How does the analog "talk" to the digital?
The Art of Penny Feuerstein

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Abstract:

My paintings are a product of the dialogue between the analog and the digital. I express this in three basic ways: by painting, using the computer, and printing. In the same way that Fernand Leger's work was a product of the industrial revolution at the turn of the twentieth century, I feel compelled to make art about the "digital revolution."

Myself. Found objects. Paint. Canvas. My printer. These all represent the analog world, matter made of atoms.

Using the computer, I mimic the digital revolution as I integrate, generate and replicate sections of scanned images taken from multiple analog sources: my paintings, drawings, photographs, and found objects.

This process of using bits to create my collage-paintings mirrors both the computational speeds of our digital age, and an evolving technology of generation and replication that we see in specific areas of science and engineering, i.e. nano technology and bio-medicine.

I bridge these worlds of analog and digital by scanning and printing. Scanning inputs from the analog into the digital. Printing outputs my images from the computer, even as it deliberately communicates how dramatically printing has transformed—from 1440 when Johannes Gutenberg invented the first printing press to our current digital revolution with such innovations as MIT's "nano-printing" techniques.

The computational speed of working with the computer creates a direct path between how I think, feel and visualize. Our digital world creates a centripetal force in my life that becomes a super integration of what's on my mind, and what I experience interacting with the rest of the world. For me, reality is not an occurrence of separate events but a state of "continuous flux" where disparate thoughts, feelings and appearances create integrated layers of reality. My collage-paintings are equally layered ideas pulled together by a layered process of painting, computing, and printing, which, together, becomes a superintegration reflective of living within the digital revolution as I create my artwork.

Two questions drive my work:

How does the analog talk to the digital?
And… how does the bit give voice to the atom?

While paint lives in the analog world of matter and atoms, the computer calls the digital world its home. My work is a dialogue between these two worlds.

The paint in my work represents the analog world. Nothing goes on or off, or changes from one state to another, without going through a transition. The tangible, kinesthetic experience of holding a paintbrush in my hands, feeling the movement between brush, oil paint and canvas traveling up my hand, arm, and into my body is totally different from manipulating images with a mouse, on a screen, then clicking a button that tells a machine to print. Paint is thick and juicy. A print is flat and smooth. There is no getting around the visceral differences.

But the digital world holds equally compelling experiences. When I'm manipulating the computer to generate, replicate and integrate my images I am mimicking the "digital revolution" both in process and experience.

Working with the computer enhances my experience of viewing life from a subatomic perspective. By converting my paintings to bits after scanning them into the computer I think about how Nature occurs in bits and pieces interacting and integrating to create infinite possibilities and opportunities within a single moment. The analog and digital world collide and swirl in my mind and on the monitor screen.

Conceptually, the computer mirrors our minds in the sense of working within a continuous state of flux where the only constant is constant change.

How does the analog talk to the digital, the bit give voice to the atom? I often compare the generation of digital DNA to our biological DNA, which is the essence of analog life itself.

Living in the "digital revolution"-with better and faster versions of the internet, laptops, cell phones, blackberries and multimedia –correlates with my experience of existence as a flow of evolving protons, neutrons and electrons. The natural outcome is that I compose my work from integrating, generating and replicating multiple sources and visually "speaking" the unique vocabulary of "copy, paste, copy, paste, copy, that runs throughout my collage paintings and the digital age of our time.

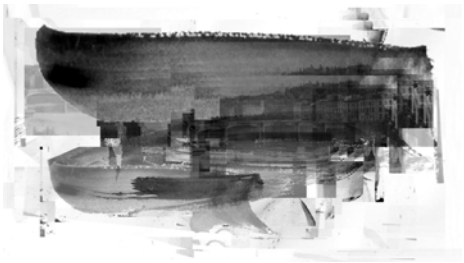
In Leger's 1921 painting "Le Petit Dejeuner," he uses geometric shapes to portray the onset of the industrial revolution of his time.

I use the essential ingredients of generation, replication and integration to portray the onset of the digital revolution of my time. I generate and replicate by choosing sections from my paintings, scanned objects, and photographs. Then I use copy/paste tools to replicate the generated selections.

"Field", "Lina and Jenna", and "Working in the Garden"
are examples of work where I generated and layered specific sections to create the final image before printing.



I play with integration because it portrays both the macroscopic view of a globalized world, and the microscopic lens of our evolving human awareness that the mental, physical, emotional and spiritual aspects of our lives are, in fact integrated. I integrate by using linking tools and layers. I use the transparency tool of the computer to further work with the idea of integration. In blue brush stroke I used the transparency tools, masks and copy paste to combine photograph and paint.



In "Waiter with Red Coat" and "Portrait" I used the transparency tools to form geometric shapes, which also reflect levels of awareness, conscious or not.


My work emerges from an on going "state of collage," a dynamic collection of disparate experience flowing between my state of mind and how I experience the world around me.

In Café, the final work is a collage comprised of layered ideas. A woman sits with a china dish, rocks, paper and scissors, each one a symbolic manifestation of her thoughts. This work portrays her physical appearance, as well as her thoughts and feelings, at the same time. In many respects, I am that woman; her thoughts are my thoughts as I paint, scan, store, retrieve, print and paint again.

Essential to my process is the act of printing. At the most basic level printing outputs my work from the computer. And it is an intentional comment about the importance of printing in our "digital revolution, " and how dramatically printing has transformed since 1440 when Johannes Gutenberg invented the first printing press, to our current digital revolution.

In an article from the MIT Deshpande Center for Technological Innovation (MIT University, Cambridge Mass) you can see how printing, as it does in my art, facilitates a graphic interface between our digital and analog worlds: "Just as the printing press revolutionized the creation of reading matter, a "nano-printing" technique developed at MIT could enable the mass production of nano-devices currently built one at a time. Professor Francesco Stellacci and graduate student Arum Amy Yu, both in the Department of Materials Science and Engineering, have developed a printing method that is unmatched in both information content per printing cycle and resolution. They achieved the latter using what Yu calls "nature's most efficient printing technique: the DNA/RNA information transfer. In the new printing method, called Supramolecular Nano-Stamping, single strands of DNA essentially self-assemble upon a surface to duplicate a nano-scale pattern made of their complementary DNA strands. The duplicates are identical to the master and can thus be used as masters themselves. This increases print output exponentially while enabling the reproduction of very complex nano –scale patterns." [1]

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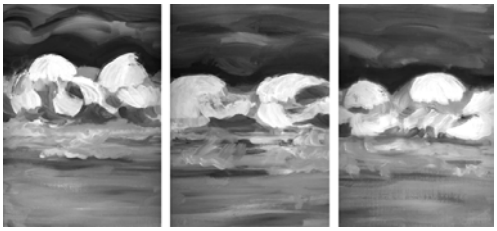
Painting, Scanning, Digital imaging, Printing, Painting

Let's take a closer look at my process, which consists of scanning my paintings or drawings into digital format and manipulating them in the computer, much as a painter pushes paint around, printing them back onto canvas and finally applying paint on the print.

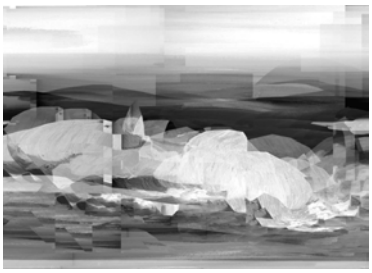
Here are two works: waves july 3, and waves july1, Each work is 2 panels consisting of oil on giclee print on canvas. In waves july 3, each panel is 50 x 68 inches. In waves july 1, each panel is 40 x 40 inches. I begin in the analog world, taking photographs and making small sketches of waves at the beach.



Later, I took the photographs and paint sketches to my studio where I painted a small oil of beach waves—all the time aware that nothing in the analog world goes on or off, or changes from one state to another, without going through a transition.

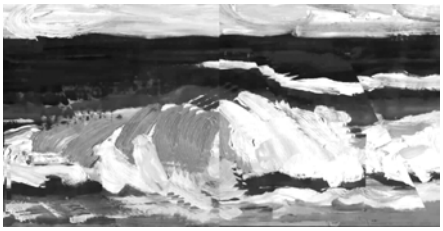


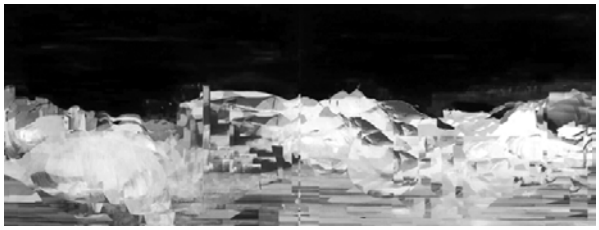
When the small oil painting dried, I scanned it into the computer and begin manipulating the resulting digital image with masks, copy/paste, and cut/paste.
Working as fast as my mind could think, I generated a flow of material by using the computer's DNA of information – bits – to create multiple layers.




Before I know it, my monitor is covered in versions of the manipulated beach waves, a collage conversation where the analog and digital are talking to each other.

I view the computer as a resource where information can be retrieved at computational speed for integrating, generating and replicating. For 2 weeks I worked, overlapping and enlarging, reducing various pieces to achieve the final versions: waves july 1, and waves july 3.





This creative process mirrors both the computational speeds of our digital age, which integrates unparalleled amounts of information, and the evolving technology of generation and replication that we see in nanomachines, genetic algorithms, biology stem cell research and cloning.

In the next stage, I send the work from my computer to a rip station, which prepares the piece for printing on a 5' x 5' format giclee printer.

This Giclee print becomes another layer of the digital world, which I use as a source of primary material, not as a reproduction. It takes 2 50 x 68-inch pieces nearly 2.5 hours to print out.

Then I coat and uv varnish the final print, and stretch it for the final phase of oil painting.

This time, as is often the case, I sat and studied the printed piece for a long time, for up to this point I usually have no idea what I am going to paint. Once I start, my strokes alternate between a haphazard approach, to mimic my free will, and a very organized application to mimic digital computation.

I applied thick layers of paint as a deliberate contrast to the smoothness of the giclee print. It was amusing to include analog paint drips in some areas, and digital paint drips in other areas.

Cool Globes, “Hot Ideas For A Cooler Planet”

In the Fall of 2006 I used the concepts of generation, replication and integration to portray nanotechnology as a solution to global warming for a public art exhibition in Chicago.

100 Artists were selected to paint their own, 5-foot fiberglass “Cool Globe,” each one reflecting that artist’s solution to global warming. Many globes were sponsored by various companies. My globe was sponsored by the Motorola Corporation.

As I began researching global warming solutions, I discovered nanotechnology, the science and technology of precisely controlling the structure of matter at the molecular level. I was amazed at the parallels between what Northwestern University, called “the next Industrial Revolution,” nanotechnology, and my creative process. [2]

The phrase -- “the next Industrial Revolution” -- invoked a 20th century artist who had always inspired and fascinated me, Fernand Léger, whose work rose straight out of the Industrial Revolution. It was clear that I had found the right direction for my Cool Globe.

Like nanotechnology, I move between the two worlds of analog and digital, by first scanning a variety of painted surfaces and every-day objects from the macro, analog world, and then manipulating these in the micro, digital world of the computer. Afterward, I print my work from the digital world onto the analog world of canvass or paper.

Nanotechnology also moves between the macro and micro worlds by transferring the assembly production of ‘real world’ factories to a microscopic, molecular-sized universe. And, surprisingly, nanotechnology uses a form of printing: ultra violet lithography and nano imprint lithography can, for example, “print” efficient and durable solar cells. [3]

But the axis parallel between my work and nanotechnology is how we both use replication and generation to achieve a final object. I often refer to my work as “generative art in an Age of Replication” because, like nanotechnology, I take a ‘bite’ out of the DNA of my materials and generate multiple replications to create works of art. Nanotechnology uses molecular machine systems to replicate and build multiple products; and in the process saves energy, reduces waste, eliminates toxic residues, and dramatically lowers production costs. [4, 5]

My challenge was identifying images that integrated art, technology, and the “next Industrial Revolution.” My version of Léger’s 1924 painting, Femme Au Bouquet, signaled Mother Earth,

knowledge, and nature. Water molecules, equations, and landscapes connected environment with technology, and the Légeresque Woman with Microscope completed the cycles of art, science, and our natural world.

It seems that the 2 questions that drive my work:
How does analog talk to digital?
And… how does the bit give voice to the atom?

…are also the driving questions behind the science and the time we live in.

References

1. MIT Deshpande Center for Technological Innovation "MIT's Nano-printing technique could enable the mass production of nano devices currently built one at a time" http://nanotechwire.com/news.asp?nid=2021, 2005
2. International Institute For Nanotechnology, " Nanotechnology is widely viewed as the most significant technological frontier currently being explored.", (www.iinano.org/), 2007
3. Nanosolar, "Semiconductor Printing", (www.nanosolar.com/printsemi.htm), 2008
4. Center For Responsible Nanotechnology, "General Purpose Technology", (www.crnano.org/whatis.htm) 2006
5. Discover Nano, "Nanotec Applications" (www.discodvernano.northwestern.edu/affect/affect/applications_content/environment/renewable)