

The Jeremiah Project

Interaction, Reaction, and Performance

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1. Elodie Berland with Jeremiah in Blue Bloodshot Flowers at the 281 Gallery, London, 1 August 2001. (Photo by Terence Tiernan)

In its use of new technologies, the Jeremiah Project raises questions of how to theorize this physical/virtual interface. In my current performance practice and research, I am working on a series of practice-based projects entitled *Intelligence, Interaction, Reaction, and Performance*. The performances consist of physical/virtual interaction utilizing motion capture,¹ artificial intelligence,² and/or 3D animation.³ The first performance of this series, which I directed, was titled *Blue Bloodshot Flowers* and was a collaboration with Richard Bowden, a systems engineer from the University of Surrey. It had its public presentation at the 291 Gallery in London on 1 August 2001. The work, which I discuss below, focuses on a performance space that allows a physical performer to interact directly and in real-time with an “avatar” or data projected image.

Video clips and notes relating to the performance and the technology used can be found at our website <<http://www.brunel.ac.uk/depts/pfa/Jeremiah/index.htm>>.⁴

My research in general investigates the aesthetic potential of digitized tech-

nology for performance. This is exemplified by a current collaborative research project with Simant Prakoonwit, a computer scientist from Brunel University. The project analyzes and explores the interface between physicality and AI technology in contemporary art practices. This practice-based research will explore the direct and real-time interaction and reaction between physical performer(s) and an “intelligent virtual entity” that can learn and develop over a period of time. The manifestation of this AI technology will take various forms, which will be explored and investigated over time, and will demonstrate both visual and aural physical/virtual interaction. The resultant avatars will become virtual performers.

My main argument is that in the digital, the physical and virtual are accentuated and, hence, current theory needs to be adjusted to allow for this technical interface and accompanying corporeal prominence. Conventional ways of interpretation have been dominated by the transference of linguistic interpretation to the nonlinguistic. This makes the body a secondary phenomenon. However, in many art forms, the body is primary and yet transient. Unless the immediacy of the body (both physical and virtual), including corporeal readings, is made the focus of interpretation, such performances as *Blue Bloodshot Flowers* cannot be fully appreciated. Therefore, I am arguing for an “inter-semiotic” mode of analysis,⁵ that is, one that includes but also goes beyond language (see Broadhurst 1999a:16–70).⁶

Moreover, it is my belief that tensions exist within the spaces created by the interface of body and technology. Since no body, not even a naked body, escapes (re)presentation altogether (Broadhurst 1999a:103), the virtual body (as any other body) inscribes its presence and absence in the very act of its performance, leaving gaps and spaces within its wake. I suggest it is within these tension-filled spaces that opportunities arise for new experimental forms and practices.

Important questions relate to new technological advancements within contemporary performance practice. Rather than providing a purely technical description of one of these new practices, I will instead investigate their conceptual implications. Since, as I have argued elsewhere, language without the body does not “mean” at all, as corporeality provides language with meaning under sociocultural and thus temporal constraints (Broadhurst 1999b:17), what then are the implications for a virtual body? Therefore my overall question is: Due to the increasing prominence of such new technological developments as artificial intelligence and motion capture in art practices, does this physical/virtual/interface give rise to a new aesthetics? What are the theoretical and practical implications of this? My aim is to explore and analyze the effect these new technologies have on the physical body in performance, especially in relation to the problem of (re)presenting the “unrepresentable,” that is the sublime of the physical/virtual interface.

Blue Bloodshot Flowers, a development of a previous performance, was an attempt “to exceed everything that can be presented.” The initial production was a text and movement-based piece that was performed at Brunel University in 2000. It was written by Phil Stanier (2001) and involves the remembrance of a love affair. There is some ambiguity regarding whether the affair is between two adults or an adult and a child or if the narrator is dead—the ex-lover is obviously long gone. The performer, Elodie Berland, is French and we used a French voiceover as a memory device with good effect. Music composed for the performance was used intermittently throughout, provided by David Bessell from the London College of Music.

The project involved a collaboration with Bowden who researches methods

excerpt from *Blue Bloodshot Flowers*

a performance text by Philip Stanier

Ed. note: The performance that was the basis for Blue Bloodshot Flowers was originally performed at Brunel University in 2000. An excerpt of the text, some of which was used in the performance described by Broadhurst, follows.

2.

He marked me out, and mapped my surface. His hands moving over my skin, fingertips rough like tiny moving cancers stretching out, trying to leap his broken-down frame into mine. There was a calm arithmetic in his palm. Strange how the body in repeating itself cell by cell, breeding, doubling, strange how these little clones can reject the persistence of the pattern towards age. Set up their own little colony. I'm sorry I've lost you: my metaphor was cancer as a symptom of a fear of death, that simply hastens it, hastens death that is, the result of a paranoid body. Was he my cancer? I was his—he was more afraid of death. While he was with me, I reminded him of his age and we wore each other out, but while I fed and grew there was less of him each time. The skin on his hand hung bare like a glove, each day the bones were thinner. I was against his skin but there was no touch, the surface was cold. His breath rattled more. We walked. Our daily average five miles; I was only a child, I would get tired. But those walks led to calm, great calm in the time of sleeping or half sleep with him, when it was twinned with my exhaustion after he wore himself out on me in the shelter of the forest. The weather was not often kind; we walked in bent-double downpours, the result of overzealous butterflies pollinating orchids in Brazil. The pelting downpour covered several darkening equators. Windless day and night. Through fields of a million blue bloodshot flowers. Battered shattered by the rain, broken glass fault lines etched in the petals. Sap and mud like blood underfoot, always cold. Wet hair in thick coils, fingers running through. As I went down on him. Those that went like worms through blades of grass. And the wet ground cradled us and we were wedged together at the knees snapping buttercup stems. Eating the flowers; despite the blankets there were too few for sustenance. I starved with a full belly. Now I walk, my daily average 1,000 miles internally. I have returned to zero so many times, I lost track of the distance covered; I deal in speed and daily averages. I don't know when he was ever silent or still. Always fumbling for intimacy. Always fumbling the anatomy of my disgrace. The other things future quiet crying and empty returning searches could not have been known in view of time and shade. Everything was too close to see the horizon. I won't repeat this enough. Cause I've got you deep inside me. I won't repeat this enough.

that allow both humans and objects to be located and tracked seamlessly and in real time. The applications of this technology range from visual surveillance to virtual reality.

When I decided to combine this original piece with interactive technology, I initially wanted a female avatar and perhaps a child to represent the child of the love affair or the inner child. However, this all seemed too literal. When I saw the avatar Jeremiah, I immediately wanted him in the performance and decided to leave it to the audience to interpret this virtual presence—though, of course, most people would assume it was the image of the departed lover.

Blue Bloodshot Flowers was both a pilot scheme for future projects and a feasibility study. It is our intention, since the public performance proved so successful, to develop the technology further. We have discussed introducing speech and hearing to an avatar. With this in mind, we developed Saul, an avatar capable of speaking; and Rachel, who can morph between male and fe-

male. Both Saul and Rachel are, like Jeremiah, heads only, but our next collaboration will contain a full-bodied avatar. Despite this, Bowden, Berland, and I are very reluctant to lose Jeremiah.

Jeremiah is a computer-generated animated head based upon Geoface technology (DECface) consisting of a simple mesh representing the face with an underlying bone structure that allows the mesh to be deformed.⁷ He (It) has a simple bone structure that allows him to express himself and emotions, such as anger, sadness, or happiness. He was developed from surveillance technology—therefore, his eyes can see. During the performance a video camera fitted with a wide-angle lens was used to capture movement, which was relayed to Jeremiah’s “emotion” engine. The camera was located above the backdrop. Although we could have used more than one camera, one proved sufficient.

Jeremiah’s emotion engine determines the current state of his apparent emotions from simple parameters extracted from objects of interest within his visual field. This simple set of rules allows chaotic behavior in a similar fashion. For instance, Jeremiah likes visual stimulus: high rates of movement make him “happy.” He likes company: a lack of stimulus makes him “sad.” He does not like to be startled: high rates of change in the size of objects surprise him. Similarly, Jeremiah does not like to be ignored. If objects exist but do not move, he assumes he is being ignored and gets “angry.” Also, if Jeremiah experiences too much “pleasure” due to too much of any particular stimulus, he will reduce the stimulus’s influence on him and grow “bored.”

Jeremiah is capable of not only interacting but also reacting. In fact he possesses artificial intelligence to the degree that he can demonstrate several emotions simultaneously as a reaction to visual stimulus. Jeremiah is unique in that he embodies intelligence that is in no way prescriptive. Therefore, the performance is a direct and real-time interaction between performer, audience, and avatar (technology).

One of the most interesting aspects of the Jeremiah Project is how much the performer/spectator projects onto the avatar. Jeremiah consists of computer-



2. Elodie with Jeremiah, smiling in the background. High rates of movement make Jeremiah “happy.” (Photo by Terence Tiernan)

ized artificial intelligence with the ability to track humans, objects, and other stimuli and to react to what's going on near him directly and in real time. However, interacting with Jeremiah is anything but objective. Most people, when they first see Jeremiah, find him "spooky." Then, after the initial contact leads to a degree of familiarity, people tend to treat him as they would a small child or a family pet. They usually try to make him smile and generally to please him. For instance, his face demonstrates sadness when he is left alone, so much so that many people find it difficult to walk away. Although Jeremiah is programmed to react to certain stimuli with specific facial emotional expressions, he can also demonstrate random behavior that can be disruptive during a performance. This unpredictability adds a further "real-life" dimension to working with this virtual being.

This aspect of the performance questions orthodox notions of origin and identity since Jeremiah's identity is in no way fixed and his origins are not easy to specify beyond listing some technical specifications. As well as questioning conventions of authorship, ownership, and intertextuality, the digital technology that created Jeremiah subverts assumptions of reproduction and representation because in every performance Jeremiah is original, just as an improvising artist is original. Jeremiah is literally "reproduced again" and not "represented."

Blue Bloodshot Flowers is divided into two sections. The first part consists of a scripted movement-based interactive piece with the human performer (Berland), while the second part involves spectators who are invited to interact directly with Jeremiah and to explore his supporting technology. Surprisingly enough, in the first part of the performance, although initial interest and curiosity was directed toward Jeremiah, the spectators' attention was mainly focused on Berland. However, the spectators' focus shifted to Jeremiah when he decided to display fairly inappropriate behavior, such as demonstrating happiness at an intense moment in the performance. We had no way of controlling his behavior, which he learned as he went along. We could, of course, turn him off but we were very reluctant to do this. Jeremiah was the focus of the



3. The audience interacting with Jeremiah during the second part of *Blue Bloodshot Flowers*. (Photo by Terence Tiernan)

performance during the second part when he directly interacted with the spectators.

Because I had decided not to restrict when people could enter the 291 Gallery, audience members arrived right up until the very end of the scripted performance. I allowed unrestricted entrance for the very reason that Jeremiah would interact with any new arrivals he spotted. And of course he did, which amused everyone, except possibly the late arrivals.

From a technological perspective, Jeremiah is based around two subsystems: a graphics system, which constitutes the head; and a vision system that allows him to see. The vision system surveys the scene and sends information to the head model, which then reacts. So Jeremiah is both the vision system and the head model. He also contains a simple emotion engine that allows him to respond to visual stimuli via expressions of emotions. The entire system is capable of running on a single PC but for speed of operation each subsystem ran on its own dedicated PC connected via a network crossover. The whole system is self-standing and, with the construction of a flight case, truly portable.

Jeremiah's head contains a simple Newtonian model of motion with random elements of movement, random blinking, and ambient motion (Bowden 2001b). The Geoface articulated bone model, DECface, provides a lifelike facial avatar that can be animated to produce various facial expressions. The software was custom written and produced by Bowden who "prescribed" what Jeremiah's expressions would actually look like. Four basic pre-scripted

4. Jeremiah contains a simple emotion engine that allows him to respond to visual stimuli via expressions of emotions. (Photo by Terence Tiernan)



expressions for key emotions are used within the system: happiness, sadness, anger, fear (Bowden, Kaewtrakulpong, Lewin 2002:126). Jeremiah's vision system is based around a Gaussian mixture model of color distributions (statistical order of the color of each pixel within an image) that uses expectation maximization within the Grimson motion tracker framework.⁸ This allows Jeremiah to probabilistically differentiate between the foreground and background pixels of a new image. Jeremiah's visual system additionally suppresses shadow and removes noise allowing static background scenes to be learned dynamically at the same time prioritizing foreground objects (125). Jeremiah's attention is randomly distributed between these objects, weighted by their size and motion. Therefore, objects closer to Jeremiah appear larger and capture his attention more than objects further away—thus, leading him to interact with the foreground objects in real time via expressions of emotions.

Blue Bloodshot Flowers as a performance is hybridized and intertextual, demonstrating such aesthetic features as heterogeneity, indeterminacy, reflexivity, fragmentation, a certain “shift-shape style,” and a repetitiveness that produces not sameness but difference. A distinctive aesthetic trait central to the performance is the utilization of the latest digital technology.

It is interesting to note that the digital as a discourse cannot convert phenomena directly but depends on a preceding production of meaning by the nondigital. Therefore, the avatar emulates the graphic design and animation of a recognizable representation, which is in this case a human head. As I have stated elsewhere, the digital, like all formal systems, has no inherent semantics unless one is added. One must add meaning. Thus digitally processed contents require different than ordinary habits of reading: reading digital contents demands thinking in terms of indifferent differentiation (see Broadhurst 1999a: 177). This is a thinking that makes little distinction between the referent and meaning, or for that matter between “reality” and representation.⁹

Blue Bloodshot Flowers can also be seen as a critical deconstructive practice. “Metaphysical complicity” cannot be given up without also giving up the critique of the complicity that is being argued against (Derrida 1978:281). *Blue Bloodshot Flowers* is apparently complicit with dominant means of digital representation, even as we are trying to destabilize those dominant structures. In other words, the piece addresses concerns regarding the commodification and consumerism of technology owned and provided by national and multinational corporations and used by government snoopers and the military.

The employment of wide, jarring metaphors is a central characteristic of *Blue Bloodshot Flowers*. The colorful and figurative use of language and the juxtaposition of metaphors evoke surreal images of sex, violence, and death. The physical interaction of the physical and virtual also creates inclusive, jarring metaphors. This mixture produces an aesthetic effect caused by the interplay of various mental sense-impressions, which unsettle the audience by frustrating their expectations of any simple interpretation and in turn produce a new type of synaesthetic effect (see Broadhurst 1999:175).

In *Blue Bloodshot Flowers*, due to the hybridization of the performance and the diversity of media employed, various intensities are at play. It is these imperceptible intensities, together with their ontological status that give rise to new modes of perception and consciousness. According to Deleuze and Guattari, “experimentation has replaced all interpretation [...]. No longer are there acts to explain, dreams or phantasies to interpret [...] instead there are colors and sound, becomings and intensities” (1999a:162). Their view of art as “sensation”—as a “force” that ruptures everyday opinions and perceptions, “to make perceptible the imperceptible forces” (1999b:182)—provides a means of theorizing the unrepresentable or sublime of this kind of performance.

Since my project is a science and art collaboration, there are very marked

5. *Elodie and Jeremiah: it is within the tension-filled spaces of physical and virtual interface that opportunities arise for new experimental forms and practices. (Photo by Sally Trussler and Richard Bowden)*



qualities in the research rationale and questions. For Bowden, the Turing test describes a system as artificially intelligent if a human user cannot distinguish the system from another human in conversation. He is attempting to test this concept of intelligence by providing an interactive human avatar with simple rules and chaotic behavior. Bowden believes the interactivity and human embodiment of Jeremiah is sufficient for people to accept him as a living entity. Therefore, Bowden's foremost question is, "How real can Artificial Life become? How do we interact with A' Life?" (Bowden and Broadhurst 2001).

My interest, on the other hand, is concerned with more arts-related questions. I want to explore and analyze the effect these new technologies have on the physical body in performance. Underpinning this is a series of specific research questions:

1. What are the effects of new technologies in the analysis of the performing body?
2. What are the theoretical implications of virtual performance for the body and space?
3. What are the implications of, and how do we theorize the resultant destabilization of identity and origin?
4. What is the potential for participation and interactivity, between and among performers and spectators, within this new art's practice?

Although much interest is directed toward new technologies such as Jeremiah, it is my belief that technology's most important contribution to art is the enhancement and reconfiguration of an aesthetic creative potential which consists of interacting with and reacting to a physical body, not an abandonment of that body. For, it is within these tension-filled spaces of physical and virtual interface that opportunities arise for new experimental forms and practices.

Furthermore, it is my belief that despite or even due to new technologies there remains the need to articulate and analyze innovative performance in ways other than the linguistic. There is now more than ever the need for an intersemiotic signifiatory practice—that is, an analysis that includes but also goes beyond language.

In conclusion, this is an ongoing project, part of what is hoped will be a variety of performances that combine the physical and virtual in performance. *Blue Bloodshot Flowers* was performed at Brunel University in June 2001, and had one public performance at the 291 Gallery, East London, in August of that year to an audience numbering between two and three hundred. However, the rehearsal process proved extremely stimulating and may prove ultimately more beneficial for research than the finished product. Throughout, emphasis is placed more on the process of adaptation—how the performance develops, and so on—than on the finished product. In this way, strategies are exposed and the apparent seamlessness of performance and technology is negated. Thus, my goal is to destroy theatrical illusion, while at the same time resisting closure from within a place that is not completely aesthetic but is nevertheless a performance.

Notes

1. "Magnetic or optical motion capture has been used widely in performance and art practices for some time now. This involves the application of sensors or markers to the performer or artist's body. The movement of the body is captured and the resulting skeleton has animation applied to it. This data projected image or avatar (Hindu: manifestation of a deity) then becomes some part of a performance or art practice" (Broadhurst 2002:157–63).
2. "The consensus [...] is that AI is about the design of intelligent *agents*. An agent is an entity that can be understood as perceiving and acting on its environment. An agent is rational to the extent that it can be expected to achieve its goals, given the information available from its perceptual processes" (Jordan and Russell 2001:lxv).
3. In August 2003, I presented a performance entitled *Dead East/Dead West* at the Institute of Contemporary Arts in London. This is a production which explores "liminal spaces" within performance, a development from my previous research locating spaces between virtual and physical performers. However, in this work, I am also suggesting that such spaces are located on the threshold of race and color and, as a result, tensions exist within certain performances. This project involved a collaboration with Jeffrey Longstaff, a choreographer from the Laban Centre, digital interactive artists from the University of West England, and 3D filmmaker Brian McClave.
4. See also Richard Bowden's web page at the University of Surrey website <<http://>

- www.ee.surrey.ac.uk/Research/VSSP/07%20-%20CVSSPMembersFrameset.html> (2001a).
5. A signifiatory practice which involves such nonlinguistic modes as those provided by the semiotics of corporeal gesture: kinetic, visual, aural, haptic, gravitational, proximic, and tactile.
 6. For Horst Ruthrof, “language cannot mean by itself but can do so only semiotically, i.e., in relation to and through corroboration by non-verbal systems” (1992:6) and “far from language constituting a replacement of non-verbal forms of signification, language and non-linguistic sign systems develop side by side toward ever more complex formations. Moreover [...] they interact with one another to constitute ‘reality’” (102). See especially Chapter 6, “The Limits of Langue” (102–19), for a more detailed discussion on the constraints of language. Also his more recent account of intersemiotic semantics in *Semantics and the Body: Meaning from Frege to the Postmodern* (1997).
 7. See Keith Waters (1987) and Waters et al. (1998), also Waters (1999–2004).
 8. Jeremiah’s vision depends on a background segmentation approach developed from an intelligent visual surveillance system based upon the work of Chris Stauffer and Eric Grimson. For more information please see Richard Bowden et al. (2002:25).
 9. For a more detailed discussion of the concepts of “differentiation” and “de differentiation,” see Scott Lash (1990:5–15).

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