Yani Kong: Special Article

Losing My Human Scale: Tiny Movies at the End of the World

The 1977 film *Powers of Ten* by Charles and Ray Eames begins on the Chicago lakeshore: a young couple prepares a picnic while they share a relaxing afternoon. As they settle in to rest on their blanket, an aerial shot pulls out to reveal the dozy pair from a meter above. The physicist Philip Morrison narrates a scientific demonstration that visualizes the relative size of things. The film begins with the napping man's hand at the centre of the frame, a vanishing point that remains throughout the film as the zoom lens reduces the human figures while continuously drawing upwards and outwards, eventually arriving at the expanse of outer space with its many stars and galaxies.

The two humans are framed inside a square of black screen with a unit of measurement on each side of it. On the left, the growing distance from the man's hand is measured in metres, and on the right, the number 10^x increases as the scale of the zoom escalates. *Powers of Ten* is an odyssey of measurement: "a film dealing with the relative size of the things in the universe."[1] It is a rapidly elevating technological journey that explores scale by way of a growing field of view: First the lake vanishes, then Chicago, then "the whole Earth," we see the solar system as it recedes into nothing, the Milky Way, the Virgo cluster. Finally, at 10^{24} power, the screen fades to intense blackness, hardly the limit of the vastness of outer space, but the bounds of our knowledge of it. From here, the zoom swiftly travels us back towards Earth to land on the same man's hand and it continues, passing through his skin's cellular membranes towards carbon atoms and molecules of DNA, what the film calls "the vast inner space."

When I screened this film with students, they reflected on it as an experience of being engulfed by the universe, where humans, or at least the students' human experience, were described as small in comparison to the immensity of the cosmos. In journals, some of them described a feeling of being dwarfed or lost in the expansiveness of what exists – sensations that suggest that the scale of the universe, 10^{24} power of human size, could really swallow us up like an atom, just as Blaise Pascal wrote in the seventeenth century.[2] Yet, the cosmic zoom of the film, even as it demonstrates all that the plentiful cosmos contains (and the abundant nothingness it seems to hold), nestles the picnickers at the centre of it all.[3] Their peacefully napping bodies are the scale by which the universe is measured and comprehended (a nod again to Pascal) and they appear to rest easy, oblivious to the mighty forces of physics.

Powers of Ten, celebrated for its achievement in delivering the image of an infinite yet intelligible cosmos, also demonstrates what is central to the disenchantment of the world: humans, who "master all things through calculation," so goes Max Weber's definition, lie at the centre of the universe, their scale provides a comparative measurement for the things within it by way of their relative difference. Now we

1. Charles and Ray Eames, *Powers of Ten*, Pyramid Media: 1968. Film. This film is easily accessed online. For reference please see: https://www.youtube.com/watch?v=0fKBhvDjuyo (accessed February 19, 2024).

2. "Through space the universe encompasses and swallows me like an atom; through thought I comprehend the world." Blaise Pascal, *Thoughts*, trans. W.F. Trotter (New York: P.F Collier, 1910).

3. Cosmic view is a term Zachary Horton employs to discuss the depiction of scalar difference in a range of media of which *Powers of Ten* is the most well-known. He clarifies the term: "a self-consciously medial project that attempts to characterize the scalar articulations of the cosmos by visualizing, from a single perspective, a spectrum of scales from the largest to the smallest known. The cosmic zoom has taken textual, imagistic, motion picture, and new media forms. The most famous instantiation is *Powers of Ten*, a 1977 film by designers Ray and Charles Eames that begins with two picnickers in a field, zooms out to encompass the entire universe, then zooms in again until the nucleus of a single carbon atom fills the frame." Zachary Horton, *The Cosmic Zoom: Scale, Knowledge and Mediation* (Chicago: University of Chicago Press, 2011), 4.

Yani Kong Presenting at the first annual UBC Undergraduate Film Conference. Photos by Jonathan Liu

have the term Anthropocene to name the current period of permanent geological change to the planet caused by human intervention. When geologists Paul Crutzen and Eugene Stoermer coined the term in 2000, they argued that our history of technological development and extractive practices had irreversibly transformed the Earth.[4] The Anthropocene points to the long-term effects of human activity and our primary contemporary crisis, namely climate change, driven by a "universal perspective [that] stands at the zenith of human achievement in the realms of knowledge, ethics, and milieu-building technique."[5]

Zachary Horton identifies the Anthropocene as a "crisis of scale" where the state of the environment calls for humans to confront themselves vis-à-vis the scale of permanent change caused by their practices.[6] As a result of the advantages humans believe they have gained through industrialization, as well as their efforts to continually expand their dominance and maintain it, humans have adopted a perspective that ignores their own scale, meaning "entities of enormous or diminutive proportion seem to humans to possess scalar attributes, while we, the perceivers of those objects, seem to occupy a scale-free perspective." [7]In *Powers of Ten*, as the master scale, "the default scale

may be the human picnic, but the picnic's default perspective is universal."[8] As a practice of "scopic mastery," to use Horton's term, the zoom function in the film is effective, rendering a totalizing view by way of the human scale of the picnickers whose comparative measure makes the conceptual scale of the entire universe legible.[9] It is possible to view the Eames' film as positioning the picknickers as just one small piece of a larger cosmos, an experience of scale that my students communicated, but by centering humans as both the vanishing point and the unit of comparative measurement, the film reinforces what Horton calls "the scale of the rational," a mono-scalar pattern of thinking that emphasizes the discourse of human autonomy, which stems from, at least, Enlightenment traditions of thinking.[10] The film's zoom function propels outwards from its human centre and extends them and its audience into the Milky Way and beyond. In watching *Powers of Ten*, what we consider our world has grown to include the scaler reach of the cosmos.[11]

Any challenge to the crippling environmental effects of the Anthropocene begins by confronting the cause of the effects themselves, so pushing against the human centred focus that defines this

4. See Paul J. Crutzen and Eugene Stoermer, "The Anthropocene," in *The Future of Nature*, eds. Libby Robin, Sverker Sörlin and Paul Warde (New Haven, CT: Yale University Press, 2013).

5. Zachary Horton, "Composing a Cosmic View: Three Alternatives for Thinking Scale on the Anthropocene," in *Scale in Literature and Culture*, eds. Michael Tavel Clarke and David Wittenberg (Cham, Switzerland: Palgrave Macmillan and Springer Nature, 2017), 40. Horton, like other scholars in the Humanities such as Donna Haraway and Rosi Braidotti, is critical of human centred perspectives. The Anthropocene imposes a human-centred universalizing overview, and the methods for intervening in the Anthropocentric damage of global warming remains based on humanity's mastering vision.

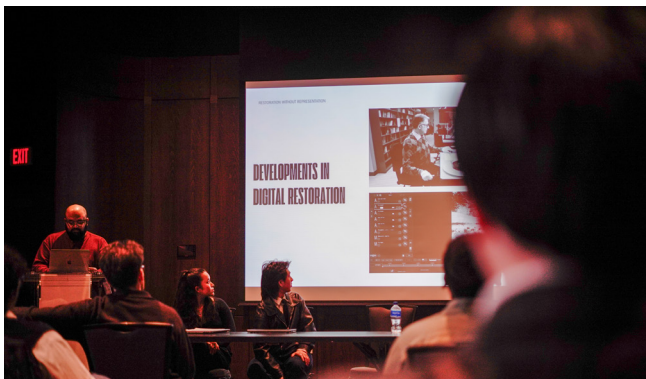6. Ibid., 35.

7. Ibid., 36.

8. Horton, *The Cosmic Zoom*, 70.

9. Ibid.

10. Horton, "Composing a Cosmic View," 35-36.

11. Derek Woods, "Epistemic Things in Charles and Ray Eames' *Powers of Ten*," in *Scale in Literature and Culture*, eds. Michael Tavel Clarke and David Wittenberg (Cham, Switzerland: Palgrave Macmillan and Springer Nature, 2017), 77. Woods describes *Powers of Ten* as an effort to educate its audience on their place within the universe, in doing so, the film privileges the ontological scale of the human by projecting the master scale outside of and beyond itself.

geological epoch.[12]   To relinquish one's human scale, or at least to decentre it, is difficult to put into practice, since the body remains the site of experience and a primary source of knowledge. Yet, we may approach this as an exercise in shifting perspectives – one that begins with the body and the scale of the self, but allows for the body's primacy to slip away, becoming something of a site of inscription – or host– for the play of relations within and among the things in the universe, a place of mixing and combination between the self and other selves, the self and other things. My current research on small-file media – moving image media that streams with low to no carbon footprint – involves practicing an embodied method of reception (or viewing). Through distortion, dispersal, and scale reorientation, small-file film aesthetics can help audiences practice flexibility in scale and perspective because these techniques generate affective attachment between the moving image and the viewer, such that one's perspective can address not simply the film itself, nor their individual experience of watching it, but can align with the conditions of the world we live in.[13]

Small-file media is a creative practice developed by Laura U. Marks, to respond to the carbon footprint of the information and communication technologies (ICT) that encompass the internet: in particular, streaming media. Driven by the electrical intensity of data servers, networks, and consumer devices, ICT produces at least 4% of global greenhouse gas (GHG) emissions — the same as the airline industry — and these numbers are projected to rise to 7% in 2030 and 15% in 2040.[14] While Artificial intelligence, cryptocurrency, and the internet of things (e.g., self-driving vehicles, "smart home" products, etc.) are themselves increasing ICT's carbon footprint, streaming media contributes more than any other ICT sector to this increase – this is when "Netflix and chill" requires burning fuels for leisure.

Small-file cinema intervenes in the rising carbon footprint of streaming media through the creation of low bandwidth films that stream at no more than 1.44 megabytes per minute – a miniscule fraction of the bitrate of high-definition videos which stream at an average of 4,000 Kilobites per second.[15] Small file movies don't share in the luxuries of their large-file, bandwidth- and energy-hungry counterparts that are meant to be streamed in 4K HD. Those are shows with smooth visuals that focus on narrative and obscure the materiality of the streaming medium. Small-file media provides an outlet for artists, filmmakers, and

12. My argument follows Donna Haraway, whose critique of the contemporary terminology associated with the Anthropocene involves adopting terminology that more accurately embraces the multispecies field of relations, troubled and otherwise, that take place on Earth (the concepts of which I work through in a later section in this chapter). Haraway proposes an expanded perspective that is inclusive of multispecies combinations and collaborations between humans, animals, and other things, among other acts of combination as a method to erode the master scale. See Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham: Duke University Press, 2016).

Pictures from the first annual UBC Undergraduate Film Confernece

13. See Jane Bennett, *The Enchantment of Modern Life: Attachment, Ethics, Crossings*, (Princeton: Princeton University Press, 2001); and Laura U. Marks *The Fold: From Your Body to the Cosmos*, (Durham: Duke University Press, 2024).

14. See F. Bordage, "The environmental footprint of the digital world." (2019) Report for GreenIT.fr.; Laura U. Marks and Steven Makonin, "Tackling the Carbon Footprint of Streaming Media," Knowledge Synthesis Report. Social Science Humanities Research Council, 2021. White Paper; and Lotfi Belkhir and Ahmed Elmeigli, "Assessing ICT global emissions footprint: Trends to 2040 & recommendations." *Journal of Cleaner Production* 177 (2018):448-463.

15. Film programs from the annual Small File Media Festival are archived and available for viewing at www.smallfile.ca along with instructional tutorials for artists interested in making small-file films.

environmental activists to explore the constraint in size through experiments with composition, camerawork, compression, glitch aesthetics, audio, and duration to speculate opportunities for energy efficiencies that do not compromise cinematic aesthetics.

Glints 3, A Ravine (2021), the third installment of the four-part small file film by Somayeh Khakshoor, opens to the filmmaker's whisper: "You can't look into my eyes/Look at the water and upturn." Water then begins to swirl in slow motion. At least it seems like water, but as it moves, it blends with itself without ever truly mixing, like oil and ink. If it was not for the sound of the rushing water and the hint of Khakshoor's title, one may never know what they are looking at because what can be seen is indecipherable as water. Still, she says, "May my faces rain on you." *They did*. I feel it. Watching from home, at her suggestion I move my head towards the sound of the ravine – ever closer to my laptop – ready to receive it.

Feel, we must, because small-file cinema does not trade in the economy of representation. To save in bitrate, the films are often short in length. Compressed for size, they can be blurry and hard to see. Some small-file movies contain dialogue (to save in file size), so sometimes, they are hard to follow. These are some of the traits of the movies' smallness, where compression, experimental and out-of-place audio, and duration become processes that erode the clichés of narrative cinema. To decrease their carbon footprints, the tiny movies are pared down so that what is left is entirely aesthetic. In the absence of representation, they become sensation.

In *A Ravine*, Khakshoor trains our gaze on movement and flow. The time of the film has been slowed, yet even this effect isn't readily apparent. Instead, the film feels intentionally thick: the fluid that consumes the screen seeps with a luxurious, even lazy quality in a basin of great depth. The audio is the hollowed-out sound of the lapping of this liquid; it the kind of sound that can only be heard when one's head is completely submerged. As I watch, my eyes follow the movement of the stream. My vision is dispersed to follow squirming streaks as they form along the surface, swishing and churning, drawing attention upwards and beyond the screen. This lasts less than a minute, then, time speeds up with a suddenness. For four seconds, it sounds like fluids rushing, rain driving. The fatty potion bubbles and floods with speed. At first, the film cultivates a sense of non-attention, scattering the gaze across the placid, trippy goo. Like a lava lamp or a vintage screen saver, the waves induce both an over-focus and a kind of

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non-focus where there is so much to observe about nothing in particular. Just as quickly, speed kicks in and we snap back to our familiar observational view. There was no event, yet the film delivers an experience of time, of being spellbound and then not.

Small-file cinema constitutes an aesthetic practice born of environmental necessity and formal experimentation. Artists can begin by filming with lower resolution. Paying attention to shape, color, and movement rather than content ensures a visually satisfying image. Recording sound in mono saves a lot of file space. Decreasing camera movement and movement in the frame, as well as using a shallow focal length, ensures that images can emerge from compression looking fairly crisp. And then compression, for small-file artists, is not a tiresome

necessity but becomes a creative medium of its own. Experimenting with the parameters of common compression platforms, such as Handbrake and Any Video Converter, artists can choose either to maximize fidelity or to exploit compression's formal potentials. For example, decreasing the frame rate saves a lot of file space and is initially barely detectible, but yields dreamlike saccadic motion at around 12 frames per minute. Depending on the parameters you select, figures can develop dramatic outlines or blur together in abstract patterns.

As if to revel in the limitations of its size, a small-file movie leans into all the things it can never be. To stream with a small footprint means the movie never can never be big: it has to be small, it has to be intensive rather than extensive which can involve experimental aesthetics that resist narrative identification in favour of abstraction. Some small-file movies do remain crisp and accessible, in part by calling on viewers' associations with form, movement, and sound. Across a selection of small-file movies, there is often the initial sensation of not knowing what we are watching, and this lack of figuration wears away at the codes of traditional viewership, in which colours, shapes, movement, sound and even story line get to play through without expectation. In a good small-file movie, every formal element matters and invites the spectator to admire how skillfully it serves the movie as a whole.

Small-file artists have described their efforts to apply a minimalist approach to a media form that typically embraces a maximalist ideology. While it can be common practice for makers to begin with a large format film, which is to say a film of conventional size and resolution, and then use compression software to scale the size of the file to fit the size limitation, many of the artists we spoke to worked to incorporate a 'small first' perspective into their process. (Slide – Show portion of Guo's film, Yan from 0:27) New York filmmaker, Vesper Guo, described relinquishing the size of the screen, making video art designed to be played on a laptop or mobile device. Beginning smaller for Guo means working within the constraints of individual device resolution. Guo's practice was nicely echoed by Tadeo Rios-Davila, who, drawing from the book *The Little Prince* by Antoine de Saint-Exupéry, discussed his philosophical intention towards the small – exploring what it means to start small as a principle. The Little Prince begins by describing the nature of grownups and their inability to perceive "important things" conceivably because their growing up, that is, their "bigness," produces

a disinterest for the small in favour of "matters of consequence," where things need to be framed by order, empirical facts, categories, costs, and status in order to be paid attention to. It is a world where the big picture overshadows the small picture. If high-resolution cinema is a cinema of passive immersion, then small-file cinema is more demanding of the audiences' embodied capacity to embrace ambiguity and their willingness to search for what is there, even when it is hard to see.

To study the small-file film requires paying close attention to the rise and fall of affects that result from the viewing experience. Small-file films activate their audience as they work a little harder to grasp what is being watched. To stream with a small footprint resists the capitalist urge for increasingly higher definition. Enhanced abstraction disturbs the identification that conventionally occurs in the viewing experience. Complexity is revealed at the level of the pixel, in the proliferation of minutiae onscreen. As audience members our perspective moves outwards, from the molecular towards the molar, towards an understanding of the world in its completeness. As the novelist Nicole Krause writes, "To paint a leaf, you have to sacrifice the whole landscape. It might seem like you're limiting yourself at first, but after a while you realize that having a quarter-of-an-inch of something you have a better chance of holding on to a certain feeling of the universe than if you pretended to be doing the whole sky."[16]

Krystle Silverfox's landscape series, *Lost Connections*, uses small-file photographic practices to reference resource extraction and explore Indigenous land rights in the Yukon Territory. In a series of four still images of Yukon landscapes, Silverfox connects the aggressive history of residential schools and the Sixties Scoop in Canada with experiments in data moshing. The artist shrinks the file size of their photos by copying the originals and reopening them in the TextEdit program. They begin by deleting portions of the code which cause the images to glitch, change colour, pixelate, and distort, resulting in highly abstracted mountain ranges, treelines, lake views, and snowscapes. The data extraction involved in making *Lost Connections* offers a commentary on the technological landscape in the Yukon Territory, where rural and Indigenous areas experience limited access to highspeed bandwidth and intermittent electricity that reminds us that the internet and digital devices are not democratic tools, and that

16. In Nicole Krauss, *The History of Love*, (New York: W.H. Norton and Company, 2005).

leveled-up devices are not frequently supported in lower infrastructure areas. By invoking extraction in their creation, Silverfox makes apparent the effects of a culture scrambled by colonization and refuses a certain legibility of the land; at the same time, they've created a small-file image that travels more lightly in a reduced digital structure.

As Donna Haraway has cautioned, the story told when we invoke the Anthropocene is one with a bad ending, because it links the continuity of the planet with the sustainability of human life.[17] It is a rigid terminology that links geology with the impact of human scale, which, although accurate in its assessment of human caused geological change, does not sufficiently embrace other forms of continuous life that persist outside human systems, nor the partnerships that naturally occur. ICT and streaming media are technological processes that are themselves intensely reliant on modes of interconnection to produce communication between servers, crossing lands to bridge networks, and requiring sacred waters to cool data centres. I advocate cultivating our worldviews away from human-centred scales towards nonhuman and hybrid perspectives that embrace interconnections, to this end, seeking collaborations with technology through materially conscious use.[18]

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17. See Haraway, *Staying with the Trouble*.

18. See Donna J. Haraway, *When Species Meet*. Minneapolis (MN: University of Minnesota Press, 2008).