2011

A matter of time

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A MATTER OF TIME

A Thesis
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of

Master of Fine Arts

In

The School of Art

by
Rebecca Kreisler
B.F.A University of Georgia, 2004
August 2011
ACKNOWLEDGEMENTS

My most heartfelt thanks,

To my family for the love and support they have offered me during these last few years and the many years before; to the rest of the “fearsome foursome,” May Babcock, Hannah Sanders and Jessie Hornbrook, the best group of ladies I could have asked to go through this crazy three years alongside; to Sarah Hayman, Leah Duvic and Josh George for the incredible friends they’ve been in the short year I’ve known them, and their uncanny ability to help me stay sane; to May, Sarah, and Josh even more for their incredible help with the installation, which literally could not have happened otherwise; to Kimberly Arp and Leslie Koptcho, for challenging me, and for their encouragement and confidence, and to them and the rest of my thesis committee, Justin Walsh, Courtney Barr and Lynne Baggett, for their insight, advice and encouragement; to Kathryn Hunter for her mentorship, friendship, and support; and, last but not least, to anyone who has ever called me Reba or Rebetta, you’ve made this place feel like home.
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ABSTRACT

We frame our experiences as narratives, and associate the narrative with the book. My work takes the form of an immersive installation of printed, paper polyhedrons that act for me as non-traditional book structures. The planes of the polyhedrons function as pages without prescribing a certain order of events. The focus has been to blur the linear narrative into a body of visual work that represents my particular human experience, one full of memories and dreams, contradictions and juxtapositions, chaos and calm.

What began as an objective examination of concepts of time in physics, philosophy, and psychology has developed into a thorough exploration into the nature and quality of my own experience. This thesis is written as a personal narrative, describing my exploration into the nature of time and navigating the reader through my creative process, research, personal reflections, and the evolution of my ideas about time. Through a continuous, self-reflective, and sometimes unpredictable process, I have developed a language of imagery that captures the essence of my experience, and I have structured that imagery into an in-the-round installation that envelops the viewer as fully as the process enveloped me. I hope to encourage my audience to more closely and consciously consider the nature of time and its impact on their own work and their own lives. Time is life, time is change, time is memory, and time is self. Without time, there is nothing.
A MATTER OF TIME

The present tumbles…

…forward?

Never slowing,
Never speeding,
However it may feel.

I worry for the future,
Dwell upon the past.
Have I not yet learned
That it’s all the same?

Now just another then,
And then another now.
Just a moment in time.

An infinitely small moment,

An infinitely long time.
INTRODUCTION

Walking into my exhibition is the visual equivalent of walking into my brain. The work takes the form of an immersive installation of printed, paper polyhedrons that act for me as non-traditional book structures telling the story of their own creation, and, thus, of my experience (Fig. 1). The gallery space is unrecognizable, with large black triangles built into the corners altering the shape of the space (Fig. 2) and walls painted with patterns that dissolve from tightly ordered into chaotic before reforming into order once again (Fig. 3). The lighting is dramatic, throwing shadows off forms that hang in an arrangement that suggests orderliness without conforming to it completely (Fig. 4). The shapes tend toward the smaller as they approach the skewed corners, which seem to recede farther than the actual walls of the gallery. The forms represent mini-narratives of my own experience, some in specific ways, and others more generally. Much like my experiences and memories, some forms are visually and physically more open and more accessible (Fig. 5), while others are closed off (Fig. 6). The largest form in the space is just over seven feet tall, and is visually and conceptually the most dominant narrative, echoing and elaborating on images found on smaller pieces throughout the space (Fig. 7). Upon entering the gallery, it looks to be a closed form, but once the viewer fully engages with the space of the room, he finds an opening in the back large enough to enter (Fig. 8). The images on the interior differ greatly from those on the exterior. The exterior images are subtle, faded, abstract and ephemeral (Fig. 9). Conversely, the images inside are bold, graphic and often figurative (Fig. 10). They depict scenes related to time, from the study of physics, philosophy and psychology. This interior space is claustrophobic and chaotic, bordering on information overload. It is not easy, or perhaps even possible, to take in everything. These images represent the starting point of this exhibition—an exploration into the nature of time. The other ephemeral, abstract images represent the personal experience that developed from that exploration. The exhibition began as work about time, and ended up being work about me. My experience could be summed up as ordered chaos, and that is what my exhibition has become. On the surface it is perhaps more order than chaos, but upon closer examination, there are plenty of overwhelming, scattered, and fragmented places within (Fig. 11).

As the work represents the experience of creating it, I could not predict exactly what it would be before I started. The work developed organically and gradually within a loose framework that I dictated from the start. The work is based not only in research, but also in the process of research; not only in structure, but also in the process of creating; not only in imagery, but also in the process of imagining. The story of the work’s creation is the story of the work itself. Einstein once said “the present moment is no more special than any other in the past or future; all times exist together.” The narrative of this work is a sequence of present moments, and it begins with a moment in March of 2010, as I prepare to board a plane in Philadelphia.

ENDNOTES

1 Jim Al-Khalili, Black Holes, Wormholes & Time Machines (Bristol and Philadelphia: Institute of Physics Publishing, 1999) 120.
Figure 1. Rebecca Kreisler, *A Matter of Time* (Panorama of Installation)

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NARRATIVE

CHAPTER 1: REMEMBRANCE OF DREAMS

I need to figure out what my work is really about. During the previous few days I have seen a tremendous wealth of artwork and much to my dismay have found even the dullest of it infinitely more exciting than my own. I have no idea what I’m doing. Something has to change. I tell myself that I will think about it when I get back to Louisiana.

In the Philadelphia airport, I spend an arm and a leg on a couple of magazines to keep me occupied during the flight to New Orleans. One is the latest issue of Discover, with a purple portrait of Albert Einstein gracing the cover alongside a headline written just for the likes of me: Beyond Einstein: 3 Radical Theories Challenge His Ideas of Space and Time.

For as long as I can remember, time has fascinated me. My favorite books have always been the ones that toyed with the notion of time—from Kurt Vonnegut’s race of Tralfamadorians who can see all moments past and future at once, to Robert Jordan’s cyclical fantasy universe. Television shows about time travel, from Quantum Leap to Sliders have captivated me ever since I was a child. I would read quantum physics books for fun, picking out whatever I could understand, and even tossed around the idea of getting a degree in physics to go along with my BFA. Ray Kurzweil has said “our intuition is linear. When we walked through the savanna a thousand years ago we made linear predictions of where that animal would be and that worked fine; it’s hard-wired in our brains.” I’ve always questioned that intuition. I’ve relished the idea that there is more to time than meets the eye, and from philosophy to physics, psychology to fiction, I’ve soaked up every little tidbit about time that I could find. I had even begun to make artwork about it, only, looking back, it was heartless, impersonal artwork that conveyed not an ounce of my passion for, or connection to, the subject.

I quickly browse through the magazine until I find the article that catches my attention: Back From The Future, by Zeeya Merall. It’s a captivating article, describing the work of physicists Jeff Tollaksen and Yakir Aharonov, which includes experiments designed to test the idea of backwards causality—the future causally impacting the present. The idea is fascinating. My smile reaches my ears as I read about “the mounting evidence that the arrow of time—the flow that determines the essential narrative of our lives—may be not just an illusion but a lie.”

As the article describes, the effects of quantum mechanics on particles are hard to predict. Two radioactive particles, for instance, indistinguishable from one another in every way, will begin to decay at completely different times, for seemingly no reason at all. “This indeterminism, along with the ambiguity inherent in the uncertainty principle, famously rankled Einstein, who fumed that God doesn’t play dice with the universe.” In 1964, Aharonov and his colleagues proposed time-symmetric quantum mechanics, which suggested that information from the future could fill in these gaps. Tollaksen and Aharonov began collaborating in the 80’s and 90’s to test this idea. They designed experiments that included three steps. First a pre-selection measurement was carried out on a group of particles, then an intermediate measurement, and a final post-selection step in which only a subset of the particles were measured. If backwards causality were in effect, the measurements at the intermediate step would be affected by whether or not the third measurement was carried out. Tollaksen finally worked out how to carry this out in 2002. Repeated thousands of times, the experiment went like this:
Laser light was measured and then shunted through a beam splitter. Part of the beam passed right though the mechanism and part bounced off a mirror to which it was attached. The team used weak measurements to detect the deflection of the reflected laser light and thus to determine how much the motorized mirror had moved...After the laser beams left the mirrors, they passed through one of two gates, where they could be measured again—or not.

It turned out that when that final measurement was taken, the angles measured in the intermediate step were amplified by more than 100 times. Amazingly, a measurement taken earlier was clearly affected by events that happened later.

Merall continued the article by questioning the impact of such findings on our free will. If future events can impact the present, then might we be forced in the future to carry out those events? Aharonov has an answer, as nuanced and as confusing as it is clarifying: “The future can only affect the present if there is room to write its influence off as a mistake.”

This answer, and this article, I find beautiful, elegant, mind-boggling and tremendously exciting. It is pure inspiration and a much-needed nudge, setting the proverbial ball rolling right along in the wind. “The wind was not the beginning. There are neither beginnings nor endings to the turning of the Wheel of Time. But it was a beginning.”

ENDNOTES


4 Merall, 40.

5 Merall, 42.

6 Merall, 45.

CHAPTER 2: DECISIONS AND APPARTIONS

I begin envisioning my exhibition. I want my work to be an exploration of time. I need to start with thorough research, reading in depth about every aspect of time I can imagine. I want to be drenched in inspiration. I feel that what I make will need to include some direct illustration of the concepts I research but that simple illustration alone would leave me too disconnected from the work. I decide that the image making process should be organic and self-informing. After an initial period of research I would begin making images and building structures, but I would also intensively document these processes. The goal would be to direct my attention to the experience of the process, specifically to the time of the process, and to use my memory in conjunction with the documentation to reflect on my own personal ideas about time and experience. I would use this reflective process to inform new imagery, and repeat this process until I felt that the imagery I was making was not only a representation of time, but of me. In a speech about beauty and truth in physics, Murray Gell-Mann compared successive theories to peeling back the skins of an onion, each layer closer to the truth, yet each bearing a remarkable resemblance to the last, and each informing the shape of the next: “What is especially striking and remarkable is that in fundamental physics, a beautiful or elegant theory is more likely to be right than a theory that is inelegant.”

I expect my process of working to be much the same as this peeling back of skins, each step in the process bringing me closer to a few simple, elegant final images.

I first decide on a basic structure for the pieces. Both academic and experiential notions of time rely on structure—consciously or unconsciously, we formulate our constructions of the moments in our lives based upon a model of time. Personally, I have always been drawn to the form of the book. Books tend to facilitate narratives, which inherently involve time and change. I imagine my work to be much like a narrative, and viewing the work to be much like a reading experience. My challenge, though, is to choose a structure that breaks away from being read in an exclusively linear fashion, as I feel that this would run counter to the broader ideas of time that I want to express. Yet, the book form begs to be read as linear.

The argument has been made that our notions of linear time are tied to the book and to the written narrative. Jo Alyson Parker argues:

there is…a correspondence between classical notions of linear time and the linearity of our traditional reading experience. Interestingly, the rise of print culture coincides with the rise of Newtonian or classical scientific determinism with its assumptions about time’s arrow and the clockwork universe. And both coincide with the rise of the great narrative genre of modernity, the novel.

A modern contrast to the linear narrative is electronic hypertext, which “compels us to reassess the connection between narrative and temporality.” As narrative has served as a means by which we assess our experience “in terms of a plot that develops over time and ultimately reaches a conclusion, the temporal uncertainty of hypertext may expose the illusion of such thinking.” I want my work to function much like a hypertext novel—to expose the illusion of thinking in an exclusively linear manner and to draw consideration to the idea that the moments in our lives exist as interchangeable pieces in formulating the narrative of our personal experience. I do not want to make a hypertext novel as my thesis work, though. The physical interaction between the viewer and my work is extremely important to me. So despite the
In the thematic appropriateness of hypertext, it, like the traditional book form, is not the right model for me. I also eliminate the possibility of a purely circular model, as this would be equally limiting, conceptually. The notion of circular time and cyclicality is abundant in ancient traditions and even some modern modes of thought. The Stoics, for instance, believed that the world continually perishes and then regenerates, and that the future is merely the return of the past. However, this circularity is but one way of thinking about time and life among many. I want to explore the idea of circularity, but not limit myself to it.

After much thought, I settle on the polyhedron as my model. For me, the polyhedron form exists in an ambiguous space between and apart from the linear and circular, or spherical. Unlike a sphere, it is comprised of a number of individual planes, which in this context represent individual moments. The planes function like pages in a book: distinct, singular moments or pieces of a whole. But unlike a book, the planes of the polyhedron are continuously connected, without a distinct beginning or end or a prescribed order of events. Also important to this structure are the inherent inside and outside surfaces, carrying the opportunity for juxtaposing two types of imagery. I intend the inside surfaces to represent the hidden, structural bones, or the truths that are not seen until sought. The outside would, conversely, represent the everyday experience, or the result of those structural forces acting upon us. Thus, the interior images would be the direct illustrations of the concepts I research, and the exterior images would be the results of reflections upon my personal experience. The interior would claim to be objective, and the exterior subjective.

I start making models of polyhedrons. Some have barely visible interiors, or are completely closed. Some are more open, and I can imagine being able to step inside them. It is important to me for my exhibition to include one structure large enough for the viewer to enter. I want my audience to be enveloped in imagery as completely as I would envelop myself in the process. The polyhedrons seem to simultaneously suggest both a microscopic and macroscopic scale. They remind me of atoms or molecules, or even sub-atomic particles, billions of times enlarged, the building blocks of all that we know. At the same time, they resemble planets and stars, forming a galactic cluster, the entire universe shrunk down to the size of my studio. These are the extremes of scale in the universe, ourselves occupying the middle ground. Looking at these polyhedrons, the relationship between the two extremes seems remarkably clear, yet it has been a tremendous problem for physicists to find a “grand unified theory” that would bring these two, often conflicting, worlds beneath one umbrella: the world of particles, ruled by quantum mechanics, and the world of stars and planets, ruled by relativity. Richard Dawkins depicted these extremes as the head and tail of a snake twisted around into an Ouroboros biting its own tail, an ancient symbol of cyclicality (in the sense of something constantly re-creating itself) and an apt metaphor for what I intend my work to achieve.

ENDNOTES


10 Parker, 41.

11 Parker, 41.

CHAPTER 3: THE LONG CHASE

With a basic understanding of what I want my work to be, I set upon a path of research. I made quick friends with a physics-for-the-layman book called *Black Holes, Wormholes, and Time Machines*. I admire the author, Jim Al-Khalili, for describing concepts as complex as special relativity and quantum mechanics in terms that anyone could understand. I wonder if I can do with images what he can do with words. I don’t wonder for too long, though, because my work doesn’t need to be about teaching, but about describing and exploring. The book provides plenty to explore.

What exactly is time? Al-Khalili immediately admits that there is really no satisfactory answer to this question. I find this ambiguity encouraging; what would be the use of asking questions that have easy, readily available answers? I am thrilled by the possibility of multiple, perhaps contradictory, interpretations. I read about ways of measuring time, based on revolutions around the sun and rotations around the Earth’s axis, pendulums and quartz crystal vibrations, and the oscillations of cesium atoms (9,192,631,770 of which constitute the standard second). But not one of these even begins to define time itself; they only give us a way to measure its intervals. In fact, until Newton, time as a concept was considered solely in the realm of philosophy. Newton’s concept of time was absolutist; time exists outside of and independent of space and all things that occur in space and it flows at a constant rate. Einstein’s quantum mechanics overthrew this determinism, but it hardly brought everything into clear focus.

Does time have a beginning? Did God create time? Or was it the Big Bang? Al-Khalili does not consider these two necessarily contradictory. If the Big Bang created not only space, but also time itself, questioning what was before the Big Bang is not necessarily logical. God could very well exist outside of time and space and perhaps have caused it, although Al-Khalili cautions that cause and effect are dependent on time, and a “cause” for the Big Bang is not required by quantum mechanics. Even more interestingly, at the quantum level, at the tiniest measurements of length and time, everything gets “fuzzy,” and the ordering of events and the idea of continuous time no longer applies. I come across a passage that intrigues me to such a degree that I read it ten times and think about it for days. Al-Khalili explains that the laws of physics say nothing about the flow of time. Time simply is, and our sense “that time passes or moves in some way” may be just a feeling.

I devour the book. I read about the two arrows of time—the psychological and the thermodynamic. The former is our perception of the direction of time. In fact, the laws of physics work in two directions. Physics’ assignment of direction is a result of the second law of thermodynamics, which states that in an isolated system, entropy can never decrease. The arrow of time points from order to chaos. I read about Einstein’s special relativity, and how it essentially disproved what most of us still consider “common-sense” notions about time even ninety years later. I read about how two simple facts of special relativity—that all motion is relative, so nothing can be said to be truly stationary, and that light behaves like a wave in that its speed does not depend on the speed of its source—lead to some intriguing concepts. For instance: at Al-Khalili’s behest I imagine standing next to someone who lights a torch and, as he lights it, running alongside the torch beam at three quarters of the speed of light. Common sense would tell me that the light would appear to me to be moving slower to me than it does from the perspective of the torch holder. If he had lobbed a baseball and I was traveling at three quarters of the speed of the baseball that would certainly be the case, but not so with light. I would see the light traveling at the same speed as the torch-holder observes it, and the only way this can
happen is if *my time is running slower than his.* From his perspective, my watch and I are moving in slow motion. And what’s more, because I’m moving relative to him, from my perspective he’s the one moving in slow motion.\textsuperscript{20} This is called time dilation, and I find it to be a fascinating concept. It made Einstein quite excited as well; he described his discovery of time dilation as a storm breaking in his mind.\textsuperscript{21} Top all this off with the fact that with high speed, not only does time slow down, but objects’ lengths actually contract, and we have a recipe for a delicious tidbit about time… “For light itself time stands still… to a photon, time does not go by at all… and the Universe has zero size…!!”\textsuperscript{22}

I finish the book, and flipping through another I find myself quite bored. Killing time on the computer I follow someone’s Facebook link to a TED talk, which snowballs into 5 hours of watching TED talks—short lectures given by leading minds in all conceivable disciplines at conferences devoted to the concept of “ideas worth spreading.” My mental wheels get turning as biologist and Oxford professor Richard Dawkins points out that a solid, dense rock is, at the atomic level, comprised mostly of empty space. He questions why it is that we perceive this rock to be solid and impenetrable, and explains that our brains have evolved the idea of the rock as impenetrable to help us navigate the world around us more efficiently, and “survive within the orders of magnitude of size and speed which our bodies navigate at.”\textsuperscript{24} I think about how this idea might apply not only to matter, but also to time. Perhaps some aspects of our notion of time are merely constructs of the brain that help us more efficiently navigate our lives.

Philip Zimbardo, a past president of the American Psychological Association and a professor emeritus at Stanford, discusses time perspective—“the study of how individuals divide the flow of human experience into different time frames or time zones automatically and non-consciously.”\textsuperscript{25} Time perspective varies between cultures, countries, individuals and social and economic classes, and people “become biased by learned overuse of some frames and underuse of others.”\textsuperscript{26} Whether someone is past-, present-, or future-oriented has a major impact on the success and happiness of the individual, Zimbardo explains. Our engrained notions about time, acting upon us at a subconscious level, affect every aspect of our lives. I realize that this is why exploring the concept of time is so important to me. Time shapes every aspect of our lives, in ways that we are conscious of as well as in the depths of our subconscious. Without time there is no change, no growth, no memory, no movement, no death, and no life. Changing the way we think about time can have a tremendous impact on our life experience. If I ever were to doubt the relevance of making work about time, I would have a simple justification at hand: there can be no subject more relevant in life or in art. Everything is about time. Without time, there is nothing.

Physicist and cosmologist Sean Carroll gives a talk on the arrow of time. He describes time in terms of its two aspects, repetition and change, explaining that synchronized repetition allows us a mechanism for measuring time, and that change allows us to assign a direction to time. He discusses entropy and the thermodynamic arrow of time, ultimately questioning why the universe was low entropy in the first place if its natural state is the super high entropy state of thermal equilibrium. He offers an intriguing, if unproven theory of a multiverse. He suggests that the main universe in the multiverse is in a state of thermal equilibrium, but that random fluctuations in the dark energy of that equilibrium might give rise to tiny pockets of super-high energy that create little big bangs and pinch off into baby universes. These baby universes, in their dense, hot state, are low in entropy and will approach thermal equilibrium over time, creating their own baby universes and ultimately more and more entropy. He posits that our universe is one of these many baby universes in the multiverse, and that the multiverse as a
whole is a time-symmetric system. Baby universes sprout off with their own arrows of time, some pointed toward our future and others toward our past, thus the multiverse as a whole is increasing in entropy in all directions of time\textsuperscript{27}, a lovely solution when one considers the fact that the basic laws of physics are all time-symmetric.

Such theories can be hard to grasp. We think of the universe as being all encompassing. The universe as part of a multiverse, existence outside of space and time and before the big bang, time dilating or subatomic particles not obeying the laws of physics that we take for granted—these things are difficult to wrap our minds around. Despite proof, even, these concepts seem far removed from what we think we know. In another TED talk, behavioral economist and author of \textit{Predictably Irrational}, Dan Ariely, shows an optical illusion of two tables, made up of lines that are actually equal, but which we see as being greatly different in length. Even after we are shown how our eyes were deceived, we still see the illusion and not the reality. “Our intuition is fooling us in a predictable and consistent way.”\textsuperscript{28} He shows another illusion, one where one color appears to our eyes as being two completely different colors based on specific visual context. When the context is removed, we can see that the colors are identical, but even once we know we are being fooled, we still see the illusion and not the reality. If we make consistent mistakes in the areas we are good at, like vision, what are the chances that our intuition misguides us in other areas? I, naturally, think about our perception of time. How much of what we believe to be true is merely illusion?

Henri Poincare, the mathematician, theoretical physicist, philosopher and engineer who introduced the modern theory of relativity, might have agreed that everything we know about space and time could very well be an illusion. He believed that our theories and understandings of the functioning of the universe are based on certain assumptions that are merely conventional and not empirically true, placing Euclidean space (a space that can be measured with straight edged rulers on three axes, as we think about space) among these conventionalisms. He believed that other models would equally valid to be set down a priori for formulating our view of the universe. “The essence of Poincare’s view is…that some of the most important principles that we take to be empirical simply are not—that they are, by their very form and content, “definitions in disguise.”\textsuperscript{29}

Henri Poincare is always on my mind now. I find diagrams of his non-Euclidean spaces a to be beautiful and complex, and they remind me of my own polyhedron structures. At work one Friday, I sit thinking about how to incorporate these diagrams into my imagery, when I am interrupted by a text message telling me that Radiolab was on today, and it was all about time. When I get home, I set up my computer in the kitchen, where I cook and listen to Radiolab podcasts for hours.

The episode on time\textsuperscript{30} begins with a version of Beethoven’s Ninth Symphony by Leif Inge, slowed down using software to stretch from its original 90 minutes to last an entire 24 hours. The music is unrecognizable. It is beautiful and powerful, and has a perpetual feeling like something important is just about to happen. It teeters on the edge of something unknown. It is enchanting. As Jad Abumrad puts it so perfectly, “the slowness unlocks something special in the original…change the routine, you make new discoveries.”\textsuperscript{31} This is what I want my work to do—to change the routine of the viewing experience the way this music changes the routine of the listening experience, perhaps unlocking something new and special in the process. Abumrad describes it as “hanging, floating time.” The music feels exactly how I want my exhibition to feel.
Later in the show is a story about Eadweard Muybridge photographing a horse to capture the moment when all four of its legs are off the ground. The taking of photographs is likened to stealing the moments out of the flow of time, permanently freezing them, making the mundane enchanting by paying close attention. This is exactly what I intend for the photographic documentation of my process to do.

In another episode, this one about memory and forgetting, I learn that memories are in essence protein structures connecting brain cells to one another. More interesting, though, is the fact that these memories do not reside permanently in any part of our brain. When we are remembering, we are not drawing upon a piece of information that has been stored inside of our mind. Instead, each time we remember we are re-creating the memory, building it anew. Every time we remember something we change the memory somewhat. Memories are unstable at the time we draw upon them, malleable, and susceptible to influence. The more often we remember, the more distorted and corroded the memory becomes. As soon as reality happens, it ceases to exist and is merely approximated in our memory, that approximation straying farther from the truth with each recollection. We tend to define ourselves by our memories, but the safest, truest memory is the one we forget.

In an episode entitled “Falling,” I hear another story that touches on our perception of time. David Eagleman tells a story of when he was a child and was playing in a house that was under construction. He fell through the roof, and can remember thinking about trying to grab the edge of the roof and realizing it was too late, and then thinking about Alice falling down the rabbit hole, wondering if this is how she would have felt. All this in what would have been less than a second. What happens in these moments when time seems to us to slow down? Physics tells us that time slows down when we move at tremendously high speeds, but Eagleman’s experience is something else entirely. Eagleman devised an experiment where people did a SCAD dive, a freefall jump with no backup safety equipment other than a net below. Participants were given perceptual chronometers, devices with numbers flashing just fast enough that they were unable to make them out. If we are really able to take in more information during these intense time-slowing moments, they should have been able to make out the numbers. But, alas, they couldn’t, even when the sensation time slowing was in effect. The slow motion is actually not experienced in the moment but is a construct of our memory. Usually, when we create memories, we edit out a lot of unimportant details. If we didn’t, we’d be overwhelmed with trivial information. In major moments of high intensity, like a freefall, our memory soaks up many more details, as they are more likely to be important. Thus, in hindsight, the moments feel like they took longer because we are able to remember so much more.

In Chronos: How Time Shapes Our Universe Etienne Klein writes that this sense of slowed time is a function of our personal psychological time, which is separate from and not to be confused with physical time. “Physical time flows in a uniform way, whereas psychological time changes in a rhythmical way; according to the circumstances it can give the impression of stagnating or, on the contrary, speeding up.” Notwithstanding the fact that special relativity disagrees with Klein that time flows in a uniform way, the idea that our impression of time is ever changing is practically undeniable.

I find some other interesting tidbits in Klein’s book, reading in my studio late at night. I read about dreams, in which “the flow of time does not always wander from before to after.” I have always been fascinated by dreams—sporadic moments and associations mixed up into strange and powerful supernatural events. Our dreams intrigue us, and this may be in part
because they deviate so strongly from our ingrained linearity. “It is not by arranging these events in a chronological way that the latent meaning can be revealed, because there is not one story but several stories that interweave, overlap, and sometimes contradict one another, each one living at its own rhythm according to its own temporality.” Likewise, it is in the overlapping, interwoven arrangement of moments and stories in my work that will reveal something deeper about my own experience.

I can scarcely imagine an aspect of time that I have not touched upon in all this reading, yet I am not all that sure that I am any closer to any answers. Saint Augustine is often quoted as saying “if I am not asked, I know what time is; if I am asked, I do not.” And there’s the rub. Time is everything, makes everything possible, rules every aspect of our lives, and despite all we know, not a soul can really say what it is.

I read for hours, and my eyelids slowly get heavy. As I turn another page, the faint sound of a trumpet dances down the hallway, through the foyer, and into my door. It distracts me from the words on the page, and I put the book down.

ENDNOTES

14 Al-Khalili, 111.
15 Al-Khalili, 114.
16 Al-Khalili, 117.
17 Al-Khalili, 120.
18 Al-Khalili, 121-4.
19 Al-Khalili, 140.
22 Al-Khalili, 161.
23 TED.com. TED. Web. 5 May 2011.
26 Philip Zimbardo prescribes a healthy take on time.
31 “Time”
33 “Memory and Forgetting”

MP3 file

Klein, 132.

Klein, 144.

Klein, 145.

Klein, 10.
I have made several model polyhedrons over these past months. I look at them now, hanging in the space where I will ultimately install my exhibition (Fig. 12). The forms throw shadows into the space; they sway slightly. I find them captivating. I propose my thesis—I talk about these models I’ve made and all the research I’ve done. Someone tells me to stop reading and start making. It’s a good suggestion. My mind is saturated, a jumble of pictures swirling in my head, ready to spill out onto paper. An archer shooting the arrow of time, only for it to come around at his back, a man falling, time slows to a halt, a girl dreaming, images scrambled above her head, a man-like god and the Big Bang, a sundial and a pendulum clock and an hourglass, clocks aboard rockets, dilating time, Poincare disc models, a Phoenix and an Ouroboros, light cones and special relativity equations, a man poised to kill his grandfather and undo his past, a black hole, a brain, a man walking in an endless circle… Yes, it’s time to start.

The whole is the sum of parts, and parts are where I begin. The first structure I build is the largest, since it figures to be the most difficult. I build it in segments, which serves both practical and conceptual purposes: it is able to be disassembled, which, practically, allows for easy transport to the gallery and, conceptually, allows for multiple possible constructions, meaning further fluidity and flexibility in the ordering of individual components (Fig 13). The interior prints would begin in pieces as well, each panel composed of three separate sheets fitted together, each a different color (Fig 14). This system would allow me to print images over several of these pieces and then rearrange them. Thus, every panel would contain background layers comprised of segments of images that would be key images in other panels. This repetition would imply connections between the panels, even when literal connections were not readily apparent. These interior images would be woodcuts and screen prints, used for their graphic and illustrative association and capacity (Fig 15).
Throughout the process of building and image making, I photograph the process extensively. I attempt to photograph every stage, making note to take a picture every time I have a distinct thought about what I am working on. To whatever degree possible, I want the camera to capture my eye’s view of the experience, creating a linear narrative that I can later pick apart, analyze, switch around, and layer upon itself. The camera never leaves my side.

Figure 13. Rebecca Kreisler, In Progress Documentation #1

Figure 14. Rebecca Kreisler, A Matter of Time (Detail, Interior)
Figure 15. Rebecca Kreisler, *A Matter of Time* (Detail, Circle Walk)
CHAPTER 5: MEETINGS AT THE EYE

The saw catches and kicks as I release the handle; a chip of wood flies to my right and lands in an ever-growing pile of sawdust. I clean the edge of the new cut with a piece of sandpaper and add the new section of armature to the pile. I'm halfway there. One pile shrinks as another grows. I stare at the pile of newly cut wood. I take in the scent of pine. I smile, enjoying the fact that I finally had a reason to buy a saw. My ears ring. I place my goggles on top of my head. I need to start building the segments, but for now, I enjoy the contrast between the lines of the one-by-twos, and the scattered, random mess of the sawdust (Fig. 16).

![Figure 16: Rebecca Kreisler In Progress Documentation #2](image)

No matter how much I prepare, I’m never prepared. I bought the wrong screws. The drill battery is dead, but I think I want to use the staple gun anyway. And where is that wood glue? All the pieces are cut, a massive pile of bones, an armature-to-be. I stare blankly, trying to figure out how to hold this mess together while the glue dries. The staples don’t do their job well. The solution appears in the doorway… Josh, taking a break. He has clamps and square edges. He has earplugs. He has my eternal gratitude (Fig. 17).
I build; I glue; I staple; I clamp; I wait. Every step is a new pattern… stacking segments together making new patterns… lines and shadows and spaces and patterns…all the segments stacked together, waiting to become whole (Fig. 18).
I sketch; I draw; I dig; I carve; I cut. The red sharpie and alcohol tone the woodblock pink, giving the drawing a look of flesh. As I carve, curls of pink and tan litter the table in a messy, twisted pile. I have three splinters in my palm, and one bleeds a little. Red, flesh, wood, and pink. The little twisted pieces look like scars (Fig. 19).

Woodcuts liken to old illustrations, screen prints to modern information. I prepare files of images to be printed on a large plotter, oiled, and exposed on screens. I hand the jump drive to the woman behind the counter. Her nametag says “manager in training,” and though I’m not her trainer, I have to show her how to use the printer. She tries to charge me for shipping a 24-inch package instead of printing on 24 inches of paper. I wonder whether this is a tremendous waste of time.

Preparing the transparency, baby oil seeps through my fingers and through the paper onto the newsprint beneath. What an unexpected artifact, this oil spotted newsprint, looking like a Petri dish growing cultures of imagination. I hang it in the window and it comes to life (Fig. 20).
I sit on the couch with a notebook, preparing to do a little math. A stray wood chip jabs me in the thigh. From the waist down, I’m a mess of stray wood chips jabbing, jabbing, jabbing… It’s a good thing I remember my sine and cosine. Who says artists have no need for trigonometry? It takes me an hour, but now I know that the brackets for assembling the segments of the large armature need to be angled at 67.4 degrees. I also now know what size wedge I need to cut in order to prop up some of these segments together. Doing this, I can visualize what it will look like all attached… oh yes, I can see it now (Fig. 21).

Figure 21. Rebecca Kreisler, In Progress Documentation #7

Sitting alone in this old room with my headphones in, I can’t hear the clock tower’s incessant ringing or my mind’s ceaseless worrying, and time gets swallowed up by banjos, mandolins and guitars, and my blade in the wood, and the wood flying everywhere (Fig 22).

Figure 22. Rebecca Kreisler, In Progress Documentation #8
Cutting the paper for printing, the shapes take forms like kites with perfect angles. Cutting and trimming, the angle is too big, cutting and trimming, the angle is too small, cutting and trimming, the angle is never right. Little bits of paper falling and piling, falling and piling, falling and piling. Blue and white and grey, a web of lines (Fig. 23). I gather it and bundle it together. Save every scrap.

Figure 23. Rebecca Kreisler, In Progress Documentation #9

I print, and I switch things around, I print again, and switch again. I print layers upon layers, building content and context. Laid out across the room they become a sea full of imagery, floating in time. (Fig. 24)

Figure 24. Rebecca Kreisler, In Progress Documentation #10
If there is such a thing as an end, it begins to feel near, as the pieces begin to come together the way they were always meant to be, building up all around me, enveloping my body as they’ve enveloped my mind (Fig. 25).

Figure 25. Rebecca Kreisler, In Progress Documentation #11
CHAPTER 6: THREADS IN THE PATTERN

I realize early on that merely photographically documenting my progress would not give me a complete picture of my experience. It could capture the physical acts I was performing, but not the thoughts that occupied my mind. So, I task myself with writing about the experience. I do this through constrained writing, stream of consciousness, and poetry writing, inspired not solely by what I am working on, but also by the things that occupy my mind as I am working, a major component of my experience. The words flow easily:

I can feel the malice in the autumn air. I need to work, but I’m afraid to start. Every thing I touch every fall falls apart, falls away, and breaks my heart. I can’t touch a thing, can’t move, can’t care, just sit and stare and wish for what I could have done to be done—for autumn to be gone.

I capture my thoughts by paying them mind, and every time I find myself thinking about thinking, I write the thought down.

I think I’d better go to bed. I think I’m going to have a nervous breakdown. I think I’m going to scream. I think I’m going to cry. I think I’m losing my mind. I think I can, I think I can, I think I can, I think I can… I think it’s going to be ok. I think it’s for the best. I think I might pull this off. I think this might actually work. I think I’m growing backwards with time. I think I should go home. I think I might puke. I think I need a broom. I think that’s enough for the night. I think it’s done. I can’t think. I don’t know what to think. I don’t know what I think anymore.

I reflect on my work and what it means. My life becomes consumed with my work—thinking about it, writing about it, talking about it, and worrying about it. I always know what my work is about, and I never quite know what it will become. This scares me, drives me, and keeps me excited and interested. I always know what my work is about, and I grasp desperately for the right works to describe it:

I think I know what my work is about, but I don’t want to talk about it tonight. I can’t explain what is without explaining what will be, and the whole point of the damn exercise is to not yet know what will be. I’m no good at talking about nothing. I just don’t see the point. I know what my work is about, but I don’t want to write about it, and I don’t want to talk about it anymore, certainly not now, when all I have are scattered bones and bits and plans, and it’s the end of a long day, and you can’t critique the picture in my head. I know what my work is about, but I can’t seem to write about it. I can only seem to write about not being able to write about it. Some kind of therapy—a hundred thoughts and no words—a clean slate and a blank page—and a sudden lack of inspiration.

I consider including my writing in the subjective exterior imagery of the polyhedrons. I am wary of too much text, wanting to avoid adding to many linear elements to the work. I
decide that the text I include will be partially obstructed, and somewhat abstracted, adding texture and context without being overly straightforward. I write short poems, and attempt to format them as triangles, the same shape as the planes of the polyhedrons.

Figure 26. Rebecca Kreisler, *A Matter of Time* (Detail, Waxed Text-Image)

As many things as I wish I
Could remember, I’m
Still longing to
Forget
You

I’ve never enough time
When every day
Feels shorter
Than the
Last

Nothing could make me more
upset than the terrible
thing that hasn’t
happened…

Yet.

As I draw, carve, and build, I sway between strict focus and letting my mind drift. I get caught up in my mind, and I make mistakes. I am jarred back to the present, and often I have moments of extreme clarity, where my distracted thoughts seem to bear immense relevance to the task at hand, my subconscious mind finding connections, parallels, meaning, and importance among the scattered pieces of my process. I often drop my carving tools and rush to find a pen, to capture in words these fleeting moments of clarity. In turn, these words often inspire new interpretations of the images I’ve created and the photographs I’ve taken. Even when I don’t include the text in the work, its influence is tangible (Fig. 27).
A gouge
A pinch
A slip
A false move
A splinter
A blister
A cut
A tiny drop of blood
A mistake
A reaction
A consequence
A distraction
A scar
A record
A reminder
A revelation

Figure 27. Rebecca Kreisler, *Scars*. 

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CHAPTER 7: SOMETHING FLICKERS

Daniel Kahneman describes a distinct difference between our “experiencing selves” that live in the moment, and our “remembering selves” that live in the past. In essence our experience is completely lost the moment it is over, being replaced by a new present. Our remembering selves skew and change that experience in many ways. While I am incapable as any of freezing my experience, I am attempting to capture it to whatever degree possible. I periodically review my photographs and writing, searching for hidden connections and parallels. Reflecting upon this documentation, I compare my memory to an actual record. In some cases my memory and experience agree, and in other times they disagree. Some photographs were taken back to back while I remember them being far removed, and vice versa. These discrepancies and divergences become an important aspect of the resulting imagery. I combine photographs together in transparent layers, thus merging separate moments into one (Fig. 28). I look for overarching themes and pick out photographs that visually represent them (Fig. 29).

Figure 28. Rebecca Kreisler, A Matter of Time (Detail, Digital Print #1)
I create new imagery derived from these photographs and document this process. I continue in this fashion until I distill my memory and experience down to a few simple images that represent the whole process. I find myself drawn to certain pictures, using them again and again. The images of discards—sawdust, woodchips left from carving, and especially scraps of paper, littering the floor like spaghetti. I alter them and layer them, make new images from them and photograph those images (Fig. 30). I simplify, and I begin making paper-cuts (Fig. 31), white-on-white prints (Fig. 32), and waxed paper images from them. These images are subtle, ephemeral and abstract, much like my memory of the moments from which they are derived.

I sit in the studio one night, cutting away at layers of paper. The work is intricate, but mindless, and my thoughts begin to drift. A million bits of thoughts litter my mind, a hundred emotions mixed up into sludge. I can hardly think straight anymore. This whole year has been a scatterbrained, screwed up, confusing, mind-twisting mess…
And there it is—a sudden, striking clarity. The pile of paper scraps, the woodchips and sawdust, the random messy piles of leftover nonsense cluttering up everything and grasping my attention so tightly—they are a beautiful metaphor for the entirety of the experience: the stress, the madness and the confusion, the million little things littering my mind. Somewhere inside I
had already known what images represented this experience, what images represented me: the ones that embody a simple, intricate beauty under the guise of an overwhelmingly confusing, tangled disaster. Take that, thermodynamic arrow of time—I just made order out of chaos.

Figure 32. Rebecca Kreisler, *A Matter of Time* (Detail, Waxed White-on-White Linocut)

ENDNOTES

CHAPTER 8: THERE IS NEITHER BEGINNING NOR END

For a brief while I consider letting the large polyhedron structure be the only piece in the exhibition. It is just over 7 feet in diameter, with space for someone to sit inside, and it’s covered inside and out with a plethora of imagery. The interior is full of the woodcuts and screen prints that I conceived of so early in the process. The outside is translucent and ephemeral, a soft light glowing through intricate paper-cuts, digital prints of layered photographs, and waxed white-on-white prints of tangled lines. There is certainly no part of the process missing from this one piece, but to leave it alone would not tell the whole story.

I consider my life to be made up of more than one narrative. These stories interrelate, conflict, join together and break apart again. Memories distant in time and space are blurrier, less specific, smaller. I think my exhibition should be the same. The largest structure is the freshest, the clearest, and the most immediate, but there are little side stories to be told—stories I mean to tell with smaller polyhedrons that visually echo and repeat elements from the large one, but in slightly different ways. For instance, one small polyhedron, *Hands of Time* (Fig. 33), combines digital prints layering photographs of my own hands and the hands of my figurative woodcuts with the hands of clocks, representing the idea that it is ourselves as much as our timepieces that define our sense of time. Another piece, *Memory* (Fig. 34), combines digitally altered photographs layered with one another in a non-chronological fashion with diagrams of the sections of the brain that handle memory. This piece calls into question the accuracy of my memory, relating back to the notion that each time we remember something we distort it. In essence, the exhibition represents a panorama of my memory throughout time, the largest polyhedron being the most present, the smallest receding farther into the future and the past.

Figure 33. Rebecca Kreisler, *Hands of Time*
I decide to alter the gallery space itself with triangular segments built out from the corners, creating an unexpected, visually skewed space and a sort of forced perspective. Walking into the installation then becomes analogous to walking into my minds-view on time. The viewer is no longer in Foster Gallery, but in my individually constructed version of reality. The new shape of the space echoes the forms of the objects within it, implying the viewer’s place both inside and outside. The walls are painted with a subtle design that echoes the imagery on the structures. The polyhedron forms are arranged in clusters inspired by the arrangement of bodies in the universe, or atoms in a molecule. As the space recedes into corners, the shapes get smaller, furthering the illusion of perspective, which is meant to represent a receding of time as well as space. The exteriors of the forms are immediately visible, the representations of my memory and experience, which, this process has shown me, are what really matter to me in the end. Closer investigation into the space uncovers the hidden interiors, some closed completely, some open only to the eye, and some open to enter completely. The physical entrance into the main, largest structure faces the opposite wall from the entrance into the gallery, making it only accessible once the viewer fully engages with the space. Entering the structures provides a new context upon which the exterior spaces can be viewed after exiting. Thus, the viewer completes the journey that I have taken in making the work.

My work started off as an examination of time, and while it has remained that, it has become something more. Through a continuous, self-reflective, and sometimes unpredictable process, I have clarified my own perspective on my initial questions—a subjective perspective that could not have been reached through research alone and a perspective that imbues my imagery with specific, thoroughly considered abstract representations of my experience of time. I know what I believe about the nature of time, but I think that I’ve always known that. What I’ve learned is why time always mattered so much to me. An exploration of time is an exploration of life, of change, of memory, and of self.
CONCLUSION

I know what my work is about, and it’s not about time. It’s the embodiment of my life and experience—through inspiration, exploration, roadblocks and epiphanies. It’s about slowing down and paying attention, and capturing the moments in time that define me. My work is a visual representation of myself. Of utmost importance to the process of creating this work was the attention I paid to my actions, my surroundings, my feelings, and my movement through time. By thoroughly altering the space of the gallery, I have put viewers in a position of heightened awareness of their surroundings as well. The installation of triangles in the corners that mimic the black color of the walls and ceiling and visually skew the space, paired with the yellow pattern painted directly on the walls, transforms the space into something new and unexpected and immediately encourages the viewer to delve deeper into the space and pay closer attention to what he sees (Fig. 35). The viewer must also be conscious of his movement through the space, with the arrangement of polyhedrons suggesting certain pathways and denying others.

![Figure 35. Rebecca Kreisler, A Matter of Time (Detail of Installation)](image)

The images on the inside of the largest structure are the most obscured. It is not uncommon for me to see someone come into the space and never realize that there is an inside to be seen. Those inside images were intended to represent the unseen, unless sought, forces of nature and time acting upon us, the structure that defines our experience. That some viewers never realize those images are there is fitting. In the end, those images also represent the starting point of my exploration and of all the other imagery in the gallery. Once someone sees the
interior imagery, they might recognize its repetition in the rest of the space and even on the walls. The specific interior images are not nearly as important as their function in the larger project. Time is the vehicle by which I began an investigation into my own personal experience, and these images represent time in all the ways I initially thought about it. From diagrams of time dilation inspired by Al-Khalili’s book (Fig. 36), to the Ouroboros in Richard Dawkins’ lecture (Fig. 37), to various clocks and calendars (Fig. 38), to an archer shooting an arrow that I equate with the arrow of time (Fig. 39), these images are the jumble of inspiring information about time that began a path of self-awareness. It is important to me that they took their place on the interior of the large structure that represents my most present and immediate personal narrative.

Figure 36. Rebecca Kreisler, *A Matter of Time* (Detail, Time Dilation)  
Figure 37. Rebecca Kreisler, *A Matter of Time* (Detail, Ouroboros)  
Figure 38. Rebecca Kreisler, *A Matter of Time* (Detail, Clocks)  
Figure 39. Rebecca Kreisler, *A Matter of Time* (Detail, Archer)
The exteriors of the polyhedrons are a range of subtle, ephemeral and intricate imagery that as a whole is representative of the entire experience of my life while making this work. So much is a blur (Fig. 40), but certain areas are crisp and clear (Fig. 41). The repeating theme is the tangled web of lines, found on the walls, in the patterns of the paper cuts, in the subtly colored linoleum cuts, and in several of the layered digital images. These messy patterns are the most distilled visual analogy for the jumbled mess of thoughts, ideas, worries, and decisions that came together into this exhibition. The process involved taking a concept as huge as time and honing it down into single moment that is the exhibition, and the imagery started with a multitude of illustrative images and resolved into a simple pattern of lines. Likewise, individual pieces take the jumbled web of lines and arrange them into ordered geometrical forms (Fig. 42).

Figure 40. Rebecca Kreisler, *Arrow of Time*
Figure 41. Rebecca Kreisler, *Poincare* (Detail)

Figure 42. Rebecca Kreisler, *The Tangled Web*. 
This exhibition is many things, all at once. It contains moments of chaos and is obsessively ordered. It is about an exploration into time, and about experiencing life. It is the result of an evolving, organic process and meticulous planning. It is a layering of moments that disagree, harmonize and interrelate. It places the viewer both inside and outside. It is a comprehensive narrative, and a frozen moment in time. Above all it is a portrait of myself, complete with contradictions and juxtapositions, confusion and clarity, memories and dreams (Fig. 43).

Figure 43. Rebecca Kreisler, *A Matter of Time* (Detail, Dreamer)
Searching for time
Searching for answers
About time;
About life.

A thorough examination
Through endless information,
Complications,
Complexity…

I can’t define time, but I can tell you that I’m running out of it.
But there is no shortage of obfuscation,
Or of obscurity or obstructions…
Only just short of sabotage.

Overwhelming chaos

Yet within it I find clarity.
Peace between frantic moments,
Beauty in the tangled web we’ve woven.
The future in my memories…

It all comes back around.

Life like Jeopardy
I’ve always had the answers;
I need only seek the questions,
And I’ll find them in time.
BIBLIOGRAPHY


VITA

In her senior year of high school, Rebecca Kreisler’s peers took bets on whether she would become a lawyer or an artist. After a short while in the pre-law program at the University of Georgia, she changed course and received her Bachelor of Fine Arts in printmaking, which lead to a glorious career in food service management before the idea of going to graduate school for printmaking won out over the physics degree and culinary school options. She would like to think of herself as a jack-of-all-trades and a Master of Fine Arts. Where the road leads next is anyone’s guess.