Perception at the End of the World
(or How Not to Play Video Games)

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FlugSchriften▲

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I am dead, again.

I am restarting Joel,

or rather restarting myself walking as Joel,

trying to sneak through the plague-infested streets of some godforsaken city in which the end of the world has already happened. My job is to smuggle Ellie, a teenage girl who has lost her parents in a large-scale apocalypse in which most of the humans seem to have perished, across the country. I don't quite understand what happened then and I don't really know what's happening now. I duck and dive, grab a brick, follow a green triangle, while all the time hacking furiously at the plastic buttons of a device I'm holding in my hand, one whose functions, shape and mode of behavior don't seem to be making any sense. And I'm dead again. A bullet came from around the corner, with Ellie cowering behind a pile of rubbish. I failed her again. I failed again. This is not good. This is not fun. Get me out of here.

And yet I keep coming back, returning over and over again to the same level of *The Last of Us Remastered*,[1] an adventure-survival video game set in an undefined near-future in which all the hope is gone and yet you keep going. My progress is minimal, my speed almost static. It is as if the game is playing me while I am trying to run away. But I keep returning.

My experience of being in the game is of someone who is not a gamer, who doesn't understand the rules, the principles, the proprioceptive expectations, the whole navigational dynamics between the screen, the interface, and their own body and mind. I keep returning because I'm pulled in by the oddity of being so spectacularly bad at something that, at first glance, looks quite simple. And I'm not really getting much better at it, despite my multiple attempts at pointing, turning, clicking, and moving. I am also strangely drawn to the ruin porn of the game set up, to its weird scenarios and improbable architectures. I want to linger there, to spend time among the debris of this post-global universe that has been taken over by a mysterious fungal infection but that has retained many traces of the world that once was. It is precisely this uncanny familiarity of the spaces around me that makes me go back to the GAME OVER and over again, to see it afresh. Yet where is the "me" in all this? And what am I really seeing? *How* am I seeing it, and with what?

I forget about Ellie, about Joel, about myself as Joel, and about the whole improbable story about the Cordyceps fungus that is haunting the world I am traversing. I slow down to the point of stopping, I want to take it all in. I pause, I look around, I don't care about being shot anymore. I am interested in a different kind of shooting, one that doesn't kill, that doesn't use a gun as its mode of access. I screen-shoot, or rather Joel as me, together with this whole unwieldy operation that involves the black thing in my hand attached with a cord to the black box, my body, Joel's body, all of us, we take the world around us in, we freeze it, we temporarily make it ours.

Flowcuts, *EGR-1* (Up), *EGR-6* (Down). Photographs by Joanna Zylinska.

H

There is a long history of gamers taking screenshot images of their achievements and memorializing interesting-looking locations discovered on their game quests. Recognizing in those voluntarily shared digital mementoes an opportunity for free and "authentic" marketing campaigns, conducted by "real players" committing so much of their time to playboring in virtual environments, game companies identified a PR opportunity. Cashing in on the ongoing practice, many developers introduced a dedicated camera mode to their games—from a simple camera device held by a character, such as a reporter in *Beyond Good and Evil*, through to a sophisticated camera function transforming the whole screen into a camera while mimicking the exposure and processing of a real-life optical device, as in aforementioned *The Last of Us*, or even an option for augmented-reality capture, e.g. in *Pokémon Go*. The technical affordance, coupled with gamers' desire to shape, save and share, led to the emergence of a new para-photographic genre known as in-game photography, aka "screenshotting." As Matteo Bittanti explains, "'Screenshot-ing' or 'screengrabbing' is an umbrella term that defines a variety of in-game photography performances whose common denominator is the collection of visual mementos by the player. Rather than using a virtual gun to destroy the environments she or he encounters, the gamer becomes a collector, an avatar-with-a-photo-camera, a flaneur of virtual spaces. The collected pictures are subsequently enhanced with the aid of Photoshop and similar tools and shared online, via flickr or tumblr."[2] For many gamers, screenshotting has become an activity in its own right,

with online realities now functioning, as explained by games scholar Cindy Poremba, legitimate sites for photographic voyeurism. "If the process and ritual behind this image making is similar, the players themselves are validating the reality of their subjects simply by creating a document of these experiences. In this sense, players are taking real photos, just in virtual spaces,"[3] argues Poremba.

Yet imagistic verisimilitude, fueled by indexical fantasies associated with the photographic medium, has been abandoned by more creative in-game photographers. Remediating the aesthetic trends of analogue photography, artist-gamer Gareth Damian Martin has scoured the hidden nooks of the popular action-adventure game *Grand Theft Auto V* to produce moody anti-utopian shots of what are literally no-places. Carefully framed and shot with an analogue camera, in black and white, with filmic grain becoming part of the process,[4] his images create a haunting panorama of the game's outskirts. Part documentary, part street photography, part cyberpunk, Martin's "heterotopias," as he terms them, evoke an uncanny sensation of the world's edges and limits. Riffing on the post-apocalyptic tenor and visuality of many popular games, they help us envisage this world's end (and also the end of this world, and of our world on the other side of the screen), while framing it for our comfort and pleasure. The practice of photographing games' edges and ends has inevitably led to a heated discussion about the frayed edges of the very medium involved. Traditionalists, such as Wasim Ahmad, writer for the photographic website FStoppers, have insisted: "It May Be Art, But In-Game Images Aren't 'Photography.'"[5] Martin, in turn, has been adamant that "photography is a useful term" for this practice "as it connects the work to a heritage and history of conceptual, still-life and object photography that stretches all the way back to the beginning of the medium."[6]

Flowcuts, *TLOU-8* (Up) *EGR-7* (Down). Photographs by Joanna Zylinska.

I came to in-game photography at a workshop run by Martin at The Photographers' Gallery in London in July 2018.[7] The most clueless of the group when it came to gaming, and probably far less keen than the other participants on upholding the conventions of the photographic medium, I was absolutely mesmerized by the visual and conceptual experiment unfolding on multiple screens. That workshop was my calling card for getting involved in an alternative way of sensing and seeing, and an alternative mode of producing technical images,[8] one that bore resemblance to what was familiar and yet that shifted the parameters of the game. Navigating the generational and kinetic difficulties of a non-gamer in the visually attractive, high-resolution 3D game environment of *The Last of Us*—the first game I bought together with a PlayStation 4 console, I turned a blind eye and deaf ear to the clunky story and its wooden dialogues, and followed instead the enthralling visuality unfolding on the screen in front of me. Like Martin, I was drawn to the game's edges, spaces half-gratuitously put in by t

in by the designers yet not really designed for the player to spend too much time in. Forfeiting the speed, the action, the trophies that presented themselves to me on the way, the whole gamey premise of the game, I mobilized my photographic apparatus—my technical knowhow and ways of seeing photographically developed over the years—to start making the gameworld a little bit more mine.

Even if not explicitly engaging with image-making as part of their plot, most 3D games rely on camera technology to navigate their characters. In my foray into gaming I became intrigued by the two vantage points respectively offered by first- and third-person games. First-person games, such as the walking game *Everybody's Gone to the Rapture* (which shares a post-apocalyptic story and look with *The Last of Us*), developed from first-person shooters, i.e., games in which the player sees the action through the avatar's eyes while becoming an extension of the shooting device, be it a gun or a camera. In third-person games, such as *The Last of Us*, the camera is placed slightly behind and above the avatar, although its angles and positioning can vary and change, depending on the game. The player is then linked to the avatar, via the camera and the controller, through an invisible "ray of light." In both types of games, players ultimately take on the camera function, no matter if they engage in the practice of screenshotting or not. I became entranced by the virtual environment of 3D games because it offered me a space in which I could test or even contest the legacy of the photographic medium by virtualizing different possibilities, simulating different outcomes and framing different viewpoints. Yet the experience offered me more than that: I saw in the game environment a laboratory for experimenting with possibilities of retraining perception and vision, of reframing what and how I (or, dare I say, "we") see the world, of learning some new affordances.

Flowcuts, *TLOU-9*. Photograph by Joanna Zylinska.

Why was this retraining and reframing needed? And do we fully understand how we see the world in the first place? Specifically, could we say that visual perception operates like a photographic camera, by cutting reality into discrete images and then stitching them together into a relatively coherent and fluid picture of the world? Or is it more like a cinematograph, projecting the film in front of ours eyes and subsequently discretizing individual stills from it? For centuries, the dominant model of vision was premised on the idea that the eye was a passive vehicle of image reception. Early photographic cameras were modelled on this very idea of the disembodied and static eye that merely captured images coming from "the world."[9] While it was assumed that we saw reality via an array of still images, our ability to perceive motion was explained by an optical illusion of each singular image supposedly "lingering" on the viewer's retina. Their overlapping was said to create an illusion of movement. This conviction led to the emergence of the "unifying myth"[10] of film studies, i.e., the "persistence of vision" theory. In their tellingly-titled article, "The Myth of Persistence of Vision" published in 1978, Joseph Anderson and Barbara Fisher pointed out that "after-images, since they are in fact tracings of stimulation left upon the retina, yield stabilized images."[11] They explained that, if after-images were actually involved in the creation of the illusion of movement, "the result would be a plethora of images resulting from the tracings scattered about the retina according to each separate fixation of the eye"[12] rather than smooth movement.

The after-image theory of perception was originally refuted by psychologist Max Wertheimer. In 1912 Wertheimer published an article titled "Experimental Studies on the Seeing of Motion,"[13] in which he demonstrated that the belief that we saw still images first, with motion somehow "added" afterwards, was incorrect. Many film scholars subsequently attempted to reconcile their own earlier intuitions about perception with the new state of knowledge. In his 1914 book, *Moving Pictures: How They Are Made and Worked*, Frederick A. Talbot suggested that:

> The eye is in itself a wonderful camera....The picture is photographed in the eye and transmitted from that point to the brain....When it reaches the brain, a length of time is required to bring about its construction, for the brain is something like the photographic plate, and the picture requires developing. In this respect the brain is somewhat sluggish, for when it has formulated the picture imprinted upon the eye, it will retain the picture even after the reality has disappeared from sight.[14]

With this description of the perception of movement, Talbot produced a delightful mergence of organs, with the eye-brain conjuncture becoming a kind of photo lab. It is important to notice that the notion of "persistence of vision," which was premised upon the retinal imprint of an image, did not entirely disappear from this theory: it only shifted to a different section of the "lab."

Flowcuts, *EGR-2* (Up), *TLOU-2* (Down). Photographs by Joanna Zylinska.

Since the 1960s perceptual and cognitive psychology has widely adopted the assumption, supported by numerous experiments, that the location where visual processing primarily occurs is the brain. The following explanation for how we see the world is shared by the majority of scientists working with vision, be it in perceptive psychology, cognitive science or neuroscience. Light coming from an object is said to stimulate the cells in our eye, producing electric impulses as a result of the stimulation. Those impulses, containing information about light and color, function as raw data that is then transmitted, via the optic nerve, to the brain. The brain refines and translates the data into what we subsequently recognize as images. The perception of movement arises from seeing the small difference between a series of RADICALLY CHANGING STATIONARY images and (involuntarily) "interpreting" it as movement.[15] Drawing on the 2006 paper published in *Nature* by Marc A. Sommer and Robert H. Wurtz,[16] science writer Julia Layton has attempted to clarify how the picture of the world we obtain ends up being so stable, despite the fact that our eyes themselves are in constant movement, which involves exploration, scanning, low-frequency tremor and saccadic jumps. Using Sommer and Wurtz' discovery that "the brain keeps track of self-movement … by monitoring an internal copy, or corollary discharge, of motor commands,"[17] Layton describes our eyes as "the video cameras of our brain."[18] Yet her actual explanation is more reminiscent of the working of a stills camera: "They take before and after shots of every focused image and compare them in order to confirm stability."[19] She goes on to clarify the process further:

Before your eyes actually sense an object, your brain takes its own picture of that object for comparison purposes. It knows where your eyes are going to move next, and it forms an image of the object that precedes our conscious, visual perception of it. Then, when our eyes do perceive that object in a sensory way (meaning we can see it), our brain has already laid the framework for a smooth transition. There's no shakiness and no instability. The brain has anticipated what our eyes are going to see, and it uses that anticipatory image for comparison to make sure the world has indeed remained stable in the split-second between the before shot and the after shot.[20]

Even though present-day research into visual perception challenges models based on the belief in one-to-one correspondence between physical stimuli and perceptual experiences, this does not stop science writers, philosophers as well as film and media theorists from seeking such correspondences. In the process—and this is the point that is of key interest to

me here—they often reach for concepts borrowed from the image-making industry: from Julia Layton reporting on the experiment in the brain correlates of vision, as cited above, through to Gilles Deleuze's acknowledgement that "The circuits and linkages of the brain don't pre-exist the stimuli, corpuscles and particles that trace them," which is summed up in his oft-cited quip: "The brain is the screen."[21] For neuroscientist Beau Lotto, in turn, "[t]he world out there is … our three-dimensional screen. Our receptors take the meaningless information they receive; then our brain, through interacting with the world, encodes the historical meaning of that information, and projects our subjective versions of color, shape, and distance onto things."[22] Photographic and film technology therefore exists in a mutually constitutive relationship with technologies *and* narratives of vision.

The constitutive role of photo-technical metaphors in explaining vision is perhaps a symptom of that fact that, as highlighted by Anderson and Fisher's sobering conclusion to their article, "even though we have been looking at motion pictures for three quarters of a century, we still do not understand the most basic perceptual principles."[23] This sense of perplexity is reiterated in the opening pages of the widely used psychology textbook, *Sensation and Perception*, with its author E. Bruce Goldstein admitting that "we still don't understand perception."[24] The difficulty refers specifically to understanding how nerve impulses, or sodium and potassium molecules flying across a membrane, produce subjective perceptual experiences for us.

Flowcuts, *EGR-5*. Photograph by Joanna Zylinska.

In other words, advanced multidisciplinary research in neuroscience has not yet found a way to explain how the subjective experience of perception is constituted *for us*—a conundrum described by David Chalmers as a "hard problem of consciousness,"[25] with perception arguably being foundational to the emergence of consciousness and a principal mode of generating subjective experience. This knowledge blind spot at the heart of visual perception studies perhaps explains why the shift from the retina to the brain in cognitive psychology has not really put to rest the mechanical metaphors of a human organ, be it the eye or the brain, as a camera, or, more broadly, an image-making apparatus, both in media-theoretical discussions and in scientific descriptions of the problem of vision.[26]

Yet this lingering cluster of photo-mechanical metaphors can also be a potent conceptual opportunity, I believe. Indeed, many humanities scholars are aware of the metaphorical aspect of *all* forms of message transmission, including scientific communication. They (or rather, we) use metaphors readily and playfully—while also remaining attuned to the historical specificity of what gets positioned as experience and evidence. The awareness that the eye is *not* a camera, that it does not see in frames per second and that it does not capture ready-made images which it then "sends" to the brain has thus enabled a new articulation of the process of perception. The demise of the persistence of vision model, with all its scientific error and metaphorical poeticity, has given way to its opposite: i.e., the premonition of vision, with the brain playing a much more active role in image construction. Yet this is not a straightforward conclusion

that, while the eye is not a camera, the brain perhaps might be. A much more creative model of perception emerges here instead, requiring us to rethink "the brain"—which really needs to be put in inverted commas—to refer to a whole apparatus that includes the observer and the thing observed, us and the world.

This phenomenological model, deemed an "ecology of perception,"[27] was originally associated with the work of psychologist James J. Gibson, but has recently been developed further by philosophers Alva Noë and Shaun Gallagher.[28] It has also been taken up by many creative disciplines, from dance through to architecture and design. Perception here stands for capturing what the world affords us and remaining open to it—but it also involves introducing cuts to what Gibson termed an "optic flow" by way of discretizing this flow into lines, edges, objects and, consequently, images. For Gibson, the optic flow names the apparent flow of objects experienced by the observer in her visual field as she moves through space.[29]
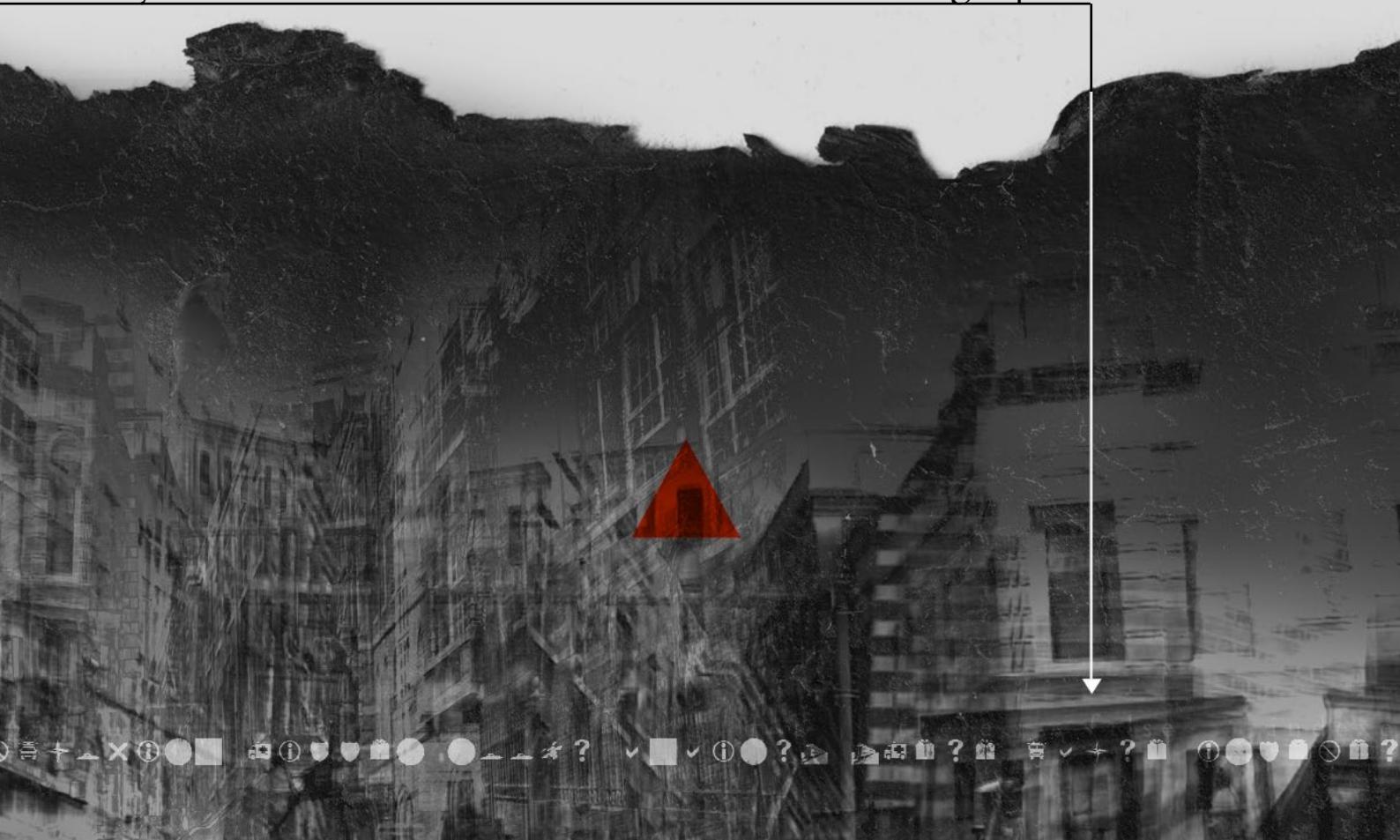
Flowcuts, *TLOU-5* (Up), *TLOU-3* (Down). Photographs by Joanna Zylinska.

His *The Ecological Approach to Visual Perception*, published in 1979, challenged the model of perception as a transmission of an image from an object to the eye—and then the brain. In its place Gibson offered the idea that perception was mobile, distributed and kinesthetic, and that it encapsulated the whole of the corporeal apparatus. In other words, vision for him required a movement of the perceiving agent's body, delivering simultaneous information about, and awareness of, "the world" and "the self in the world."[30] Building on the subsequent research in neuroscience and cognitive psychology, in the concluding words to their article, "The Myth of Persistence of Vision Revisited," which was another attempt to debunk a model that had cast a shadow for longer than expected, Anderson and Anderson similarly concluded that perception was an active process, one in which the corporeal apparatus of the observer—her eyes, brain, and the whole body—participated: "We rapidly sample the world about us, noting the things that change and the things that do not change. We turn our heads for a better view; we move left or right to gain additional information provided by a different angle. We move closer or farther away. We actively seek more information about things that interest us."[31] Perception thus extends from the brain into the world, with "the brain" standing for the dynamic space between the observer and the world. It is also inherently coupled with action. It would not therefore be too much of an exaggeration to say that *I perceive therefore I act*, with the reverse of this statement also having some veridical value.

The key problem that emerges here is the need to understand the mechanism through which cuts are made in the optic flow. As discussed

above, our eyes are in constant movement of several different kinds. They are also "drawn to hard edges,"[32] which become points of stoppage on this inevitably blurry journey of perceptive movement. Ruth Modrak explains that "The eye and the brain are accustomed to using contours as a way to understand the environment."[33] Even though nothing in the world is actually made up of lines and edges, "they eye and brain have evolved systems that encode these differentiating signals and process the information in such a deceptively casual manner that we start to believe that edges and lines are visible components of the 'real world.'"[34] We could therefore go so far as to suggest that "the brain," which by now, as we have established, stands for a wider perceptive apparatus embracing our whole body and reaching out into the world, introduces edges and cuts into the imagistic flow: it cuts the environment for us to see it, and then helps us stitch it back together again.

Flowcuts, *TLOU-5*. Photograph by Joanna Zylinska.

IV

The *Flowcuts* project presented here has allowed me to explore both the working of perception and the way we can understand it, conceptually and experientially. My investigation commenced with the images, with the written material developed in response to the image-making process. By revealing my method, I am not by any means promoting immersion in "pure experience" or advocating the superiority of practice over theory: my experience of screenshotting within gameworlds was of course always being mediated both by my ongoing photographic practice and by my knowledge of philosophy and media theory. The images that form the *Flowcuts* series were all captured from multiple angles around various scenes and locations I had come across, using the embedded camera function in the two games featuring post-apocalyptic scenarios I mentioned earlier, *The Last of Us* and *Everyone Has Gone to the Rapture.* Each image had been produced from overlaying, in Photoshop, views of the same scene captured from several different angles. It was then edited according to my own aesthetic preferences, fueled by the two games' end-of-the-world landscapes and scenarios, in the photo-editing program called Lightroom. The retaining of the traces of multiple singular shots within the images was a nod on my part to various theories of perception. It was also an attempt to show the process of navigation between seeing movement and enacting cuts in the optical flow, a process that our visual apparatus constantly performs as part of what we know as "seeing." The final images became what I began to call "image-concepts."

I should clarify that my venture into the neuroscience research into perception presented in the previous section of this essay was not an attempt to justify or, worse, *prove* the correctness of my intimations about perception enacted in the images. Rather, I looked into the science material with a view to developing a satisfactory mode of "cutting" through the flow of ideas, affects and percepts with a view to temporarily stabilizing them into images. This approach was partly indebted to Gilles Deleuze and Felix Guattari, who in *What Is Philosophy?* had come up with a strategy for taming the chaos of the world and its multiple sensations exerted upon us with the help of "Chaoids." This was the name they gave to art, science, and philosophy, three creative practices which they identified as the daughters of Chaos. In other words, Chaoids became for them different enablers for organizing matter and ideas into forms in three different registers and genres—and for creating concepts out of chaos. Importantly, for Deleuze and Guattari concepts do not serve "to replicate accurately in discourse specific segments of the world as it really is (as science does), but to propose articulations of and/or solutions to problems, to offer new and different perspectives on orientations toward the world."[35] Every concept is thus a "matter of articulation, of cutting and cross-cutting."[36]

As Sarah Kember and I have argued elsewhere, the process of cutting needs to be seen as "one of the most fundamental and originary processes through which we emerge as 'selves' as we engage with matter and attempt to give it (and ourselves) form. Cutting reality into small pieces—with our eyes, our bodily and cognitive apparatus, our language, our memory, and

our technologies—we enact separation and relationality as the two dominant aspects of material locatedness in time."[37] The image-concepts presented here are therefore not just illustrations or visual metaphors of a philosophical or scientific problem: they are temporary stabilizations at the cross-roads of art, science, and philosophy. They also serve as devices that can help me (and, hopefully, others) to approach and think *through* the problem. Once again, science is thus not evoked here as evidence but is rather mobilized in recognition of the fact that science research into cognition, perception, and vision has already been part of, or even shaped, the philosophical understanding of those concepts since ancient times—and that it has also generated (and been furthered by) artistic practice. Also, as discussed earlier, film and media theory has always been engaged with, or even premised upon, scientific knowledge about perception. The recent shift from the eye to the brain, from the after-image to the neuro-image,[38] is a testament to this engagement.

Flowcuts, *TLOU-1* (Up), *TLOU-4* (Down). Photographs by Joanna Zylinska.

Taking the fundamental role of "the cut" into account, screenshotting as a process where the game player uses the camera or camera-function provided within the game to screen-capture a scene from the point of view of the playing character, could perhaps therefore be renamed as screencutting. Even though a certain violence is implied by both terms, cutting involves a more multi-dimensional and less targeted operation. Its endpoint is not the arrival of a bullet (or bullet-like ray of light) that razors the world into submission, but rather the creation of a temporary 3D shape that subsequently becomes flattened and recognized as an image. The experience of capturing screens as images in a 3D game environment arguably allows us to move beyond the camera/shutter model of perception, enacted by the supposedly fixed eyes which neatly slice the world into stills. This model, which was widely upheld up until the mid-nineteenth century but whose shadow still lingers in many contemporary conceptualizations of vision as stable, acute and anchored, was based on the architecture of the camera obscura. The camera obscura's monocular aperture became "a more perfect terminus for a cone of vision, a

more perfect incarnation of a single point than the awkward binocular body of the human subject."[39] In-game camera activity can allow us to reclaim and reengage the body's mobility and awkwardness. It can do this not so much by offering a prosthesis of vision in the gameworld but rather by becoming "an extension of our moving-and-perceiving body, in its dual nature as both subject and object in the world."[40] As well as being interested in the experiential enactments of some learned behaviors around perception, vision, mobility, and action in a controlled environment of the game, I was specifically drawn to the possibility of exploring framing as a corporeal–conceptual device for organizing the world.

Framing is no doubt artificial, in that "reality" does not of course present itself to us in frames. This is perhaps a good moment to mention, albeit in passing, that many contemporary theories of perception adopt what is known as "conscious realism," an updated yet reversed version of Bishop Berkeley's conviction that reality, or at least what we humans call and perceive *as* reality, is only ever a product of our senses.[41] Unlike Berkeley's subjective idealism, this theory does not negate the existence of reality, that is of the actual material "stuff" that makes up the world, it only challenges the possibility of us ever accessing that reality in a true, unmediated way. In other words, we could say that we see what we need to see rather than what is "really" out there, while there is no one to assess and guarantee what this out-thereness looks like, as any attempt to describe, capture and measure it is inevitably entangled with the very devices, be it human or machinic, that undertake the process of description, capture and measurement. Framing is an

important part of this process, especially as knowledge and understanding, increasingly produced today in a visual form, typically come to us framed, from the rectangle of the book block to the square of Instagram. I would therefore go so far as to suggest that we frame the world in rectangles not because our visual apparatus encourages us to do so, but rather because rectangular frames, in the shape of mirrors, windows, books, and pictures, are already part of our established epistemological repertoire.

Screenshotting in gameworlds has also offered me the opportunity to enact the fantasy of early industrial age: that of becoming an eye. With its antecedents in the plethora of optical instruments—such as opera glasses, bi- and monoculars and spyglasses[42]—made for the pleasure of the eighteenth-century urban voyeur, this fantasy has been re-channeled by the recent experiments with the omnipresent camera-eye, from the ill-fated Google Glass through to wearable cameras. The frequency and semi-automation with which camera phones are used today have created a situation in which perception, experience and thus consciousness are permanently coupled with framing and capturing reality through a handheld rectangular glass device. The artificial, laboratory-like aspect of the game environment is therefore getting ever closer to the experience one has in the world *outside* the game. Game theorist Rune Klevjer argues that in "navigable 3D environments, the main 'body' of the avatar, in the phenomenological sense, is not the controllable marionette itself (for example Mario or Lara), but the navigable virtual camera, which becomes an extension of the player's locomotive vision during play."[43]

Flowcuts, *EGR-6* (Up), *TLOU-7* (Down). Photographs by Joanna Zylinska.

3D games can thus be said to facilitate the enactment of a mediated desire for "becoming an eye": that of "becoming a camera." There is a long history of artists experimenting with image-making and vision in this way, from Alexander Rodchenko's and László Moholy-Nagy's adoption of the floating viewpoint of a bird or the angular perception of an insect through to Lindsay Seers literally becoming a camera by taking photos with her mouth.[44] In gameworlds, this artist is no longer avant-garde, and they are not even an "artist" anymore. In the plethora of possibilities and angles on offer—2½D, over the player's shoulder, camera-centered behind the player, unbroken first-person perspective, perspective switch, freelook—screencutting allows *any* player to produce a multi-perspectival, multilayered tissue of images that are a direct result of them approaching a scene in a certain way. The images produced are therefore an outcome of the interwoven and mutually constitutive ecologies of perception and ecologies of media.

In-game photography in the simulated space of the gameworld also allows for the denaturalization of perception: it reconnects the perceiving agent with the mechanics of its perceptive apparatus, while foregrounding the latter's technical aspects. It is therefore perhaps more apposite to say that screenshotting not so much *de*naturalizes as, rather, *de*mechanizes perception as a specific learned behavior. It also reframes being in the world as being a sensing agent, one whose openness to the world comes not just through the primary senses such as the eyes or ears but also through the distributed perceptive multi-organ that entails the whole body—what we earlier called, perhaps somewhat reductively, "the brain." It thus allows us to see better—and to understand seeing both corporally and as a corporeal, haptic process. Shifting the human perceptive apparatus beyond its

conceptual lodging in the eye, screenshotting as enacted in 3D game environments allows players to become more attentive to the distributed nature of perception and vision, a process in which the whole of the human body is mobilized to produce images and thus to enable players to see the world. Screenshotting is therefore a way of retraining players' eyes, bodies, and minds in both seeing the world and understanding perception better. This experience can generate new forms of sensation and cognition for experienced gamers as well as game novices. Indeed, for me the game environment became a space for reorienting myself as a distributed subject of perception and action, and for taking in this knowledge, mentally and corporeally.

This kind of experience could of course be undertaken in a different visual environment—an immersive art installation or even a city walk. Yet the game environment makes that task a little easier perhaps: both embracing and eliding the experience of mediation, it stages worldliness for us as a mobile task to explore and engage with, with our eyes, hands, brains and bodies all participating in seeing *and/as* doing. In *Mobile Screens: The Visual Regime of Navigation*, Nanna Verhoeff suggests that "interaction with screen-based interfaces already entails a performative, creative act."[45] She goes on to argue that in the visual regime of navigation movement itself is both performative and creative because it "not only transports the physical body, but affects the virtual realm of spatial representation. This implies a temporal collapse between making images and perceiving them."[46] Here perception reveals itself to be an inherently creative task. In screenshotting the photographer's eye extends beyond the optical apparats with its line of vision to reach onto the world in a more dynamic and enfolded way.

We could thus go so far as to say that, paradoxically, the mediated experience of being in a video game denaturalizes the enculturation of photographic image-making as the objective representation of reality, while also opening up the apparatus beyond the eye-hand-world triangle. Once again, in-game photography is particularly predisposed to undertake this process of repositioning human perception as ecological because the camera in the game is often invisible. Indeed, in many instances *the whole body becomes a camera,* as walking is itself an actively engaged mode of seeing and sensing. The coupling of these activities is actually imperative for the survival of the playing character in many games: otherwise, they simply get shot. Screenshotting thus allows one to escape screen shooting. It teaches the character how to navigate the world safely, but it also becomes a way of taking on and enacting perception with one's whole body. Poignantly illustrating the error of the persistence of vision theory, it also playfully engages with it as a lingering shadow in understanding our perception of motion, in film and "in life." If our "brain" is indeed believed to have evolved not to see "reality" but to help us survive,[47] the constant flood of intermixed stimuli would be impossible to process as discrete pieces of information. Life can thus be redescribed as an ongoing process of navigating between cinema and photography, with image-making becoming a mode of world-making, for gamers and non-gamers alike.

Flowcuts, *EGR-4* (Up), *EGR-3* (Down). Photographs by Joanna Zylinska.

$$\boxed{\text{CODA}}$$

In a somewhat uncanny turn of events, I took first steps toward this project on perception and gaming in 2018, but the majority of the *Flowcuts* images were made in the early 2020. This meant that I was screenshotting the gameworlds that had been abandoned by their inhabitants as a result of some vaguely specified global-scale pandemics while becoming increasingly aware of the COVID-19 coronavirus epidemic developing in Wuhan, China. By the time I was ready to submit the images and the accompanying essay for publication in March 2020, the World Health Organization had announced a worldwide pandemic, with my home city of London, UK, going into partial lockdown. I started wondering whether I should pull the project altogether, rewrite it, or replay it through other games. I became anxious about the timing, or even about the work being seen as an example of disaster scholarship or trauma art, a cynical attempt to milk public anxiety for my own visual experimentation. In the end, I decided against changing it too much. Even though the project is ostensibly about perception, and it *could* therefore have been illustrated with a whole variety of other, visually "nicer" and safer, games, I cannot deny my own premonitory turn to the post-apocalyptic video games to think about how we see and frame the world.

I also need to mention that I have been concerned with the apocalypse in my work for a while now. This interest has been fueled by the unfolding climate crisis and the accompanying economic disasters in different parts of the world in the aftermath of the global financial crash of 2008. I have

also been intrigued by the ongoing fascination with stories of our human collapse as a civilization and as a species. It's important to note that it's not the apocalypse *as such* that enthralls me, but rather the way we mobilize and utilize it in concepts, words and images. As part of this exploration, I have become increasingly suspicious of the so-called "ruin porn" associated with the representation of dilapidated landscapes, abandoned buildings and soon-to-expire worlds.[48] In proposing the notion of a "feminist counter-apocalypse" in a recent book,[49] I wanted to raise questions about the modes of knowledge and visualization, and the paternalistic articulations related to them, that come from some contemporary prophets of doom and gloom. At the end of the day, many such prophets seem more interested in peddling their wares, be it the latest techno-fixes or the latest Great Ideas, than in developing more workable ways of collaboration and coexistence on our planet, for humans and nonhumans alike. Such totalized imaginings of the end of the world seem to forget that the apocalypse itself is not distributed equally. Many groups, tribes, people, and nations throughout our human history have already experienced vital threats to their existence, via environmental or socio-political means. There is thus something politically disabling in adopting this all-encompassing apocalyptic tenor to describe the fate of the world for "us all."

This perhaps explains why in my first venture into videogaming, I chose games that dealt with imagining the apocalypse—a popular entertainment genre in different media in recent times, but one that offers particularly rich material for both training our imagination and exploring behavioral

simulation in gameworlds. Yet we must remember that fascination with disaster kitsch is also a psychological mechanism, allowing us to cope with anxiety about the end of the world, be it our planet or our everyday ways of going about things. Indeed, ruin porn has a mollifying nature: it projects and forecasts horror and trauma for us so that we don't have to spend time and energy imagining it, while also enclosing it for us in a series of palatable, albeit horror-inducing images. Apocalyptic imagery gives us the relief of being able to stare at a disaster from a distance, in the safety of our own home, computer or phone, while being able to slowly take it in. But it also becomes a carrier of our anxiety, framing disaster for us as pictures, while taking it away, for a short while at least.

In any kind of political or existential crisis, the question of perception, of our bodies and minds interacting with the world of which they are part to make meanings and interventions in it, remains fundamental. Because, before we figure out how we can mobilize the redemptive promise entailed in any apocalyptic narrative to try and make our world more livable, we need to ask a number of fundamental questions: How do we see what's around us? How do we organize the flow of images, data, figures, affects, and percepts to construct a coherent picture of the world? When do we become *ready* to see things? How do we frame what we see? And how can we reframe it?

Notes

1   *The Last of Us*, one of the most highly rated and best-selling games of all time, was created for the game console PlayStation 3 in 2013. It was remastered for PlayStation 4 in 2014 and subsequently became known as *The Last of Us Remastered*. This is the version of the game I played, but for the sake of simplicity, I will be simply referring to *The Last of Us* from now on.

2   Matteo Bittanti, "The Art of Screenshoot-ing: Joshua Taylor, Videogame Photographer," in *Mister Bit – Wired IT*, December 24, 2011; http://blog.wired.it/misterbit/2011/12/24/the-art-of-screenshoot-ing-joshua-taylor-videogame-photographer.html

3   Cindy Poremba, "Point and Shoot: Remediating Photography in Gamespace," *Games and Culture*, vo. 2 issue 1 (2007), 49-58, 50.

4   This is the explanation of Martin's technique as provided by the games website Kotaku:

> "I use a DLP projector connected up to a console or PC and a projection screen," says Damian-Martin. "I then photograph the game as it's projected on the screen using two different 35mm cameras and a very high ISO black and white film stock. The reason for this is that photographing a game from a screen would mean the image is broken down into RGB pixels creating a 'screendoor' effect across the image making it obviously digital. The interaction of the soft DLP image and the heavy grain of the 3200 ISO film stock I use is what creates the strange reality of the images—our minds automatically fill in the detail that the grain suggests, making the image feel more real than it does in the game."

Rich Stanton, "These Photographs Make Video Game Worlds Look Real," *Kotaku*, March 22 (2018), https://www.kotaku.co.uk/2018/03/22/these-photographs-make-video-game-worlds-look-real

5   Wasim Ahmad, "It May Be Art, But In-Game Images Aren't 'Photography'," *FStoppers*, March 24 (2017), https://fstoppers.com/originals/it-may-be-art-game-images-arent-photography-170382

6   Matteo Bittanti, "Interview: Gareth Damian Martin: The Aesthetics of Analogue Game Photography," *GameScenes*, February 4 (2018), https://www.ga-

mescenes.org/2018/04/interview-gareth-damian-martin-the-aesthetics-of-ana-logue-game-photography.html

7   It was "Shooting Virtual Cities: In-Game Photography Workshop," held on July 7, 2018. I am grateful to Martin for the inspiration the workshop provided me with—and for bearing with me when I didn't know how to hold a game controller properly.

8   I am borrowing the concept of technical images from Vilém Flusser. He defines technical images—a term which for him embraces photography, film, television, video and other hybrid image forms—as "mosaics assembled from particles" (6). Flusser differentiates them from "traditional images" such as cave or oil paintings, which he considers as having a different relation to reality: traditional images are mimetic, while technical images function as visualisations, i.e., models. Vilém Flusser, *Into the Universe of Technical Images*, trans. Nancy Ann Roth (Minneapolis: University of Minnesota Press, 2011).

9   Rebekah Modrak observes that several early theories of vision, developed, among others, by Plato and Euclid, already hinted at a more dynamic process, positing that light particles "were projected out of the eye onto objects," with the eye actively creating the image. This latter model is indeed much closer to our current understanding of perception and vision. Rebekah Modrak with Bill Anthes, *Reframing Photography: Theory and Practice* (London: Routledge, 2011), 4.

10   Joseph Anderson and Barbara Fisher, "The Myth of Persistence of Vision," *Journal of the University Film Association*, vol. 30, no, 4 (Fall 1978), 3-8, 3.

11   Ibid., 6.

12   Ibid.

13   Max Wertheimer, "Experimentelle Studien über das Sehen von Bewegung," *Zeitschrift für Psychologie* (1912) 61: 161–265.

14   Cited in Joseph Anderson and Barbara Anderson (née Fisher), "The Myth of Persistence of Vision Revisited," *Journal of Film and Video*, Vol. 45, no. 1 (Spring 1993), 3-12, 7.

15   This is a phenomenon described as beta movement. It is a cognate phenomenon to "phi motion," a concept introduced by Wertheimer in his 1912 paper, which I discuss in the main body of my text. Anderson and Anderson offer their own term for what became known as beta movement, arguing as follows: "Since we know that

the individual pictures of a motion picture are not really moving, and that our perception of motion is therefore an illusion, and since we *now* know that the effect has nothing to do with persistence of vision or phi movement, we suggest that henceforth the phenomenon of motion in the motion picture be called by the name used in the literature of perception: *short-range apparent motion*," "The Myth of Persistence of Vision Revisited," 10. They also indicate that human perception cannot distinguish between *apparent* short-range motion and *actual* motion in the natural world. "To the visual system, the motion in a motion picture *is* real motion," they claim, 10.

16   Marc Sommer and Robert Wurtz, "Influence of the thalamus on spatial visual processing in frontal cortex," *Nature* 444 (2006), 374-7.

17   Ibid., 374.

18   Julia Layton, "How does the brain create an uninterrupted view of the world?," November 15 (2006), HowStuffWorks.com, https://science.howstuffworks.com/life/steady-view.htm

19   Ibid.

20   Ibid.

21   "The Brain Is the Screen: An Interview with Gilles Deleuze," in *The Brain Is the Screen: Deleuze and the Philosophy of Cinema*, ed. Gregory Flaxman (Minneapolis: University of Minnesota Press, 2000), 365-374, 3

22   Beau Lotto, *Deviate: The Science of Seeing Differently* (London: Weidenfeld & Nicolson, 2017), Kindle edition.

23   Anderson and Fisher, "The Myth of Persistence of Vision," 7.

24   Bruce E. Goldstein, *Sensation and Perception* (Belmont, CA: Wadsworth Cenage Learning, 2010), 8th edition, 4. Some conceptual clarification is required here. I have been using the terms "visual perception" and "vision" interchangeably throughout this piece: both refer to the act of obtaining information from athe world from light entering the eyes. Due to the dominance of the eye in our everyday understanding of how see the world, "perception" and "vision" are often treated as equivalent in everyday parlance – and I have myself offered such a shortcut here at times. Yet, as pointed out by Lotto, "in terms of the sheer number of neural connections, just 10 percent of the information our brains use to see comes from our eyes. The rest comes from other parts of our brains, and this other 90 percent is in large part what this book is about. Perception derives not just from our five senses but from our brain's

seemingly infinitely sophisticated network that makes sense of all the incoming information," *Deviate*. The further part of my essay aims to show that visual perception *always* involves other senses—a concept that has become known as the "ecology of perception." Vision is never thus *just* visual.

25   David J. Chalmers, "Facing up to the problem of consciousness," *Journal of Consciousness Studies* 2 (1995): 200-19.

26   As argued by Joseph and Barbara Anderson ("The Myth of Persistence of Vision Revisited," 7),

> Theories such as Werthiemer's [*sic*] which emphasize a central fusion process were reflected in early film literature, but with little understanding of the physiological mechanisms involved. Frederick A. Talbot, for example, in *Moving Pictures: How They Are Made and Worked* offered an account of this central fusion variation of the persistence of vision theme. The cinematographer, according to Talbot, takes advantage of a "deficiency" of the human eye: "This wonderful organ of ours has a defect which is known as 'visual persistence'." (Talbot 3) Talbot provided one of the most colorful explanations of this so-called defect:
>
> > The eye is in itself a wonderful camera....The picture is photographed in the eye and transmitted from that point to the brain....When it reaches the brain, a length of time is required to bring about its construction, for the brain is something like the photographic plate, and the picture requires developing. In this respect the brain is somewhat sluggish, for when it has formulated the picture imprinted upon the eye, it will retain the picture even after the reality has disappeared from sight. (Talbot 4)
>
> According to Talbot, then, each two contiguous images blend or fuse together in the brain, allowing for the perception of smooth, continuous movement. He further compares the brain to a then-contemporary apparatus for slide projection, known as a "dissolving lantern," by means of which one view is "dissolved" into another. (Talbot 5)

27   Two contrasting accounts of visual perception are currently predominant in the cognitive sciences: the theory of inferential perception, premised on cognitivist thinking, whereby the subject establishes a relationship between the environment and the percept by means of a rational inference, i.e., interpretation, and the theory of direct perception, one that involves a more direct grasping of the relationship between the percept and the information provided by the stimulus. This second theory is the one known as "ecology of perception."

28   Alva Noë, *Action in Perception* (Cambridge, MA: MIT Press, 2004); Shaun Gallagher, *How the Body Shapes the Mind* (Oxford: Oxford University Press, 2005).

29   See James J. Gibson, *The Perception of the Visual World*, Boston, MA: Houghton Mifflin, 1950.

30   James J. Gibson, *The Ecological Approach to Visual Perception*, Boston: Houghton Mifflin, 1979, 187. This paragraph and the next one have been reworked from my book *Nonhuman Photography* (Cambridge, MA: MIT Press, 2017).

31   Anderson and Anderson, "The Myth of Persistence of Vision Revisited," 11.

32   Modrak, *Reframing Photography*, 10.

33   Ibid., 11.

34   Ibid.

35   Gilles Deleuze and Félix Guattari, *What Is Philosophy?*, trans. Hugh Tomlinson and Graham Burchell (New York: Columbia University Press, 1994), 208.

36   Ibid.

37   Sarah Kember and Joanna Zylinska, *Life After New Media: Mediation as a Vital Process* (Cambridge, MA: MIT Press, 2012), 75.

38   See Patricia Pisters, *The Neuro-Image: A Deleuzian Filmphilosophy of Digital Screen Culture* (Stanford: Stanford University Press, 2012).

39   Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), 53.

40   Rune Klevjer, "Enter the Avatar: The Phenomenology of Prosthetic Telepresence in Computer Games," in *The Philosophy of Computer Games*, eds. Hallvard Fossheim, Tarjei Mandt Larsen and John Richard Sageng (London & New York: Springer, 2012), 17-38, 32. I am grateful to Agata Zarzycka for pointing me towards Klevjer's work.

41   See Donald D. Hoffman, "Conscious Realism and the Mind–Body Problem," *Mind & Matter* Vol. 6:1 (2008), 87–121.

42   See Hanneke Grootenboer, *Treasuring the Gaze: Intimate Vision in Late Eighteenth-Century Eye Miniatures* (Chicago: University of Chicago Press, 2012), 82-88.

43   Klevjer, "Enter the Avatar," 3.

44   Rodchenko and Moholy-Nagy were involved in photographic experiments

aimed at displacing human vision by adopting the floating viewpoint of a bird or the angular perception of an insect. These radical new viewpoints amounted to what Moholy-Nagy described as a "New Vision," which the new society in the then nascent modern era required, according to his revolutionary intimations. Seers' *Human Camera* project, in which she literally becomes a camera by taking photos with her mouth, was an activity which I previously read as enacting the inherently photographic nature of life itself (see Zylinska, *Nonhuman Photography*, 75-77).

45   Nanna Verhoeff, *Mobile Screens: The Visual Regime of Navigation* (Amsterdam: Amsterdam University Press, 2012), 15.

46   Ibid., 13.

47   As Lotto argues, "The world exists. It's just that we don't see it. We do not experience the world as it is *because our brain didn't evolve to do so.*" He then adds that "our brains developed not to see reality but just to help us survive the constant flood of intermixed stimuli that would be impossible to process as discrete pieces of information, if it were even possible for them to appear that way." For Lotto, perception is not an end in itself: he argues that we perceive so that we can move. Also, (eye) movement, "combined with a constant search for difference," is the fundamental condition of sight. (*Deviate*, Introduction, Kindle edition)

48   See Chapter 3, "Photography after the Human," in Zylinska, *Nonhuman Photography*.

49   Joanna Zylinska, *The End of Man: A Feminist Counterapocalypse* (Minneapolis: University of Minnesota Press, 2018).

IT IS AS IF THE GAME IS PLAYING ME

BUT I KEEP RETURNING

WHILE I AM TRYING TO RUN AWAY.

About the Author

Joanna Zylinska is a writer, lecturer, artist, curator, and—according to the ImageNet Roulette's algorithm—a "mediatrix." She works as Professor of New Media and Communications at Goldsmiths, University of London. The author of many books—including *The End of Man: A Feminist Counterapocalypse* (University of Minnesota Press, 2018) and *Nonhuman Photography* (MIT Press, 2017)—she is also involved in experimental and collaborative publishing projects, such as *Photomediations* (Open Humanities Press, 2016). Her art practice involves playing with different kinds of image-based media.