The International JOURNAL of TECHNOLOGY KNOWLEDGE & SOCIETY

Technology and Design

Peter DePietro

VOLUME 1

COMMON GROUND

www.Technology-Journal.com

INTERNATIONAL JOURNAL OF TECHNOLOGY, KNOWLEDGE AND SOCIETY
http://www.Technology-Journal.com

First published in 2005/2006 in Melbourne, Australia by Common Ground Publishing Pty Ltd
www.CommonGroundPublishing.com.

ISSN: 1832-3669
Publisher Site: http://www.Technology-Journal.com

The INTERNATIONAL JOURNAL OF TECHNOLOGY, KNOWLEDGE AND SOCIETY is a peer refereed journal. Full papers submitted for publication are refereed by Associate Editors through anonymous referee processes.

Typeset in Common Ground Markup Language using CGCreator multichannel typesetting system
http://www.CommonGroundSoftware.com.

Technology and Design

Partners in the Evolution of Creativity

Peter DePietro, Quinnipiac University, United States of America

Abstract: In 1963 President John F. Kennedy said "Man is still the most extraordinary computer of all." This statement resonates more today than it did in the 60's, when personal computers were merely in the imaginations of boys named Bill and Steve, because the worlds we work in, design in and live in are influenced by and, in most instances, created by computers. The preponderance of data generated by computers, controls us, but it doesn't define us. We define us. We morph and manipulate the data in our lives in order to manifest vision. We are extraordinary. However, we will remain extraordinary only as long as there is innovation to keep the data new and fresh, and there are persons who are both technologically and creatively proficient to implement new tools that allow us to manifest new vision. Our mission as designers to infuse beauty and better quality of life is dependent on updated tools and state-of-the-art equipment. The software tools we use to create magnificent, complex and inspirational works cannot be simple, commonplace and tired; the hardware that runs the tools cannot be obsolete. It's not that that which is new is superior to that which is old. It's just that, as new textiles are made more durable by chemical formulas calculated by a computer, and new architecture, like Frank Ghery's wondrous billowing sheets of titanium, stand erect because of computer imaging and engineering, the innovation that makes these projects possible must be constantly reinvented. This way, we stay ahead of the creative curve; we follow a progressive path into the future of design. There should be no turning back to 1962, before the insight, before the dream. We must forge ahead and create that which has not yet been created.

Keywords: Technological Innovation, Design Technology in Society, Creative Vision and Computer Data

The Driving Force

IT HAPPENS EVERY so often. Design and technology coalesce to create a great public work; a towering monument; a clever invention; a physical something so grand it takes your breath away. What makes this happen? What makes two seemingly contrary forces – design and technology, creativity and utility – merge into one empowering partnership that produces something magnificent?

Man wants more than he has. Man wants what he doesn't have to be grander than what he has. Man wants to be recognized for creating what he didn't have. But, most importantly, man wants to create something necessary, to fulfill a purpose, to contribute to some greater good. So, it is more than ambition and enthusiasm that drive man to design. It is the need to create something more interesting, more powerful, better than what came before it. It is the desire to be extraordinary.

Take, for example, concrete. It is not something you immediately think of when you think of great design. However, with concrete the ancient Romans redesigned the world. Their ambition: the largest empire known to man. Their need: colossal works that would inspire and endure. In order to create works that were both aesthetic and long-lasting, they needed a building material that theretofore did not exist. The rudimentary cement that previous cultures, like the Greeks, had used would not suffice to construct the magnificent arches and domes that Roman artisans and engineers envisioned. Existing concrete simply was not durable enough. So, the Romans created an original conglomerate of sand, lime, clay and gravel that when dried was structurally harder than stone[1]. Their cement was more reliable and versatile than previous versions. With it, the Romans were able to build roads, erect buildings, form city-states, transport water to the urban populace, build temples and theatres, and create infrastructure that would withstand the stress of weather and the attacks of enemies.

With their technologically advanced cement, the Romans designed and built one the greatest empires the world has ever known, leaving a lasting mark on architecture, engineering, art and culture.

Concrete… empire. Ambition fueled need, which created technology, to make design.

[1]Endnotes
Maurice Daumas, ed., *A History of Technology and Invention* (New York: Crown, 1969): *page*

Techno-Creative Symbiosis

> "Every action is an idea before it is an action, and perhaps a feeling before it is an idea."
> - W. Stenger

There is a direct and necessary relationship between design and technology. However, though technology can cause design, it is creative vision which defines design. This leads to the question: does technology or vision come first? Must technology be in place, so a designer can have vision? Or, must vision come first, so technology can be invented, to create design? We've faced this dilemma before with chickens and eggs. And what we conclude is that there is no conclusion. You simply cannot have one without the other.

The symbiosis between design and technology can be illustrated with the measurement of one of life's most important components, time. Early devices, such as the Chinese gnomon in the eighth century BC, measured time by casting characteristic shadows from a rod planted vertically in the ground[2] – rudimentary in function and style. This changed during the Middle Ages and just prior, when kings and emperors wanted their timepieces to be attractive, as though these devices were measuring their time, not objective time. So, with the invention of mechanical timepieces, such as the hydraulic clock by Chinese inventor Yi Hsign in the year 725[3], timepieces were on their way to becoming as attractive as they were functional. And a trend began. Vision and technology became partners with a single mission of balancing form and function. We see this paradigm continue today with timepieces whose mechanics are as high-end as the gems which adorn them. A Rolex watch is an example.

There are chickens; there are eggs. There is technology; there is vision. One need not come first, but both, together, are necessary.

Design for Living

> "The ability to convert ideas to things is the secret of outward success."
> - Henry Ward Beecher

Why do we design? What motivates us to create works that will last and inspire future generations?

We design for survival. The ancient Egyptians created elaborate mummification in order to preserve the dead body, the shelter of the soul. They designed and redesigned the process for years until during the New Kingdom, from about 1550 to 1070 BC, they had a sophisticated means of preservation. Their final design for eviscerating and dehydrating the body involved burying the corpse under natron, a natural compound of carbonate and sodium bicarbonate, chloride and sodium sulfate; coating the body with melted resin; and, wrapping the body in strips of cloth that had been soaked in resin.[4] In essence, they freeze-dried the body. This concept, reworked with nitrogen and modern technology, is alive and well today as cryogenics.

One could argue that preservation of dead bodies is not design, it is science. I put forward that science is design – as art is design, as engineering and architecture are design. Any method, practice or process that produces a physical manifestation of an original concept is design.

We design to transport ourselves. Trains, planes and automobiles have been subjects for designers for centuries. It's not enough that technology produces a machine that gets us from point *a* to point *b*. We insist that the machine be stylish.

We design for aesthetic appeal. Let's face it. Icons become icons because they are great to look at. Which bridge would you rather walk over on a Sunday afternoon: a classic bridge with its iron cables arching gracefully from solid stone arches, or a wooden span with splayed boards and splintered supports? Most of us would choose the former, because we are drawn to design which is attractive. Such design inspires us. It instills confidence. It lifts our spirits.

We design to communicate. Throughout history man has pushed the limits of technology to communicate with his fellow man. With smoke signals, native Americans designed systems for long distance, wireless communication, long before cell phones.

We design for taste. Those of us with a sweet tooth should appreciate the technology that created a culinary staple. The process involves extracting a liquid from a plant stalk, boiling the liquid to a reduced state, then crystallizing it.[5] The process was first used in 4th century India; then in Indochina, then in China, where it was called "stone honey". Today, we call it sugar. The basic process used to create sugar hasn't changed in seventeen hundred years. When you achieve successful design, there's no need to change it.

We design for a seemingly endless list of reasons: to excite, to calm, to profit, to enable, to fight, to protect, to inflict pain, to cause relief, to complicate, to simplify, to explore, to dazzle, to bore… to create, as with revolutionary drugs like Viagra... to destroy,

---

[2] Daumas, 295.
[3] Donald Clarke, ed., *The Encyclopedia of Inventions: The Story of Technology Through the Ages* (New York: Galahad Books, 1977): 76.
[4] Clarke, *page.*
[5] Clarke, *page.*

as with nuclear weaponry. Ultimately we design to change the world, for better or worse.

The Cycle of Design

> "Always design a thing by considering it in its next larger context."
> - Eliel Saarinen

In the history of civilization, concepts that have led to masterful designs have had a lasting impact on society. These important designs which contribute to man's cultural, scientific and economic evolution, seem to recur time and time again. However, each time these concepts resurface, they are fused with modern technology, and the vision is reborn. The design is made better.

Take, for example, the writing pen: such a small item; such an important design. Where would we, western society, be if we never created a writing instrument that allowed us to pen ideas, document events, record stories, sign declarations, begin marriages, end wars? Where would we be?

What started as a crude writing tool made of a chunk of lead in Neanderthal times, became a metal stylus holding a piece of lead in the Middle Ages, then a graphite pencil in 1565, crafted by Swiss physician Konrad Gesner. This first pencil was made of a solid cylinder of wood with a piece of lead affixed to one end.[6] The modern pencil would continue to evolve, when in 1812 American William Monroe created a metallic writing strip, made of graphite, clay and water, and inserted the strip inside a tube of cedar wood; and, in 1829 when Philadelphia native Joseph Saxton automated the pencil by adding a revolving screw to move the inserted lead in and out. From there pencils evolved into pens. There was the quill pen, pens that you dipped into ink, and pens that contained their own supply of ink.

As the role of the pen in society took on more importance, documenting our history and culture, the technology of the writing instrument advanced, so did it's appearance. We required a pen that looked good and worked well. So, high-end pen manufacturers like Mont Blanc designed state-of-the-art instruments with even ink flow, retraction mechanisms and exteriors embellished with ivory, gold and gem stones. The pen had evolved into a status symbol with a real place in history. Founding fathers created governments by signing declarations; world leaders resolved conflicts by signing treaties; politicians advanced legislation by signing bills.

The functionality and the look of the pen are continually redesigned. The writing instrument is continually transformed. It is an evolution, both functional and aesthetic, that aims to produce the most useful, most attractive writing instrument – always. There are pens for the elite, pens for the masses, fine tips, felt tips, roller-balls, decorative pieces, plain pieces, instruments with ink in every color imaginable. All these choices for writing down our thoughts. It is design and technology codependent, completely reliant on one another, trapped in a evolutionary relationship that gives all people the power to document expression.

Visionaries

> "Originality is the one thing which unoriginal minds cannot feel the use of."
> - John Stuart Mill

Visionaries change our world. From science, fashion, engineering, art and architecture, there are people whose ideas and concepts have dramatically changed the way we live, work, dress, travel, communicate and think. And technology is paramount. Let's examine the contributions of four visionaries to gain an understanding of how they impacted design, and to examine if their designs were a result of technology or vice versa.

Leonardo da Vinci

Leonardo da Vinci was a man ahead of and beyond his time. He was a painter, architect, engineer, mathematician and philosopher -- a true Renaissance man. He grew up in the Tuscan town of Vinci. In 1466, at the age of 14, he moved to Florence to apprentice in the workshop of Andrea del Verrocchio, a renowned Italian artist and teacher. This would prove to be a pivotal moment in da Vinci's life, for it was here that he began drawing and painting – and creating a body of work that would be studied by artists and designers for centuries. His works included the Annunciation in 1481, The Adoration of the Magi completed in 1482, The Last Supper in 1497 and Mona Lisa, begun in 1503. From 1482 to 1490, while in service to the Duke of Milan, da Vinci designed machinery, buildings and weapons and produced studies on a range of subjects, including geometry, mechanics, municipal construction, and architecture. Later in Rome, he would explore human anatomy and physiology, until the Pope forbade him from dissecting cadavers.

In the case of da Vinci the inventor, vision clearly preceded the technology needed to produce his works. It would be centuries later when flying machines would actually transport us; when long-range artillery would keep our enemies at bay; and, when man-made organs could sustain life. None of this, I

[6] Henry Petroski, *The Pencil: A History of Design and Circumstance* (New York: Alfred A. Knopf, 1992): *page.*

believe, would have been possible without da Vinci's concepts.

Leonardo da Vinci's vision was complex and varied, but singular to the man. As Sigmund Freud said: "Leonardo da Vinci was like a man who awoke too early in the darkness, while the others were all still asleep." His designs were revolutionary. They would prompt the development of impressive technology for centuries.

Coco Chanel

From the Renaissance, we jump forward to nineteenth century France. Born in Saumur in 1883, Coco Chanel would become one of Fashion's great visionaries of the twentieth century. Her designs for women would combine comfort and ease with style, a combination which up to that point had been the focus of men's fashions. She created a design revolution.

In 1909 Chanel opened a milliner's shop in Paris. Here, she first showed her understated design style with the hats she created. Her hats defied the style of the day, which was ornate and, dare we say, a bit over-the-top. Chanel rebelled against the window dressing of women in Victorian times. Her designs were simple, yet elegant, and appealed to an upwardly mobile clientele, to a modern woman.

Soon she was expanding to couture, working with the material jersey, a first in the French fashion world. According to *Time* magazine, Chanel "appropriated sports clothes as part of the language of fashion." [7] Her popularity soared in 1926 with the design of a little black dress named by *Vogue* magazine the "Chanel's Ford", as a reference to the first-of-its kind, trend-setting automobile by Henry Ford. Coco Chanel's vision carried her through the 1920's and 1930's. She was courted by Hollywood, and continued to exhibit her inventiveness by designing costumes for the movies. Even a scandal in 1945, when she was exiled to Switzerland for an affair with a Nazi officer, could not quell her genius. In the mid-1950's Chanel launched a successful comeback with her signature suit.

As famed dramatist Jean Cocteau said of Coco Chanel: "She has, by a kind of miracle, worked in fashion according to rules that would seem to have value only for painters, musicians, poets." [8] She was a cutting-edge designer, whose designs were possible because of technology. The fabrics that she worked with to create easy-to-wear fashions had been invented. But she gave the fabrics a dazzling, new life.

R. Buckminster Fuller

When we describe visionaries, we often use the phrase "ahead of his time". However, if there is one visionary most deserving of this label, it is R. Buckminster Fuller. "Bucky", as he was known in certain circles, was an inventor, an architect, an engineer, a mathematician, a poet, a philosopher, a cosmologist, a humanitarian and a futurist. In a word, a designer.

Fuller's lifelong goal was the development of what he called Comprehensive Anticipatory Design Science or the attempt to anticipate and solve humanity's major problems through the highest technology by providing "more and more life support for everybody, with less and less resources" [9].

As early as 1927 he was designing experimental houses, such as his 4-D Dymaxiom House that hung from a mast, and incorporated far-reaching features, such as self-contained power supplies and systems for compacting wastes and recycling water. In 1933 Fuller was the first to design a streamlined, lightweight automobile with front-wheel drive, a rear engine and shatterproof glass.

Fuller is perhaps best know for his pioneering design and construction techniques based on tetrahedron structural principles. His Geodesic Dome is considered by some to be "the lightest, strongest, and most cost-effective structure ever devised. The geodesic dome is able to cover more space without internal supports than any other enclosure. It becomes proportionally lighter and stronger the larger it is."[10] Over 300,000 of these domes have been constructed around the globe, as science centers, entertainment complexes and sports arenas.

Some of his concepts were controversial; others scoffed at; still others proved to be invaluable. It takes this kind of radical thinking mixed with imagination to produce great, useful designs. During Fuller's time, some of the technology necessary to manifest his vision existed; some of it had yet to be invented. Nevertheless, he was a designer who would not be compromised by what people perceived as "infeasible." In his words, "Good is not good, where better is expected." In his life, he was awarded 25 U.S. patents, authored 28 books and received 47 honorary doctorates in the arts, science, engineering and the humanities.

Frank O. Gehry

Born in Toronto, Frank Gehry moved to Los Angeles with his family at the age of sixteen. In 1962, he established his own architectural firm, Frank O. Gehry and Associates, Inc. and embarked on a career that

[7] Ingrid Sischy, "Coco Chanel", *The Time 100*, Time Magazine site, Jun 8, 1998, http://www.time.com/time/time100/artists/profile/chanel.html.
[8] Sischy, http://www.time.com/time/time100/artists/profile/chanel.html.
[9] "Who is Buckminster Fuller", The Buckminster Fuller Institute site, http://www.bfi.org/introduction_to_bmf.htm.
[10] "Who is Buckminster Fuller", http://www.bfi.org/introduction_to_bmf.htm.

would produce some of the most evocative and important buildings of our time.

The works of Frank Gehry are sweeping, fresh and complex. His unique fusion of art and technology has produced signature works, such as the Guggenheim Museum in Bilboa, Spain and Disney Symphony Hall in Los Angeles, both of which would not have been possible without computer technology.

Frank Gehry and his associates use CATIA, computer-aided three-dimensional interactive application, to document their designs. This tool was developed in the mid-1980s and first used by aerospace manufacturers, such as Boeing, to design airplanes. Gehry and his team use the software to plot their designs and produce 3-D models, which provide the detailed information necessary for the fabrication and construction of Gehry's organically structural forms. Contemporary materials like titanium, which conforms to the amorphous shapes, and surface coatings, which color the surfaces of the titanium with hues of pinks and yellows to give a shimmering effect, make a building a Gehry building.

With technology, Frank Gehry has created new forms that define space and mark place in a way that has made us rethink why we build buildings. In the New York Times Paul Goldberger wrote of Frank Gehry's work: "His buildings are powerful essays in geometric form and materials, and from an aesthetic standpoint they are among the most profound and brilliant works of architecture of our time."[11] Indeed, Frank Gehry has shaken up the conventional balance of form and function, and created a new kind of populist architecture. Gehry once wrote: "When everybody else is ready for the ending, I'm just ready to begin."[12]

Pushing the Boundaries

Designers who embrace new technologies and push the boundaries of creativity in an effort to disrupt the balance between form and function will inevitably create something important. The four visionaries above – da Vinci, Chanel, Fuller and Gehry – are representatives of a group of forward-thinking designers whose disruption of the form/function balance has had lasting results. These visionaries experimented with the conventional design process by working with new technology, envisioning new technology or both. Through such reinvention of the design process, something more beautiful than useful can become more useful than beautiful and visa versa. When that happens – when the aesthetic and the functional coexist in a precarious state – visionary concepts result. Visionary concepts are timeless and adaptive. They will last forever.

The Digital Aesthetic

> "Man is still the most extraordinary computer of all."
>
> - John F. Kennedy

Not so long ago, when Bill Gates and Steve Jobs hunkered down to create a machine that would process data more efficiently and quickly than ever before, they revolutionized the personal computer. But more importantly, they created a new way for all of us to look at ourselves, through computer monitors. They created a digital aesthetic. It is an aesthetic born of bits, measured in bytes, malleable and transferable. It offers designers in the twenty-first century a whole new set of tools with which to create. Like Renaissance masters did with oils, like physicists did with the Theory of Relativity, designers will redefine objectives, redirect vision, and ultimately revolutionize the arts, sciences, health care, education, communications, sports and entertainment with 0's and 1's.

Some people question the digital frontier as the place where our next visionary works will be born. These people consider the digital aesthetic cold. They maintain that there is little warmth in a landscape drawn in PhotoShop, a love story shot on mini-DV or a musical soundtrack created with Midi files. One might suspect that they are right. Digital visuals seem flat compared to those created with textured oils or laid to film. Midi tonality is thin compared to acoustic symphonic sound. And, generally speaking, technology is not known for moving its audience to tears. But is the coolness a result of the designer's failure to convey emotional warmth, or is the coolness interpreted by a viewer who is naive in his exposure to digital work? This question illustrates the ostensible disparity between old and new media in terms of connecting with an audience. How can the designer reconcile this disparity and create a work whose emotional breadth will touch its viewer? The designer cannot. As Michelangelo could not predict reaction to his storytelling in oils atop the Sistine Chapel, nor could he control it. So the digital designer must leave the impressions left by his works to those who view them. The viewing public will over time and through exposure to new works come to embrace the digital aesthetic as emotional, whether in art, science or architecture. The viewers themselves will reconcile the chasm between old and new. Therefore, with more exposure to new media works, people will understand their richness, both in terms of visual impression and purpose. We went from cave drawings in coal to paintings in oils with no problem. We can advance to digital designs born of light emission in the same way.

---

[11] "The Design Team", Walt Disney Concert Hall site, http://wdch.laphill.com/wdch/designteam.

[12] Karen Templer, "Brilliant Careers", Salon site, October 5, 1999, http://www.salon.com/people/bc/1990/10/05/gehry/.

The Interactive Element

> "Put your right hand in. Take your right hand out. Put your hand foot in. And you shake it all about."
>
> - Larry LaPrise

In the digital age a new type of design is alive, that in which the *viewer* becomes the *user*: interaction design. Never before have technology and design been so interdependent. With interaction an integral design component, form and function become part of a design cycle more complex than before. The success of a design depends on a meaningful interactive experience, not on the conventional form/function balance. For example, the edgy design of an electronic kiosk for a trendy urban area is more an amalgamation of asymmetrical forms than a repository of information, if the user is not motivated to approach the kiosk and use it. The form of the design must be inviting, so that the function of the design can be executed. In a sense, with interactive works *form becomes function*.

Some people may argue that the physical components that define the visual aesthetic of the kiosk have nothing to do with whether or not the kiosk is functional in its delivery of information. The contrary is true. From the designer's perspective, the purpose of the form is to deliver information. Hence, the design is not fully realized until the user has received the intended information. This requires interacting with the kiosk, the form. Hence, the user is engaged in a cycle of *view, approach, use, experience* that, once started, must be completed. Form instigates use, which creates interaction with the form, which defines the function of the design. With interaction design, a designer's objective is not so much to balance form and function, as to cause function with form.

When we consider the direct and necessary relationship between design and technology (mentioned earlier), we must consider that *direct and necessary* is relative to and defined by the times. In da Vinci's drawings of flying machines, there could be no direct relationship between design and technology, because the technology his design required did not exist. From that we can deduce that his design was not necessary, for the time, as it could not be built.

Let us consider *direct and necessary* in the context of interaction design. Using the example of the kiosk above, the user pushes one its buttons because he wants to know where, say, the nearest Italian restaurant is located. Is there a *direct* relationship between the button-pushing, the electronics that deliver the information, and the design? Yes. The user could not have retrieved the information without interacting with the machine, without pushing the button. Is there a *necessary* relationship between the button-pushing and the design? Yes. We know buttons get pushed. It's culturally bred into us. We don't gaze at buttons. We don't sing to buttons. We push buttons. So the designer can add this intuitive design element, whose function is obvious because of its form, and know that the user will interact with it appropriately, as intended. Appropriate interaction serves and helps define the design. What about the kiosk's artful visual presence? That is certainly part of the design, and a necessary part. The unusual abstract forms, visible from a distance, are what drew the user to the kiosk from across the plaza in the first place. The cycle of *view, approach, use, experience* was completed, because design and technology had a direct and necessary relationship.

Bit by Bit: The Cycle Continues

> "When we build, let us think that we build forever."
>
> - John Ruskin

There will be a period of awkwardness as designers, present and future, figure out the optimal use of technology and how to best manifest vision with binary code. In the beginning, designs may seem experimental, out-of-touch or just plain weird. But these growing pains will pale compared to the potential of changing the world bit by bit.

There is an abundance of possibility. As textiles are made more durable by chemical formulas calculated by computers; and architecture, formed of billowing sheets of titanium, stands erect because of 3-D imaging by computers; and artificial organs which sustain life are modeled by computers; and life-sized art interacts with people on the street because of intelligence generated by computers, we are reminded that our mission as designers to infuse beauty and better the quality of life is dependent on innovation. Now, it's digital. In the future, who knows? Perhaps we will communicate our designs telepathically – no paint, no bits, no solid matter to mold and shape, no physical record of our design, just a memory, an emotional connection to a moment when we experienced an important work. Who knows?

What we do know is that the we must forge ahead and create that which has not yet been created. We must follow a progressive path into the future of design. We must constantly innovate. But let us do so with a nod to the past. The works of the masters are the roots of design. Their vision will undoubtedly inspire us. Let it.

In 2005 the four visionaries described in this paper were once again celebrated. The works of Leonardo da Vinci were the subject of the best-selling novel *The Da Vinci Code.* The designs of Coco Chanel were on exhibit for the first time in New York City's Metropolitan Museum of Art. In tribute to his contributions to the arts and sciences, the United States

Government put R. Buckminster Fuller on a postage stamp. And, Frank O. Gehry began work on a number of buildings around the world, including the Art Museum of Ontario (Toronto, Canada), the Museum of Tolerance (Jerusalem, Israel), the Science Library (Princeton University, United States) and the Bridge of Life Museum of Biodiversity (Panama City, Panama).

From Ancient Rome to Silicon Valley and perhaps to a place beyond earth where we might one day live, the cycle of assembling bits, digital or otherwise, to design something useful, beautiful, meaningful, lasting or all of the above, and the need to innovate technology to make these new designs goes on. The co-evolution of technology and design continues. It always will.

About the Author

Prof. Peter DePietro
Peter DePietro, Professor of Interactive Communications, is a digital artist, a new media scholar and a Silicon Alley (New York City) professional.

THE INTERNATIONAL JOURNAL OF TECHNOLOGY, KNOWLEDGE AND SOCIETY