

NOTES ON STRING BEINGS
MARTHA MASON

String Beings explores the simple yet profound metaphor of string in all its contexts, and the use of that metaphor to describe the complex connections between humans, and between humanity and technology. From the genetic string, the DNA that connects one human being to another, to the seemingly unimportant connections we have with strangers on a daily basis, who have involved relationships of their own, there is an invisible web connecting humanity.

Like the seemingly random threads of thought, or weaving together of life experiences, *String Beings* has a non-linear flow. It is a series of quiet observances of various relationships that exist, and the use of the connections between humans to influence each other. The explorations are of power struggles, manipulation or even the comedic inner struggle that is portrayed by one animated scribbler character whose legs just won't behave! Occlusion is another visual and artistic theme. How much of the puppeteer can the audience see, without literally shedding too much light on stage, destroying the projected image? Martha wanted the audience to be able to see the performers who are sometimes behind a small barrier when being captured on camera, so that the audience could enjoy seeing both live and digital at the same time, appreciating that it is done live. But the technical challenge is to not destroy the front projected effect with too much light. This controlled vision occurs as a choreographic theme in some of the duets that take place as well. We are asking, how much of ourselves do we allow ourselves to be seen by others and how much in control of that are we? How much do we try to influence others by trying to influence what they see?

The use of Bachrach's intelligent video processing technique was an exciting challenge for Snappy. Artistically, it has always been important to Martha to use Snappy as a vehicle for exploration of themes and techniques that have only remained seeds of interest in the past. Ever since she was a young dancer, Martha loved the idea of creating environments through projection of slides or video. In 1997 she created a 20-minute solo where she danced behind a sheer screen that was front projected, and lit herself from behind, appearing like a hologram and becoming one with the film's characters or images. But it was so expensive, and Martha was just starting Snappy, that she decided to just focus on simple, barebones choreography for a while. Working with Bachrach is a natural growth beyond that point and began when one of the dancers in the company, Carey Foster, who knew them both, heard them talking about the same themes (motion capture and digital puppetry) and introduced them.

Although there is no motion capture in *String Beings*, there is live video capturing on stage by one of three separate cameras, which then through Jonathan's intelligent programming, transforms what it sees into an animated projection that Jonathan created. Sometimes these images can be manipulated carefully, and the performer is transformed into a digital puppeteer. At other times, connections of the performers can be "tracked" by a glowing white orb, (visually, this looks like a chakra, or like someone's soul) on the scrim, offering an alternate perspective or a possible alternate reality for the audience to

see. The bodies can be tracked in an outline, offering an abstracted view of the performer, and using the LOOPER effect, where a delay program will allow the moving performers to be seen again digitally, creating a relationship between the live dancer and the digital dancer. This effect was a profound one for Martha. If a performer stands still on stage, the effect goes away. If they shimmer slightly, or move, the image appears. The repeating of the ghostly digital image represented for Martha the alter ego of a person, or their soul trying to catch up with them in transit.

Another effect seen, THE SCRIBBLER looks like a drawing, scribbled, of a human being, but it is constantly alive, and being redrawn so it is not a static animated character. None of the animation is static on screen. It is constantly alive and thinking – assessing where humans are on stage, and making judgments about their light level, their facing, their closeness to another person on stage, the color of their clothing, the clearness of their background, etc. This makes each performance very ALIVE and always slightly different from the next night.

It was very important for Jonathan and Martha that the images and the technology blend equally with the live performance, so as to enhance, not detract from, the humanity that Snappy always tries to portray. String Beings, (accompanied by two live string instruments!) is ultimately about relationships of various kinds that will all feel familiar, whether the viewer has experienced them, witnessed them, or simply wished they'd had them.

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JONATHAN BACHRACH
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Bachrach's art is based on themes of social/power relationships, perception and generation of motion, and naturalistic and dance-like rendering. He has produced a series of works called social studies which explore social relationships as dynamic systems that are stripped down, but highly evocative. Each one is an ever changing system of interacting elements where collective behaviors are distilled and rendered within a dance framework.

His intimacy machines examine social rules, intimacy, and how computers can mediate interactions between participants allowing people to for example overcome their normal social boundaries. In his original intimacy machine, he constructed a reciprocal peepshow routed through a computer providing an indirect mechanism for people standing in close proximity to each other to stare at each other directly in the eyes, a feat that otherwise proves tremendously difficult for humans.

In his motion work, he has worked on a series of studies that mirror the levels of perception of motion that we use to understand say dance. Bachrach has been fascinated by how people can translate motions over time onto their own bodies and how they make sense of movement histories. In so far as sensing and actuating are duals of each other, we can start to understand how to move in a manner that maximally elucidates a sensory response once we can understand how people process sensory information.

Bachrach has been working on frame by frame computational animations that incorporate human like rendering which have a dance like quality. The rendering itself is performed as if by riding on an animator's pencil tip. The scribbler fills discovered forms by finding internal points to fill and then scribbling within the forms by bouncing off their boundaries. The pencil is modeled as having mass and momentum so that it can replicate the nuances of human drawing with all of its grace and errors. Each frame is drawn afresh in a statistical fashion. Furthermore, any frame is only a partial story and the full story can only be told by integrating over many frames. This produces a dance like motion and relates to the notion that our perception of reality is tenuous and that our realities and our bodies are both constructed out of an ever changing federation of components.

Stringbeings involves a number of elements of Bachrach's prior work and yet presents novel challenges in terms of staging dance with live video. The very minimal bar is that the dancers and projection be visible and readable to the audience and to the camera alike. Lighting of dancers and placement of the projection surfaces makes or break the the dance performance. In Stringbeings, we chose to place a full stage downstage black scrim between dancers and the audience, to place the cameras just upstage of the scrim pointing upstage, to front project onto the scrim, and to selectively light the dancers mostly from the side. The black scrim permits a graceful mixing of dancers and

projection. Finally, the cameras are pointed away from the scrim to avoid unintentional video feedback.

The second challenge is that the projections be integral to the performance. Watching the human body move is mesmerizing in its own right and thus projections must compare favorably to and not detract from the dance experience. The eye must be able to incorporate the real and the virtual. Furthermore, projections must relate and complement the dance. The mind must be able to relate the two experiences. The full stage scrim allows us to merge the real and the virtual and to place the dancers in relation to the projections.

The third challenge is that the interactions be readable as being causal, that is, that the audience be able to understand that the visual processing is happening in real-time and not prerecorded. If viewers can discover the causal relationship between movement and visualization, then all the positive properties of live performance can be delivered. In order to enhance this causal relationship in *Stringbeings*, we place dancers in relationship to the visuals and make the visuals particularly sensitive to the nuances of the dancers.

In terms of the construction of the visuals, Bachrach's process involves creating formal languages for describing perception, movement and rendering. He composes visual interpretations out of a series of visual transformations that incorporate perceptual and movement principles, natural rendering techniques, and a range of media data types such as images and line segments. Each visual treatment builds upon previous ones, and all the treatments together form a precise high level language built out of descriptive words and phrases. One could go so far to say that they even form a rough theory of perception and movement.

In fact, Bachrach sees many parallels between art and science. He sees both as involving the intellectual journey of asking and answering questions. Artists and scientists are both in the business of revealing truths, retraining the mind, and instigating discussion. Bachrach is a research scientist at MIT CSAIL where his academic goal is to understand and control space-time through the invention and application of high level programming languages and to invent and choreograph new high degree of freedom robotic structures and federations of parts. Applications range from bioengineering to swarm robotics and substrates range from cells to silicon.

In conclusion, Nancy Upper of Phi Beta Kappa society says "... *String Beings* ultimately is about light, the manipulator of all living things. Light transforms: outdoors and indoors, day and night, existent reality and projected reality. In the hands of Martha and Jonathan, light even transforms itself."