional video in which 300 illuminated drones and light projections were used to create shapes of moving animals in the sky (Head, 2021). However, there could be more research about projection mapping and light art on snow surfaces as site-specific artworks and particularly projection mapping on snow sculptures integrated into the environment can be defined as relatively new research field.

The Master's program Arctic Art and Design (AAD) at the University of Lapland is an innovative degree program of art and design which deals with contexts and art and design practices from northern Europe and the Arctic (Coutts et al. 2018). According to Jokela et al. (2020) Arctic regions are facing ecological, social and cultural changes and these changes will have an impact on the lifestyle and traditions of arctic communities and their wellbeing (p. 89). Therefore, topics of Arctic Art and Design projects can be, for example cultural sustainability, biodiversity and ecological concerns in Arctic regions such as climate change and globalization (Jokela et al., 2020).

1.2 Research approaches

A practice-led research approach is applied to find out how light on snow can be used artistically to create environmentally engaged videos that illuminate consequences of climate change in Arctic regions. Experiments with video projections, LED lights, natural lights but also environmental art practices and an exploration of snow helped me to find possible solutions. Documentation videos and photographs of the creative process and final video artworks attempt to put a spotlight on effects of changing snow conditions in Lapland and are site-specific. Videos that are projected on snow and other natural elements are very sensitive to the environment and at the same time they can be very effective because they can create imagination, fascination, emotions and interest in the winter environment. Using projection mapping and other light art forms in combination with snow can help getting peoples attention in an innovative but also emotional way. Often projection mapping is used for entertainment or commercial purposes. Illuminating snow and nature and thereby putting consequences of climate change into the focus, could be a new approach for artists and designers. During the practice-led research I transformed the snow and the environment into a stage and snow elements became actors. Thereby, I explored possibilities for artistic expression and investigated the interaction between environment and technology.

My Master Thesis includes a practical part in which I explored different techniques and possibilities of projection mapping, light art and snow sculptures in relation to the environment. During the creative practice of the practice-led research I worked from experimentation to final video and photography outcomes. Thereby, I used self-reflection to refine my research question and I worked in an iterative cycle of practice-led actions. Experimentation, exploration and observation were applied methods that helped me to find out how an artistic expression through light can be created effectively. A detailed documentation of the practice was useful for self-reflection and further analysis of the data. Another approach that I used is a qualitative approach by interviewing experienced artists in the relevant art fields. Artists that I interviewed are Eric Mutel and Tone Emblemsvåg. My master's thesis provides a detailed description of the research process and a discussion of the relevant research data. Topics of relevant theories and literature that I refer to are: Climate change in Arctic regions, art dealing with climate change, Arctic Art & Design and winter in Lapland, environmentally engaged art as land art, environmental art and eco-art, nature as collaborator, digital eco-art, projection mapping, audiovisual media, social media and the creation of emotions through art. Some key

authors are Coles and Pasquier (2015), Demos (2016), Granly Foss and Øidvin Burgess (2020), Craps (2020), Grande (2011), Jokela (2007), Jokela et al. (2020), Huhmarniemi (2019), Goldsworthy (1990), Kojo (2004), Knuutila (2014), Alvarsson et al. (2010), Hartig et al. (2001) and Wilms and Oberfeld (2018).

1.3 My own position in relation to the topic

The idea to explore the combination of media art and snow sculpting emerged because I have passions in both fields and I am convinced that there are new possibilities to elaborate. Before coming to Lapland I studied Bachelor of Arts in Design with a focus on Media Design at Münster School of Design in Germany where I carried out projects in the fields of photography and animation. During my studies in the Master's program Arctic Art and Design at the University of Lapland, I was able to gain first experiences in snow and ice sculpting which included a Snow and Ice Skill training taught by Antti Stöckell in cooperation with the Arctic Snow Hotel in Lehtojärvi and a Winter Art and Design course taught by Antti-Jussi Yliharju in cooperation with the Snow Lounge in Salla. In February 2020 I participated at Nallikari Snow Fest in Oulu together with Miia Mäkinen and Henna Timlin (as Team Snow Drop) and in March 2021 I was part of the snow sculpting team of the Arctic Fashion Show 2021 for which we created snow and ice sculptures that were placed next to the catwalk. During all snow sculpting activities I experienced the challenge when the snow or the ice starts melting and transforming into water. This challenge is an essential part to think about when an artist is working with the natural material snow or ice. Changing snow can make the sculpting very challenging. While working at snow hotels next to professional snow sculptors with many years of experience I got the impression that the snow conditions were unusual in the winter season 2019–2020. Repeating periods of warmer temperatures and rain can make snow and ice constructions collapse earlier than usual. Of course such variations of snow conditions can occur on an occasional level but on the other hand the possibility that the reason for an unpredictable winter is climate change has to be considered and the consequences have to be taken seriously. Artists with snow sculpting and light art knowledge can use their skills to bring changing snow conditions more into the focus.

2. THEORY

2.1 Consequences of climate change in Arctic regions and art raising the discussion

The ongoing climate crisis causes a wide range of complex problems worldwide. Anisimov et al. (2007), the authors of the report of the Intergovernmental Panel on Climate Change (IPCC) with a focus on Polar regions (Arctic and Antarctic), explain that Polar regions are in general defined as extremely vulnerable and global warming is especially visible in these regions. For instance, scientific data clearly shows the reduction of arctic sea ice and glaciers, but also the change of river and lake ice and melting of permafrost in Subarctic areas are described in the report (Anisimov et al., 2007, p. 657). Demos (2016) also describes environmental transformations in Arctic and Subarctic regions due to anthropogenic climate change. Impacts that he mentions are, for instance, higher water temperatures, less snow and more freezing rain in the winter, the reduction of permafrost and most visibly the melting of glaciers and polar caps at an alarming rate which will cause rising sea-levels and floods in low-lying costal areas (Demos, 2016, p. 81). Climate change already has severe impacts on animals living in Arctic and Subarctic areas and threatens the ecosystem and biodiversity. For example, in some regions the tree line has slowly moved further north so that the tundra area in these regions is declining (Anisimov et al., 2007, p. 666). Another issue is the increase of invasive species in fragile ecosystems and biodiversity loss (Demos, 2016, p. 82).

The topic that I chose for my Arctic Art and Design research is changing snow conditions and ecological consequences that are connected to changing snow layers in Subarctic areas such as Lapland. These changes can be considered as more subtle changes than the very visible change of melting polar ice caps and glaciers, but they are also relevant place-specific changes that need to be taken into account and that require detailed observation over a period of time. Due to climate change snow conditions and vegetation in Subarctic areas will change tremendously if the human-caused climate change continues at the current pace. Different articles provide information about changing snow conditions and how the change is affecting reindeer and caribou populations (Anisimov et al., 2007; Turunen et al., 2009; Demos, 2016; Wing, 2017). Researchers point out that the lifestyle of indigenous communities is threatened due to the projected decline of reindeer and

caribou populations caused by changing snow layers (Demos, 2016, p. 84; Turunen et al., 2009). The Climate Institute provides the perspective of the Sámi herder Anders Kroik, who is quoted by Wing (2017):

“According to Sámi herder Anders Kroik, “the snow becomes like sheet metal here, and the reindeer that eat from the ground don’t have the strength to get through that layer,” leading many to starve.” (Wing, 2017, p. 4).

The anthropogenic climate crisis is getting worse and more and more artists include the topic climate change in their artworks. In some of the artworks nature can be defined as a collaborator. For example, in artworks in which melting ice is used to connect people with the beauty of natural ice through physical and sensory experience. One example is the artwork *Ice Watch* (2014) by Ólafur Elíasson in which among other senses the sense of touch was significant. People were able to feel melting glacier ice on their skin and explore the beauty of glacier ice with all their senses (Elíasson, 2020, p. 57). Elíasson (2020) aims to have an impact on the audience. He states that art and culture are becoming more and more important for people because they have the power to lead to another future and change. Regarding climate change Elíasson (2020) argues that it is important how scientific data is communicated. He believes that certain factors are relevant such as the used language, the cultural background and emotions (Elíasson, 2020, p. 57). Elíasson (2020) is an internationally well-known artist and his artworks are great examples how physical and embodied experiences can be used to have an impact. Another example is the art project *Tundra – Melting ice precious earth* (2007) by Laila Kolostyák who also used ice in her artwork. Especially the process of melting ice inspired her to create meaningful installations. In the art project she used melting ice as an artistic material to draw attention to climate change in Arctic regions (Kolostyák, 2017). This symbolism is very strong because that is what is happening, the ice is melting – melting polar ice caps, melting glaciers and melting permafrost.

Moreover, there are some examples in which artists and scientists collaborate to document vanishing ice or changing landscapes. They are communicating climate change through visualizations of scientific data. For instance, Kothe et al. (2015) introduce drawings and visualizations from artists that were part of expedition groups and furthermore provide information about the *Cape Farewell Project*. This project was coordinated by David Buckland who invited different kinds of artists, for

example visual artists, writers and musicians, to collaborate with scientists that are working with climate change issues. The aim was to communicate climate change but also cultural change. In this project Paul D. Miller created sound art by using scientific data. In his soundscapes with the title *Acoustic portraits of ice* he used sound to explore transforming ice and thereby the artist is giving a new perspective by using sound (Kothe et al., 2015, p. 51).

In communicating climate change artistic expression can be seen as a valuable tool that can help to move people emotionally. According to Huhmarniemi (2019) artistic practice and art-based research can support environmental research (p. 184). Huhmarniemi (2019) also mentions the *Cape Farewell Project* and refers to Buckland who describes artistic expression as a powerful tool that can help to create emotions and stories that are beneficial in communicating climate change (p. 186).

Buckland worked with video projections on glacier ice. In his work *Ice Texts* (2005–2009) he projected words that express climate change onto glacier ice. For example, he projected the words *Burning ice* onto a wall of a glacier (Buckland, 2005–2009).

It seems that the topics melting ice and melting permafrost are already well present in contextual artworks. I see a gap in communicating the changing snow conditions and its ecological effects in the Subarctic area Lapland. In general there could be more place-specific artworks dealing with local consequences of climate change. In the previously described examples *Tundra – Melting ice precious earth* (2007) and *Ice Watch* (2014) the artists transported ice from an arctic region into an urban city of another country which had positive impacts on the audience and people experienced the beauty of arctic ice with all their senses. When making an environmentally engaged video I can consider how to capture and share my own multi-sensory experience that I have during the creative practice. Both images and the sound of a video can be important factors to move people emotionally. The example *Acoustic portraits of ice* described by Kothe et al. (2015) shows that there are possibilities to explore audio material for creating new perspectives so that the use of sound can be considered when creating environmentally engaged videos.

2.2 Arctic art, design and winter in Lapland

The concept of Arctic Art and Design (AAD) has been introduced in research (Permar & Coutts, 2016; Coutts et al. 2018; Huhmarniemi & Jokela, 2020; Jokela et al. 2020). Arctic Art and Design is blending both traditional and innovative practices of art and design practices and moreover it combines contemporary art, indigenous art and non-indigenous art, service design, product design and media productions (Jokela et al. 2020). Huhmarniemi and Jokela (2020) describe the role of arctic arts and they see a huge potential in place-based art practices and environmentally and socially engaged artworks dealing with arctic issues. Arctic art projects can be valuable for educational and economic purposes such as the empowerment of local communities and the development of the creative industry instead of resource-based industries (Huhmarniemi & Jokela, 2020).

There are traditions of combining winter art with light art visible in Finland and Lapland. Nyman (2004) describes the integrated playfulness in snow artworks. One example that he mentions is the making of snow lanterns. He interviewed people who grew up in Finland and asked about snow games and traditions related to snow. One example that the interviewees described is how they made snow lanterns out of simple snowballs. Many of the interviewed people remembered these snow lanterns from their childhood. Feelings that are connected to these memories are warmth and security (Nyman, 2004, p. 41).

In addition, the multi-sensory experience of the arctic winter can inspire artists. Kojo (2004) writes about the experience of winter in the northern nature with all senses. The experience of sounds of the natural environment during the winter is described as natural quietness (Kojo, 2004, p. 71). Kojo (2004) also reflects on winter lights, smells and tastes of winter (pp. 71–73). In addition to the inspiring descriptions of the different experiences the article shows photographs of the beauty of winter, natural shapes of ice and shapes of snow lying over trees.

Moreover, Knuutila (2014) sees it as interesting and inspiring to implement technology, gamification and interaction into the winter environment (p. 193). He explores the combination of media art and snow and ice design and introduces the reader to different media expressions on ice and snow. The examples embrace experimentation and the use of multi-sensory experiences with the help of

technology (Knuutila, 2014, pp. 192–193). One challenge which he mentions is that some technologies can be fragile when using them in extremely cold environments and a designer needs to consider this issue. For example, projectors and sound equipment could need a case or even a heating box (Knuutila, 2014, p. 193). An inspiring approach that I see in the examples is how experimentation can lead to innovative and unique results. In one example an image was projected onto falling snow and the camera captured a fantastic image by shooting with a long exposure.

Jokela (2007) explained that in Lapland the snow cover on the surface stays for eight month a year, starting in October and ending in the beginning of May (p. 115). This gives many opportunities for artists who are working with snow and ice. Jokela (2007) gives an overview of how winter art can be an experience. Environmental art as winter art experience is introduced. According to Jokela (2007) environmental artists are looking, for example, at the site and its materials and substances but they will also have subjective multi-sensory experiences. Moreover, artists can consider cultural aspects of the place. Jokela (2007) mentions Andy Goldsworthy who used snow and ice and created inspiring artworks integrated into the nature. Furthermore, Jokela (2007) describes his own way of creating winter art in the cold environment. He mentions the experience of winter sounds and also the experience of cold wind on the skin and he sees the experience of the environment with all senses and also the elements time and place as important factors (Jokela, 2007, p. 121).

Stöckell (2020) shows his winter art projects on his website and describes the process of making art with snow but also light. He integrates snow and ice sculptures into the environment and thereby he uses natural snow, for example snow that he cut out of the ground by using a saw. In his artworks he interacts with landscapes, lights and shadows. On his website are very beautiful and inspiring examples that show how light can be valuable for snow sculptures and in addition to natural light sources, such as sunlight and aurora borealis, he uses artificial lights for highlighting the sculptures (Stöckell, 2020).

Furthermore, Huhmarniemi (2007) describes how fire is used in contemporary art. The combination of snow, ice and fire can be used for a sculpture. Huhmarniemi (2007) refers to the event Snow Show that took place 2004 in Rovaniemi. At the Snow Show the interaction of snow, ice and fire was presented in one example. It can be argued that this is another form of light art in which fire is used as light source. In addition, Huhmarniemi (2007) mentions that also the sound of fire is essential for

an experience. Another artwork that Huhmarniemi (2007) describes is the fire and ice artwork of Timo Jokela who integrated ice pieces into a fire sculpture. Interesting for Jokela was the visualization of change (Huhmarniemi, 2007, p. 98).

2.3 Environmentally engaged art as land art, environmental art and eco-art

Environmentally engaged approaches can be seen in land art, environmental art and eco-art. According to Grande (2011) early land art can be seen as more theoretical and conceptual oriented whereas current works in environmental art and eco-art have visible action-based approaches and promote a dialogue between humans and the living ecosystem (p. 23). The engagement with local nature leads to a unique artistic and sensory experience. Artists who are spending a longer time in one location to explore natural materials and the surrounding environment get in contact with living ecosystems but also non-living elements of nature. Andy Goldsworthy's works are site-specific and include organic or inorganic materials and his works are often temporary artworks that vanish with time. Natural materials that Goldsworthy used are, for instance, berries, ice, snow, leaves, wood or rocks (Grande, 2011, p. 38). Goldsworthy not only created a great amount of artworks integrated into the environment, he also spends a lot of time at the chosen location and documents what he experienced and how the environment changes with time (Grande, 2011, p. 38).

Even though the main materials that environmental artists and eco artists are using are natural materials from a specific location, technology plays a role as well. When creating temporary artworks the documentation with photography or video are important factors because then the artworks are captured for a long time and can be shared worldwide and not only people in the place where the artwork is located can see it. Looking at Goldsworthy's work he always uses photography for documentation. While photography can be seen as a more simple form of technology there are also video documentations available that documented Goldsworthy during his artistic process. Goldsworthy himself did not want to work only with primitive methods and he embraces the use of artificial lights and big machines for some of his large-scale projects (Goldsworthy, 2000, p. 8). However, Goldsworthy also describes how he often needs to work with his bare hands to create the planned artwork and he sees his hands as great tools. But, he also embraces other tools, technology and traveling to locations (Goldsworthy, 1990). All in all, Goldsworthy (2000) gives some examples

how working in nature, with natural materials and the use of technology can be valuable and he does not see it as contradictory to work with his bare hands, with natural materials and also use technology or machines (p. 8).

Also Grande (2011) describes eco artworks that are documented with photography and video and which were exhibited in the Pori Art Museum in Finland. One of the aims of land art, environmental art and eco art is to create artworks outside the museum in a natural or urban environment. However, the *Eco-Art exhibition* in the Pori Art Museum shows how the documentation via photography and video can be used to bring the artwork also into the indoor environment of a museum. For artists, who work environmentally engaged, it seems necessary to collaborate with the natural environment and create artworks with natural materials that include nature elements in order to gain new perspectives, however, it always seems important to get attention through different channels so that it is a good option to additionally show documentations of the artwork in a museum space.

2.4 Nature as collaborator in creating art

Nature as a collaborator in creating an artwork is clearly visible in Goldsworthy's artistic practices in natural environments (Goldsworthy, 1990). Thereby, wind, gravity and changing weather conditions are important factors when he creates artworks outdoors. Even though there can be some assumptions about how the artwork will look like, the continuously changing nature will automatically interact with the artist's creation and can make the result unpredictable or surprising. Goldsworthy (1990) often collaborates with nature in his artworks when he is playing with changing or moving materials, natural light sources or when his artworks start to fall apart over time, melt or even grow. Surroundings of a place, existing materials, weather conditions and different seasons also are significant factors and will influence the result of an artwork (Goldsworthy, 1990). Even animals living in the chosen place can interact and collaborate with the artwork. This influence can sometimes be predictable but often has some unpredictable or challenging aspects. A challenge between the artists initial idea and the influence of nature can occur especially when the artist has a certain aim and can not accomplish it because of the unpredictable side of nature. But, on the other hand, surprising and fascinating results can arise that the artist might not have predicted or just

discovered during the practice, by doing experiments or by accident. Goldsworthy (1990) embraces this challenge and works together with changing nature such as changing weather and time. He explains that an artwork can become much more effective when it is threatened by nature and he gives the example of a balanced rock that can get much more tension when the wind and the weather challenges it – then it starts to wiggle and might fall apart (Goldsworthy, 1990). The same tension can be used when working with the fragile material snow and changing temperature. Furthermore, Goldsworthy (2000) argues that timing is critical and sometimes it is challenging to make an artwork in the right moment because there is not enough time or the right moment is gone. For him there are always compromises happening between him as an artist and nature that continuously changes, for example, simply when a day ends and the night starts, snow melts or a tide comes in (Goldsworthy, 1990).

The view of nature as a collaborator also emerged in contemporary art practices and is visible in current artistic research projects. Elo et al. (2020) present artistic research results from the *Research Pavilion #3* arranged by the University of Arts Helsinki in the context of the Venice Biennale in which about fifty artist-researchers from different countries took part. The participating artistic researchers where taking into account the current changing environment and how sustainable artistic research practices could look like. For example, in the following artistic research practices nature as a collaborator played a role: Mari Martin's research *Sensory Excursion as a Site of Encounter* deals with a sensory excursion in an environment and included participation with humans and non-humans, Laura Bissell's research *Landscaping with Beavers* can be seen as a collaboration with beavers and in Katja Juhola, Maria Huhmarniemi, and Kaisa Raatikainen research *Artistic Research on Dialogical Aesthetics – Ethics of Gathering* place-specific current issues were included in participatory and socially engaged projects that worked with endangered meadows and wood-pastures, freshwater pearl mussels and the circular economy (Juhola et al. 2020). In the artistic research *Artistic Research on Dialogical Aesthetics – Ethics of Gathering* the artists collaborated with local communities and the interactions between human and nature can be defined as positive and empowering (Juhola et al. 2020).

2.5 Digital eco-art

That the use of technology can be beneficial when creating environmentally engaged art is studied by Coles and Pasquier (2015). For their artistic practices they use the term Digital Eco-Art in which they implemented technology into the environment and let participants interact with the technology but automatically also with the environment. Unique experiences were created by artists who used the combination of media technology and nature elements. For the research project an independently powered system was created which they called “The LocoMotoArt independent power system” and which provided, for example solar powered batteries by taking into account the portability because the aim was to implement technology into natural setting where it was difficult to get access to electricity. With the help of the described power system artists were able to implement video projectors and sound equipment into natural areas (Coles & Pasquier, 2015, pp. 4–5). The study investigates how technology can contribute to a deeper connection between humans and nature with the help of using technology as a mediator. Coles and Pasquier (2015) explore the relationship between humans, technology and nature and how technology might help to enhance connectedness to nature. In the research project, artists chose a location and created a media or sound installation that interacts with natural material, elements and sounds of the location. The sounds of the surrounding environment became part of the installation, for instance, sounds of ocean waves or sounds of animals living in the area. The experience of natural ambient sounds is playing an essential part and is interweaving with the implemented technology such as video projections on rocks or in caves (Coles & Pasquier, 2015, p. 8). While some people argue that technology is not compatible with nature, the study shows that technology implemented into a natural setting can have a positive effect on the relationship between human and nature and moreover has the potential to even enhance the connection between human and nature by creating positive feelings and stimulating human senses. Participants interacted with the technology and because the technology was integrated into the natural environment, they automatically interacted with nature and natural sounds as well (Coles & Pasquier, 2015, p. 12). For my research it is interesting to find out if these positive feelings of connectedness to nature through the interactions between technology and nature are also tangible through video artworks and documentations that are shared online.

2.6 Definition and value of projection mapping

Projection mapping, also called video projection, 2D or 3D projection mapping, is the art of projecting an image, a video or an animation onto a two- or three-dimensional object so that the projection matches the surface of the object. This method is often used for light art shows implemented onto buildings for entertainment or advertisement but it is also used for stage designs, theater productions or for artistic purposes.

Historically, projection mapping is connected to storytelling. Gaddy (2018) illustrates the most simple and primordial projection technique in human history – light and shadow creatures. Before people could even write down stories they used pictures to tell stories, for example, through cave paintings. Another method was simply the way of forming shadows into creatures and shapes by using the hands (Gaddy, 2018, pp. 50–51). Nowadays, video projectors are the common technique to create projection art. Gaddy (2018) explains different projector types and their advantages or disadvantages in detail (p. 298). Understanding the technology of the different projectors will help the designer with the decision which projector is suitable for the project. There are even advanced technologies available, for example the projectors from the company Lightform which have 3D scan features integrated intended to make the mapping process much faster and easier.

Gaddy (2018) explains that projection designers and artists need to consider certain technological issues by taking into account the object or surface on which they want to project an image. In addition, designers and artists that make video projections for performances, stage designs or theatrical use need to consider aesthetic, cultural and dramaturgical aspects (Gaddy, 2018, p. 44). Moreover, Gaddy (2018) describes that the designer of a projection for stages needs to take into account the interaction between actor and the projected image (p. 45). For my research in which I use projection mapping methods in a natural environment I can think about nature elements as actors that can interact with projected images and sounds. According to Gaddy (2018) physiology and psychology are important factors for projection art and besides the sense of seeing, other senses need to be taken into account. Furthermore, he argues that it is beneficial to understand optics, physics of light and the human perception of light (Gaddy, 2018, pp. 67–68). For example, Gaddy (2018) explains how transparent objects interact with light compared to opaque objects. Opaque objects reflect all light and they do not absorb light while on the other hand transparent objects

reflect only a small amount of light and light energy passes through the transparent object and this energy will be refracted by the transparent object. If the artist projects light on a translucent object some light will pass through this object and the light will also be scattered a lot. Also, the thickness of a translucent object plays an important role because thicker translucent objects are more opaque and less transparent (Gaddy, 2018, p. 77). This is an interesting phenomenon which can open up new possibilities for experimentation when projecting on ice surfaces, mixtures of snow and ice or even on snow with lower density.

Coles and Pasquier (2015) describe how videos are projected onto natural elements such as rocks, caves and sand so that an interaction with the natural environment takes place. Changes in the environment and natural elements are interacting with the projected video. The previous described collaboration between human and nature in environmental art practices is also visible when technology is implemented and a collaboration between nature, technology and human can emerge. Moreover, the artists Friedrich van Schoor and Tarek Mawad, also known as 3hund, show how projection mapping but also other artificial lights can be integrated into a natural environment and captured on video to create short films (Sierzputowski, 2016; Ghadiok, 2019). For example, they project onto different non-living elements but also living beings of the natural world, show new perspectives by investigating in the topics bioluminescence and electroluminescent and document the artistic practices with the help of video and photography (Sierzputowski, 2016; Ghadiok, 2019). Their videos have a special appearance and are sometimes barely distinguishable from a computer generated video. However, the fact that the artists did the videos by making projection mapping in a real forest and onto trees or mushrooms fascinated the audience. Moreover, in their experimental works they are playing with water reflections and its interaction with the movement of water (Sierzputowski, 2016). Thus, a collaboration with nature is also visible and their artistic practices have similarities to my practical research part because I also used projection mapping methods in a natural environment and filmed the installation to create videos.

2.7 Audiovisual media, social media and emotions

The use of color and sound can support an artistic expression in an audiovisual media work and has the power to create emotions. Wilms and Oberfeld (2018) studied how color can create different

emotions. In their study they argue that not only the hue of the color is important factor but also the saturation and brightness will have an effect on the mood (Wilms & Oberfeld, 2018, p. 910). Moreover, Granly Foss and Øidvin Burgess (2020) explain how the temperature of color and the use of a soundscape can have an effect on the content of a video and can create different emotions. Examples of videos that were analyzed are educational videos dealing with climate change. Color temperature and soundscapes are used to support a certain content and the effectiveness can vary depending on what colors or sounds are used. Granly Foss and Øidvin Burgess (2020) argue that an extremely warm color such as an intensive red expresses danger. However, if the warm color is not that intensive it can be more connected to safety than danger taking the saturation of the color into account. Furthermore, Granly Foss and Øidvin Burgess (2020) investigate the perception of soundscapes of different videos. For example, the use of pitches outside human vocal range can create alienation which contributes to a feeling of risk and can symbolize the invisible threat of climate change and its complexity that is difficult to manage (Granly Foss & Øidvin Burgess, 2020, p. 19). The described example shows how video producers can create feelings of fear and danger with the help of color and sound. However, other studies show approaches in which emotions of grief are used to enhance empathy with nature. Craps (2020) gives the example of Marybeth Holleman's poem *How to grieve a glacier* in which the problem is described that it is impossible to hold a glacier in the arms for grieving (p. 1). That some people feel deeply sad and grieve for glaciers that are disappearing due to climate change seems important factor. Craps (2020) offers a quotation from the journalist Dahr Jamail who wrote the book *The End of Ice: Bearing Witness and Finding Meaning in the Path of Climate Disruption*, published 2019. Jamail reflects on a personal closeness that he had with his friend who was dying and he argues that humans should have this kind of intimacy with the earth (Craps, 2020, p. 2). Moreover, Craps (2020) gives the example of the global environmental movement extinction rebellion because people of the movement often use funeral symbolism such as coffins, silent processions, black veils, and white roses (p. 4). Furthermore, Craps (2020) states the following:

“Coming to terms with ecological grief can inspire efforts to work through it and reinvigorate practices of environmental advocacy in the face of the daunting ecological challenges confronting global society in the 21st century” (Craps, 2020, p. 5).

In this sense sharing the grief that we have for dying nature with others can help to create more empathy with the earth and can also create awareness and make people move emotionally. Grieving for

non-human lifeforms, organisms and non-living elements of nature and sharing this grief with others seems to be an important process.

Hartig et al. (2001) studied the ecological behavior of people. They see great value in positive experiences of natural environments and positive motivations that can occur from fascination and restoration of nature (Hartig et al., 2001, p. 603). Previous studies give evidence that a positive nature experience can not only take place in a real natural environment but also through an audiovisual experience, for instance, through images and videos of nature (Ulrich, 1984; Laumann et al., 2003). Moreover, sounds of nature can have an impact on human's health and recovery by creating pleasant emotions. This is visible in the study of Alvarsson et al. (2010) that demonstrates how pleasant nature sounds can be used for stress recovery.

The sharing of images and videos on social media can be considered because it is important part of the daily life of many people. Especially since the COVID-19 outbreak and the resulting restrictions it became more and more important to keep in touch with families and friends through social media. Content that people share can be personal or professional content or it can be defined as activism. International youth protests that addresses the emergency of climate change, initiated by Greta Thunberg who started with school strikes for the climate, began 2018 and are ongoing. Protests are carried out on streets but also on social media platforms (Boulianne et al., 2020, p. 208). Social media platforms play a significant role in creating a space for political engagement and sharing of concerns about climate change globally (Boulianne et al., 2020, p. 208).

Gold et al. (2015) describe how students can be involved in the creation of videos dealing with climate change. The described research program is called *LENS ON CLIMATE CHANGE PROGRAM DESIGN (LOCC program)* in which students from middle and high schools in Colorado engaged with local consequences of climate change. They learned about local issues linked to climate change, collaborated with scientists and were supported by teachers who educated them in storyboarding and the creation of videos. The program helped students not only to engage with local ecological and social issues linked to climate change, it also taught students valuable skills in video production and taking interviews with locals. This program is a good example how video production can be used to create environmental engagement in a positive and empowering manner. Gold et al. (2015) describe that some of the students struggled in school and were not much interest in after school activities be-

forehand but through the practice-based program they became eager to learn and take action. The produced videos were shared on social media channels but also newspapers and a radio channel showed interest in reporting on the program and one group even decided to submit their video to a competition (Gold et al., 2015, p. 239).

2.8 Carbon footprint of environmentally engaged artworks

When creating artworks that deal with environmental issues such as climate change, the own carbon footprint of the artist and the exhibition can be controversial. Demos (2016) has a critical view on huge contemporary art exhibitions. As an example, he mentions the dOCUMENTA (13) in Kassel. The own carbon footprint and exploitation of fossil fuel-based resources of the exhibition can be criticized (Demos, 2016, p. 256). From his perspective, in the current urgent situation of climate change, the concept of huge exhibitions does not seem sustainable enough. On the other hand, Demos (2016) sees that contemporary art is playing a significant role in communicating important issues and making things in our society visible. The approaches shown in the art exhibition of dOCUMENTA (13) are very valuable. As an alternative example, Demos (2016) mentions the Occupy movement that organized a different exhibition close to the dOCUMENTA (13). In this alternative exhibition people did not have to pay admission cost and participatory art activities were offered for everyone. Important issues such as de-growth and recycling were communicated. However, the Occupy exhibition did not get much attention (Demos, 2016, p. 256). Having the critical view of Demos (2016) in mind, the use of technology for a project can lead artists to contemplate about where the energy for the technical equipment comes from and if it is sustainable.

3. METHODOLOGY

3.1 Research question

- How can the use of snow sculpture, projection mapping and light art help to create environmentally engaged videos that illuminate the consequences of climate change in Arctic regions?

3.2 Research strategy

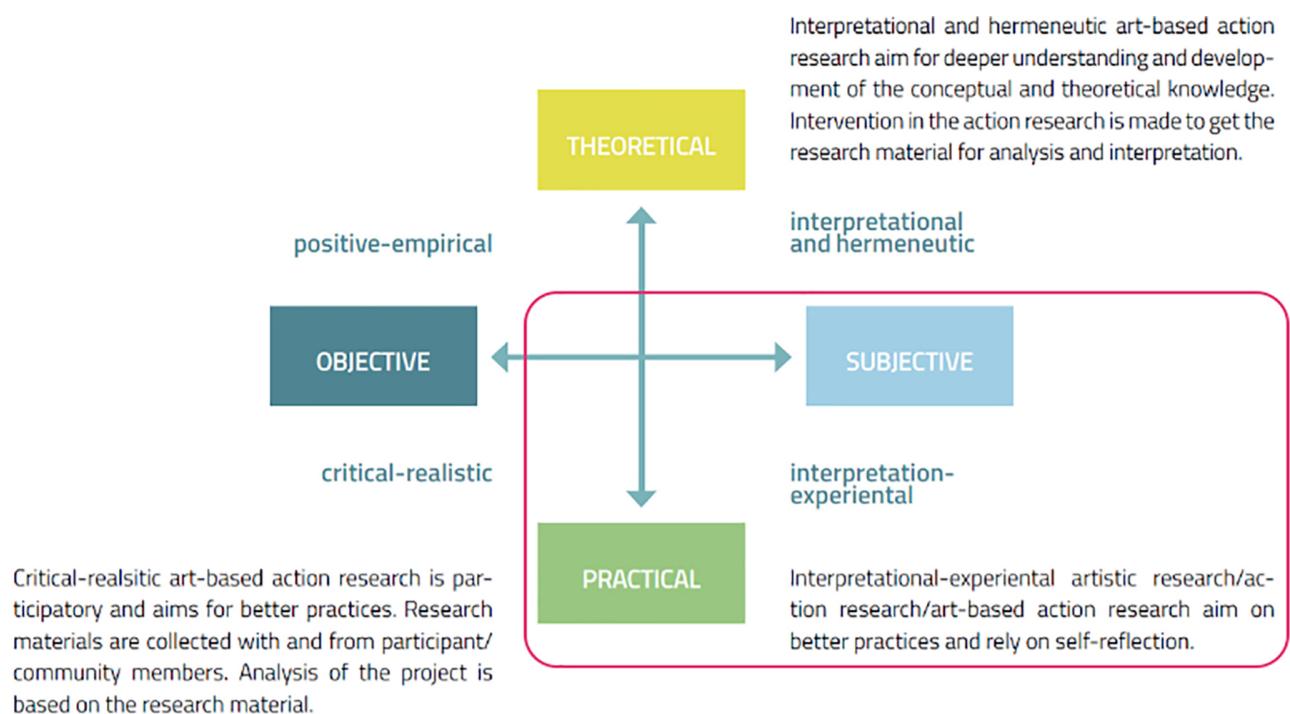
Practice-led research in the field of Arctic Art and Design

For my research I decided to use a practice-led research approach in the field of Arctic Art and Design. The practice-led research approach has similarities with practice-as-research, practice-based research and artistic research. The term artistic research is often used in the field of visual arts (Nelson, 2013, p. 10). All these approaches are focusing on practice as an important source for conducting research. Because I am working at the intersection of art and design I prefer the term practice. Smith and Dean (2009) explain the term practice-led research as an approach that includes the artwork but also the creation of the work as research to get insights from the creative process which can be documented, theorized and analyzed (p. 7). It seems important that an artwork reveals new knowledge otherwise it might not be accepted as research (Smith & Dean, 2009, p. 7). As Nelson (2013) explains practice is the key method of practice as research in which practice is seen as evidence of a research inquiry (p. 9). Therefore, practical knowledge and doing art is essential part of the practice as research approach (Nelson, 2013, p. 10). Creating an artwork and reflecting on it might not be enough to gain new knowledge so that not only creative practice and its documentation can be valuable but also inquiry in background theory (Skains, 2018, p. 96). The focus in my practice-led research is on the practical exploration of projection mapping, light art and snow sculpting as environmental art, but my research also includes background theory inquiry and qualitative interviews with artists to find a gap of theoretical knowledge. My aim is to find out new knowledge through creative practice with the chosen technique while having the background knowl-

edge in my mind. During my practice-led research I used my practical knowledge in the field of media art and winter art for exploration. Thereby, I aimed to investigate into the unknown to create something innovative and to gain new knowledge that could help me to find possible solutions to my research question. Creative practice is an experimental act which aims to help answer certain research questions in the field of art and its practice (Skains, 2018, p. 86). Skains (2018) focuses especially on a conceptual practice-based research approach and explains that artist researchers, who are using conceptual methods, are creating artifacts influenced by their own thoughts. These artifacts are part of the research process and through this practical process artist researchers are aiming for a deeper understanding of the created work. Practice-based research that is contextual can be used to create, for example social change (Skains, 2018, p. 86). Because I want to investigate the topic climate change through projection mapping and light art on snow, I see conceptual and contextual approaches in my research. In addition to the practice-led research strategy, a qualitative approach is applied by interviewing artists who are working in the field of media art, snow and ice sculpting and light art. The interviews helped me to gain a deeper understanding of the related art fields and offered useful insights about what is known and what is possible in the investigated area.

Another approach that inspires me is an applied research approach, more specific an art-based action research approach. According to Muratovski (2015) an applied approach is looking for solutions by testing different possible solutions. A scientific research approach on the other hand is focusing on the problem by using analysis strategies and the definition of a solution is based on the analysis. As Huhmarniemi and Jokela (2018) state, art-based action research as a strategy uses art to further development work to empower local communities and society in general to become more sustainable. What inspires me in action research is that it aims to improve the conducted practice. The process goes in a cyclic spiral of planning, acting, observing and reflecting. Questions that I have to ask myself are what, why, how and if I need to improve something in my practice (Muratovski, 2015, p. 193). Most action researchers are conducting action research together with participants and it is often part of a social practice that aims for change (Muratovski, 2015, p. 193). Even though my practice-led research focuses on a subjective and practical strategy the cycle of planning, acting, observing and reflecting can be seen in my research process. Huhmarniemi and Jokela (2018) are referring to Pirkko Anttila's double dichotomy of research approaches. I put myself in the area of practical and subjective because my research aims to explore my practice by doing practical experiments, observations and self-reflections to investigate in my research question (Figure 1).

Figure 1. Anttila's double dichotomy of research approaches. Anttila (2007).



Note. The intention of my study is marked in the diagram in the area of practical and subjective. The diagram is Pirkko Anttila's double dichotomy of research approaches (Anttila, 2007), used by Huhmarniemi and Jokela (2018) to explain art-based action research (p. 11).

During the research process I used self-reflection to refine my research question by working in an iterative cycle of practice-based actions. In conclusion, my practice-led research approach has also similarities to a multi-method approach. The term multi-method approach means combining several research methods. Muratovski (2015) illustrates that it can be beneficial to combine different methods because it can reveal new insights in a unique way (p. 40). In addition to practice, I used also other methods such as interviewing and reviewing literature.

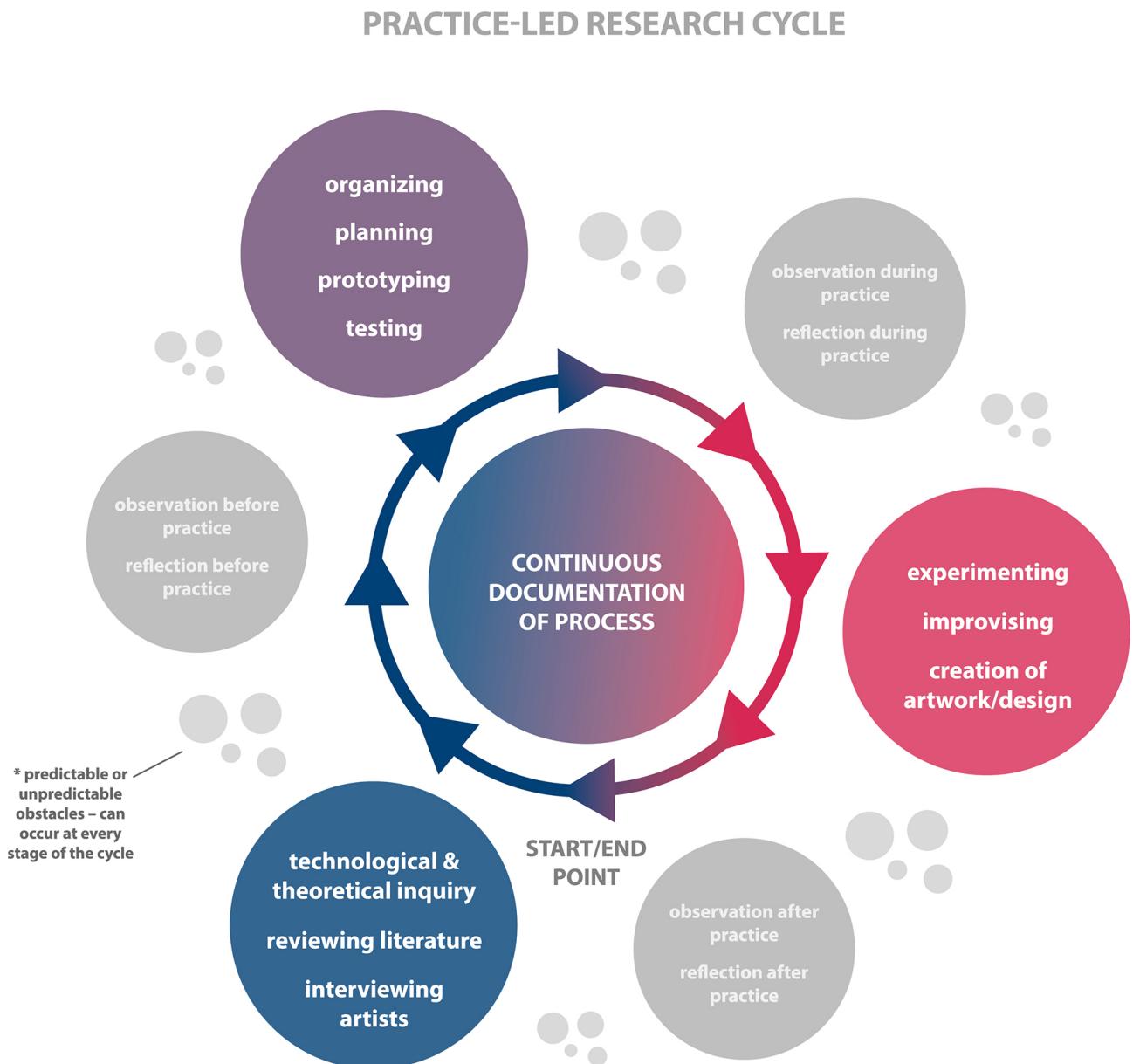
3.3 Research methods

Practice as method

Practice is the key method in the practice-led research approach. My practice consists of several creative processes: Projection mapping on snow, the making of snow sculptures integrated into the environment, the making of video and sound material for the video projections and also the production of videos that capture the created installation. Inspired by the cycle of planning, acting, observing and reflecting which is used in art-based action research approaches I created my own iterative working cycle which included the following steps: Technological and theoretical inquiry, organizing, planning, testing, experimenting, the making of an artwork/design, observing and self-reflecting while focusing on my research question which still was allowed to change during the process (Figure 2).

As I mentioned before, in addition to creative practice as research method I used a qualitative approach in which my method was interviewing. I interviewed two artists who are working in the art field in that I investigated to get a deeper understanding, useful insights and inspirations. According to Leavy (2017) qualitative research looks at people's subjective experiences and searches for meaning and understanding. It is often used in exploratory or descriptive research. I did qualitative interviews with the artists Eric Mutel and Tone Emblemstvåg.

Figure 2. Iterative practice-led research cycle. Kurpat (2021).



3.4 Research data

Documentation

Qualitative research data can be collected, for example, through documentation with the use of different audio-visual materials (Muratovski, 2015, p. 50). Thus, in my practice-led research I collected data by documenting the whole process of creative practices by using different documentation tools. According to Mäkelä and Nimkulrat (2018) documentation of the creative process is defined as a research tool that consists of reflections on and in action. It can also help the researcher to communicate the whole process of the creative practice, personal experiences and reflections (Mäkelä & Nimkulrat, 2018, p. 12). In this sense documented thoughts and feelings that the artist or designer had during the creative process can support the self-reflection and analysis, but it can also help to communicate the process to others.

Tools that I used for documentation are photography, video, time-lapse and notes that describe my thoughts, feelings and insights. With the time-lapse method it is possible to observe the whole process, for example, the making of snow sculptures and the setting up of the equipment, so that a view behind the scenes is documented. Barone and Eisner (2012) explain that time lapse videos can make things visible that otherwise we would be unable to see. I used time-lapse videos especially for the documentation of the making of snow sculptures. Photography and video documentation captured, for example, how a video projection installation works and how an audience could interact with the installation. I did observations and reflections before, during and after the practice-led cycle. Muratovski (2015) explains that researchers need specific tools such as observation to understand human activities in detail and furthermore they need to describe their observation, explain it and in the end, they are aiming to find possible solutions that could make improvement (p. 16).

Video production

In addition to documentation, I used video and sound recordings to create expressive video artworks that helped me to explore how the chosen technique could create emotions. Thinking about filmmaking techniques and how moving images and audio create emotions is valuable for answering

my research question. Jacobs (2016) states that audio-visual technologies can be used to explore and represent emotions. For example, filmmakers are able to create something that is beyond textual and verbal communication by playing with captured images and sounds. They have the freedom to manipulate images and sound by changing the focus or they can play with time and space (Jacobs, 2016, p. 486). A film or video can influence the audience's emotions and thereby it is significant how the filmmaker or videographer is capturing a scene, how the focus is set, how the film is edited or manipulated and how the image and the sound interact with each other. In my research I focused on video productions in which I explored how it is possible to express the topic climate change in Arctic regions through projection mapping and light art on snow. Capturing the created installation through video made it possible to explore how filmmaking techniques can be used not only for documentation but also for exploring how audio-visual techniques can create emotions and empathy with nature. Produced videos were shared on social media channels so that I was able to get a wider audience than I would have gotten through making just the installation on site. In the end I published video and photo materials combined with some notes that I took during the creative practice on my website, instagram, facebook and youtube channel. I used different channels on social media for publication to get feedback and in addition I submitted one video to short film festivals and a selection of photographs to a photography competition to gain a wide audience that can comment and discuss the outcomes.

3.5 Analysis of research data

The analysis of my study took place during and after the creative process and it is part of my written thesis. Continuous documentation was essential part that helped me to write a detailed description of the whole research process and revealed important insights. Through observation and self-reflection techniques and an assessment of the documented material I gained a wide range of insights which I then classified to the most relevant research data by having the background theories and my research question in mind. Huhmarniemi and Jokela (2018) explain how to collect and analyze research data. The collected data can be classified and grouped to similar topics. My analysis of the research data is described with the help of a visualization of the analysis process that shows the classified data and main themes (Figure 21). In a discussion chapter I discuss the relevant research data in relation to previous theories. The discussion is supported by graphics and photographs that explain

the results of the study. According to Nelson (2013) practice as research can have a multi-mode research inquiry which includes a product, for example an artwork in an exhibition, a film, a blog or a performance, the documentation of the process and a complementary writing (p. 26). In addition to artistic videos and photographs that I shared online I wrote down the whole research process and discussed the collected data. In the end, outcomes of the study are videos and photographs that can be seen as artistic outcomes but also a written part with a description and discussion of the collected data. According to Barrett (2007) creative arts research can be categorized as emotional and subjective. The artist researcher gains new knowledge not only through theory but especially through the experience during artistic practice (Barrett, 2007, p. 115). Therefore, self-reflection by the artist researcher is important part of an artistic and practice-based research approach. Also, a detailed representation of the conducted artistic practices is necessary to explain the gained knowledge. In the description of the process and in the discussion chapter my artistic experience but also the experience of winter in Lapland is included to offer my gained knowledge to the reader.

4. DESCRIPTION OF RESEARCH PROCESS

4.1 Interviews with artists: Eric Mutel and Tone Emblemsvåg

My research cycle started with getting in contact with artists who are working in the field in which I want to investigate. I got in contact with the artist Eric Mutel with whom I had a qualitative interview. Eric Mutel is an artist who is working in a wide range of art fields, including snow and ice sculpture, light art, photography, installation and combinations of these fields. Interviewing an artist who is experienced in combining different art disciplines and who also has experience with snow and ice as an artistic material was inspiring and valuable for the research process. The most important insights that I retrieved from the interview are described in the following. First of all, experimentation can be a beneficial and an essential part of the artistic process. Mutel illustrates how site-specific installations can bring value and also how the site can bring new inspiration for the artistic process. For instance, climate change can make the work with snow and ice challenging but the topic and the visible change can also be implemented in the artwork. Thereby, not only snow can be an interesting material but also ice. Mutel uses ice and snow in very innovative and experimental ways and after the interview I got the impression that the intensive exploration of the material snow and ice can be rewarding for my research. Another important insight is that the inclusion of sound and performance can be an interesting option. Moreover, Mutel explains that technical equipment needs to be adjusted to the temperature and outdoor conditions and the implementation can be challenging.

After I had carried out my first experiments with projection mapping and light art on snow and had first results, I conducted a second interview with the artist Tone Emblemsvåg who has experience as a scenographer, set designer, illustrator, graphic designer, exhibition designer and visual artist. In detail Emblemsvåg provided me technical information about her own artworks in which she used the techniques projection mapping and light art. Some technical information are, for example, that putting animations on black background can make the mapping process easier and projecting from inside through a window can help when it is extremely cold outside. Emblemsvåg also did projection mapping on snow surfaces which made the interview very valuable. Moreover, she shared her

personal motivations, thoughts and feelings about her artworks with me. I gained from the interview that the combination of projection mapping and light art can create a magical atmosphere and Emblemsvåg sees many possibilities with the technique video projection on snow. For example, she described how images could be projected onto melting snow and how movement can be added to a static snow sculpture. Furthermore, I got the impression that the combination of visuals and sound can be very valuable and can trigger emotions. Another interesting point was how much Emblemsvåg achieved through collaborations with other artists and the participation in light art festivals. In addition, she described art in public space and how it can bring new audience. Very valuable for my research was also how she described her way of creating art – she sees, same as the artist Mutel, experimentation as an important part of the process.

4.2 Software inquiry

There is a variety of programs available for making projection mapping. For example, the program After Effects from Adobe has a video output on which a projector can be connected. After Effects is a useful program to create animations and video content as well. I had After Effects already installed and gained good experience with it. For better projection mapping features I looked at some of the most common projection mapping software: MadMapper and TouchDesigner. After further inquiry I found the software Isadora from the company Troikatronix which has easy to use projection mapping tools and in addition impressive live performance and interaction features. I found out that Isadora is a good program for making video projections and that it is often used for live visual and sound performances for the stage and theaters. I tested the software Isadora and I learned quickly how to make projection mapping with it. In the end the features for live interactions and live performances in Isadora made interesting video projections possible which I didn't initially have in mind.

4.3 Experiments with projection mapping and ambient sounds

On December 2nd, 2020, my first experiment with projection mapping on snow surfaces started in front of my apartment building. My apartment is located on the ground floor and has access to a terrace. This made it a suitable location to get familiar with projecting mapping on snow surfaces

because I was able to project through the terrace door. The projector (Acer H6522BD, 3500 Lumen, 1080 px) and the laptop (MacBook Pro) was positioned inside in the indoor environment. So at this point I had the chance to completely focus on the projection mapping and did not have to be worried that the technical equipment could get too cold or wet. In fact, moisture could have been a problem that day. It was about 0 degree that evening but over the day the temperature was above freezing and the snow was wet. So, putting the projector outside seemed to be an unnecessary risk on that day. On the other hand, the wet and therefore sticky snow was perfect for making snow sculptures. I had the idea to form snowballs in different sizes and integrate them into a tree in front of my building. It was easy to form smooth snowballs with my hands and to integrate them into a tree in front of my building.

With the software Isadora I created a live sound interaction which consisted of circular shapes that were connected to a Sound Level Watcher which made it possible that the projected image reacted live to all sounds that went through the internal microphone of the laptop. The next step was the mapping process which took a while and required patience. I mapped the shapes as precisely as I could onto the snowballs that I placed in the tree. After the mapping, the live sound reaction of the shapes were visible on the snowballs and showed how the shapes became bigger or smaller according to the sounds that the microphone input captured.

Before, during and after every conducted practice I wrote down notes of what I observed and what insights I gained from the practice. Other important steps were the video and photography documentation of the experiment. Documentation through video seemed most valuable because the movement of the projected shapes and the sound interaction were captured. Later I decided to focus on the technique video as documentation tool but also as tool for creating environmentally engaged video artworks. One insight that I gained from the first experiment was that I could think about the chosen time. I chose a moment when the street lamps were turned on which created a yellowish atmosphere that mixed up with the color of the projected shapes. Furthermore, the light of the street lamps created shadows that disturbed the projection. I considered that next time I should choose a moment when the streetlamps are turned off or even better I could choose a different location with less light pollution.

Figure 3. First experiment: Live sound interaction and projection mapping on snow. Kurpat (2020).



Note. Still from video: <https://www.youtube.com/watch?v=keEaDdWcbY4>

Another insight from the experiment was that it is helpful to observe and test the snow conditions beforehand because when there are colder temperatures it might be not that easy to form sculptures with natural snow and water might need to be added to shape snowballs. Moreover, I gained insights regarding the live sound interaction. Initially I wanted to let the graphics react to my voice but when I opened the door it looked fascinating how the projected shapes reacted to the sound of the cars. I also noticed that the shapes react to the snow sound that I created while walking through the snow. I had the consideration that it could be interesting to let the video projections react to nature sounds, like wind, water, fire or animals. More considerations that I had were that live sound interactions can be an interesting experience for a possible audience and that through an interaction with the environment a site-specific artwork can be created.

Finally, I had insights regarding the improvement of the technique. Putting the projector in a box for heating and protection against snow could make it possible to be more flexible in the choice of a suitable place. Moreover, regarding the production of videos, the use of an external microphone for

the camera could make better sound quality possible. For the next experiments I decided to use a good external microphone to capture the sounds of the environment well. I realized that the medium video works surprisingly good and audio-visual media such as video can help to capture what happens in the projection mapping installation and in the surrounding environment. For the next practical experiment I decided to focus on video productions which capture projection mapping and light art on snow sculptures in a way in which the viewer can also get a notion of the surrounding environment.

4.4 Experiments with videos of fire and embers

During my research process I regularly went through planning and testing phases. In these phases I wrote down ideas, made sketches, created animations and video content and tested software and equipment. I also built a projector box for heating and protection against snow. In the following I will describe the process of planning and testing equipment for the projection mapping experiments that I produced in Nuorgam.

First of all, I want to explain why I chose the location Nuorgam. Key factors played a role in the choice of the location: No light pollution to capture the color of the sky without disturbing street lamps, silence, access to power and wind packed snow. I thought that I will find all of the listed aspects in Nuorgam. The access to power was achieved by renting a cottage which had electricity and a suitable environment with trees close to the cottage. Nuorgam is a small village in the municipality Utsjoki and is the northernmost point of Finland and it is close to tundra area which means that vegetation is limited so that there are no huge trees but some small arctic birch trees and small willow shrubs. I found out that the location is popular for watching northern lights because of the clear sky and almost no light pollution. Although the cottage was near a street, it turned out that the atmosphere was much quieter than in the city of Rovaniemi. The only thing that I could not find in Nuorgam was wind packed snow. I was hoping for wind packed snow because it is perfect for making snow sculptures outdoors. For example, it is possible to use a saw or carving tools to cut out pieces of snow out of the ground. The snow that I found in Nuorgam was extremely powdery and therefore it was challenging to make sculptures out of it. However, I found a way to form sculptures by adding water to it – I will explain this method in detail later.

Before I was able to make projection mapping outdoors, I had to get a projector box. Because I wanted to investigate the construction of a projector box I made a prototype out of wood. This prototype worked sufficiently for my needs so that I decided to use it for the projection mappings in Nuorgam.

Figure 4. Set-up of technical equipment with projector box, in Nuorgam. Kurpat (2021).



Before the practical experiments in Nuorgam I made sketches and a plan of the shapes of the snow sculptures. I got inspired by the round shape of the earth and I wanted to continue with the idea of integrating snowballs into trees. I liked the aesthetic of the round shapes and the fact that snowballs are easy to make. The whole process of making snow sculptures, environmental art and also projection mapping and video documentation seemed huge to me, so that I wanted to keep the sculptures more simple. I also had the plan to use wind packed snow and cut out circular shapes out of the ground. At this point I did not have prepared video content for projection mapping and I wanted to project simple colorful shapes with a sound interaction onto the snow, as I did in the previous described experiment. This idea got influenced by the chosen location and I created video content of burning wood, embers and fire when I had spent a couple of days in the cottage. I used this video content for the experiments that I will describe next.

I carried out experiments with projection mapping on snow in Nuorgam on January 14th–16th, 2021. The influence of the environment, the snow conditions and also the temperature played an important role. Also my personal and emotional experience influenced the results. The chosen cottage from which I used electricity was located close to the Tenojoki which is a famous river for salmon fishing. The river connects Norway and Finland and at its shore arctic birch trees and willow shrubs are growing. The snow in this area was very powdery and challenging to make sculptures out of. I tried to form snowballs out of the powdery snow, which seemed impossible, so that I experimented with a mixture of snow and water. Adding water to the snow helps to make it more sticky and easy to form with the hands. With this method it was possible to form snowballs and to glue the snow onto branches. Experiments with snow and water were made outside and inside the cottage. I formed some snowballs outside and glued them directly onto the branches of the chosen tree. On that day it was about -20° celsius and it was possible to use water like glue because it freezes immediately. It is also important to be careful because water should not get on the skin of the hands when it is that cold. I was well prepared and I wore waterproof gloves. In addition, I took some snow inside the warm cottage and let it melt a bit. With this snow I formed perfectly shaped snowballs which I then took outside again and balanced them on branches of a tree.

When the snowballs with the mixture of snow and water froze again they had a bit of an icy surface which was significant for the special appearance of the later accomplished video projection on snow. The exploration of snow conditions, trees and the whole environment in detail was essential part of the place-research. During this process new ideas came to my mind influenced by the experience of doing environmental art with snow.

Figure 5. Experimenting with powdery snow and water. Kurpat (2021).



Note. Still from video: <https://www.youtube.com/watch?v=BGgEOHOOByo>

Furthermore, the fact that I was living in a cottage with a wood heated oven influenced the results of the projection mapping on snow. For instance, I got inspired by fire. Watching burning wood and embers while warming up my fingers after forming snowballs inspired me to record fire and use it as content for the video projection. I recorded the fire inside the stove of the cottage. I used these video and audio recording of burning wood and embers for the projection mapping on snow. My plan was to project the videos of glowing embers and burning wood onto the snow surface and I also wanted to include a sound interaction of the fire sounds.

In Nuorgam I carried out two projection mapping installations which I documented in detail with video and photography. In the end two artistic videos were accomplished that I shared online: *Glow* (Figure 6) and *Embers* (Figure 10). For the first video *Glow* (Figure 6) I used the previously described snowballs in the tree and the prepared video content with close ups of moving images of fire and embers. For this video I used only the moving images but not the sounds of fire. The sounds that I used in this video were the surrounding ambient sounds of the environment. In the end I made a

comparison of ambient sounds of an urban and a remote environment by editing sequences of the first experiment with the live sound reaction that I made close to my apartment and sequences of the video *Glow* together to one video (Figure 23).

Figure 6. *Glow*. Kurpat (2021).



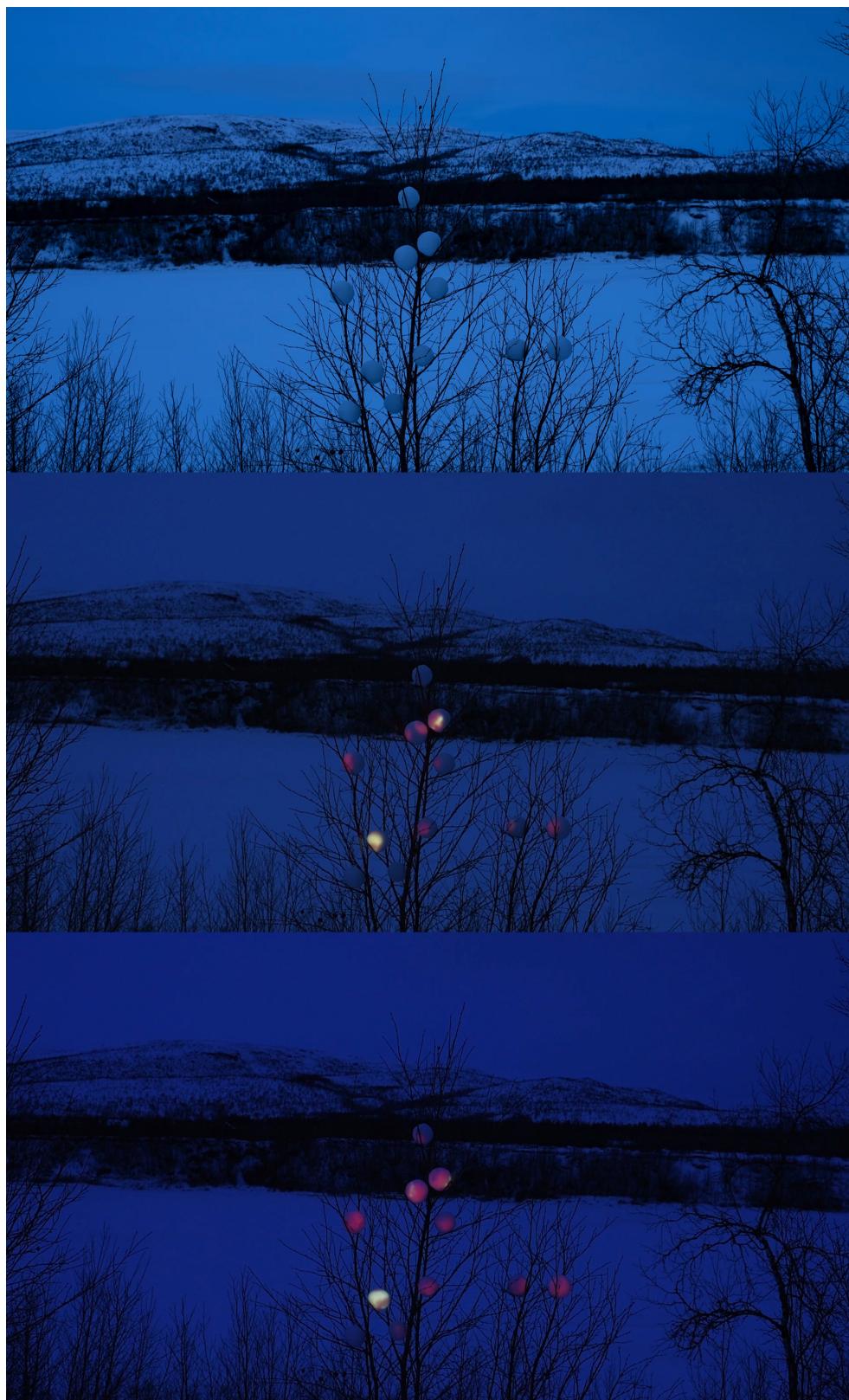
Note. Still from video: https://www.youtube.com/watch?v=JUfddyGZ0_U

In the following I will explain the process of projection mapping outside in front of the cottage for the first video artwork *Glow* (Figure 6; Figure 7). The projector was placed in a box for heating and protection against snow (Figure 4). As I mentioned before the projector box was homemade and a first prototype because I wanted to explore the possibility of building my own projector box. The projector heated the box well and I had to add some ventilation for further projects. The whole process of mapping was quite challenging because the laptop should not get too cold and sometimes the screen was not working as smooth as usual because of the cold. Putting the laptop on top of the box helped me to keep the laptop warm enough and then I managed to do the mapping in the cold. As soon as I was ready with the mapping I put the projected video on an endless loop so that it was running continuously. Then, I filmed the installation from different perspectives. For the shooting I

used my DSLR camera (NIKON D750) and different lenses. The process of taking videos and pictures was challenging due to the cold climate. But, all in all, the whole technical equipment was possible to use in the cold and did not get any damage. Important factors were carefulness and precaution.

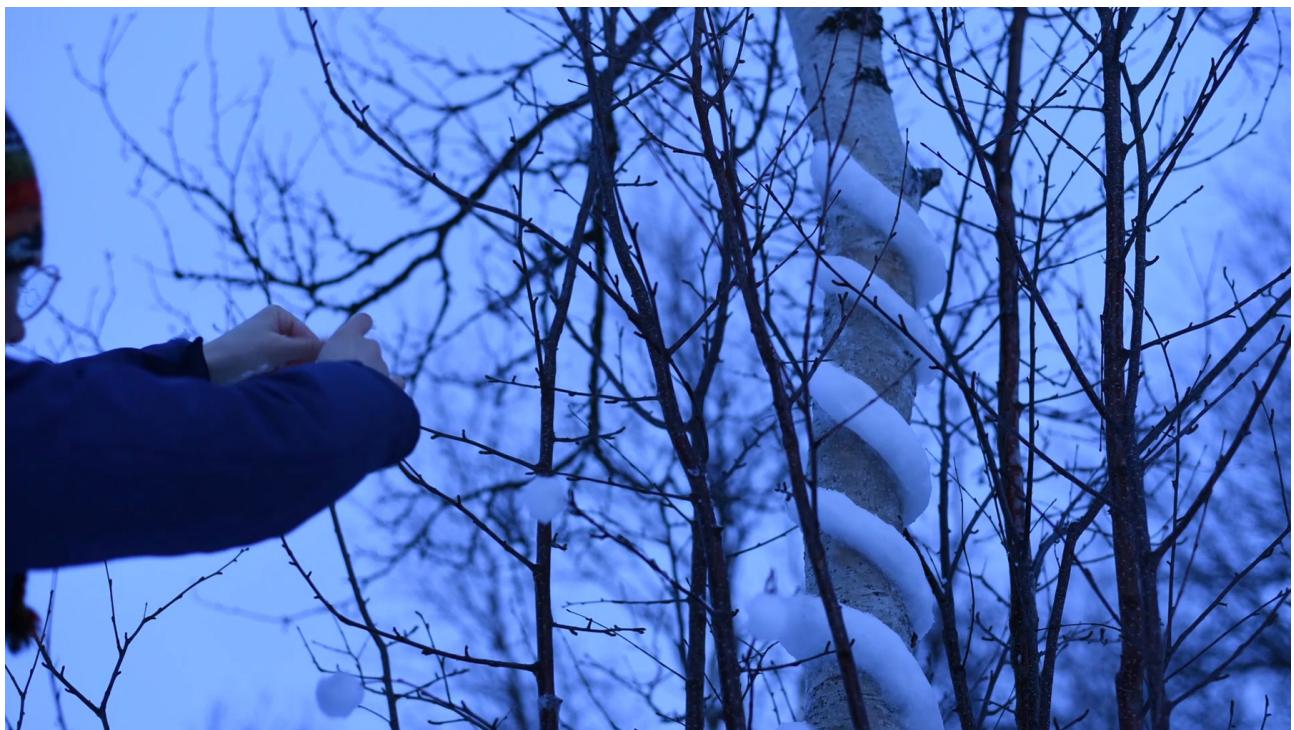
The outcome of this experiment shows how beautifully the color of the video projection can blend with the color of the sky, which was at that time in a magical blue twilight (Figure 7). When I was sure that my equipment works well in the cold and I went through a whole projection mapping process and video recording of the installation, I decided to make a second experiment. For the second experiment I decided to spend a bit more time outside to experience the environment even more. On that day the temperature rose and it was about -8° celsius when I created snow sculptures. Outside I experimented more with the mixture of snow and water to figure out more possibilities. Inspired by the environment and the whole experience outside I started glueing snow onto a tree. This time I created a spiral shaped snow sculpture that I arranged on a trunk of a tree. This sculpture emerged out of intuition rather than planning. While trying out how it is possible to glue the snow with water onto trees I came up with the spiral shape. After that, I got into a flow of creativity and I started to form very small snowballs that I then glued with the warmth of my bare hands onto flexible branches. With the warmth of my hands I melted the snow a bit so that it became more sticky. Patiently I got these small snowballs attached to the branches (Figure 8). Because I attached these snowballs on the tip of the branches something interesting happened – the snowballs on the branches moved up and down when the wind came. A wonderful movement was created in collaboration with the wind and gravity. The nature elements wind and gravity became participants of the artwork. This was the first time that I realized how I was interacting with nature and creating artworks not only in the nature or inspired by nature but also in collaboration with nature. The interaction with nature and the influence of nature became an important part of the research.

Figure 7. *Making-of Projection mapping on snowballs. Kurpat (2021).*



Note. Stills from video: <https://www.youtube.com/watch?v=aM0dI3p5G14>

Figure 8. Making-of snow spiral on tree and small snowballs. Kurpat (2021).

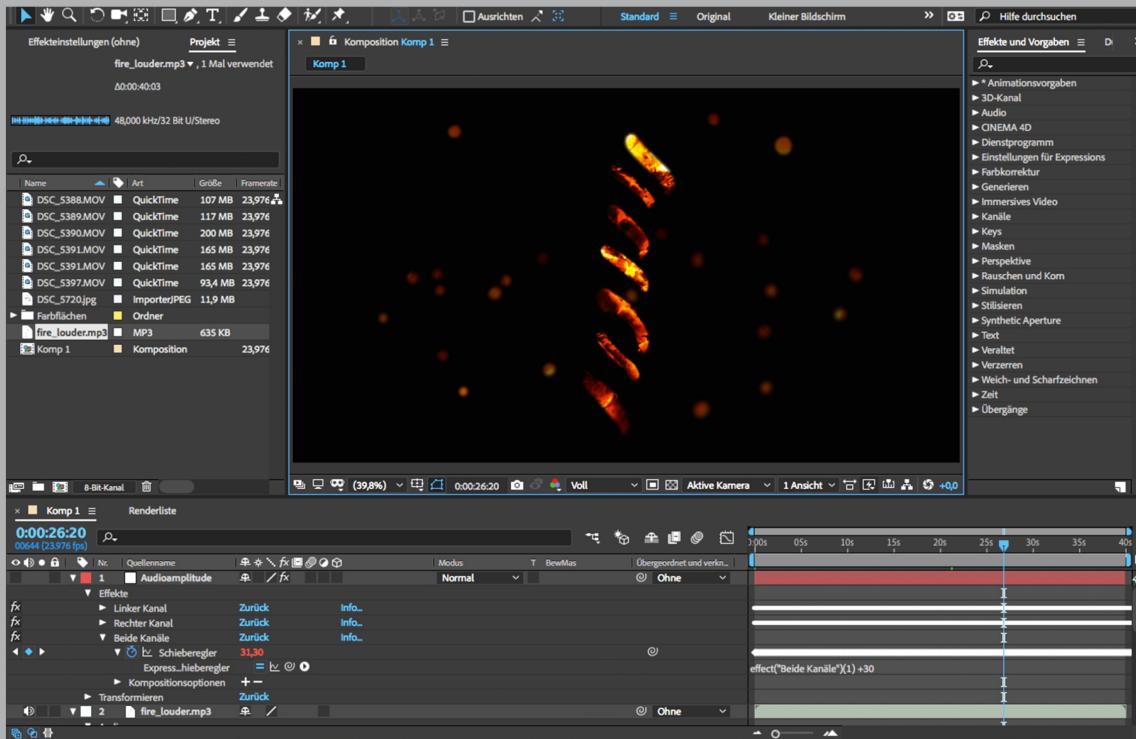


Note. Still from video: <https://www.youtube.com/watch?v=7dYM20PnIRs>

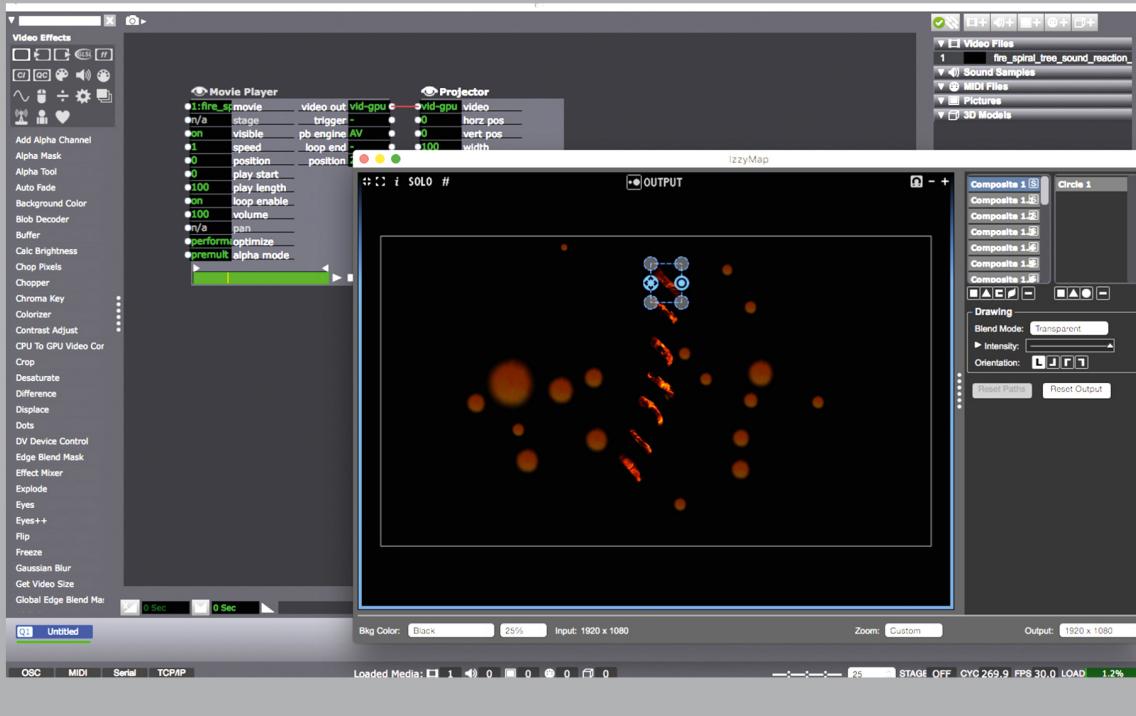
When the snow and environmental artwork was ready, the next step was to prepare a video composition for the projection mapping. I decided to use videos of fire and glowing embers again, but this time I used also the sounds of fire. In addition to prepared circular shaped video content on black background I prepared shapes that would fit onto the spiral shaped objects. This time I used the audio reaction features of After Effects instead of the live sound interactions of Isadora. I wanted to use After Effects this time because it has impressive sound reaction features and moreover I was interested in exploring different programs. In After Effects I put the whole video composition onto black background and I was also able to create a soft mask around circular shaped video content (Figure 9). This helped me a lot during the mapping process because black content is almost invisible when it is projected and soft masks created a smooth transition between the projected image and the snow surface. After exporting the whole composition to a movie file, I used this file in Isadora for mapping (Figure 9).

Figure 9. Screenshots: Sound reaction in After Effects and mapping in Isadora. Kurpat (2021).

After Effects:



Isadora (IzzyMap):



This time the process of mapping took much more time than in the previous experiment because I created quite a lot of small snowballs and during the mapping process I realized that the mapping on many small objects takes a while. Finally, every snow element was illuminated and I started filming the installation. At that point the sky was already very dark and I missed the twilight situation so that in the videos I noticed that the tree is barely visible. I realized that I have to make more videos early in the next morning because I also wanted to have video documentations in which the whole tree is visible.

While I was filming the installation that night something happened that I did not plan – the snow melted in the evening because it was getting warm rapidly (about +3° Celsius) and overnight water drops on the small snowballs froze again which created an aesthetic that I could not have created without the influence of nature (Figure 26). Early in the morning I made more video recordings of the installation and the snowballs which had very tiny icicles on it. The light atmosphere on that morning was blue and it was slowly getting brighter and brighter. In the next step I created a short film out of the recorded videos. Later I named this short film *Embers* (Figure 10) and published it online. I had the idea that the video could animate the viewer to think about consequences of climate change such as melting snow and ice in arctic regions but also about the increasing forest fires during the summer because I projected videos of glowing embers and burning wood onto the snow surface and let it interact with fire sounds.

Most important data that I gathered while doing the described projection mapping experiments in Nuorgam are following: First, in both video artworks *Glow* (Figure 6) and *Embers* (Figure 10) the beautiful blue twilight situation of the polar night is captured. I found out that fire and ember textures look very interesting on snow surfaces and they are mixing up nicely with the surrounding blue light of the environment. In an innovative and site-specific way the snow was illuminated.

Figure 10. *Embers*. Kurpat (2021).



Note. Still from video: <https://www.youtube.com/watch?v=owzT29FKZCw&t=22s>

Another important observation is that the temperature in Nuorgam varied from -20 to +3 which influenced the artwork. Changing temperature, changing snow conditions but also the influence of wind and gravity influenced the outcome of the video significant so that it can be said that nature became co-creator of the artwork. The collaboration with nature can offer unique results. In addition, the detailed exploration of snow conditions was an important part of the process. Moreover, the intuitive flow of creativity outside in nature can influence the artwork. In some cases improvisation can be more beneficial than prepared plans because the experience of the environment, the snow, the changing temperature and weather will play a role and are might not be known beforehand. Last but not least I got the insight that melting snow, water drops and fire appear to be suitable symbols for the topic climate change in Arctic regions.

4.5 Experiments with LED lights

On January 25th–29th, 2021, I had the chance to do experiments with wind packed snow and light art in Kilpisjärvi. Essential part of my research was to explore different snow conditions so that I was pleased when I found wind packed snow in Kilpisjärvi. My wish was to explore the wind packed snow in detail so that I decided to live in the snow for a few days. I have to mention at this point that I have had experience with camping in the snow since 2013 and I was well prepared for sleeping in a tent in winter. Due to the lack of access to electricity on this research trip I was not able to do projection mapping. In the following I will explain the process of making environmental art and light art combined with wind packed snow in detail. Because I knew beforehand that my chosen location will be off-the-grid, I decided to do some simple light art experiments and improvisations as an alternative technique to projection mapping. This time I did not plan much beforehand because I wanted to get into the flow of creativity influenced by the environment and the snow. However, I collected some simple LED lights that I could find in my apartment for improvisation. LED lights that I took with me for experimentation where flashlights, christmas lights and a camp lantern that is supposed to be for camping to light up the tent and can change colors. All these lights were able to run with batteries.

Figure 11. *Camping in the snow.* Kurpat (2021).



First of all, I will explain some techniques that I used for creating light art. The LED lights were placed inside the snow and behind snow sculptures to illuminate either the whole sculpture or a particular part of it. Other methods that I used were the indirect illumination of snow and long-exposure photography to capture the light more intensely. During the experimentation I also tried out possibilities to include shadows in the artwork. I carried out a wide range of smaller and larger experiments. Especially the artistic experiments with the titles *Interaction with Aurora and Moonlight* (Figure 13) and *Enlichenment* (Figure 15) helped me to collect valuable data but also other artistic practices played a key role in the process, for example, the experiment *Weeping tree* (Figure 16).

Figure 12. *Making art with snow and light – an interaction with aurora borealis.* Kurpat (2021).



Note. Still from video: <https://www.youtube.com/watch?v=9YNSyPprY9Y>

For the experiment *Interaction with Aurora and Moonlight* (Figure 13), I created plate shaped snow sculptures (Figure 12) that I integrated into an arctic birch tree. I used wind packed snow which I cut out of the ground by using a saw. For the illumination of the snow sculptures and the branches of the tree I put a LED lamp into the snow below the tree. To capture the indirect illumination of snow and

branches more intensely I took long-exposure photographs. During the process of taking photographs I was lucky that northern lights started to appear in the sky. The northern lights were dancing for a while and also the full moon was shining bright and created shadows of branches on the snow sculptures. A unique experience was created in collaboration with northern lights and the moon light shadow. To capture this very special moment I put up my camera on a tripod in a way in which the illuminated snow sculptures were visible but also the sky with dancing northern lights and the moon light shadow on the plate shaped snow sculptures. Then I started a time-lapse video which ran for several minutes. When the time-lapse video was ready I noticed a movement in the video that I did not plan. Because the tripod was placed in the snow and the time-lapse recording took several minutes the snow influenced the video result. Even though I tried to put the tripod in the snow as stable as possible the material snow let the tripod with the weight of the camera move slowly deeper into the snow. A smooth camera movement upwards was created by the snow. Again nature became my collaborator in creating art.

Figure 13. *Interaction with Aurora and Moonlight*. Kurpat (2021).



Note. Still from video: <https://www.youtube.com/watch?v=dsEcv06B9fE>

While making snow sculptures for the artistic experiment with the title *Enlichenment* (Figure 15) I explored the snow conditions in detail and tried out different carving methods. In the previous described experiment I used a saw to cut out snow sculptures from the ground which worked well. For the next experiment I took a deeper look at the snow that was attached to rocks. In Kilpisjärvi huge boulders are lying between the birch trees and shrubs and some of these huge rocks are larger than the trees. I explored the snow on the rocks in detail and noticed that it is also wind packed as the snow on the ground but slightly softer. With my hands I started to form reliefs into the snow on the rock and occasionally I used a saw or a scraper for making details. After a while it became more and more three dimensional. I sculpted trumpet shaped snow sculptures inspired by arctic trumpet lichen. When I removed the snow from the rock during the sculpting process some real arctic lichen became visible on the rock surface.

One day before making the snow sculptures I observed a reindeer digging in the snow and searching for food (Figure 14) and in addition I recognized different snow surfaces, some were packed from the wind and some were very soft and easy to get through. I also recognized ice surfaces and very deep snow. I observed the reindeer smelling on the surface of the snow and digging through it to get food (Figure 14). Afterwards it became more and more clear that this practical phase and the experience of the environment led me to a topic that is connected to the place and time. I started not only to think about different snow conditions and climate change but also about what consequences it has for local vegetation, animals and traditional lifestyles in the north.

For the illumination I used simple LED lights such as christmas lights, flashlights and a camp lantern that can change colors. I put the lights in the openings of the snow sculptures that were shaped like trumpet lichens so that the sculptures were illuminated from inside (Figure 15). The trumpet shape made it possible to hide the lights nicely. Because of the changing colors of the camp lantern the different light colors were mixing constantly in an interesting way. That night the moon was shining bright again which I included in the video and photo documentation (Figure 15). Observing and capturing the surrounding environment and its interaction with the created light art installation became an important part of the research process.

Figure 14. A reindeer searching for food. Kurpat (2021).



The aesthetic of LED-lights behind or inside snow has similarities with some of my projection mapping on snow surfaces experiments *Embers* (Figure 10) and *Glow* (Figure 6), but it is limited in creating emotions. The creation of emotions depends on the color, the shape of the snow sculpture and the surrounding environment. It does not have moving images or sound visualizations like in my video projection experiments. However, I tried to add movement by letting the color of the LED light change and I also did experiments where I played with shadow to add more movement. Using a light source, for example a simple LED light such as a flashlight, makes it possible to play with shadows. Using shadows to tell stories is a very old technique – probably one of the earliest methods of making projection art (Gaddy, 2018, pp. 50–51).

Figure 15. *Making-of Trumpet Lichen Snow Sculptures and Enlichenment*. Kurpat (2021).



Note. Stills from video: <https://www.youtube.com/watch?v=YottiUJrhgI&t=110s>

Another experiment that I made in Kilpisjärvi was the experiment *Weeping tree* (Figure 16). In fact I did not manage to set up lights for this example because of changing weather conditions but it is still a snow sculpturing and environmental art experiment that influenced the further process. Again I used wind packed snow from the ground and made drop-shaped snow sculptures that I put into the branches of an arctic birch tree. The process of balancing the sculptures on branches required patience and time. When I was ready with the environmental artwork I took pictures during a beautiful twilight situation. I wanted to implement LED lights to this artwork but when I was ready for the implementation the weather had changed. It became windy and it started to snow. When the snow storm was over the sculptures had fallen down and still it was too windy to put them onto the branches again. Even though I did not manage an illumination, the pictures that I took in the twilight situation are valuable data because they show the special twilight situation during the winter season in Lapland and the drop-shaped snow sculptures, inspired by the experiment *Embers* (Figure 10) in which water drops appeared due to warmer temperature, seems to be an effective symbol for the topic climate change and changing snow conditions in Arctic regions. In addition, I liked the aesthetic of the integration of drops in the tree so that I planned to do this composition again in another experiment.

Figure 16. *Weeping tree*. Kurpat (2021).



Data that I collected from the described practical experiments are, first of all, that spending time outside in the snow extensively had huge influence on the results. Without spending so much time in the snow I probably would not have had the described experience. The results were influenced by, for example, aurora borealis, moonlight, shadow and windy weather. A detailed observation of the environment were necessary to gain an engagement and an interaction between me and nature. In the end I had the feeling that I became part of the environment, I had snow all around me, slept on the snow and I even melted snow to get drinking water and to prepare food. I used my winter camping experience and combined it with creating art outdoors. The fact that I was very close to the material snow and the natural environment made results possible that not only illuminate the beauty of nature but also show the beauty of natural light situations and phenomena.

While experimenting with LED lights I realized how different colors create different moods. For example, warm light colors such as yellow or orange lights created warm feelings that reminded me of summer and created an interesting contrast to the cold environment. Intensive red colors were very visible in the dark environment and reminded me of alarm signals. Cold colors highlighted the cold environment but created less contrast. In the experiment *Enlichenment* (Figure 15) I observed how different light colors can mix up with each other. Especially the mix of the colors of the shadows fascinated me which happened on a natural snow formation above the snow sculptures so that not only the snow sculptures that I made were illuminated but also the natural snow formation that was created by the wind (Figure 15).

The documented videos and photographs highlight the unique arctic nature and the possibilities of snow sculpting with wind packed snow. Using simple LED lights instead of a projector offered insights into a technique that everyone can try out without the need of a projector or projection mapping skills. Regarding the consequences of climate change in Arctic regions I decided to focus on: *Changing snow conditions and ecological consequences that are connected to changing snow layers in Subarctic areas such as Lapland.*

4.6 Experiments with snow, water and reindeer sounds

As I mentioned before when I did experiments in Kilpisjärvi I met a lonely reindeer in the landscape digging for lichens and shrubs. The reindeer might have lost its herd because I knew that during the winter reindeer are more in the forest where it is easier to get lichens because of softer snow. For the next experiments I decided to continue the research with an exploration of reindeer, lichen and changing snow conditions and I used the previous gained insights for another video projection installation in which I interacted with sounds of snow, water drops and reindeer. I visited a reindeer farm close to Rovaniemi where I recorded reindeer sniffing and eating lichen. In addition, I recorded surrounding sounds of walking reindeer or clashing reindeer antlers. I used the recorded sounds to create a sound visualization with the program After Effects and I combined it with an animation of a moving water texture which I also created in After Effects. I mapped the water texture onto drop-shaped snow sculptures. Because I liked the aesthetic of the *Weeping Tree* (Figure 16) created in Kilpisjärvi, which I could not manage to illuminate, I decided to create similar drop-shaped snow sculptures which I again balanced in branches of a tree, but this time the location of the tree was in Rovaniemi.

On March 14th, 2021, I carried out the projection mapping experiment in Rovaniemi. I chose Rovaniemi because I wanted to do experiments in a forest location in which reindeer are likely to spend the winter. Also I wanted to integrate the lights of the city and the light pollution above the city to create a contrast to the previous experiments in which I had clear sky and more silence. However, I did not want to do the experiment in the city center of Rovaniemi but more in the surrounding natural environment of Rovaniemi. I found a suitable location in nature from which the lights of the city were still visible. When I explored the snow I realized that it was too powdery to form sculptures with my hands. Then, I found a track of a snowmobile – it was not an official track, someone just drove with its snowmobile randomly through the forest. The compressed snow of the snowmobile track seemed suitable and I decided to get sculptures out of the track. Even though I had tools with me such as a saw which would have been possible to use, I decided that I want to try another method. Inspired by the fact that reindeer are digging in the snow to get lichens I also was digging with my hands in the snow to get out snow sculptures. I explored the consistency of the snow in detail. Some parts of the snow were well packed and suitable for sculptures but some parts were powdery. With my hands I created drop-shaped snow sculptures of the compressed snow. The sizes

and shapes of the sculptures got influenced by the different layers of snow in the snowmobile track and the pressure that I used for forming the sculpture. These drop-shaped sculptures became more organic and did not have as sharp edges like they would have gotten if I would have used a saw. For me it was an interesting artistic practice with a very primitive method, digging in the snow and shaping the snow with my hands, in combination with the very technical process of doing projection mapping. When I formed enough sculptures I balanced them in a tree like in previous experiments (Figure 22). I documented this process through video documentation and then continued with the projection mapping process. This time I had a portable battery (ECOFLOW RIVER Max, a lithium-ion battery with integrated 220V inverter) for the projector and the laptop. The temperature was about -2° celsius which made the mapping easy because the laptop screen was working smoothly and my fingers did not get very cold. Interesting insight of this projection mapping experiment was that I was not only interacting with the natural environment but also with the urban environment. In the background of the recorded videos lights of the city are visible and the whole sky had a red color this evening. Because it was cloudy the lights of the city were reflected in the clouds. The reddish sky reminded me of images of forest fires and I found it interesting that even though I did not plan to have a connection to forest fires again it happened because of the light pollution of the city and the cloudy sky that caused a red color (Figure 17).

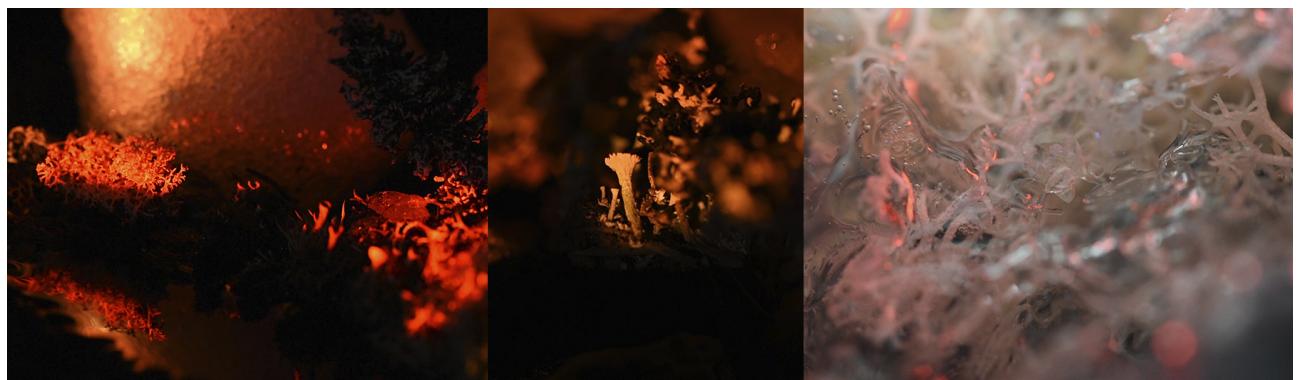
During the whole experiment I hoped to capture melting snow and water drops on the snow sculptures again as it happened in the experiment *Embers* (Figure 10). Even though, I watched the weather forecast, which was promising, a melting process did not take place. When working with snow outdoors the influence of an unpredictable nature or weather change can always happen and sometimes the artwork cannot be implemented as planned so that artists benefit from improvisation and an open minded attitude. To continue the exploration of projecting videos onto melting snow, I did some melting snow experiments indoors. Thereby, I used a macro perspective and projected moving images onto melting snow, water and lichen (Figure 18).

Figure 17. *Changing Winter – Experiment with reindeer and snow sounds.* Kurpat (2021).



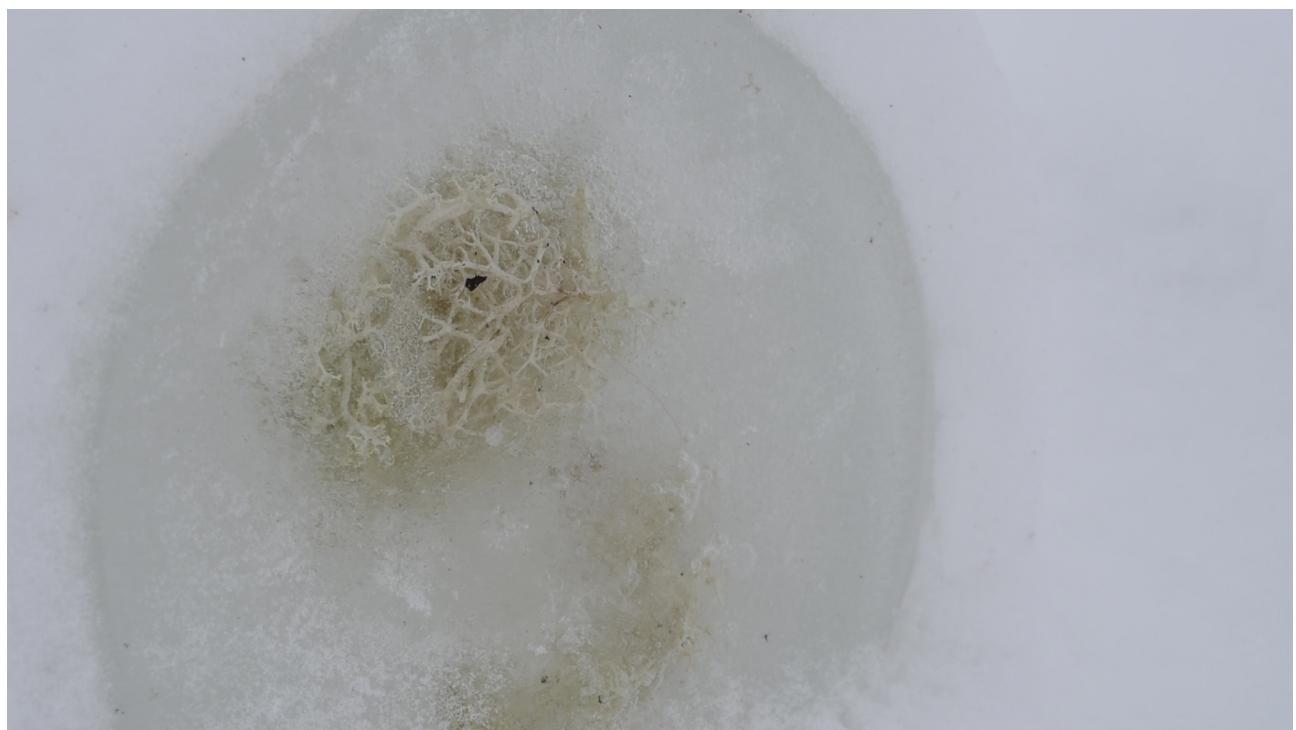
Note. Stills from video: <https://www.youtube.com/watch?v=nq53UO3A8i4&t=27s>

Figure 18. *Video projection onto melting snow, water and lichen – a macro perspective.* Kurpat (2021).



In another experiment that I did to explore changing snow conditions and its consequences, I combined drop-shaped snow sculptures with ice elements that had frozen reindeer lichen inside (Figure 19). My plan was to illuminate the ice elements and the lichen inside the snow sculptures, however, again changing weather conditions and extreme cold wind made it difficult to carry out light art or projection mapping. In the end I focused on capturing the snow sculptures that were challenged by the wind (Figure 24). The interaction with strong wind gave me new insights and will be elaborated further in the discussion chapter, so that even though the implementation of technology was difficult to achieve, the collaboration with wind is captured and can be used for artistic expression.

Figure 19. *Frozen reindeer lichen inside an ice piece.* Kurpat (2021).



Looking in detail at lichen shapes led me to further theoretical investigation and I started to read fascinating facts about lichen. For instance, lichens are symbiotic lifeforms that consist of two organisms – a fungus and an alga, and they are not only important as food for reindeer and other animals. Scientists see great importance in lichens, for instance, lichens are an indicator for clean air and moreover it seems that lichens help with carbon dioxide and nitrogen sinks (Ahmadjian, 1995, p. 124). According to Elbert et al. (2012) and the Max Planck Institute for Chemistry organisms such as

algae, mosses, and lichens (cryptogamic covers) take up a great amount of atmospheric carbon dioxide and nitrogen (Max Planck Society, 2012, p. 1; Elbert et al., 2012, p. 1). Furthermore, cryptogamic lifeforms such as lichens seem to play an important role in ecosystems by providing nitrogen as fertilization for the ground in nutrient poor ecosystems. (Max Planck Society, 2012, p. 3; Elbert et al., 2012, p. 3).

4.7 Experiments with natural light sources

In addition to experiments with artificial lights where some sort of power source is always needed, I got interested in using just sunlight. I carried out an experiment in which the sunlight shined through thin layers of snow (Figure 20). The use of sunlight led to an intensive exploration of carving wind packed snow. In a piece of wind packed snow I carved lines that almost got through the snow and I left only a very thin layer of snow which made it possible that sunlight can shine through. The use of sunlight caused further thoughts about the use of energy for an artwork. In fact, doing experiments with artificial light made it mandatory to get power either from a house that has electricity or from a battery. I started thinking about where the energy that I use for creating light art comes from, but also the energy that I use in my daily life. As an artist that has a passion for media art, projection mapping and also digital art I have to think about my own carbon footprint, where the electricity comes from and if it is sustainable.

Figure 20. Experiments with sunlight and LED light on snow sculpture. Kurpat (2021).



Note. Still from video: <https://www.youtube.com/watch?v=kdNPLp-ShLU>

4.8 Sharing on social media and submitting to festivals/competitions

To gain feedback I published some of the results of projection mapping and light art on snow on different social media channels and on my website. Most feedback that I got was focused on the technique and people were interested in how I made the light art installations and sculptures out of snow. Moreover, I got feedback that was mainly expressed through the use of emojis and the comment that it looks beautiful, awesome, impressive or magical. The word that was used the most was the word beautiful. Emojis that were used were smilies with hearts or stars as eyes, hearts in combination with snowflakes, hearts in red and blue and stars. Emojis can help to express emotions virtually and are increasingly common on social media and in text messages (Shoeb & de Melo, 2020).

Many interactions between people are online nowadays and it is possible to gain a diverse audience through social media. In times of COVID-19 even more interactions take place online. That is why I wanted to share results on different social media channels. However, the feedback that I gained so far is limited and further afford is necessary to get more qualitative feedback that then could be analyzed. In any case, I appreciated the given comments which were very positive and motivated me to share more of my art and also the process of making the artistic experiments.

Film festivals and photo competitions can be good opportunities to gain an audience besides social media. I submitted the video *Embers* (Figure 10) to some international film festivals and a selection of photographs to the UArctic Photo Competition: Arctic Polarities 2022. So far, the video *Embers* (Figure 10) has been selected by two festivals, once as a finalist (High Tatras Film & Video Festival) and once as a semi-finalist (Luleå International Film Festival).

4.9 Relevant research data for effective outcome

The description of the process demonstrates that I did several artistic experiments which I documented with video and photography to find possible answers to the research question: *How can the use of snow sculpture, projection mapping and light art help to create environmentally engaged videos that illuminate the consequences of climate change in Arctic regions?* Some of the videos are rather short, some are longer and could be categorized as short films and others are documentation videos and short time lapse videos that show how I made the artworks and installations. Even though, it is not yet possible to give information about what impact my created videos have on the audience, the practice-led research, several artistic experiments, interviews with artists and literature of previous research gave me valuable insights and important key factors that seemed to be significant for the creation of effective environmentally engaged videos.

All data that I collected from the creative practice were classified (Figure 21). In the middle of Figure 21 an overlapping of important factors is shown. This overlapping visualizes the creation of emotions and empathy with nature in which different components play a role. During the analysis process I grouped insights to similar topics and in the end I defined five components which I will discuss in the following discussion chapter.

As visualized in Figure 21 the following research data could help to create an effective environmentally engaged video in which projection mapping and light art techniques on snow surfaces are implemented and the aim is to create emotions and empathy with nature:

- 1.) Integration of snow sculptures into the environment
- 2.) Interaction with nature sounds and ambient sounds of environment
- 3.) Collaborating with nature while making snow sculptures, installations and filming of installations
- 4.) Creating a non-human-centered perspective
- 5.) Experimentation with different lights, e.g. video projection, LED lights, natural lights

Figure 21. Visualization of classification process of collected data. Kurpat (2021).



Note. In the middle of the figure an overlapping of colors symbolizes the blending of relevant research data that has the potential to create emotions and empathy with nature.

5. DISCUSSION ABOUT RESEARCH DATA

5.1 Integration of snow sculptures into the environment

As theories of environmental art practices (Goldsworthy, 1990; Jokela, 2007; Grande, 2011) and interviews with artists told me there is value in doing site-specific installations. Moreover, I gained that the exploration of the material snow and ice in context to the chosen environment can be beneficial. During my creative process I did site-specific art and embraced the experimentation with different types of natural snow but also with projection mapping technology and light art. Because I chose to make snow sculptures that are implemented into the environment as a form of environmental art I also perceived the whole winter environment in detail during the long process of experimenting with snow, making art out of snow and balancing small snow sculptures on branches or rocks. I recognized that the more remote the environment was, the more I paid attention to the surrounding nature and sounds of nature. The experience that I gained during the creative practice and the physical and sensory engagement and experimentation with snow and the environment led me to a contemplation about the chosen techniques and about benefits of the use of light but also sound for creating artworks and videos that intend to enhance environmental engagement.

Figure 22. *Balancing snow on branches and making projection mapping with Isadora.* Kurpat (2021).



Note. Stills from video: <https://www.youtube.com/watch?v=rBU4awro1vo>

My artistic experience but also the experience of winter in Lapland was an important factor. Jokela (2007) explains that environmental artists are experiencing nature in a multi-sensory and subjective way when doing art in nature and with natural materials and furthermore he describes his own experience of creating winter art and how he perceived winter sounds or felt the cold wind on his skin. I feel related to the described sensory experience and it seems that the natural environment itself with its elements and sounds but also time and place are relevant when looking at my research question. So it can be said that the implementation of the snow sculptures into the environment indeed played a key role in my research and during experimentation with snow and light I recognized that I started to observe nature in detail and listen to sounds of the surrounding environment carefully.

The artistic and personal multi-sensory experience that I gained during the creative process had a significant effect on the outcome of the created videos and especially the integration of the snow sculptures into the environment and the making of projection mapping and light art outdoors to illuminate the snow sculptures but also the surrounding environment itself influenced the videos. As an example, the outcome of the videos would have been totally different if I would have made snow sculptures out of a perfectly shaped snow cube that would have been placed on a market square. The integration of the snow sculptures onto trees and rocks and also in more remote environments made it possible to capture pure nature and helped me to illuminate the beauty and importance of snow and how it is changing. The medium video made it possible to capture the illumination of snow sculptures and the interaction with the environment most effectively because video captures movement and audio, preserving more of the actual experience for the viewer. Moreover, documentation videos are reflecting my own experience that I made while making art with snow, the environment and light and therefore documentation videos have the potential to bring artistic experiences closer to people and might inspire others to make art in a natural environment, with natural materials and light by themselves.

5.2 Interaction with nature sounds and ambient sounds of environment

Making art in a natural environment during the winter created a unique artistic experience in which I felt deeply connected with nature with all my senses. Likewise Kojo (2004) illustrates the experience of winter in a multi-sensory way and describes the experience of winter sounds as natural

quietness (p. 71). During my process I noticed this natural quietness, but I also realized that it is never completely quiet because there will be always some sort of sounds to discover, even though it is only the sound of the wind, dropping snow or cracking ice. I had the feeling that the exploration of nature sounds and its interaction with light art can be significant to enhance nature connectedness and to add emotions to the videos. While Kojo (2004) focuses on the natural beauty of winter light and snow structures Knuutila (2014) explores media expression on snow and ice and the use of technology such as video projectors but also sensors to create an interaction with technology and winter environment. In my experiments I did not use sensors but the features of the used software made sound interactions with the environment possible and it helped me to express myself artistically through video projections that react to ambient sounds and nature sounds.

The interaction with technology and ambient sounds of the environment can play an important role when creating environmentally engaged artworks. This is very visible in the study of Coles and Pasquier (2015) where artists implemented technology such as projectors or sound equipment into natural settings. Coles and Pasquier (2015) describe how video projections were accompanied by ambient sounds and nature sounds such as the sounds of waves from the ocean or the sounds of animals who were living close to the installation. During my creative practice I did experiments with ambient sounds from two different environments, an urban environment of the city Rovaniemi and a rural environment of the village Nuorgam (Figure 23). In the created video of Figure 23 the ambient sounds are documented in a unique way by using projection mapping on snowballs integrated into trees and the projected light is moving to the present ambient sounds. It can be argued that through the use of technology the viewer gets animated to listen to the sounds of the environment in a more conscious way because the projected light is highlighting the sounds by reacting to its sound waves. In this sense with the help of a sound visualization of the sounds of the chosen place, the sounds of nature are directly in the spotlight. In other words the voice and songs of nature would become more visible through the interaction with nature and ambient sounds and technology is used to help the earth to get heard and possibly animates the audience to listen and observe carefully what the environment is telling us.

Figure 23. Sound visualization of ambient sounds of two different environments projected on snow-balls. Kurpat (2021).



Note. Stills from video: <https://www.youtube.com/watch?v=dWLtCHx9d3Q>

All in all, it can be argued that sounds of nature and ambient sounds of the environment can add value to an environmentally engaged video because emotions can be created that have their origin in the perception of nature sounds. I listened carefully to the sounds of the environment in which the installation was created and through the created videos I was able to share what I heard. As Coles and Pasquier (2015) argue in their study, sounds of nature and ambient sounds of the environment could have the potential to bring nature closer to people. In my research I also see great potential in the use of nature and ambient sounds for projection mapping installations and the creation of environmentally engaged videos because nature sounds can not only show what is going on in the environment, moreover the sounds of nature can create awareness and feelings by putting the focus to certain sounds of the environment and highlighting them through sound visualizations and sound wave reactions.

The perception of soundscapes in videos is analyzed in the study by Granly Foss and Øidvin Burgess (2020). They argue that certain sounds can create feelings of risk, for example the use of pitches outside human vocal range can create alienation which contributes to a feeling of risk and can symbolize the invisible threat of climate change and its complexity that is difficult to manage (Granly Foss & Øidvin Burgess, 2020, p. 19). Creating emotions based on risk and danger emphasize the tremendous consequences of climate change and are useful if the aim is to point out how critical the ongoing

ing situation is. Even though the focus on risk and danger can show how urgent the situation of climate change is, it can also happen that extreme emotions of fear are leading to eco-anxiety. Therefore, I see a need for sensitivity especially when creating videos that might also be watched by children – even though it is an emergency after all. Having sensitivity and empathy with the earth in mind, created videos could have the potential to create feelings of grief but also hope by supporting nature connectedness rather than creating anxiety and in the best case might also create feelings of love for the natural world. Sounds of nature that I used during my practice and for video works are, for instance ambient sounds, the sound of wind, but also sounds of burning wood, dropping water, snow and reindeer sounds to express consequences of climate change.

During my practice I developed the wish to enhance empathy with nature through the created videos so that I tried to create emotions with the help of moving images and sounds. Even though more analysis is necessary to categorize which emotions I created in my videos I suggest that the feelings of grief but also love and hope can be valuable emotions that artists can attempt to achieve when they aim to enhance empathy with nature. To bring nature closer to people I see great potential in the use of nature sounds and it can be a valuable approach to interact with sounds of the environment for artistic expression and for the creation of environmentally engaged videos that communicate climate change because consequences of climate change can not only be communicated through pictures but also through sounds and sounds have the power to create feelings (Granly Foss & Øidvin Burgess, 2020).

Moreover, studies indicate that nature sounds can help people to recover from stress and can be beneficial for health (Alvarsson et al., 2010). As I mentioned before when creating videos with the complex and terrifying topic climate change I see a necessity not only to create feelings of fear – when the aim is to activate people, a strong mind and positive energy can have more effect than creating something that might lead to eco-anxiety and feelings of powerlessness. Having the research about positive effects of nature sounds in mind, it seems to be an important factor to include sounds of nature when creating environmentally engaged videos that illuminate consequences of climate change. The illumination is than supported by sounds of nature that can create feelings, for instance, feelings of hope but also feelings of fascination for nature and moreover there is the potential to have a positive effect on peoples emotional state because the videos might create less anxiety but instead maybe empathy with the earth or at least interest in the natural world, so that the audience

might got the wish to safe the beautiful and important natural world that is in the spotlight of the video. Because nature sounds could have positive effects on mental health it could be also considered to create empowering videos that strengthen peoples mind and body through the inclusion of sounds of nature that reduce stress. Alvarsson et al. (2010) state that the effect of nature sounds on stress recovery most likely be more effective in areas with less traffic noises (p. 1044). During my process I went to remote areas with less traffic noises and also less light pollution to experience and capture pure nature and I indeed found sounds of nature such as the sound of snow under my shoes while walking which I defined as pleasant and relaxing. However, when I experienced nature sounds in a remote area during the winter, I not only perceived sounds that have the power to reduce stress, for example, I also heard loud wind noises. I connected the sound of strong wind to the feeling of the icy wind on my skin, cold fingers when trying to set up the camera and technical equipment and the memory that I had to hide in a shelter for a while until the snowstorm was over. So, of course there are not only pleasant and relaxing sounds found in nature because nature is not only a relaxing place it can be extremely harsh as well. During the creative practice I realized how wind could be used to create dramatic feelings and the amount of drama depends on how strong the wind is.

Figure 24. *Snow sculptures challenged by the wind.* Kurpat (2021).



Another recording that I made was the recording of the sound of snow and dropping water. Alvarsson et al. (2010) uses nature sounds that are a combination of sounds of fountains and birds which are usually perceived as pleasant nature sounds. Available nature sound collections on Spotify and YouTube that are categorized as relaxing and empowering also often include sounds of fountains, water, streams or the sound of raindrops to create pleasant feelings. So, water sounds often are perceived by people as pleasant sounds – however, when I experienced rain during the winter and how the snow became wet because of rain, the sound of rain created unpleasant feelings in me that were connected to danger because rain makes everything melt faster and the frozen lakes and rivers might become unsafe. Moreover, being in a remote area and getting your clothes and shoes wet can be dangerous. So, even sounds of nature that are usually defined as pleasant can be perceived as unpleasant in a different context so that video creators can use nature sounds to create a wide range of feelings and it depends on the creator of the video what kind of feelings he attempts to express and how the sound is used in combination with the moving image. Emotions created by nature sounds can be ambivalent, depending on the context and on the person's personal experiences – even though, some sounds have the tendency to create certain feelings there are also personal experiences and the context of the video that will influence the perception. The ambivalence can be further explained by the example of the nature element fire: Fire sounds, same as images of fire, can create feelings of warmth and safety (e.g. campfire) but fire can also create feelings of danger (e.g. forest fires) and it depends on the context which feelings are triggered.

5.3 Collaborating with nature while making snow sculptures, installations and filming of installations

Artists can collaborate with nature and use materials and sounds of nature and the environment for artistic expression but in a sensitive way and by including the influence of nature in the process of creation. Light itself does not leave any visible traces on snow or the natural environment so that light art can be seen as a sensitive solution. Creating artworks outdoors with fragile and constantly changing materials such as snow has not only an effect on the created artwork but also on the experience that an artist gained doing creative practice. Grande (2011) illustrates how artists engage with local nature and how this engagement leads to an artistic and sensory experience. Experiencing local nature and observing it in detail during the slow process of making artworks was essential part of my

creative practice. In general, it can be said that the process of doing environmental art is rather slow and also light art and especially projection mapping is a slow process and the artist needs to be patient, look at the light and how it effects the illuminated object in detail to get a good result and automatically the artist will spend a longer time at a place and observe nature and light in detail to gain a certain outcome. For instance, I explored the material snow in detail but also other natural materials of the chosen location because I integrated the snow sculptures into trees and on rocks which was sometimes quite challenging. Moreover, I used natural snow from the environment which had different conditions and was sometimes wind-packed and easy to use and sometimes powdery and very challenging to use. Thereby, I got also interested in lichens, that are underneath the snow surface or attached to trees or rocks.

A key insight that I gained through creative practice was the collaboration with nature and how snow and the whole artwork change over time due to events in the environment such as changing temperature, wind and gravity. It can be valuable for artists to collaborate with nature, while doing artworks with snow but also during the creation of video works. The graphic in Figure 25 shows one example based on my study how a development of shapes for snow sculptures in collaboration with nature emerged. Inspiration and especially the influence of nature are important factors. In the example I shaped snowballs and experimented with different types of snow and variations in size and amount of the snowballs. Making the snowballs very small made the influence of nature most visible. In this example the influence of nature was increasing temperature that lead to melting snow and dropping water followed by decreasing temperature resulting that the water drops on the snow sculptures become ice and tiny icicles were created on the bottom of the snowballs (Figure 26). Melting snow and ice on snow surfaces are effective visualizations of changing snow conditions because they show what is really happening.

Figure 25. Example 1: Development of shapes for snow sculptures in collaboration with nature. Kurpat (2021).

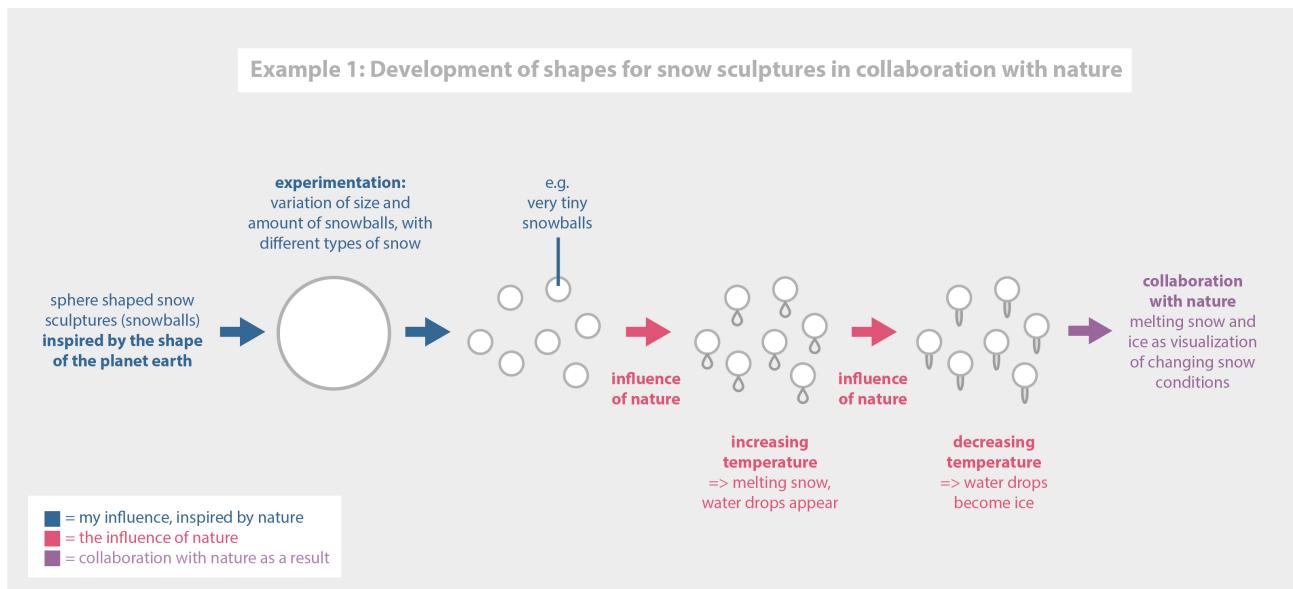
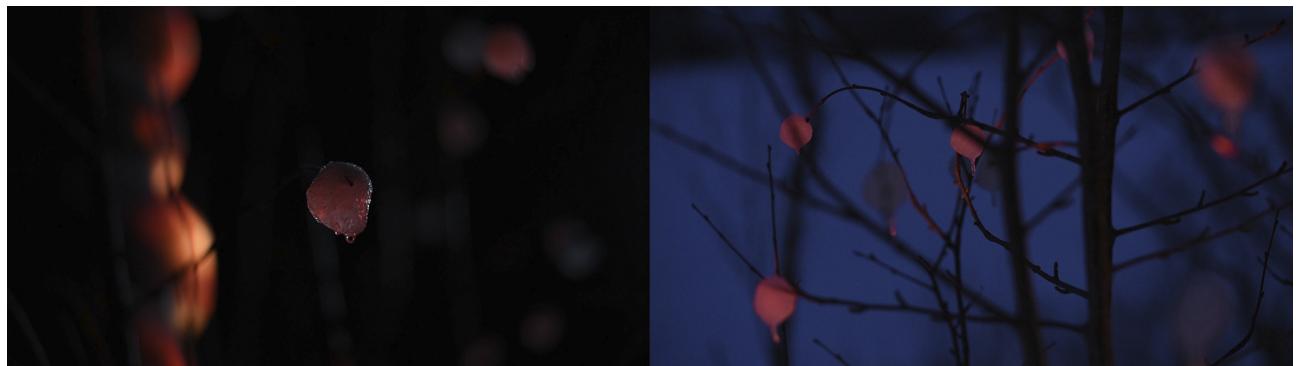


Figure 26. Stills from the video Embers. Kurpat (2021).



Note. Stills from video: <https://www.youtube.com/watch?v=owzT29FKZCw&t=22s>

In the created artwork *Embers* (Figure 10; Figure 26) I captured the collaboration with nature through video. Later I decided that the video *Embers* (Figure 10; Figure 26) has the potential to be categorized as experimental short film which I describe as following:

Through artistic expression the short film aims to animate the viewer to think about consequences of climate change such as changing snow conditions and increasing forest fires in Arctic regions. To illuminate this urgent issue I projected videos of glowing embers and burning wood onto snow surfaces and included a sound interaction with fire sounds. While I was shooting sequences of the short film something happened that I did not plan – the snow melted in the evening because it was getting warm rapidly, about +3° Celsius, and overnight water drops on the small snowballs froze again which created a special aesthetic. So it can be said that the film is made in collaboration with nature.

Nature as collaborator in creating environmental artworks are well present in many artworks of Andy Goldsworthy (Goldsworthy, 1990). Goldsworthy also uses snow and ice in his works and includes the process of melting or freezing that happens over time. Based on my study melting snow, water drops and fire appear to be suitable symbols for the topic climate change in Arctic regions. Changing matter or nature elements that change over time can be used by artists to express or communicate climate change effectively. Capturing changes that are happening over time can be more effective than showing still images. For example, Goldsworthy (1990) explains how changing weather and time can create more tension. Goldsworthy (1990) gives the example of a balanced rock that can get much more tension when the wind and the weather challenges it – then it starts to wiggle and might fall apart (Goldsworthy, 1990). I experienced this described tension during my creative practice and I see great value in the use of tension created by nature for environmentally engaged videos. When working on the topic climate change this described creation of tension can be used for expression and what I found out during my experiments is that projecting light on melting snow and ice illuminates changing snow conditions in an effective way because it shows what is happening – rising temperatures, increasing rain, melting snow and resulting ice layers. The issue that in Lapland ice crusts are appearing on top of the snow surfaces due to increasing rain can be visualized by capturing how the aggregate state of H₂O is changing from snow to water and then to ice when it is getting cold again. Moreover, the act of balancing snow sculptures on branches and rocks can symbolize the balance or unbalance of the ecosystem.

While collaborating with nature Goldsworthy (2000) argues that timing is critical and it can be challenging to capture the right moment because there can be not enough time to capture it and the perfect moment can be missed. I noticed this feeling of the right moment while doing experiments, sometimes the timing turned out to be perfect like in the video *Embers* (Figure 10) and sometimes the aim was more difficult to achieve due to unpredictable changes in the weather or too windy and extreme cold weather. Anyway, although the results did not always turn out as planned, the influence of nature created other interesting results and therefore it can be argued that artists, who are working outside in a natural environment and in collaboration with nature, need to be open minded and should not hold on too tight on their initial plans because the collaboration with nature can be unpredictable but at the same time it can reveal surprising and magical results that the artist never thought of and might make the topic climate change more tangible because moving and changing nature elements are included in the artistic process and creation of videos. As well as nature sounds can create feelings also images of nature can create feelings and it can be an innovative approach to create images of nature in a collaborative way by including the influence, for example, of changing temperature, wind or gravity. Furthermore, there is evidence in previous research that nature itself but also images and videos of nature can have a positive effects on humans health and recovery (Ulrich, 1984; Laumann et al. 2003). This phenomenon is especially studied in the context of health but it can be also valuable when creating environmentally engaged videos that attempt to create emotions and aim to help to connect humans with nature.

Hartig et al. (2001) explain that positive experiences in natural environments and positive motivations through, for example, fascination and restoration can help to enhance ecological behavior (p. 603). Having this in mind, through a collaboration with nature also an experience of nature can be captured through the medium video and fascination can be created through the illumination of the beauty and importance of nature to create positive emotions. Furthermore, Hartig et al. (2001) are giving the example of a link between emotional attachment and protective behavior which is visible in the behavior of people who want to protect their homes (p. 602). When people feel connected to the natural environment and see the nature and the whole planet earth as their home, that they love and therefore are emotionally attached to it, the chance can be higher that they want to protect and save the earth. So, if the environmentally engaged videos capture nature, create fascination and interest for nature through the chosen technology and in collaboration with nature they might help to build up an emotional attachment between human and nature.

5.4 Creating a non-human-centered perspective

In my experiments I illuminated snow with different light art techniques to highlight changing snow conditions in Lapland and my aim was to make these changes more tangible by showing the beauty and importance of snow but also the surrounding environment and other nature materials and elements. As I mentioned before during my practice-led research the feeling arose that the focus on empathy with nature and the creation of emotions could be important factors when creating environmentally engaged videos that illuminate consequences of climate change in Arctic regions. The importance of empathy with nature is described by Craps (2020) who discusses the term ecological grief by illustrating how, for example poems, articles, books or funeral events for melting glaciers can help to communicate a grief. The process of melting can also be described as dying and water drops can symbolize tears.

The graphic in Figure 27 shows a second example based on my study how a development of shapes for snow sculptures in collaboration with nature emerged. I did several experiments in which I used different types of snow and made variations of drop-shaped snow sculptures. It was essential that an influence of nature occurred because of variations in the density of natural snow – sometimes I had wind packed snow and sometimes the snow was more powdery. In addition, I did some experiments in which I combined snow with ice elements and lichens (Figure 19; Figure 24) and in other experiments I carved reliefs into the snow sculpture which caused very thin layers and light was possible to shine through the snow sculpture (Figure 20). In Figure 28 all variations of different drop-shaped snow sculptures that I did during creative experiments are juxtaposed. It seems that drop-shaped snow sculptures can be seen as symbols for changing snow but also crying nature and therefore have the potential to create feelings of grief for snow and the ecosystem.

Figure 27. Example 2: Development of shapes for snow sculptures in collaboration with nature. Kurpat (2021).

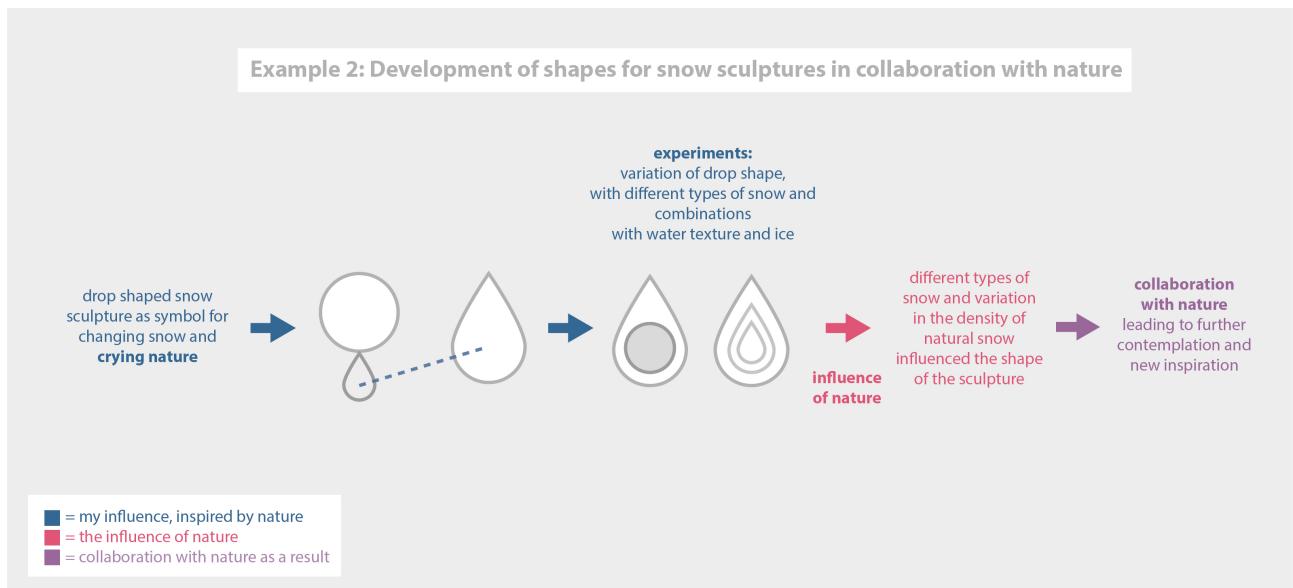


Figure 28. Drop-shaped snow sculpture as symbol for tears and grief – different variations. Kurpat (2021).



Grande (2011) argues that artists that are exploring environments for a longer period of time will get in contact with non-human beings of the ecosystem (p. 38). Because I chose different locations for projection mapping and light art on snow in which I spent different periods of time I feel related to this statement. First, in the urban environment of Rovaniemi I projected through the terrace door of my apartment and the video result was influenced by the urban environment, traffic sounds and light pollution of the city. Even though, I did spend time outside to make snow sculptures that I integrated into trees, I did the projection mapping from inside. When I went to more remote places and more natural environments, I automatically spent more time outside because of the beautiful landscape and I started to explore different types of snow and experienced nature with all my senses in a way that would not have been possible in an urban environment. In the more remote areas I also did the projection mapping and light art experiments outside to capture the beauty of the natural environment, even though the implementation of the technical equipment was more challenging than in the urban environment. In addition, I also did experiments in the surrounding natural environment of the city Rovaniemi which already has less traffic noises but still the light pollution of the city which is visible in the created video *Changing winter* (Figure 17). In this example an interweaving of natural and urban environment can be observed. I recognized that in natural environments I tend to stay longer outdoors because of the beauty of nature and because of the will to explore nature in detail and therefore I experienced nature with all my senses during the creation of artworks.

Experiments with snow but also with lichens and reindeer sounds, also from a macro perspective (Figure 18), made me realize that I get connected to nature, specifically to snow, trees, rocks and lichens underneath the snow and I started to observe the environment in detail during the process of environmental art but also light art. Feeling this connection to nature and observing nature and the chosen environment in detail can generate new perspectives that can be used for environmentally engaged videos. So, I would argue getting in contact with nature and the ecosystem can be beneficial when expressing climate change. Because I focused on changing snow conditions, an exploration of different snow types and changing snow was helpful for the research. An approach of encouraging a dialogue between human and the living ecosystem is recognizable in the field of eco-art (Grande, 2011, p. 23). This can be also an interesting approach for environmentally engaged videos, which could be also defined as digital eco-art, and the illumination of non-human beings of the ecosystem but also the relationship or interaction between non-human beings and humans can be an innovative solution to express climate change. Demos (2016) explains that it is necessary to change from an

anthropogenic worldview to a view that puts also animals, non-human lifeforms, organisms and environmental elements into the center because otherwise a sustainable world seems impossible. According to Demos (2016) putting only the human in the center causes climate change, environmental degradation and pollution so that also artists and filmmakers can help to create a more nature-centered view by highlighting also non-human lifeforms, organisms and non-living elements of nature instead of just putting humans in the focus of the video.

5.5 Experimentation with different lights, e.g. video projection, LED lights, natural lights

The Experimentation with different lights and different video content for projection mapping helped me to discover possible solutions to express the topic climate change and how light can be used to create certain moods. Through artistic expression I tried to get closer to the topic: *Changing snow conditions and ecological consequences that are connected to changing snow layers in Subarctic areas such as Lapland*. Sometimes the fascination of nature and experimentation with different techniques steered me in a slightly different direction which was more focused on the beauty of nature and natural phenomena without having a clear connection to climate change. However, I think this was a valuable artistic experience in any case and I think artists can benefit from the detailed observation of nature as well as the experimentation with different lights. Most valuable insights that I gained are that the interaction with artificial lights and natural light sources can not only create fascination but includes nature into the process of creation. Moreover, I recognized during the experimentation with different lights that the color of the light, its saturation and brightness but also the color of the surrounding environment will have an influence on the mood of the installation and therefore also on the mood of the video work. Wilms and Oberfeld (2018) studied the effect of colors on emotions and included not only the hue but a combination of hue, saturation and brightness. The results of their study show, for example, that the statement “Red causes higher arousal than blue” can be incorrect when changing the saturation or brightness of the colors, so that a highly saturated and bright blue can cause a higher amount of arousal than a lowly saturated and dim red and furthermore they argue that when designers want to communicate a certain issue with a certain mood, it can be valuable for them to consider the interaction between hue, saturation and brightness (Wilms & Oberfeld, 2018, p. 910).

When implementing lights outdoors, either through video projection or LED lights, artists can consider the possible emotional effect or association that might result from the implemented light by taking into account hue, saturation and brightness of the light and moreover, I suggest that it is important to bear in mind the light color of the surrounding environment to get the desired result. For example, during creative practice I observed how the color of the video projection mixed up with the light color of the sky. This insight can be used to create different atmospheres. As an example, a completely dark environment can cause different feelings compared to a blue or purple environment resulting from a twilight situation. As I observed during creative practice, the light of the sky will influence the projected light. Thus, when projecting an intensive color when it is very dark outside the saturation of this color will be very high, but when the environment is getting brighter due to the sunrise the projected color will become less saturated and will mix-up with the light color of the environment (Figure 29). Besides, when projecting in the urban environment I noticed how the light mixed up with the color of the lights of the street lamps which needs to be taken into account when doing light art in an urban environment (Figure 3).

Figure 29. *Light situation of the environment influences the mood of the video.* Kurpat (2021).



Granly Foss and Øidvin Burgess (2020), who studied color temperature and soundscapes, also argue that the saturation of a color can have an effect on the mood. They explain that an extreme warm color such as a high saturated red expresses danger. However, if the warm color is not that intensive it can be more connected to safety than danger. I think this change of saturation of a color can be used to create feelings of ambivalence. As an example, I projected videos of glowing embers onto snow and when the environment was very dark the glowing embers were very intensive and red so that it might be perceived as dangerous. As a comparison I projected the same videos of embers onto

snow when the environment had a blue light and the color of the video projection mixed up with the blue so that the colors of the embers turned out to be a bit more purplish and softer so that the whole mood changed and could be defined as more mysterious or magical. However, further research is necessary to analysis the mood of the videos that I created. Nevertheless, there are clear indicators in current research that color and sound can have an effect on peoples emotions and therefore should be considered when creating environmentally engaged videos.

All in all, to create a certain mood artists need to consider the effect of the color, the saturation and the brightness of the light but also the color of the environment. Moreover, not only colors but also different forms of light, for instance, video projection, LED lights or natural lights such as sunlight can create different emotions (Figure 30). In general, art can be seen as something that provides emotion, sensory experience, perceptual or imaginal knowledge (Leavy, 2017, p. 14) and therefore art can support science in communicating climate change in an emotional way. Moreover, Barone and Eisner (2012) argue that art can be seen as a source of human understanding of the world and this is a different kind of understanding than science provides and art should not replace or contradict science but complement (p. 171).

Figure 30. *LED vs. Sunlight– Different light forms will create different emotions.* Kurpat (2021).



In the interview with Tone Emblemstvåg I had the chance to gain knowledge and insights from the point of view of an artist who had professional work experience in the field of projection mapping on snow. The description of her own work with projection mapping on snow offered new perspectives to me. Emblemstvåg sees many possibilities with video projection on snow, for example, project-

ing onto melting snow and adding movement to a static object. However, she also describes how other snow sculptors were more skeptical about the use of projection mapping technology and preferred more simple lighting for their snow sculpture. With her own projects Emblemsvåg demonstrates how video projection but also light art implemented in an environment can create a magical atmosphere. For Emblemsvåg and also the artist Eric Mutel, experimentation is an important part of the process so that in my practice-led research I also embraced experimentation with snow and technology and how the technology can be implemented in an extremely cold climate. While experimenting with technology outdoors an energy source is always needed so that I did first experiments with projection mapping close to a house and a cottage to get electricity from there. Later I used a battery to experience video projections in a more remote area without the sounds of the city or street in the background. A contemplation about the use of energy began during the practice-led research because of following reasons: When experimenting with projection mapping and light art there will be always some sort of energy source needed and the use of different energy sources made me think of my own carbon footprint as an artist and also the use of videos of fire and embers made me think of fire as the first human made form of usable energy which can symbolize either safety but also danger. Furthermore, the battery that I used would have been possible to use with solar energy but the sunlight in Lapland is limited during the winter. However, in April the sunlight can be used to charge the battery and when the sunlight is more present it is also possible to experiment only with sunlight as alternative light art form.

Considering the own carbon footprint when using technology to create an environmentally engaged artwork seems reasonable. As Demos (2016) argues huge exhibitions like the dOCUMENTA (13) in Kassel can be criticized regarding its own carbon footprint and exploitation of fossil fuel-based resources (p. 256) so that artists could create alternative exhibition models, art workshops and activities that are taking into account the own carbon footprint. It is crucial to stop overconsumption and environmental degradation and a sustainable and social development is needed (Demos, 2016). According to Demos (2016) we are in the middle of an environmental and social crisis that is linked to capitalism and exploitation of nature, nonhuman life but also human life so that the outcome of the study could be used for activism or for conducting art workshops that deal with environmental issues taking into account the own carbon footprint.

As an example, in the study of Coles and Pasquier (2015), an independent power system is used which was called “The LocoMotoArt independent power system” and provided solar powered batteries as a portable power source (pp. 4–5). This approach could be an inspiration for creating more sustainable power systems for artistic practices in natural environments.

It can be argued that when doing art outside or experiencing art installations outside an experience with all senses and an engagement with nature already takes place and therefore light art technologies and the creation of videos might not be necessarily needed. However, during the dark period of winter some lighting will be necessary to make artworks visible and moreover previous studies demonstrate how technology can be used for artistic expression (Knuutila; 2014) but also to explore the relationship between humans, technology and nature and how technology can help to enhance nature connectedness (Coles & Pasquier, 2015). Technology could help to make people more interested in nature and environmental issues and possibly enhance environmental engagement. In my own creative practice I did different experiments and I experienced both a connection to nature with and without technology because first I made snow sculptures as a form of environmental art, then I combined it with light art and projection mapping and as a comparison I did experiments only with the use of sunlight to have a different experience with light but without technology. Coles and Pasquier (2015) describe that some people see technology and nature as separate from each other and incompatible but Coles and Pasquier (2015) argue that technology seems to be a beneficial tool to enhance the connectedness between nature and human. In their study they implemented technology into a natural environment and created media and sound installations in which participants interacted with the media installation but also automatically with the natural environment and surrounding sounds with all their senses which created positive feelings at the participants and it stimulated senses.

It can be said that the stimulation of senses always take place while interacting with an environment but with the use of technology it might be different and it can make also people interested in environmental issues that are usually less interested in experiencing nature. Moreover, technology can be used to draw attention to a specific topic or element of the environment. For example, I put attention to ambient sounds such as wind but also sounds of fire, snow and reindeer and let them interact with the moving images when I made sound visualizations on snow sculptures. This made the audience focus on the surrounding sounds of the environment and without the sound interaction the audi-

ence might would not listen to the sounds of the environment with such a consciousness. Thus, it can be said that the creator of an installation can influence the perception and sensation of the audience by shifting the focus to a specific happening in the environment by choosing the video content, sound interaction and other features that technology can offer.

Nowadays, many people are well connected to technology, technology is accompanying the daily life of humans and the digital world plays an important role in social interaction. In this sense some people are more familiar with experiencing technology than with experiencing nature with their senses so that the combination of technology and nature can bring nature and environmental issues closer to humans and can make also people interested in engaging with nature that are otherwise less connected to nature. During my creative practice I experienced the combination of technology and nature but I also did experiments in which I used only sunlight to illuminate snow so I would argue that technology indeed can be beneficial but natural lights seems also powerful to create certain moods so that both can be important factors when creating environmentally engaged videos. The use of more simple techniques such as LED-lights that run with batteries can offer more flexibility but is limited in creating movement. In this case interacting with natural light sources such as sunlight, moonlight, aurora borealis (Figure 13) or just the color of the sky seems valuable to capture the beauty of nature and to create feelings of fascination. Moreover, movement can be added by interacting, for example, with shadows, wind, gravity or melting snow. Artists will benefit from experimentation with different light forms which could lead to further contemplation about light in general. Contemplation that arose from my research included the following: Light is energy, the sun is a powerful star and its light makes life on earth possible and fire is the first human made form of usable energy. It might be valuable for artists to contemplate about light, energy and the earth as habitable planet in the solar system when expressing the topic climate change and these thoughts can influence the outcome of the video work.

6. CONCLUSION

If I look at my research question – *How can the use of snow sculpture, projection mapping and light art help to create environmentally engaged videos that illuminate the consequences of climate change in Arctic regions?* I can answer that with the collected data and experiences that I gained during creative practice, especially the integration of snow sculptures into the environment has the potential to create effective environmentally engaged videos but moreover other key factors can be the interaction with nature and ambient sounds, a collaboration with nature during the whole creative process, the creation of a non-human-centered perspective and the experimentation with different lights and projection mapping technologies – artificial lights but also natural lights such as sunlight.

Based on my study the physical and sensory experience of the artist gained through the experimentation with different types of snow in a natural environment is key factor. Balancing snow sculptures on branches and rocks can be used for artistic expression and artists can use the tension of balancing, falling apart or melting to communicate how fragile northern ecosystems are. In addition, the experimentation with different light forms and the environment itself will have an influence on the outcome of the video. Regarding the refined topic *Changing snow conditions and ecological consequences that are connected to changing snow layers in Subarctic areas such as Lapland*, a detailed exploration of different types of snow, the observation of the surrounding environment and the perception of sounds can be beneficial when expressing changing snow conditions. Moreover, the winter environment itself with its elements and sounds but also time and place are relevant factors that can be used to create certain emotions and empathy with nature.

Videos that include the feeling of the winter environment can enhance interest in arctic winter, how beautiful it is but also how it is changing due to climate change. Thereby, I see a great benefit when the illumination of snow is supported by sounds of nature and ambient sounds. Sounds of rain drops, snow, reindeer, fire, wind and ambient of different environments seems to be effective sounds that can be used to create emotions and empathy. When sounds of the environment are consciously perceived, for example with the help of a sound visualization, it has the chance to put the focus on a specific issue. Therefore, sound visualizations of nature and ambient sounds seems to be important factors to enhance empathy with nature and nature connectedness by creating an emotional attach-

ment. Emotions such as feelings of grief, hope, love and fascination for the ecology of the earth appear to be relevant emotions that artists can focus on. Having the positive effects of nature images and sounds in mind it can be possible to create empowering videos rather than creating feelings of anxiety or powerlessness. However, even though there are great possibilities to create positive feelings, nature sounds can not only be perceived as pleasure. Nature itself has many sides so that of course a wide range of feelings can be created with the help of nature sounds – for instance, ambivalent feelings, feelings of tension or drama. In addition, the perception of the sounds is depending on the context and the subjective experiences of individuals.

Because of its empowering aspects, art can lead to social change. This emotional power is also recognizable in images and sounds of nature. Thus, artists can use videos and sounds of nature for artistic expression and in collaboration with nature, whereby nature as an artist can be co-creator of environmentally engaged art and contribute to an effective outcome. My study demonstrates how the collaboration with nature can influence the outcome and how it has the potential to make the environmentally engaged video more effective. When working with natural snow outdoors an influence of nature will always take place. Different densities of the snow but also the conditions of the environment will automatically have an effect on the shape of the snow sculptures but also on the installation and the video outcome. Based on my study changing temperature, weather conditions, wind and gravity can play important roles for fascinating nature collaborations and especially the illumination of melting snow and freezing water can be effective when expressing the topic changing snow conditions in Lapland because it highlights the issue and might create emotions of grief or love for snow. Feelings of grief can be also expressed by using drop-shaped snow sculptures that are symbols for melting snow, tears and crying nature. When people feel emotionally attached to something this creates the will to protect it. The earth is our home and the ecosystem of the earth needs to be in balance – every little piece that changes will contribute to an unbalance and the climate is changing in many ways. Artists can create site-specific art in collaboration with nature that expresses consequences of climate change of the chosen location to show a variety of local-based consequences of climate change in an emotional way.

The Illumination of non-human beings of the ecosystem and relationship or interaction between non-human beings and humans is a possible solution that has the potential to create new perspectives. Based on my study the making of environmental art and light art in more remote areas can

help to get in contact with non-human beings of the ecosystem. Focusing on non human-centered perspectives by observing nature in detail and interact and collaborate with it to create an environmentally engaged video has the potential to bring aspects of the changing ecosystem into the focus that might otherwise been less illuminated. Regarding the topic changing snow conditions in Lapland especially empathy with snow, lichens and reindeer seems to be key factors to create new perspectives.

Furthermore, the color of the light but also different light forms and the color of the surrounding environment can be important components for the creation of emotional effects. Experimentation with different light art techniques is a relevant part because through experimentation it is possible to get closer to the desired mood of the video. It is beneficial to consider the color of the light, the shape of the snow sculpture and the interaction with the surrounding environment to create certain moods. The projected light will mix up with the color of the environment and the mood will be different depending on the light color of the environment which needs to bear in mind when attempting to create emotions. Videos of fire, embers or water textures seems to be suitable content for video projections on snow surfaces that express the topic climate change and changing snow conditions. When working with natural lights, sunlight can create warm feelings. Other natural lights that can be integrated into a video are, for example moonlight, twilight or aurora borealis which can create fascinating feelings. In addition, the interaction with shadows is possible to use for artistic expression. When using a projector access to electricity is needed and technical knowledge and software skills are required. Moreover, challenges with the technical equipment in extreme and cold environments can occur. Light art, made with LED lights or natural lights, can be an alternative technique to projection mapping which can be easier to achieve and also contribute to the creation of emotions. However, there is great value in the use of video projections on snow for communication, interaction and creation of emotions even though it is more challenging to implement, it has lots of possibilities taking into account the features of modern software. For instance, it is possible to let visuals react live, in real time, to sounds of the environment.

During experimentation with projection mapping, light art but also natural light sources, a contemplation about the use of energy and the earth can emerge – everything is from nature, the energy that we use every day and also resources for the production of technology are from nature. Exploitation of natural resources to get energy and overproduction need to stop and also artists can think

about the topic and try their best to reduce their own carbon footprint. However, from a media designers perspective I did not reject the use of technology but I see a need in rethinking energy consumption and how it would be possible to use renewable and more sustainable energy. Regarding my project, the use of solar energy is possible with a portable battery as soon as the sunlight comes out, however, during the dark season solar energy can not be used much which highlights how extreme the conditions in the north are – dark, extreme cold and no sunlight. When it is possible to use sunlight as an energy source and for artistic expression, for example in April, it could be considered more sustainable. More research about the use of renewable energy such as solar and wind energy in northern countries could be valuable to go deeper into this topic but for my study I decided to focus more on the illumination of changing snow conditions and the artistic expression.

Further research can be made regarding the own carbon footprint of the artist and how the developed art form could be used for alternative exhibitions and activism, for example, through social media or on sites. Moreover, it seems to be valuable to study the effects of the created videos and what kind of emotions people feel when they watch the videos. This could help to find out how to express or communicate certain emotions most effectively. A study with different people with multicultural backgrounds could be valuable. Furthermore, the making of the art installations itself with projection mapping, light art and snow can be further studied. An opportunity could be to conduct art workshops with the developed technique to analyze the experiences of participants of the workshop. In this workshop people could learn how to make snow sculptures as a form of environmental art in collaboration with nature and technology. Last but not least, the impact of social media can be analyzed because through social media the illumination of snow can be shared. To add more scientific information to the emotional videos a collaboration with scientists from relevant fields could bring more value, so that in a next research cycle artists and scientists could work hand in hand to communicate climate change issues most effectively by adding an emotional side to the scientific facts.

ACKNOWLEDGEMENTS

Throughout the writing of this Master's Thesis I have received support and inspiration.

First of all, I want to thank the artists Eric Mutel and Tone Emblemväg who's artworks are very inspiring to me and who gave me valuable information from a professional point of view.

I would like to thank my supervisor, Dr. Maria Huhmarniemi, whose expertise in art and art-based research was very valuable and I'm pleased that I got professional support from a great artist and researcher. I would like to thank Pia Eriksson for the helpful feedback on my writing style and my theoretical framework.

I would also like to thank Antti Stöckell and Antti-Jussi Yliharju who taught me a lot about snow and ice sculpting and are inspiring snow sculptors. I'm very happy that I had the chance to learn snow and ice sculpting skills at the University of Lapland and to have such great teachers.

Furthermore, I would like to thank the teachers Tatiana Kravtsov and Professor Glen Coutts who taught me a lot about environmental art and site-specific art made with natural materials. The environmental art lectures and workshops were always very profound and offered me new perspectives.

In addition, I would like to thank my partner Jonas de Buhr who is always the best companion, who joined my research trips into the snow and with whom I was able to share my obsession with snow and light. I would also like to thank my parents for their emotional support and sympathetic ear.

Last but not least, I would like to thank nature for the great collaboration and I'm convinced that we will stay in contact.

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ATTACHMENTS

Sharing of videos and photographs took place on following websites:

- <https://www.youtube.com/channel/UCGauryuPEVkhQycWPw5yrAw>
- <https://johannakurpat.com>
- <https://www.instagram.com/johannakurpat>
- <https://www.instagram.com/illuminationofsnow/>
- Personal facebook page of Johanna Kurpat

Interview with artist Eric Mutel

Your art ranges from sculpture, snow and ice art, light art, photography, installation and combinations of these fields. What is your motivation of working with different media and combinations of different art fields?

It slowly by slowly came by itself. I was working with photography at first, but I was also interested by architecture, lights, performing arts... and after looking at more and more projects in these different fields, I found some interesting connections between them. For example, light has an obvious importance to photography. Lights & Architecture or Lights & Sculpture are very connected as well. So I usually found that different fields had to interact together in some of my project. When it was obvious for a project that different fields had to interact to achieve the project, I therefore worked with them. For example, I did brought ice and dance/ performing arts together because for some specific project dance it was necessary for the ice experiments to go further. At the same time, it is possible that dance inspired the ice work project at first.

Why do you like working with snow and ice? What makes it interesting to you?

Ice came at first into the picture as a wish to work with it as a lighting system as well as it did involve to think about it in an architectural way. At the same time I got more attracted, inspired and interesting by nature, climate and related subject. I got to work with ice in a way by mistake when I

was looking for a solution with some photographic experiments. I was looking for a virtual image, an image without paper support, an image that could vanish through time. I got to work with a photo liquid emulsion and tried to melt it into hot water and freeze it. This brought something different where the image got liquified and I continued to experiment with it to finally arrive to some images printed on liquid emulsion, then transferred and frozen to ice. I continued to use this work for video project where image are disappearing thought time, as well as I used this to create large scale scenography or installation.

Snow came later, after I could practice a bit more with it and after I got to know more different snow and the different structure you can work with. Snow got very interesting for sculpture but also as large scale structure and also combined with ice and lights.

How do you combine light art or projections with snow and ice sculptures? Can you describe a specific artwork in which you chose this combination?

I have often used ice with the frozen photography process and so the photography became a light object as well as sometimes a full large scale installation where lights was involved, so the all things serve as a lighting installation. There's been projects where ice was strictly used as lighting design or/ and an architectural lighting space. Either light went through the ice or the photography and became the lighting design, or it could also be that ice was used as a structure, sculpture or space which would be seen differently depending how you light it up. This was also the case for some snow installation or sculpture, which where always thought and planned to be lighted up in a certain way and therefore create different space and perception.

For example, in 2007, I worked in a stage design for the ice music festival in Geilo in Norway for which I've designed a specific shape stage with ice, frozen image, and lights, which have change over the day because of sunlight during day time.

(<http://eric.mutel1.free.fr/index.php?Set-design-ice-snow/p4>)

In 2010, in Kirkenes, for example, for the Barents Spektakel, I worked on a large scale maze, with snow, ice, lights and candles, where the lights and candle light were used through ice pillar to enhance the structure of the maze and worked together with the poetry of the sound performance of this piece.

(<http://eric.mutel1.free.fr/index.php?Set-design-ice-snow/p1>)

Are there any project examples in which you used projections?

Projections as such, as video projections, no not really for project with ice and snow on site. I did work on project with video projection work in classic gallery space.
I have used lighting projection on ice and snow, or to and in ice and snow structure.

In what kind of artwork do you think projections can be valuable?

Well, in the artwork for which we would find a need for it, where it brings something to it, either process wise, or because there wouldn't be an other way to achieve it. Projection is still a medium as such but it's also a tool, it can help to create the artwork, just be part of it or be its final goal.

What possibilities do you see in the combination of projection mapping and snow or ice sculptures?

I haven't been really doing projection mapping with snow and ice sculpture. The fact that snow is white and ice is often transparent, and the fact that the projection is actually lights, I would see an interest of projection mapping in changing the perception of a space, supporting the structure of a space or structuring the space or object, bringing a space or object to life, creating illusion of movement or space into space. Projection mapping, snow and ice could be all together used as a lighting system for example.

What role does technology play in your artworks? What kind of technologies are you using and how are you using them?

I would seek or use a technology if I need it, if I find that this is necessary to achieve the goal or help me finalize the project. But some project could also be triggered or inspired by a technology, in the way that it is the medium itself that is the starting point, that triggers the research, the experiment or the final goal of the project.

I have worked with photography and video, still image as well to create time-lapse or stop motion video, and computer to process them. Some of this work were then used on video projection as video installation, or on video display. Lighting is an other parts of the technology I used, lighting device and programming software. Other technology are more analogic, like the freezing process for frozen photographs in ice, or frozen clothes process for the performing arts project and video work. But I sometimes had to call for specific freezing device or storage for some works.

What value do you see in creating art installations? How does the presentation as part of art installations influence digital artworks?

Installations might involve more than one media or different art fields, which for me could bring more complex forms and subjects. They allow to use space and involve spectator into the art forms and can be a way to present ideas in a wider perspective.

As I mentioned, sometimes the technology can be the subject and the question that lies behind the artwork.

What benefits do you see in creating art in public space?

Some of my projects had to be done in public space because they were linked to nature or because they had to be part of the nature and outdoor space. Some works were thought and planned as site specific, sometimes because that space was the inspiration for the artwork, or the work was better fitted there, for historical reason or for esthetic reason.

What role does experimentation play in the development of your projects?

It's been essential. I had to confront myself with the matters or ideas and concept. I had to touch the matter, practice by myself, try and search for solution or result. I have to go through the process of trying, of experimenting, to progress and understand, like it is or should be or has been in science.

As an artist who works with snow and ice – do you see challenges in your working process because of climate change? Do you observe changes in the climate and how does it have an impact on your working environment?

I came to work with snow and ice because it supported the concept of some project or help me work in development process for some goal I was looking for.

Not all my work are done in the nature and therefore influenced by climate change, but for some presentation for which it used to be easier to plan with snow and ice when it is for sure cold become more difficult to plan when it is not cold enough. But the fact of climate change can also be a part of the project, not impacting the way we work but using it for the artwork, we could use it to change the artwork. So in a way it will impacted it as it will become a different project.

What are your sources of inspiration? Where do you get inspiration?

From many different ways. It could be from nature, from places I have seen or visited, from things I have seen, things I have read or heard... from many different subject...

How does sound and performance play a role in your artwork?

It came also somehow by itself, for some project, but it doesn't have to be there for every project. I collaborated on some project of Norwegian musician Terje Isungset for some ice music project because we met and were both interested by the work of the other and there was sometimes some opportunities to combine them. Performance came sometimes also into the pictures because of some encounters with other artist with whom we've seen some interest to try things together. So it is again the opportunities somehow that brought things together. They play a role when we see that this different artworks can interact together or support each other.

What do you want to communicate with your art? Do you want to make people see things from different perspectives or create discussions?

Both I think, to see in different perspectives and sometimes also create discussions. There's different artwork so there is different direction. Some work with photographs and ice and some earlier works were orientated towards some questionnement on memory, conservation, images and photography as a medium – Some of theses works, when they were done in nature or with natural materials were also opening discussion about nature. Works with dance performance for example with the frozen clothes had to deal with movement but also with many other subject.

On your website I saw that you are using a 3D software for planning your projects. What kind of software are you using and how does it help you in the whole process of planning and implementing the project?

Yes, I have been using or had to use or tried to use several different 3D software for planning some projects, because some became large scale installation, or sculpture, or also performance space and I needed to visualize either the space or the sculpture. I used through time, Maya 3D, sketch up, Cinema 4D. For some installation, it helped to create the space itself and plan the logistics with it. While I draw it on the 3D Software it helps me see how I will be able to built it or how it won't be possible or see what I need in order to make it happening. In 3D Software you can also play with different option to help you change and find interesting designs and form that you may not have think about.

How do you manage to set up technical equipment in extremely cold environments? What tips and tricks did you gain during years of experiences?

Well, through time I have learned a bit how things react to cold and extreme cold, and actually things you can do change a lot depending on temperatures, so we need to always adjust to the temperatures we can have.

As well as setting up installation of ice in the very cold, we have also done it in mild temperatures, which can be really challenging. So depending of the temperatures, I adjust the logistics to it, and back up system if needed, or option and different plan depending on what weather comes up.

Same for the frozen photography, there're things I need to do at different temperatures otherwise it doesn't work. It's a bit of finding the correct balance and planning the right moment to work on one things or an other.

Thank you for your time!

All the best to you.

Interview with artist Tone Emblemsvåg

Can you shortly introduce yourself?

My name is Tone Emblemsvåg, I am 47 years old and I come from Telemark in Norway. I have 25 years of experience which covers different aspects and areas in visual design. I have worked as a set designer, illustrator, graphic designer, exhibition designer and visual artist. I enjoy working in the intersection between art and design. As a scenographer I have worked a lot hands-on, with everything from art in urban and open spaces, to festivals and window displays. I have a BA Hons in Design and Scenography at the Royal Central School of Speech and Drama in London. I have also for the last few years been involved in the sign-painting and hand lettering community where I have contributed in several workshops and exhibitions.

From 2005–2014 I worked with video-installation art and video-mapping under the name ForYourEyesTruly with Ernst Føyn. We are now both in regular employment working in the creative director fields in different companies, so we don't get to do many video-mapping projects anymore, unfortunately. We used to have a shared pleasure in creating live-visuals for clubs, concerts, festivals

and commercial events, before I moved into the art field. I got commissions to do my own on-site specific video-installations. I still work in the cross section between art and design with illustration, motion graphics and installations in the 3D environment, both physically and digitally.

In collaboration with Elisabeth Kristensen you made video projections on a snow sculpture that was inspired by northern lights – Can you tell me a bit about the collaboration and the work flow? For example, what technology and tools did you use for the video projection?

I met Elisabeth through a VJ-workshop ForYourEyesTruly arranged for artists in Kristians and she asked me if I had ever projected on snow. I had already done some tests on snow for another project that fell through, where we tested on snow and smoke, and it looked amazing. Elisabeth's sculpture project was planned for the following winter in 2011 January 29th for Hovden Snow sculpture festival. The festival was building an annual snow sculpture exhibition, of high artistic standard, and aimed to become the leading resource centre for snow and ice sculpture of this category in Northern Europe. Back then we had worked mainly at festivals for artists and clubs, so taking the step into the art of snow-sculpture world was a great opportunity for me. My immediate response was that snow is another canvas for expressing my art, that I had not tried before. I received a brief from Elisabeth a few months before the festival. She wanted to create a sculpture that was inspired by the Aurora Borealis and she asked me to use my artistic expression to create a customized animation for it. She had already provided me with a 3D model of the sculpture so it was easy to start the work process on my own. I started creating an animation where my aim was to make it look like the northern lights. After working with that, I would send her some sketches with that in AfterEffects on top of her model. Then I met her in Hovden for the festival 2 days before opening. I only brought my camera, MacBook and a 4000 ansi-lumen projector. (It's a long time ago now so I don't remember what kind of projector it was.) The software we used back then was VDMX /Mad Mapper, but I think for this project I made a vector mask of the sculpture shape and placed this in separate layer of VDMX as I experimented with different animations in layers underneath before locking the animation and looping it. So we didn't use Madmapper for this at all. It was expected to be minus 20 degrees, so we had already decided to beam the projection from behind a window, so the sculpture was placed strategically in front of a room in building. I worked inside in this room the whole day and evening before the opening day. It was a smooth process and I was glad I didn't have to work outside in the cold.

What do you think is most challenging when doing video projections outside during the winter and on snow surfaces?

Definitely the cold and the fact that you can't experiment as easily as when the temperature is comfortable. But in this situation we had already decided to place all the technical equipment indoors so it was easy. We didn't even want to take the risk of the equipment freezing. I have done other projects outside in the winter, and the technical challenges are always risky, either its raining or snowing, or just really cold.

What possibilities do you see in the combination of video projection mapping and snow sculptures?

So many, and as snow is so organic, and melts, it makes it more playful. I would have loved to play more with this and see the sculpture changing over a few weeks, but unfortunately this event was one night only. I remember the other artists being purist about the fact that snow sculpture should only be snow and nothing else. Adding tech, a digital element, was not acceptable it seemed. Even though some of them did play with lighting their sculptures, which of course is necessary in the dark, and some would also play with color through the ice, I think their main idea was to not meddle, or get too technical with nature. But I believe, as we added movement to the sculpture, it looked amazing. As the darkness is so dominating, I think it definitely brought something special to Elisabeth's work, an extra layer to the form and also I believe it added to the story of the sculpture. You are able to bring something to life with projections and tell a different story than the one of the white canvas, so what's wrong with that? Also it brings a different story than the one you experience when you look at the sculpture in the daylight.

What role plays story telling in your artwork? What benefits do you see in including stories into your artwork?

Sometimes I can just play with visuals, experiment for hours and various stories will come to me through the process. It's like drawing and painting, I have been doing that for my whole life. I don't always have the story as I start drawing something. But as a trained set designer it's natural for me to either be provided with a script or if it's my own project, to create a visual for the project. In the «Aurora Borealis» as it was Elisabeth's sculpture, she came up with the story and the theme of the Aurora Borealis coloring the snow. It became a very visual and simple story, we simply wanted to

recreate Northern Lights in a physical form on snow, and with color through video-projection. Combining the two disciplines, Elisabeth sculpting the snow and me dressing it with color.

In your artwork *Fairytales by the river* you used light and video installations – which looks magical – Could you explain a bit about the aim of the project and why you decided to combine light art with video projection? What kind of lights did you use and why?

I guess it was more that we added video-projection to the light installation as this event is mainly a “lighting up the riverside” event. “Light walking” along the Alna-river is an annual event that gathers thousands of people on a dark autumn evening. A number of local organizations put out torches along the river and contribute cultural elements. The districts in Groruddalen wanted to add an artistic dimension to the cultural event that also appealed to a new audience. In 2012 I contributed as an artist for luminous art installations in 3 of these places. In collaboration with Kulturbyrået Mesén (the curator) and the districts, we chose 3 different locations. The river at Haugenporten in the district Stovner, a beautifully shaped new pond at Hølaløkka in the district Grorud and the mystical birch forest in Alnaparken. There is quite a distance between the 3 locations and the riverwalk is long. My work was based on the magical atmosphere along the river at the autumn equinox, and drew inspiration from the supernatural, playful and imaginative in the Norwegian fairytale tradition. Nøkken, water-lilies and forest creatures were the starting point for my stories.

1. «Luminous streams» Made by placing light wires in the water and luminous elements on stones (by the Haugen gate bridge, district Stovner.)
2. «Water lilies», in the form of luminous balloons floating on the water surface at (by the Hølaløkka pond, district Grorud)
3. «Fireflies and creatures amongst the trees»; Atmospheric animation screenings on scenic gauze, accompanied with an aerie soundscape by Merete Mongstad. (In the Alna-park, District Alna.)

The installations were shown on September 27, 2012. We had to install all 3 projects the same day, so they would be ready and lit up for when it started to get dark around 1800 hours. We had 3 teams working in the separate location, making preparations and getting everything ready and I had to go between the 3 during the day to make sure everything was going according to plan. I had great helpers. One was out on the river placing the «Water lilies» which was made from luminous balloons. These we made with mini-led lightbulbs glued to clock-batteries, placed inside the balloons before we inflated them. We had to lower small fishing weights on each of the balloons to make them

stay in place in the river. Parallel to this happening I had two professional tree climbing guys up in the trees to help me set up the scenic gauze between the tall birch trees where I projected the image of the two forest creatures with crystal on their heads, at the same time as I walked around on the ground placing mini-led lightbulbs glued to batteries to the trees to make it look like a thousand little fireflies was sitting in the trees. I think it added a playful 3D effects around the visual piece. We tested the animations and the sound when it started to get dark. We had done some site-tests before hand as well. The animation was made the weeks before and I had a great collaboration with soundscape artist Merethe Mongstad. She created the beautiful fairytale soundscape that people would hear as they came walking trough the forest and spotted the animation in-between the trees and all the little glow-lights in colors around it.

I always create my animation on a dark background so that when projecting onto scenic gauze it looks like the animation floats in the air. In the dark forest, this turned out exactly how I wanted it to. We had a projector box standing by one of the trees and speakers placed around surrounding the installation. It was really magical as people came through the forest and walked into this scenario. At the third location for «Luminous streams» I wanted to «draw» in the river and fill with color, to make it look like some unidentified creatures streaming down the river. We didn't have much time to test this, but it was a challenge in it self to make it work that day.

I had to wear waders to place the light strings in the water, which was shallow, but it was a strong current, of course, as its a river. The thin lights are 20 meters long for each connector, and I placed the electric connectors in a safe plastic bag under the bridge and pulled the different color strings out in the river as far as it was possible. Because of the current they started to move around so things started happening by it self, but it ended up looking really magical as it got dark, as you can see in the pictures. The whole project was a learning experience, but I figured that I managed to get most of the effect I was aiming for, and as always, when working in nature, taking the weather into account, we were so lucky with how this turned out in the end. As the dark came and people came walking along the river to experience the art it all felt very rewarding.

What benefits do you see in creating art installations in public space or in a natural environment?

I always found it very interesting to see the interactions between audience and art in public space. And I have always found public art very important myself, as I get really inspired moving around in urban spaces and observe, as others like to observe nature. Some people will walk quickly

past and others lingers for a minute or much longer. I think it's so important to make art public to everyone, as there is so many people who never walk into a gallery or a museum. By creating art in a public room you reach a larger, more diverse audience. I also really love the interactions that occurs when I work in a public space valuable. I get to talk with all kinds of people while I am working, and then when the finished piece is installed, I will often sit in the background and observe their reactions.

In your artwork Limborama your visuals projected onto objects and also sound is used to trigger memories – What value do you see in the combination of projected visuals and sound design?

For me it has such great value, maybe more than I am able to express. My love for music got me started working with moving image in the first place. Music was always so important to me growing up and through my whole life. There has always been a very deep connection between the drawings, paintings and videos I make and sound and music. I started working with video in clubs with my DJ friend Sunshine and what we created together used to be really special, but it was mainly for fun. We created the club-nights we wanted to go to where sound and vision combined was equally important. We have done one art project together after she has moved further into working with more abstract soundscapes. (Its called «Play Kittiwake» I can tell you more about that, if you are interested). Further on, as I moved into working in the fairytale-forest project and Limborama, I was lucky to team up with Merethe Mongstad, who would take my story and make her version of it as a soundscape. I find it adds a division to my work, I don't think one can exist without the other. Saying that, now, as I appreciate silence more, maybe I should explore making moving pictures without sound?

What role does experimentation play in the development of your projects?

Experimentation is a vital part of why I am doing it, the asking why and the playing aspect of creating something visual. Experimenting with the software, and exploring the space, bouncing ideas, drawing sketches, rendering so many versions I don't know in the end which one to use. It's funny, but this is what keeps me going in all the work I do. I always try to record my process in sketchbooks and pictures and I tend to go back and look at this and find the process more pleasing and satisfying than the end product. I don't really feel as pleased during «openings» or presenting a finished work as much as the actual process. I always feel sad and melancholic after, and then I need to move on to working on something new.

What are your sources of inspiration? Where do you get inspiration?

When another artist, like Elisabeth contacts me and wants to collaborate on an idea, I get inspired. When we did «Aurora Borealis» in 2011, the internet and social media wasn't as dominant as it is now, and I think I was more in my own head, and on my own planet then (some people still think I am). I guess I cared less what people was thinking of my work, and I didn't get so easily affected or influenced by other peoples work. I had a playful «flow» going, that I find now often gets interrupted, by social media. Back then, I would just go on exploring on my own without caring what other people would think of it, apart from the artist I was working with. In the last year as the pandemic has forced us to stay home and practice social distance, I have revisited some of the calm and effortless playfulness I had back then, when I used to spend more time in solitude working. I need to have just enough alone time so I can dive in and get inspired. But I also need interacting with other people. It's just the art of finding the perfect balance between social life and solitude to be able to create. Sometimes I can get really inspired just looking at the sea, or just look at people. I always draw, listen to music and surround myself with books and magazines. I explore art, films, people, architecture, and go traveling as much as I can.

I can also get inspired by playing with a camera, just, looking through the lens. And I love playing and experimenting in the live-mixing software, like VDMX or Resolume. I used to go to workshops with other video artists, and host workshop as well. Now, as we can't travel, I tend to travel in the MacBook and on the internet, where there are tons of sites I love and I especially love the Public Domain website. I do online classes at Skillshare and I have recently enrolled a diploma in UX design. So I am constantly exploring and evolving my skills.

Is there anything else you would like to add?

One quote, that always inspired me to look at things in a different way is by Roald Dahl, and I always have this with me: "And above all, watch with glittering eyes the whole world around you because the greatest secrets are always hidden in the most unlikely places. Those who don't believe in magic will never find it."

Thank you for your time!