Throughout
Art and Culture Emerging with Ubiquitous Computing
edited by Ulrik Ekman | foreword by Matthew Fuller

Jacko and Sears 2003). This trend is recognizable, but in the strict and narrow sense it is far from mature and not much more than ten years old, and it is marked, much like its sister disciplines contributing to a ubicomp culture, by an unresolved series of questions respecting the ethicopolitical desirability, technical feasibility, and functional robustness pertaining to various kinds and degrees of embeddedness versus explicit unfolding of interaction designs. This (in)visibility or (un)calmness undoubtedly explains in part why you may have slowed your strides across Trafalgar Square in London in 2008 for at least two kinds of reasons. First, it might be due to your feeling affirmatively invited into media artist Rafael Lozano-Hemmer's large installation *Under Scan* (2008) at the square by the elegant technical and embodied interactive play with the movement of individuals' shadows and a great many prerecorded video portraits (figures I.1 and I.2). Then it might be because you began to think as the shadow play of the installation broke off in order to illuminate and visualize the embedded grids and control mechanisms at stake in its surveillance and tracking systems operating on this public square.[5]

When you visit Lozano-Hemmer's *SubTitled Public* (2005–) installation, you see people not wanting to enter its black box or making a fast escape just after entering it, but you also see others remaining to move around inside in order to explore the projections of verbs that continuously follow each individual as "public subtitles," perhaps even pushing their exploration to the point of enjoying a playful exchange of "subtitles" by touching another person. If you were present at one of the earlier installations of David Rokeby's *Very Nervous System* (1986–1990), you might have observed a blind boy jumping back as if hitting a physically erected wall when he tried to enter the unmarked interactive auditory environment of the installation. This reaction did not occur just because the boy's senses of hearing and touch were operative, however acutely. It happened also because Rokeby's performative interactions involved contact with sonic blocks seemingly alive so they fostered an affective and sensorimotor event in which hearing was first another protosensory touch, an auditory spacing with a vibrant force of tactility to whose impression the boy could only be responsive.

In a pervasive game such as *SuperFly* by the Swedish company It's Alive Mobile, you are not only preoccupied with the goal of becoming a virtual celebrity, with all its concerns relating to performative self-presentation, but also immersed in the flow of the game because play appears to command presence and thus responds by granting a sense and sensation of presence. When you enter into pervasive gaming with Blast Theory's *Uncle Roy All Around You*, doing so means engaging with a largely post-GUI setting relying on wearable, mobile, or embedded software and hardware for its provision of a virtual and "natural" physical environment that does not just *facilitate* the game but is technologically prepared so as to be continuously *responsive* to mobile, location-oriented gameplay. You stay involved on a performative basis largely

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Figure I.1
A young woman and an *Under Scan* video portrait exchanging greetings in the streets of Leicester, UK (2006).
Source: Photograph courtesy of Rafael Lozano-Hemmer.

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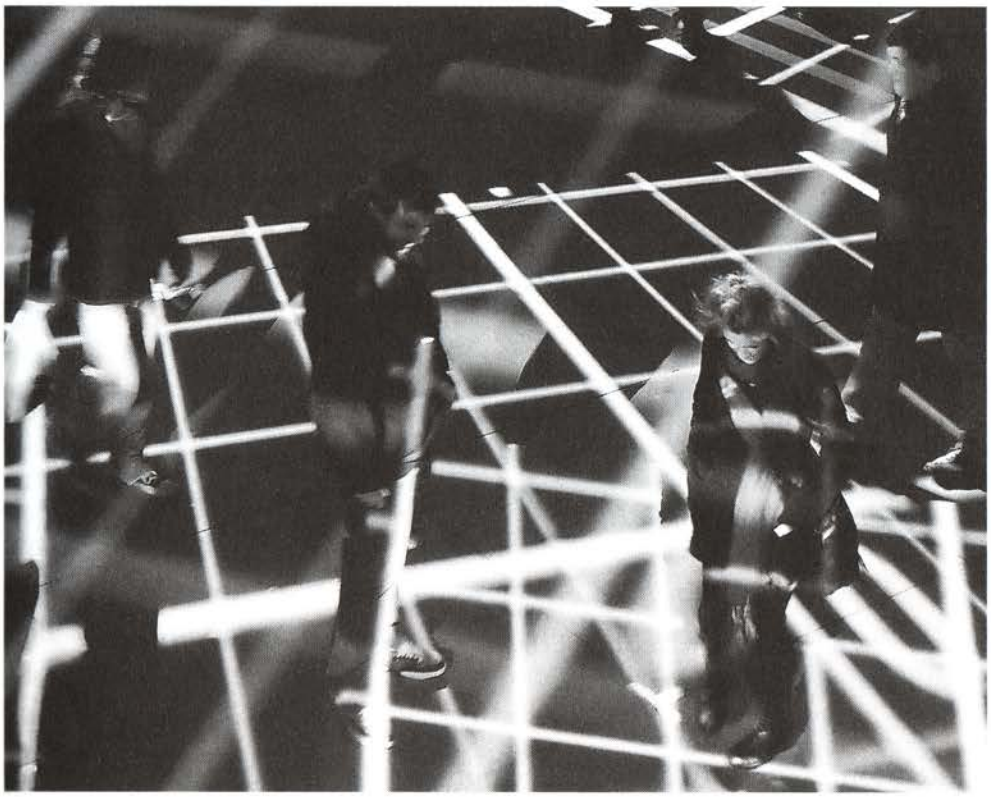

Figure I.2
A laying bare of the surveillance and tracking grids in *Under Scan* (2008), Trafalgar Square, London.
Source: Photograph courtesy of Rafael Lozano-Hemmer.

because the game manages to engage you in an ongoing mixed-reality (re)organization of time and space. (See figure I.3.)

In other words, whether you are running on a virtual plane or moving through city streets and buildings, the gameplay has you swallowed by the seeming presence of playing. You are in the flow, as Mihály Csíkszentmihályi (1990) would say, and this means keeping on playing live, playing with liveness—that is, prolonging a sense and sensation of presence and presencing.[6]

Some of us have participated (less playfully) in meetings at work that took place in rooms that were aware of the people (tele)present to the extent that digital projections were adjusted accordingly, just as calendar arrangements were made more easily. Such rooms did much in terms of illustrating why the development of systemic context awareness is a chief goal for ubiquitous and pervasive computing, just as the ensuing errors and misunderstandings did much to make clear that an approximation of interacting with human context awareness still remains a formidable technical challenge—for instance, in terms of going from awareness of physical location and movement to

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Embeddedness

Because Weiser's original ideas and ideals for ubicomp have been widely adopted by technical developers and cultural theorists alike, they should be revisited today with respect to the implications of an embedded ubicomp, notably in terms of relations between human and technical context awareness. Pointing toward a human-centered computing with a "calm" context awareness is obviously a move that is culturally and technically far from innocent or value free, and it is still unclear today where technical developments and cultural approaches will end up going. Here it might initially be of interest to pursue a double course, at once parenthesizing some of the potentially exaggerated fear of technical embeddedness evident in cultural studies *and* opening up technical research and development for more culturally informed variants of constructive criticism, because these variants continue to risk being underestimated in spite of laudable moves toward transdisciplinary research teams in this particular field.

"Embeddedness" is in and of itself nothing new (figure I.6). We recognize it easily enough in conventional notions of enfolding so as to provide support or reinforcement, in the recursive nesting of some element in the middle of a similar or different element, or simply in our everyday practices of embedding various media into a text document or a Web page so as to form a compound file. "Embedded systems" have likewise been a staple of computer science for quite a long time and denote devices

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Figure I.6
Becoming aware of embeddedness and systemic context awareness in Rafael Lozano-Hemmer's *Under Scan*, Leicester, UK (2006).
Source: Photograph courtesy of Rafael Lozano-Hemmer.

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The digital-image file has only a virtual existence as image, a potentiality, and must be actualized to be seen. Once the actualization ends—for example, because we shift to actualizing another image on our screen—the existence as actualized image ceases. In its actualizations, the image will manifest itself differently according to the screen, the paper, or other surface on which it is actualized. British philosopher and art theorist Peter Osborne seems largely in agreement with what I am suggesting here as he notes that "it is in its potential for an infinite multiplication of visualizations that the distinctiveness of the digital image lies" (2010, 60). Thus, the screen "lends" materiality to images during the time they are activated. This principles affords actualization games by which photographs or, for that matter, video images may migrate across a wide set of surfaces, acquiring shifting materialities under way. When Rafael Lozano-Hemmer's installation *Under Scan* (2004) was shown in Trafalgar Square in London in November 2008, its video images of people projected onto the street enlisted viewers to interact with them at times by laying themselves down on the street to replace the materiality of the street with that of their own bodies, which had now become screens for photographic display ("Tate Intermedia" 2008).

Although the image can adopt material qualities from where it is displayed, it also carries material qualities irrespective of how it is actualized, which will follow it in its various manifestations. They are the result of complex dynamics between the surfaces photographed, the light used, the atmosphere at a location, and so on, but they can also be construed through various forms of filters and effects, either used at the time of exposure or, which is as likely for recent photographs, as part of a postproduction process.

In some ways, as we have seen, digitalization entails a reduction of complexity for the medial materiality of photography in that a rich set of paper forms, chemical processes, and techniques disappear. The loss of medial complexity has spawned two reactions. Inside the digital realm, photographic software has been equipped with numerous filters and effects that emulate lost processes and formats such as sepia, solarization, black and white with variable graininess, and so on. Outside of the digital realm—and partly in active negation of and response to digitalization—a host of older techniques have been reactivated by photographers who cherish the unique qualities of the various chemically based techniques. This double effort to restore materialities lost with the migration of photography to a digital platform also relates to more general current sentiments, where the body, materiality, and presence are activated as a response to a digital realm often conceived to be disembodied and virtual.

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part of their appearance. Rather, what differentiates enclosed ambient phenomena such as Turrell's *Skyspaces* from objects, what makes them intensify the experience of being surrounded, is more than anything else the *dynamic*, *processual*, and *topological* character of the fields. The ambient effect of the framed *Skyspaces* is *predominantly temporal* rather than spatial. This distinction leads to another important aspect of ambience: although the mere vastness of a phenomenon might play an important part in many ambient experiences, spatial ubiquity, in the sense that a phenomenon is actually being "everywhere," is not essential to all ambient situations. The ubiquitous effect of ambient experiences can be primarily spatial, as in the effect of a "total field" (*Ganzfeld*) actually surrounding the viewer. But it can also be primarily temporal, as in the experience of a time–space surrounding, circulating around, the subject. An ambient field may be a river, a car ride, a digital device, a distant soundscape, or a fly on the wall. Ambient aesthetics thus cannot be reduced to a mere question of space and the experience of ubiquity, consistency, and nonfigurativity as spatial characteristics. It must rather be considered as the unfolding of an event, the becoming of a dynamic and consistent spatiotemporal situation.

Ambient Events

Ambient events are not autonomously organized according to principles internal to the form—as opposed to the way a narrative structure, for example, organizes its own immanent time–space. An ambient field does not structure its own time. Rather, it unfolds its effect in *real time*; it surrounds the subject in and with real time. The ambient experience can last for hours or minutes, but it needs a certain duration to establish itself as ambience. If the time–space is too short, it will close in on itself as a distinguished moment and potentially become a focal point, a climax, within a longer span of time.

Immanent elements move about in the field, and the subject moves, actually or virtually, in relation to it (through, across, about, along, toward, etc.).[11] The specific pattern of movement created by each set of dynamic relations is not only an essential part of the ambient experience; it is itself of an ambient character. Thus, qualities such as nonfigurativity, dehierarchization, and ubiquity, which characterize the basic spatial organization of the ambient field, also apply to the temporal structure of the event as an unfolding time–space. Ambience is also nonfigurative and ubiquitous in time in the sense that its dynamic processes are of a *nonteleological* character. A telos eventually invests the experience with meaning from somewhere outside, somewhere *after*, the event. In contrast, the ambient event relates to nothing outside itself as event. Its movements may have a direction, but they have no goal or endpoint; they move about without "knowing" where. Instead, what gives the pattern of movement within the field an ambient character is the continuity of the movement as event. An ambient

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field varies constantly, but in order for it to maintain its surrounding, its effect, it is never experienced as changing in any essential way. It rather appears as what Gilles Deleuze and Félix Guattari (1988) refer to as *continuous variation*, a situation where nothing "happens," and still everything is new.[12]

The ambient field's ubiquitous, nonfigurative character does not mean that it is uniform in any ontological sense. The field can be hypercomplex and chaotic, consisting of an infinite amount of discrete elements and still be experienced as consistent, undifferentiated, and whole. It can be a "chaosmos" (Deleuze and Guattari 1996, 204–206), a chaotic cosmos or cosmic chaos. Ocean waves, the sound of a howling wind, and the song of birds are chaosmic events in the sense that they produce a continuous and "chaotic" immanent variation but at the same time remain distinctively consistent throughout the entire time–space. What matters is not the existence of different singularities—or the variation between them, for that matter—but the preservation of the nonfigurative, nonteleological, and ubiquitous quality of the field, no matter how complex and divided it may actually be. Instead, what is still important is that no singular element in the event takes the quality of a figure and becomes a center of the subject's attention.

For that reason, *continuity* and *repetition* are the key principles in the spatiotemporal distribution of singularities in the ambient event. They eliminate any figurative properties the elements may have and establish a dehierarchized, ubiquitous whole. This is, for example, the case in ambient music—from the classic pieces by ambient music pioneer Brian Eno and German groups such as Cluster and Tangerine Dream in the 1970s to contemporary electronic musicians such as Aphex Twin, Biosphere, Oval, Robert Rich, and others. Ambient music typically unfolds as a quite complex sonic chaosmos, constantly vibrating in continuous variation. At the same time, however, the music always preserves a strong nonfigurative character, exactly because of the way each element is distributed in continuity and repetition throughout the entire event. Hence, there are no musical "figures" in ambient music; no melodic elements or foregrounded gestalts stand out from the "surrounding" background. The music consists only of fragments of continuous and repetitive sounds and timbres, very often with a strong reverberation to "soften" the individual sounds and "blur" the boundaries between them. When some parts in the field take what first might seem like a quasi-melodic quality, the melody always either has a very "weak" identity (it is always *too* simple, *too* monotonous, *too* unfinished and fragmented) or starts to become a repetition or a discreet variation of itself (a sequence, a curve). Consider as a visual example of a quite similar situation the interactive light installation *Pulse Room* (2006–) by Canadian Mexican media artist Rafael Lozano-Hemmer. Here, one hundred to three hundred clear light bulbs hang from the ceiling in a large grid. While entering the space, the participants are invited to let a sensor detect their individual heartbeats by placing their hands on an interface by the entrance. Each bulb now flickers in its

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own "individual" tempo according to the registered heart rate of the different visitors. Lozano-Hemmer and the visitors thus create at the same time a representational space of strong poetic qualities and an objective, abstract–concrete ambience. Because of the serial character of the composition, the dynamic space is never experienced as hierarchical or teleological but rather appears as an ambient chaosmos of flickering electric light, constantly varying in repetitive pulsation.

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11 Transmateriality: Presence Aesthetics and the Media Arts

Mitchell Whitelaw

In Rafael Lozano-Hemmer's *Pulse Room* (2006) is a space filled with hundreds of incandescent light bulbs, hanging in a flickering array. A participant grips a pair of electrodes, causing the closest bulb to pulse in time with her own heartbeat; after a moment, this new pulse moves to join the multitude of the array. The room is full of human pulses, all characteristic double beats, faster and slower, brighter and duller, but palpably reembodied in glass and glowing wire. *Pulse Room* is one example of what I argue is a significant turn within recent media arts emphasizing the materiality of media and computation: a materiality that we are directly implicated in, as this work shows. Through Hans Ulrich Gumbrecht's work, this chapter proposes a "presence aesthetics" in the media arts and argues that media technologies can elicit moments of intensified being-in-the-world despite their more familiar role in distancing that world from us.

After making a specific theoretical argument in its first half, the chapter briefly considers some wider implications of an aesthetics of presence in the media arts. It applies media technologies as concrete, material, and present-with-us rather than as transparent conduits for immaterial, informational content, yet works such as *Pulse Room* also show how patterns can traverse material substrates as the embodied is dynamically reembodied. This is transmateriality: a view of media and computation as always and everywhere material but constantly propagating or transducing patterns through specific instantiations. Extrapolated from examples in the media arts, transmateriality is more or less prospective here, an expansive sketch. It is finally applied, in that spirit, to ubiquitous computing. Transmateriality emphasizes the continuity between computation and material environment—two terms that ubiquitous computing necessarily distinguishes even as it seeks to link them more tightly. Following this turn of presence in the media arts leads, then, to the question of a transmaterial ubiquity.

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