Communication Between the Digital World and Human Existence

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Communication Between the Digital World and Human Existence
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Introduction

As a Master of Fine Arts candidate with an undergraduate background, and strong interest in the graphic design field, I decided to investigate the interactive communications between humans and computers. This field of interest was developed by my fascination in human to computer relationships. The processing of information has always intrigued me. In researching this area I have begun to realize how limited the documentation is concerning this field of study. This especially applies to any forms of visual expression.

My proposed thesis statement: “Communication between the digital world and human existence” initiated a focus to translate the underlying form of binary communication into two and three-dimensional visual expressions. Through research I explored the binary code process and how it could be interpreted as visual works of art, symbolically represented.

I was granted a Bachelors of Fine Arts degree in 2000 at Rochester Institute of Technology; my field of study was graphic design. Graphic design provided a solid understanding of the development and intercommunication of computers. I was encouraged by faculty and peers to pursue an in-depth investigation of digital communications and to symbolically translate my interpretations into art. As a result of this relatively new influence of the computer, through symbolically represented visual artwork, a majority of my research was done via the internet. Through my research and experimentation I feel that I have accomplished the goals that I have set for myself as well as opened the doors to many future possibilities in this expressive field of communication.
Digital World and Human Existence

In order to begin to explain my reasoning behind combining these two subjects, computer language and its representation in art, I first need to provide a definition for comparative purposes. The digital world can be visually described in many ways. I am focusing on the communication aspect of computers and how they accept and process what we are asking them to do. This process is best described as HCI (human-computer interaction).

Unfortunately for us, there is no general and unified theory of HCI that we can present. Indeed, it may be impossible ever to derive one; it is certainly out of our reach today. However, there is an underlying principle that forms the basis of our own views on HCI, and it is captured in our claim that people use computers to accomplish work. This outlines the three major issues of concern: the people, the computers and the tasks that are performed. The system must support the user’s task, which gives us a fourth focus, usability: if the system forces the user to adopt an unacceptable mode of work then it is not usable.\(^1\)

In breaking down these three issues of concern I recognize that people produce the communicative activity. Whether it is designing a magazine layout, programming a web page, or illustrating architectural plans, the human is the originator of the idea. The computer is the machine employed to process and output the finished product.

A computer is an electronic machine which handles information. That information can be in the form of facts and figures, words, pictures, or even music. The computer can store its information, sort it, do calculations with it and show us the answers. In a fraction of a second, it can work out sums that would take many hours to do with pencil and paper. But computers aren’t “intelligent.” They will do only what we ask them to do, no more and no less.\(^2\)

The computer is made up of six major components that enable the task at hand to be

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completed. These six components are the Clock, which controls the timing of the operation; Input/Output device, linking the computer to the outside world; Processing Unit, where the actual work is produced; Control, monitoring the flow of data throughout the computer; Random Access Memory, temporary memory that can be used in any application; and Read Only Memory, unlike the RAM, a device that can only read information, for this reason RAM is used for information that the computer always needs.

Information is processed through a computer using binary code. This binary code is represented through a series of 1s and 0s.

A 1 represents a pulse of electricity and a 0 represents the absence of a pulse. All the data given to the computer – numbers, words and even pictures – must be translated into this machine code of 1s and 0s. The computer can then receive it as electrical pulses. When the computer has completed its operations, the result is translated back from machine code into a language we understand. ³

Historic initial human existence or the origin of life raises the question of how did we actually get from the "beginning" to the present? What exactly is our beginning and who really can validate this question. This question has riddled scientists and religious leaders for many centuries. Although many people have interpreted their theory as to the origin of life, I believe that there are only two possibilities. These two theories derive from two most opposing views. They are generated from both the religious and scientific communities.

   In the beginning God created the heavens and the earth.
   The earth was with out form, and void; and darkness was on the face of the deep.
   And the Spirit of God was hovering over the face of the waters.
   Then God said, "Let there be light"; and there was light. ⁴
   Then God said," Let us make man in Our image, according to Our likeness; let them have dominion over the fish of the sea, over the birds of the air, and over the cattle, all the earth and over every creeping thing that creeps the earth.”

So God created man in his own image; in the image of God He created him; male and female He created them.  

All religious denominations believe in one or more higher beings that created the world and humans. According to the scientific community, existence is derived from the Big Bang theory which was established by scientist Georges LeMaitre in 1927.

Georges LeMaitre (1894-1966) showed that religion and science -- or at least physics -- did not have to be incompatible. LeMaitre, born in Belgium, was a monsignor in the Catholic church. He was fascinated by physics and studied Einstein’s laws of gravitation, published in 1915. He deduced that if Einstein’s theory were true (and there had been good evidence for it since 1919), it meant the universe must be expanding. In 1927, the year he got his PhD from MIT, LeMaitre proposed this theory, in which he stated that the expanding universe was the same in all directions -- the same laws applied, and its composition was the same -- but it was not static. He had no data to prove this, so many scientists ignored it. (Another scientist, Soviet Aleksandr Friedmann, had come to the same conclusion independently, a few years earlier.) Even Einstein was reluctant to endorse this extension of his theory of general relativity.

In 1929 at the Mt. Wilson Observatory in California, Edwin Hubble discovered that galaxies were moving away at high speeds. He was, like most people, unaware of LeMaitre’s 1927 theory. But LeMaitre used Hubble’s dramatic discovery as evidence for his theory. It was easy. If you imagined the galaxies rushing away from us as a movie, just run the movie backwards. After a certain time, all those galaxies will rush together. LeMaitre put forth the idea that there was once a primordial atom which had contained all the matter in the universe.

The other support LeMaitre used was the idea of entropy, which states that everything

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is moving towards greater and greater disorder.

Others took notice and named his theory “big bang.” LeMaitre’s ideas opened more questions, many of which forced physics and astronomy together: What was that primordial atom like? Why would it explode? He pursued the topic for some time, even suggesting that there ought to be some form of background radiation in the universe, left over from the initial explosion of that primordial atom. He became more interested in the philosophical ramifications of his theory, which were many.6

Despite these uncertainties in the exact age of the universe, it has become accepted that the expansion that we see now began about 15 billion years ago, from a situation in which all matter was in a highly condensed state. The term Big Bang is applied to this event, and the picture this conveys of a universe consisting of fragments hurled out from an exploding center is essentially accurate.7

This paper is not intended to delve into the meanings of each of these theories; instead it is to simply present these two most prominent views of human origin. Due to the origination of human life we are here and our interactions with technological devices occur each day of our lives. Communication is our most important tool in our day-to-day actions. It is important to me to compare these two communications as it exists in computer usage and art translation.

Everyone experiences the mind-boggling problems that accompany computers, such as “Where did I save that”, “This isn’t what it looked like before”, and the most popular “It is easier for me to do it by hand”. Through research I have found that very few artists address the process of digital computers to create two and three-dimensional fine art works. The art that I have done symbolizes many different aspects of the interaction between the digital world and human existence. Through these works, I have explored not only the problems that arise through the communication process, but also the transition and multiple developments in our current civilization.

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7 Trefil, James S. The Moment of Creation. (Charles Scribner’s Sons, 1983), pg. 12.
My goal is not for the viewer to fully understand the full meaning that I am trying to express, but rather to have the viewer sense an appreciation of the friendship that we have formed with these electronic machines.
I began my fascination with this human-to-computer interaction during my course of study for acquiring my Bachelors of Fine Arts degree in graphic design. I was constantly intrigued as to how we could move a mouse tool around on a flat surface, see it on the screen, tell the computer to do a command and within seconds the task would be completed. Although many people may not contemplate this process in-depth, this action intrigued me for years. How could we manipulate an image on the screen or perform hours of calculations within seconds? As a person who learns by visual example, I was at first skeptical when I could not see what was happening on the inside of this electronic box. There were so many questions that I had and so many concerns to explore. I was determined to find a way to symbolically represent these feelings in a visually appealing way.

When researching digital art on the Internet I was instantly bombarded with artists using digital processes to create images. I wanted to examine the functions and processes of the computer as well as the invisible faith that by inputting certain information, completed formulas produce a product that we seek. I began recording a list of the problems and successes that resulted in my daily life as I worked with a computer. I not only wanted to focus on the mechanics of the computer, but I also wanted to research digital communications world-wide via the Internet. The body of art that I developed represent views on these different aspects of communication.

I began researching materials that would help me to physically describe digital aspects I was trying to represent through my work. My first experiments were in wood and the lamination process. I first created smaller scaled models of larger art trying to fine-tune what I was attempting to create. Wood was a material that I felt could symbolically represent the origination of the computer. In the beginning of the computer age, computers were very simple and made of basic materials. For my art wood became this basic material. Wood as a material, had a sense of
simplicity. It was consistent in texture and the fibers suggested a sense of mass inner workings with their variable grains. Although wood was a material that I knew very well, not only my studies in fine arts, but also from my employment in the construction field. Still, I recognized that wood would not be the solution for everything that I was wanting to create.

The next material that I began experimenting with was epoxy resin and liquid glass. Since I did not have access to glass casting, I was in search of a medium that would satisfy my creative goals as well as create the same effect as cast glass. On my first attempt, I experimented with Aristocrat liquid glass. Although this material was crystal clear, I found that it would not cure quickly and it was not meant to cast into larger shapes with a thickness over 1/2 inch. It is mostly used for crafts and tabletops. I then tried the West System 105 epoxy resin. This material is for marine use, but I found it very effective in accomplishing what I was looking for. This process led me to other aspects of glass other than casting.

I immediately became enthralled with the slumping and fusing processes of glass and the unique properties of glass. Glass is a very temperamental medium that maintains very distinctive characteristics to work with.

Slumping is the controlled bending or downward sinking of glass while being heated; unlike sagging, the cross section of a slumped piece does not change noticeably.  
Fusing is the joining together of glass by heat being applied in order for the pieces to stick together. There are two basic types of fusing, full-fusing and fuse-to-stick.

Full-fuse temperature (approximately 1550 to 1620 degrees F.) at which glasses melt together to form a flat surface. (Note: This temperature may vary for different individual glasses.) A hard glass (e.g., plate glass) will fully fuse at 1620 degrees F.; a soft glass (e.g., Spectrum) will fully fuse at 1550 degrees F.  
Fuse-to-stick: Fusing at the lowest temperature possible and yet have separate pieces of glass stick together. Glasses retain all of their individual character and the edges round slightly. No noticeable flow or displacement of the individual layers of glass occurs.

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Both of these processes are done in a kiln, either using a mold or using a kiln shelf directly. I had planned on creating a total of seven pieces, that would include either the slumping or fusing processes. My first experiments incorporating these processes involved incredible learning of processes. I had to first learn how to produce effective successful molds, and then how to operate a kiln. The molds that I created for all of the glass slumping that I did were composed of a mixture of plaster and silica. During the preparing of these molds I also used strips of heavy burlap to help keep the mold together during and after the firing process. Since I knew that I wanted all of the glass to be clear, not translucent or opaque, I was also worried about the possibility of devitrification.

Devitrification: crystallization in glass, usually occurring as a scum on the surface of the glass. This crystallization takes place when glasses are held at temperatures slightly below the liquidus temperature for each glass; this temperature is approximately 1400 degrees F. for most glasses.11

Once my molds were completed, I began talking with students who were majoring in glass as well as studying the textbook Glass Notes12 for preparing a firing schedule that would give me the results that I was looking for, to achieve the slumping process. Once I had a rough idea of what my firing schedule would be, I ran a test with a piece of the same glass that I was planning on using. During the firing process, I found that I had not allowed the temperature to get hot enough for the glass to completely slump into the shape that I wanted. The second problem that I encountered was that if there were any indentations or raised surfaces on the mold, they would reveal themselves on the glass during the hottest point of the firing. I made personal notations for increasing the slumping temperature to 1525 degrees F. This

12 Text written by Henry Halem in 1996 that has been a major text and study guide for individuals working with the glass medium.
was my final firing schedule (figure 1). Upon consideration, I decided to leave the imperfections in the mold as they added another sense of distortion to the glass. This added element would be repeated because five slumped pieces were going to be using the same mold.

I had intended to create six experimental works that would incorporate the fusing process of glass. They would all have fiber optic cable sandwiched between the layers of glass. Since the final art would be flat, I decided that they would work best if they were created on a kiln shelf. I ran the schedule that I had created for the slumping process, and the only change that I made was that I held it at 1000 degrees F. for 3 hours instead of running it all the way up to 1525 degrees F.

Once the firing was finished, and I removed my test, I noticed a reddish color that had appeared on the side facing the kiln shelf. After asking a few of my peers, I came to the conclusion that there must have been some kind of reddish copper powder on the shelf that fused itself to the glass during the process. I noted that I needed to make sure that all of the shelves were washed down before I used them again. Unfortunately, this was not the only problem that I encountered. The fiber optic cable that I had laid between the two pieces of glass had completely melted and then evaporated. I should have foreseen that this would have happened, as fiber optic cable is made up of tiny glass particles surrounded by fiber like string (Aramid yarn), which is encased, in a plastic coating. All of these materials melt at lower temperatures than the glass that I was fusing. As a result, a very light white haze between the glass was left where the cable used to be. I decided that since copper is considered an electronic conductor, it would be a reasonable substitute for the fiber optic cable. I ran another test with the same glass that I had been using, except for this time I sandwiched twenty-two gauge copper wire between the glass sheets. The results that I achieved after running this test were exactly what I was looking for.

Since these fused pieces of glass were going to be cut and placed into frames that I had made, I decided that I should explore the diamond band saw. During the first glass cutting that I made to the fused test piece, I noticed that the glass was riding on top of the metal plate. This in turn caused the glass to prematurely crack before I was finished with the cut. Since there was an
excess of computer mouse pads lying around, I decided to use these as a sponge-like base to hold the glass stationary. This technique worked, but left me faced with an additional problem. Though the two sheets of glass were fused together, where the wire ran through them, air gaps remained. While I was cutting these pieces down, the mixture of the water from the saw and the fine glass dust from the cut, crept into the crevice that was left between the two pieces. Once this water dried, it left a milky whiter residue inside the pieces of glass. I realized that if I were to increase the highest temperature in my firing schedule, the glass would fuse together more and form one solid piece as apposed to two pieces stuck together. I went back into the schedule and increased the highest temperature to 1400 degrees F. After running another test, I was able to correct my original problem. The two sheets of glass completely became one at the highest temperature. This in turn eliminated the gaps that had formed from the previous test and prevented the water mixture to penetrate between the sheets of glass.

At this stage, I was ready to begin developing my major works in sculpture, painting and mixed media art.
Watercolor is a medium of beguiling ironies. It takes great skill to control, yet must appear to be free of control. Physically it needs room to move easily, but without running away. Painting in watercolor requires a disciplined approach that at the same time does not stifle the results. You might compare the experience of applying a watercolor wash to that of throwing a ball a long distance and being there, perhaps a little out of breath, to catch it just at the right time.13

Painting in watercolor gives this representation of time and place. Each brush stroke, although maybe only applied once, can create an individual identity. The majority of my paintings are influenced by Abstract Expressionism.

Sometime during World War II the center of the Western art world shifted from Europe to the United States-specifically, from Paris to New York. Émigré artists arrived and their influence merged with native American traditions to create new ideas and styles. Abstraction was the main stylistic vehicle, and Abstract Expressionism, centered in New York, spread through the postwar world.14

I have studied and admired the work by Willem De Kooning, Mark Rothko, and Jean-Michel Basquiat. Their style and ease of expression and defining color fields drew me to their work and the meaning behind it. Although Kooning’s trademark style which incorporated both figurative and abstract subject matter at the same time is his most well known, I tend to be more attracted to his later works (figure 2).

De Kooning’s late paintings, although seemingly isolated and disengaged from his earlier periods, are actually a culmination

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and synthesis of his artistic evolution, and corresponding attributes are frequently in comparisons of earlier and later paintings. Throughout the forties, de Kooning continued to extend the dissolution of anatomy into a refined abstraction consisting of a continuous surface of lines and planes that created an ambiguity of space, volume, and subject. It was also at this time that he began the practice of tracing forms from one work onto another, reinterpreting and manipulating them into a vocabulary of shapes that he would reuse for decades, particularly during the eighties when he relied heavily on recycling old drawings into new paintings.\(^{15}\)

I began to respect and look much more closely at Mark Rothko’s work, particularly those paintings created during the early forties. His theatrical figurative expression and use of chalky, pale colors drew me into his work. I began to research the full development of his artwork (figure 3).

Figurative associations and references to the natural world disappeared from Rothko's paintings of the late 1940s. Linear elements were progressively eliminated as asymmetrically arranged patches of color became the basis of his compositions. The paintings of 1947-1949 are sometimes referred to as multiforms to distinguish them from the more distilled compositions that follow. Certain multiforms retain the play of figure, line, and ground that Rothko employed in his works on paper from 1944-1946, and various textural effects are directly related to his experiments in watercolor and gouache.\(^{16}\)

During my freshman year in college, I was introduced to a modern artist that worked closely with Andy Warhol and had the same expressive characteristics as Kooning and Rothko. Jean-Michel Basquiat incorporated painting and drawing into abstract representational art.

Basquiat drew and painted on canvas or paper with a confident and intelligent hand,

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\(^{15}\) Fischer, Peter. Abstraction Gesture Écriture. (Zurich ; New York : Scalo, 1999) pg. 36-38.

working rapidly and spontaneously, and revising and changing instantaneously and visibly. His works are raw and aggressive, displaying an intuitive and spontaneous expression of form, color, and gesture combined with a subjective content of meaning and importance. Basquait masterfully fused painting and drawing with abstraction and representation.17

Personal Communication Series (Personal Direction)

In compiling my research on these artists, I became highly influenced by them. Freedom of expression and individual sense of meaning led me to produce a series of works using paper and mixed media with watercolor. This series was derived not only from these sources, but also from my experimentations in watercolors. I found this medium to directly relate to an appropriate means for communicating visually. Each separate little river that the paint created became its own personal story of how it was going to move and flow.

The copper wire that has been fused between the glass, represents a consistent current of information flowing through the piece, while the individual stitching on the paintings themselves (made of fine copper wire) expresses a sense of information processing. Although there is a constant flow of information, the painting takes on a mind of its own as it defines relevant information in the creative process. The glass is raised up off of the painting to insure a sense of constant movement resulting from the shadows that the wire creates.

In the piece Inner Me (figure 5), I tried to create a feeling of loneliness and solitude,

while still striving for its voice to be heard. The dark brown oyster-shaped object in the center (figure 6), represents the central focus of energy. This central shape is not only where the information is accepted but also processed and distributed. In relating this object to a person, it would be equivalent to our brain as it accepts information, processes it, and then distributes it to the rest of our body for performing the desired action. The murky green haze that surrounds this shape represents the abundance of disturbance from the outside world.

*Curious Collision* (figure 7) was created to define the instant that the information being received collides with the integral processing development unit of the computer. The brown shape from the top moving toward the center symbolizes the human mind and thought process, where as the brown shape approaching from below is the digital world, symbolizing a computer. The sap green shape in the center (figure 8) is expressing the instantaneous invisible explosion that occurs when both worlds collide. This references the beginning of the
communicational relationship between humans and computers.

Once the processing of information has been initiated, everything that we input is broken down into binary code. This is necessary so that the computer not only processes all of the information faster, but also so that the information is more easily transmitted and received by other computers. *Binary Intuition* (figure 9) shows a mass of murky sap green representing a vast amount of information that the computer has already stored in it. Peeking through this mass are small shapes of white and yellow (figure 10). These shapes symbolize the images that we are importing into the computer. Fading into the compositions background are rows of 0s and 1s representing the binary code, the slow process within the computer that breaks down the information that we are giving it. This blurred code fades into the background, representing only the beginning stages of processing.

*Pale Envy* (figure 11) reminds all humankind that we can become envious of the amount of work that a computer can do.
The burnt sienna mouth shaped object in the foreground is a representation of how irritated we can become while we await the answers that we have been searching for. The brown background, fading in and fading out, stands for the fast-paced digital realm that is constantly processing data (figure 12). We withdraw ourselves from this world as we are constantly reminded that we are not machines but only human. As humans, we must eat, sleep, and continually develop our knowledge. Computers are a continuous cycle of work and implementation of information.

rain: a heavy fall of particles or bodies.18

Binary code is much like a rainstorm. Each individual drop of water combines with other drops to create a massive storm. Binary code is a collaboration of multiple 0s and 1s pulled together to create the information that is inputted into the computer. In this aspect clouds are also much like computers as both computers and clouds collect information. In the piece \textit{Drops of Fury} (figure 13), I tried to express this similarity with a central, single drop. In order to represent the solitary drop, I created an elongated painting in order to give a sense of the path that this drop would be traveling (figure 14).

Awaiting Invite (figure 15) highlights the process that we go through as we are waiting for the computer to process the information that we have given it. Although most of the time the computer can work much faster than we do, there are often times that we ask the computer to do multiple tasks simultaneously. This in turn leaves us waiting for the results. The two vertical lines in the center of this work represent a human and a computer side by side (figure 16). On the ends of these lines are strong red blotches. These blotches represent the humans mind and the computers processor. The green horizontal line represents the information that is in the middle of being processed.

This art as well as the previous five, are perfect indications of how we as humans work closely with computers on multiple levels.
Contrasting with Wood

Through the ages the unique characteristics and comparative abundance of wood have made it a natural material for homes and other structures, furniture, tools, vehicles, and decorative objects. Today, for the same reasons, wood is prized for a multitude of uses.

All wood is composed of cellulose, lignin, ash-forming minerals, and extractives formed in a cellular structure. Variations in the characteristics and volume of the four components and differences in cellular structure result in some woods being heavy and some light, some stiff and some flexible, some hard and some soft. For a single species, the properties are relatively constant within limits; therefore, selection of wood by species alone may sometimes be adequate. However, to use wood to its best advantage and most effectively in engineering applications, the effect of specific characteristics or physical properties must be considered.\(^{19}\)

This art series was derived from the naturalistic qualities that wood communicates. Through its’ untouched, natural beauty, wood is a very close representation to a newly born child. They are both unharmed by the world around them and stand still in all of their innocence until we begin to mold them into what we consider the perfect personal vision. Through this series, the wood used was my representation of a human through the entire communication and interaction process.

There are many types of wood that one could choose to work with, each one containing their own characteristics and qualities. The wood that I chose for all of my art was Eastern white pine. I selected this wood because of its extreme availability as well as its smooth, even grain.

The first work, in which I symbolized wood as a human characteristic, was *Path to Schizophrenia* (figure 17). Through this sculpture I wanted to accentuate broken communication that we often experience in our dealings with the digital world.

\(^{19}\) *The Encyclopedia of Wood*, (Drake Publishers Inc, 1977), pg. 2.
I began by sawing a pine board into three 8” x 16” equal pieces. After sanding them down with 110 grit sandpaper, I stained them with two coats of Minwax Ipswitch pine stain and finished them with three coats of Minwax gloss polyurethane to give a shining preserved look. These boards were then instilled as a representation of the information processing center for the human mind. In order to represent the path of information that an individual would need to process, I developed three separate cast resin cylinders which had copper wire encased on the inside (figure 18). These cylinders were created by first cutting three pieces of 2” PVC 12” long.

Polyvinyl chloride (PVC), thermoplastic that is a polymer of vinyl chloride. Resins of polyvinyl chloride are hard, but with the addition of plasticizers a flexible, elastic plastic can be made. This plastic has found extensive use as an electrical insulator for wires and cables. Cloth and paper can be coated with it to produce fabrics that may be used for upholstery materials and raincoats.

After cutting the PVC to length, I then began cutting 12 gauge wire into 18” lengths. This wire symbolically represented the flow of communication that we process. Due to my previous experiments, I knew that the West System 105 epoxy resin was able to provide the cast glass look that I sought. Due to the fact that this resin is extremely strong as a bonding agent, I coated

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the inside of the pipes with vasoline to ensure that I would be able to release them when they had cured. I then proceeded to cap the ends of the PVC pipes with specially fitted caps meant for 2" PVC pipe, and then began positioning the 12 lengths of the 12 gauge copper wire in the center of the pipe. I used clay at the bottom of the pipe to secure the wire so that it did not move during the casting process. Once the resin was mixed, I filled the three PVC pipes full and stabilized the ends of the copper wire with another PVC cap with the center of it cut out. Once the resin had set, I removed the cylinders from the pipes, and used a band saw to cut the ends so that they would be smooth and flush with each other. For the two end sections, I left the copper wire on and attached them to a 90% iron elbow used for encasing electrical wiring. These elbows were then attached to the wall in order to give the appearance of a never ending current. For the center section, I cut both ends smooth so that it would continue the flow of the communication out of the wall through all three pieces and then back into the wall. The reason that the three sections had a space in between them was to represent how we process information. Although the computer may be sending us one continuous signal of communication, we in turn do not always process it fully. Often times this line of communication is uninterrupted so that we do not receive all of the information.

In the early 1960s a quiet revolution began to take place in the field of woodworking. Simply stated, it involved the gluing together of layers of wood, a process known as lamination.

There was nothing new about the technique as such. Lamination in one form or another is almost as old as woodworking itself. In the past, lamination was used as a means of increasing wood bulk. For example, in the Middle Ages wood sculpture was frequently made rather crudely laminated wood. The process as practiced at that time, however, tended to be unreliable. Glues were temperamental; many were made according to home recipes and could not be counted on to provide lasting bond. Also, the tools were not precise enough to provide the exact gluing surfaces
required for proper laminating.

Laminations had to be dowelled or scarfed if they were not to fall apart.

In more recent times, lamination came to be regarded as a means of greatly increasing the tensile strength of wood. It was found that the interruption and restructuring of wood grain through a process of layering and gluing under carefully controlled pressure increased the wood’s capacity to withstand fracturing and splitting. In addition, it stabilized the wood against warping to such a degree that laminated wood forms could be utilized in such critical applications as airplane propellers.21

When I researched the lamination process, I encountered the work of two artists that strongly influenced the development of my creative concepts for the laminated sculptures. I realized that both Gabriel Kohn and Wendell Castle have created similar yet distinct forms. While Castle is primarily a furniture designer and Kohn is a sculptor, their distinctive styles have many like associations.

I was first drawn to Gabriel Kohn’s work because of his direct, simple unploished sculpture. Each work conveys a distinctive feeling, that suggests a spontaneous approach to construction that results in his abstract, symbolic forms. (figure 19).

After studying in Paris for a year, Gabriel Kohn traveled throughout Europe until 1952 when he returned to America. Upon his return, he taught at the Cranbrook Academy of Art in Bloomfield Hills Michigan and then in 1954, moved to New York.

By the late 1950s, he had developed his characteristic style, which reconciled the intuitive impulses of Abstract Expressionism with the geometrics of Constructivism. The wood sculpture from 1956 on was created in an improvisational, additive process that employed such carpentry

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techniques as doweling, laminating, and joining. Kohn believed architecture to be the "grandest form of sculpture," and his work, in which skewed, dramatically asymmetrical volumes recur, demonstrates his fine sense of spatial organization and balance.22

Although Wendell Castle is primarily a furniture designer, his processes and concepts have been a strong influence on developing the majority of my work. I feel that Castle can definitely be considered a master of his craft (figure 20).

Wendell Castle's fascination with laminated wood forms began with a Kansas childhood and balsa wood kits of World War II fighter airplanes which employed simple lamination techniques.

Studies in design and sculpture at the University of Kansas led to further exploration of both the technique and aesthetic of wood lamination. Today Castle is widely regarded as the world's foremost exponent of laminated wood forms.23

In the piece Aneurism (figure 21), I wanted to show the near perfect harmony that exists between humans, computers, as well as the communication between them both. I began by sketching the shapes of the two objects that would represent

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man and machine. I decided on the half moon shape with a flat center in which humans and computers would be facing towards each other while at the same time the top of each of the crescent points in the opposite directions. While I still wanted the underlying body of both sculptures to have smooth, untouched wood characteristics, I also wanted them to have opposite outside shells (figure 22). The body of both of these works were made from laminated Eastern white pine cut into tapering squares. I began the process by deciding on the overall dimensions of my work and then dividing it by the thickness of the wood layers. Once all of the square layers were cut to size, I began gluing both sides of the wood laminates and then applying them to each other. Due to the curved pattern that the stepped layers created, I was unable to clamp the sculpture as a single form. As a result, after gluing, I nailed each layer to the previous layer, using 2 ½” finishing nails. By using these nails, it not only stabilized the entire form during the drying process, the nails also added to the structural solidity of the sculpture.

Once the initial artwork had dried, I began to give them shape by using a mallet and chisel to get rid of the excess material as well as to give it a smooth flowing appearance. I soon found this to be extremely time consuming as well as very stressful on the work due to the constant blows applied by the mallet. I then turned to an angle grinder with a 110 grit sanding disc. This moved the process along much faster and also allowed me to smooth much of the sculpture out as I worked. In order to get the forms to the smooth finish, I sanded them down with 220 grit sand paper by hand to finish them off.

Once the forms where finished in the sanding process, I used Watco Danish oil to accentuate the grain of the wood and to highlight the individual layers. I wanted to link
the two forms with a solid form of communication, so I used a 2” glass tube. This tube was connected by clamping each piece down on a solid surface and using a 2” hole saw to form the void in each one. Once the tube was cut to length, I wanted to fill it with a material that would have both human and digital characteristics incorporated into it. I decided that sand would be the best material to use; unfortunately I was unable to find the sand color that I was looking for. Instead of sand, I used salt and rubbed the correct color pastel over top of it. By doing this the particles of salt slowly began to accept the color. In order to show human characteristics on one and digital characteristics in the other, I began researching different materials that would give me the look and feel that I was looking to accomplish. For the human form, I covered it with Golden’s Extra Heavy Gel Medium. By coating the entire piece with this medium, it gave the impression of a vasoline/skin like feel to it. As for the digital piece, I pounded 1” copper nails all over the outside of it. I then began wrapping and connecting each nail with twenty-two gauge copper wire to form the impression of multiple circuits and a continuous current.

Overall, Aneurism has the feel of a bonding communication between humans and the digital world with a continuous understanding between both parties.

Collective Conscience (figure 23) is an example of the same message being communicated to both the computer and the human, but understood in two different ways. In developing this art, I began with multiple sketches depicting two large forms bound by a single form of communication. I then decided that the forms should be made of stack laminated pine, which included random missing sections from each piece.
These missing pieces would later be reattached but in a different material. I began the stack lamination process by cutting pine boards into squares and laminating them as I had done previous. This time during the lamination process, I not only stepped each piece up, but I also turned each one in small increments in order to give the impression of movement. Although there was movement in the top half of each work, the base of each sculpture was firmly planted. During this lamination process, I randomly removed half of some of the layers. Once all of the pieces were removed, I casted a large box full of plaster and silica in which I would insert each of the pieces. Before I inserted them, they were covered with vasoline and added screws for handles so that they would be easier to remove once the mold was cured. With the mold cured and the pieces of wood removed, I casted aluminum into it to form the alternate half of the layers in each of the forms. Now that these were cast, I returned to the laminated forms and once again used the angle grinder to smooth the shapes out to the desired texture. Each of the forms were then rubbed with Watco Danish oil to extenuate the individual lavers. The alternate layers were cleaned and then inserted into the voids in which they belonged. These aluminum layers were adhered using Liquid Nail Construction Adhesive. This material would create a strong bond, as well as allow room for climatic changes that would cause expansion and contraction.

I bolted an inch thick steel plate to the bottom of each of the forms to ensure balance and then screwed 2" 90% steel electrical conduits to the top of each of the forms. These steel 90% corners are the acceptance point of the communication being disbursed to each of the pieces (figure 24). I proceeded to cut 15, 8' fiber optic cables that I attached to the top steel corners on each.
Through this representation of communication acceptance in different forms, I was able to convey the complexity of mutual understanding between humans and computers.
Breaking the Boundaries

When attempting to discuss computer networks, the possibilities are numerous. In information technology, a network is a series of points or nodes interconnected by communication paths. Networks can interconnect with other networks and contain subnetworks.24 Networks can also be classified according to their geographical extent: local-area, metropolitan-area, or wide-area network.25

The term local area networks originated as a description of size. They cover a small local area, with a typical radius of no more than a mile or so. They also carry data at high speeds and are usually owned by a single organization. Metropolitan area networks (MANs) cover a city and operate at data rates similar to LANs.

The biggest networks of all, wide area networks (WANs), are worldwide services such as CompuServe Information Services Network, and they typically operate at low speeds (although that is now changing).26

I am focusing solely on networks and the spatial distance which pertains to each. Out of these three network systems, I am only looking at the LAN (local area network) and its relationship to humans/users.

*Through the Circuit Walls I* (figure 25) and *Through the Circuit Walls II* (figure 26) are focused

upon the brain and our attempts at processing information at the speed in which the network is sending it. The central cast aluminum sections became the focal point in both paintings. In order to acquire the haphazard patterns and shapes that I wanted, these works were all cast individually into sand on the foundry floor. Each of these sections represents a different part of the brain processing a different part of information being sent to us. Woven throughout each of these sections of aluminum are bright orange fiber optic cables which are representing the flow of information in and out of the brain.

Fiber optics A technology that uses laser light pulses, sent over thin glass fibers, to deliver data at high speeds (up to several gigabits per second).27

The base of these paintings are coated with a rough, pale colored texture put there to represent the static and miscellaneous information that cannot be processed (figure 27). This texture is produced by mixing sifted concrete and gesso together and then painted on the surface. The process leaves a rough, almost moon-like texture that suggests a void or lack of information. These paintings represent the minute amount of information that we can process in regards to the total amount that is being sent through the network.

Through my developments in the slumping and fusing processes of glass, I began to become familiar with the work of Mary Shaffer (figure 28). Her style of creating forms from raw

metal with the incorporation of slumped glass has continued to hold my attention and inspire my creativity in the glass processes (figure 29).

Mary Shaffer has been working as an artist in glass since the 1970s and has stayed with the pioneering technique that first attracted her to the material. Her work is instantly recognizable and has an integrity born of remaining faithful to the particular process she chose at the start of her career as an artist in glass: the technique of slumping glass, or letting it assume a shape dictated by gravity and force of circumstance while still warm.

*Motivated Current* (figure 30) was my attempt at viewing the human brain as the information processing is underway. The work was a series of five separate frames filled with glass sheets. Each of these layers of glass have thin 22 gauge copper wires sandwiched between them in order to represent the flow of information. Once the wires were laid between the layers of glass, I created a concave mold for these sheets to sit on top of. This concave mould was the key factor in the slumping of each of these frames in order to get the desired effect that I was searching for. Once these sheets were laid on top of the mold, they were placed inside of the kiln ready to be fired and slumped into the mold. The firing schedule that I ran (figure 31), worked perfectly as

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28 Klein, Dan. *Artists in Glass: Late Twentieth Century Masters in Glass*. Octopus Publishing Group Ltd 2001. pg. 188
the glass slowly melted and bent to form the perfect dome shape. While the entire work is a representation of the the brain processing information received from a network, the domes in the glass represent individual heart beats throughout the entire process (figure 32).

In frame #1, there are 3 copper wires sandwiched between two layers of glass. In frame #2, there are 6 wires sandwiched between three layers of glass. Frame three is the period where the brain has reached its maximum processing ability, and is extremely stressed. In this frame there are 9 wires and four layers of glass. As this is the extremely stressed point of the brain, in frame 4 there are only 6 wires and three layers of glass. The final and last frame contains only 3 wires sandwiched between two pieces of glass. All five of these frames, represent not only the tension that the brain undergoes during this process, but also how the human body continuously creates a heart beat in accordance with what the brain is processing. Throughout this work of art, I feel as if I have captured a small segment of time in the height of the human processing session.


(figure 32)
Conclusion

“Communication between the digital world and human existence” holds a technological power that can in fact be visually shown through fine art. Through my research, experiments, sculptures, and paintings, I feel I have opened the door to a new realm of symbolic communicative art. With my fascination in human to computer relationships, I have developed work that has transformed the written word into interpretive fine arts. These pieces have covered topics from underlying binary information to networking transmissions with the potential of becoming much more complex in future works.

For me, the body of artwork that I have created, is a strong representation of the human to computer relationship and how each world is represented through symbolic interpretations and sculptural configurations.

The digital world is here, with new technology created daily. These innovations, though continually changing, create multiple possibilities for advanced work in this field.
Bibliography


7 Trefil, James S. The Moment of Creation., (Charles Scribner’s Sons, 1983), pg. 12.


12 Text written by Henry Halem in 1996 that has been a major text and study guide for individuals working with the glass medium.


28 Klein, Dan. Artists in Glass: Late Twentieth Century Masters in Glass., Octopus Publishing Group Ltd 2001.) pg. 188.
Figure 1: FIRING SCHEDULE FOR SLumping GLASS

Figure 2: WILLEM DE KOONING, UNTITLED, 1961, OIL ON CANVAS, 80 x 70 INCHES (203 x 178 CM), DAROS COLLECTION

Figure 3: MARK ROTHKO, UNTITLED, 1944, COLLECTION OF KATE ROTHKO PRIZEl

Figure 4: JEAN-MICHEl BASQUIAT, EARTH, 1984, 83.5 x 76 cm, 32.9 in. x 29.9 in.

Figure 5: SCOTT MITCHELL, INNER ME, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 9 in. x 12 in.

Figure 6: SCOTT MITCHELL, INNER ME, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 9 in. x 12 in.

Figure 7: SCOTT MITCHELL, CURIOUS COLLISION, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 7 in. x 18 in.

Figure 8: SCOTT MITCHELL, CURIOUS COLLISION, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 7 in. x 18 in.

Figure 9: SCOTT MITCHELL, BINARY INTUITION, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 9 in. x 15 in.

Figure 10: SCOTT MITCHELL, BINARY INTUITION, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 9 in. x 15 in.

Figure 11: SCOTT MITCHELL, PALE ENVY, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 8 in. x 14 in.

Figure 12: SCOTT MITCHELL, PALE ENVY, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 8 in. x 14 in.

Figure 13: SCOTT MITCHELL, DROPS OF FURY, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 7 in. x 22 in.

Figure 14: SCOTT MITCHELL, DROPS OF FURY, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 7 in. x 22 in.

Figure 15: SCOTT MITCHELL, AWAITING INVITE, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 5 in. x 5 in.

Figure 16: SCOTT MITCHELL, AWAITING INVITE, 2002, FUSED GLASS, COPPER WIRE, WATERCOLOR, 5 in. x 5 in.

Figure 17: SCOTT MITCHELL, PATH TO SCHIZOPHRENIA, 2002, CAST RESIN, COPPER WIRE, WOOD, STEEL, 8 in. x 82 in.

Figure 18: SCOTT MITCHELL, PATH TO SCHIZOPHRENIA, 2002, CAST RESIN, COPPER WIRE, WOOD, STEEL, 8 in. x 82 in.

Figure 19: GABRIEL KOHN, GUEST IN THE HOUSE, 1958, WOOD, 50 x 21 x 11 1/2 INCHES (127 x 53.3 x 29.2 CM), PRIVATE COLLECTION

Figure 20: WENDELL CASTLE, CHERRY SETTEE, 1968, STACK LAMINATION, 30 x 76 x 78 INCHES (76.2 x 193 x 96.5 CM), PRIVATE COLLECTION

Figure 21: SCOTT MITCHELL, ANEURISM, 2002, GLASS, WOOD, COPPER, SAND, GEL MEDIUM, 10 in. D x 27 in. W x 22 in. H

Figure 22: SCOTT MITCHELL, ANEURISM, 2002, GLASS, WOOD, COPPER, SAND, GEL MEDIUM, 10 in. D x 27 in. W x 22 in. H

Figure 23: SCOTT MITCHELL, COLLECTIVE CONSCIENCE, 2002, CAST ALUMINUM, CABLE, WOOD, STEEL 30 in. W x 63 in. H x 18 in. D
Figure 24: SCOTT MITCHELL, COLLECTIVE CONSCIENCE, 2002, CAST ALUMINUM, CABLE, WOOD, STEEL 30 in. W x 63 in. H x 18 in. D

Figure 25: SCOTT MITCHELL, THROUGH THE CIRCUIT WALLS I, 2002, CAST ALUMINUM, CABLE, CONCRETE, GESSO, ACRYLIC, 34 in. x 78 in.

Figure 26: SCOTT MITCHELL, THROUGH THE CIRCUIT WALLS II, 2002, CAST ALUMINUM, CABLE, CONCRETE, GESSO, ACRYLIC, 34 in. x 78 in.

Figure 27: SCOTT MITCHELL, THROUGH THE CIRCUIT WALLS I, 2002, CAST ALUMINUM, CABLE, CONCRETE, GESSO, ACRYLIC, 34 in. x 78 in.

Figure 28: MARY SHAFFER, "FRAGILE ICE TONG", 1996, SLUMPED GLASS AND METAL, H 76cm (30in), W 51cm (20in)

Figure 29: MARY SHAFFER, "MAQUETTE MAMOURE", 1986, SLUMPED FUSED GLASS AND IRON, H 31cm (12 1/5in), W 6cm (2 1/4in), D 8cm (3in)

Figure 30: SCOTT MITCHELL, MOTIVATED CURRENT, 2001, SLUMPED FUSED GLASS, COPPER WIRE, WOOD, H 18 in., W 94 in, D 4 in.

Figure 31: FIRING SCHEDULE FOR SLUMPING GLASS

Figure 32: SCOTT MITCHELL, MOTIVATED CURRENT, 2001, SLUMPED FUSED GLASS, COPPER WIRE, WOOD, H 18 in., W 94 in, D 4 in.