Edited by Joel Garreau and Ed Finn

Emerge

MARCH 2014

Contents

Future Tense Essays

Prelude

A cyborg in a leather jacket circulated under the circus tent. Her technology was subtle, but unmistakable.
As she tapped the temple of her glasses, she asked a young mother with a 7½-year-old girl by her side, "What is the most interesting ethical question this carnival raised for you?"
Came the video-captured reply:

> "How do you surround people with technology and not have them react fearfully? People don't know what's happening and they're – it seems like you don't understand – I'm surprised. People don't know what's happening but they're still standing right there."

Behind her, two clowns, an aerialist and an industrial robot frolicked. To her side, an internationally renowned experimental musician and a band called There Is Danger jammed with a squadron of flying bots. There's no other way to say it: the humans and the robots were playing together.

The crowd seemed oblivious to how appropriately was the band named. What touching faith they had in the technology! A director watched, nauseously, as he realized the bots were not flying the way they had in rehearsal, while the crowd pushed their 4-year-olds right up to the edge of the stage.

Even the Voice of God thundering through the speakers (algorithmically modulating the dire incantations of Master of Ceremonies Tania Katan) didn't seem to dampen the festive atmosphere of the carnival: *People always choose the path that makes it easier to live with the worst things they want to do.* While the crowd swayed to the music.

TOTAL NUMBER OF

ATTENDEES

51 PARTICIPANTS

434 TWITTER SHARES

1110 FACEBOOK SHARES

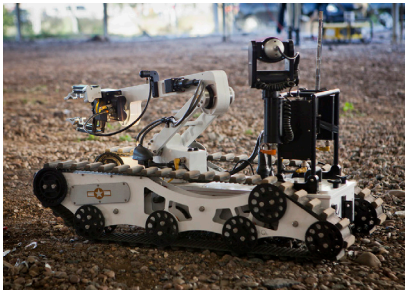
About Emerge

Since its inception in 2012 Emerge has pushed the envelope of performance, technology and critical thinking. Each year we examine these issues through an experimental lens, asking challenging questions about the future of our mediated lives by building, sharing and experimenting with visceral experiences of the future. These tangible futures create a unique opportunity to explore ethical questions in practice, through provocations and dilemmas you can reach out and touch.

Our Theme for 2014

“The Future of Me”

The triumph of the empowered individual has never been more central to our society. We live in a world of personalized medicine and Google Now, a world where online learning platforms, individualized search terms and focused marketing allow us to precisely tailor our lived realities to our preferences. Individuals have never had so much power to shape the world around them. Globetrotting entrepreneurs run businesses out of their smartphones, activists build digital coalitions of millions to leapfrog traditional political channels, makers use 3D printers and consumer electronics to reinvent manufacturing, Bill Gates decides to eradicate polio and tiny groups of passionate bibliophiles transform self-published e-books like *Fifty Shades of Grey* into mainstream cultural phenomena.



At the same time, individuals have become nothing more than tiny motes in networked systems that are global in scope and staggering in complexity.

The idea of individual human agency seems fanciful in a world of Big Data and ubiquitous surveillance, where systems monitor, analyze and streamline our behavior in ways that are too complicated to understand, let alone bring under human control. And even as the sanctity of the individual gives way to the power of the network, these systems, in their growing sophistication, move ever closer to something similar to cognition, threatening the stable ground on which individual human identity is premised. Crisis points in the global economy, the scandals over leaks of classified government information, and the growing shadow wars waged by drones and in cyberspace reflect the incredible challenges these systems pose to those who seek to control them, whether for public benefit or private gain.

ASU's Emerge 2014 challenges engineers, artists, scientists, designers, story tellers, ethicists, humanists, makers and futurists to explore questions of individuality, autonomy and freedom, as well as control, automation and facelessness. Are we on the verge of the triumph of the individual? Are we building a future dominated by systems, where self-determination is only a memory? Or, inevitably, is something much more complicated afoot? And if so, where might it be taking us?

Setting the Stage

Our challenge for Emerge 2014 was to take our combination of theater and reflection to the streets: the corner of 3rd Street and Garfield in central Phoenix, to be exact. Over the course of four days, a series of activities transformed an empty gravel lot into a carnival of the future.

Drone Confidential

A performance created by experimental musician David Rothenberg in collaboration with the band There Is Danger and ASU students and faculty pondered both the ethics of drone assassinations and a future in which robots and humans collaborate artistically and play music together. What emergent emotions will the bots of the future feel as they carry out their directives? Will they be recognizable to us? How will they use art to explore and share their feelings?

The Still

A dance performance created by ASU's Julie Akerly responded to the increasing centrality of texting and social media as tools for creating, nurturing and sustaining relationships. How do our devices act as tethers that constrain and

control our behavior? How do young people, especially women, cope with the double bind of wanting privacy and anonymity, while also using digital media in accordance with social scripts as a way to be noticed?

You n.0

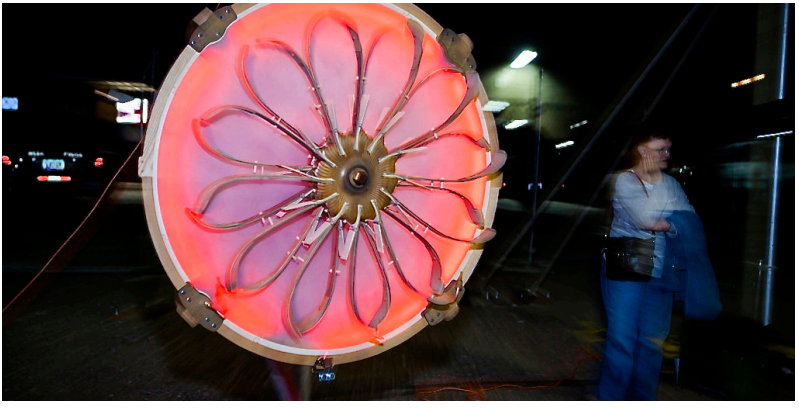
The product of a collaboration between ASU students and faculty in robotics this performance brought clowns and aerialists into collaboration with Baxter, a cutting-edge humanoid industrial robot.

myHealth Personalized Preventative Medicine

From ASU's Virginia G. Piper Center for Personalized Diagnostics, a working prototype of a future health clinic that uses genomic testing, sensors and wearable computers to predict and prevent diseases. What incredible ethical challenges will we face when we can precisely predict the time and cause of a person's death?

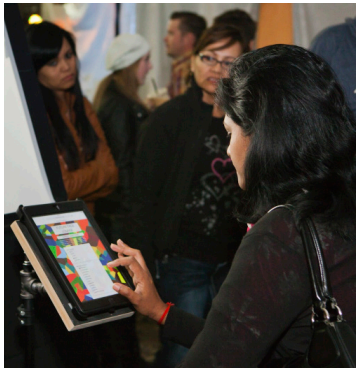
My Future Frontier / Mi Futura Frontera

An interactive installation designed by science fiction legend Bruce Sterling and collaborators from the Turin Maker Lab, powered by open-source Arduino electronics, that considered the significance of national borders for individual identity. To what extent does where you are determine who you are? How much do national borders continue to matter in a world where technology creates new global assemblages of people, products and capital?



Sirens

This interactive wood sculpture created by ASU's Thad Trubakoff presented a breathtaking collision of traditional craft with digital sensors, motors and microcontrollers.



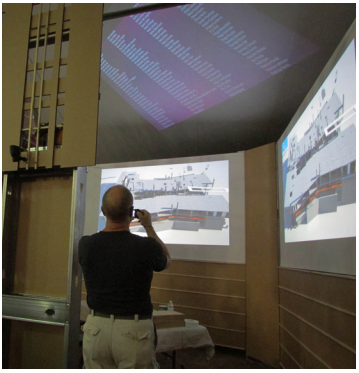
Future Face Lounge

ASU's Steven Yazzie confronted carnival-goers with this question: How much do our visible identities – race, gender, ethnicity, social class – affect the way we are conceptualized and treated by others? Does digital media, by splintering physical reality with algorithmic filters and virtual avatars, mean the end of the tyranny of looking and seeing? Or does it merely provide new tools for encoding, sorting and measuring people to perpetuate inequality?

Wearable Electronics

Students from ASU's Center for Cognitive and Ubiquitous Computing demonstrated how prototype wearable electronics could assist people with disabilities, or people recovering from serious injuries. Are we hurtling toward a present where intelligent wearable technologies expand our definition of "me" to include computers, sensors and other enhancements?

Carnival Games of the Future
The STEAM Carnival team from California provided an experience of the future of play featuring face tracking, digital image distortion and motion sensing technology. Does play become serious when it means applying computational logics that observe and digitally transform the human body?



Architecture By Everyone
An experiment in crowdsourced architecture masterminded by ASU's John Ball provided a glimpse of a radically democratic urban future where citizens have the power to hack and remake their lived environment. Choral conductor Eric Whitacre managed to create a virtual choir with over 8,000 crowd-sourced voices from 101 countries. Then he placed each contributor's video in an architectural setting. If hundreds of people can join together to create one harmony in a chorus, can thousands of people collaborative to design a smarter, safer, more equitable city?

Digital Tabernacle

Digital media provocateur Marcel O'Gorman and environmental humanist Ron Broglio applied a religious epistemology to a seemingly secular question: When do our increasingly strange and intimate relationships with our smartphones and digital gadgets become excessive, or even sinful?

Sand Mandala

A sacred Tibetan Buddhist sand painting was painstakingly created over the course of several days at the International Artist Residency Program Gallery at ASU's Combine Studios. Sand Mandala paintings function as symbolic archetypes of the Buddhist depiction of the intricacies of the mind and a vision of the ideal world, as well as an altar to confer blessings.

REACTIONS ON

TWITTER

@whybirdssing

@ASUEmerge had 7000 people under the tent dodging saxophones and drones. Amazing....

@neuromarketer

Confessing digital sins at ASU's Emerge 2014 - Arizona State University

@sagarkamat

Visited the @ASUEmerge Carnival of the future. And yes, it was futuristic. Feeling mildly high with all the futurism.

@johnsolit

And #asuemerge said, “Give Baxter wheels.” And it was good. And terrifying. But mostly good.

@BiodesignCasper

The future under the big top tonite @ASUEmerge

The Ethics of the Carnival

Carne vale – a farewell to the flesh. On the last night before 40 days of Lenten fasting, medieval Catholics threw a tremendous party with masques and dancing, parades and debauchery. In traditional Catholic fashion, every excess was balanced: the ascetic strictures of Lent were balanced by an evening of raucous and decadent fun.

Carnival is a period of inversion where the social order is upended by masks and disguises that confound typical class and social boundaries, tracing its roots back to the Roman and Greek traditions of saturnalia, bacchanalia and dionysia. The night becomes more important than the day. Festival overwhelms normality. Partying becomes serious business.

But the carnival is more than just a period of excess. It is a moment for questioning the social order, for experimenting with different moral regimes and broaching the forbidden questions. In literature the carnival can be the backdrop for serious critical work, like Edgar Allen Poe's "Masque of the Red Death" or Mikhail Bakhtin's work on Rabelais.

We put on the Carnival of the Future to take advantage of this cultural form, this magical space, for very specific reasons. We wanted to introduce experiences of the future in a playful, inviting way. By staging them in a setting where everything is already inverted, where people expect to be surprised, challenged and delighted, we removed some of the normal mental barriers to real engagement. More importantly, carnivals are all about the

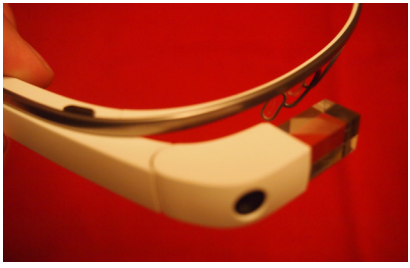
interplay of base emotions and high intellect: animal passions and artistic creativity. Our carnival was a way to ask the deep ethical questions as thought experiments but also gut checks: visceral experiences that carnival-goers would feel on a deeply human level.

The result was an experience that was largely improvised, messy and provocative, from the drones buzzing overhead to the strange clowns and creatures populating our temporary dance floor. One small measure of our success: not all of those clowns and creatures were commissioned or invited. Emerge itself attracted a series of carnival players, performers in disguise who were drawn to the bright lights and big questions of the one-night big top.

Ethics Scan

"Emerge 2014: Artists + Scientists Redesign the Future" was ethics-intensive.

Google Glass-equipped ethnographers roamed the "Carnival of the Future" tent that attracted 7,000 people – more than twice the capacity of ASU's Gammage Auditorium – asking the attracted crowds these questions:

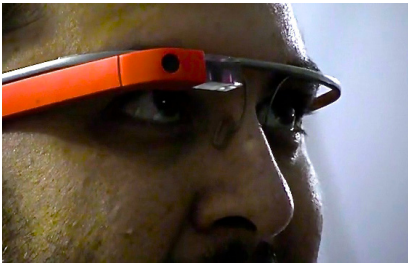


What is the most interesting ethical question this carnival raised for you? Do you have an answer for it?

What is the biggest ethical challenge our children will face that no one else has faced before?

What does it mean to be an ethical citizen in the 21st century?

Should humans collaborate with machines to make art? Why or why not? Does that mean we need to change the definition of creativity?



Have you ever consciously thought about how much you trust your digital devices, like

your smartphone or your laptop? How have you decided to answer that question in your everyday life? Can you share an example of information or media that you would not entrust to your digital devices?

"Should humans collaborate with machines to make art?" the interviewer asked one man in a necktie who held up his own smartphone throughout the entire interview. He was utilitarian, and thus sanguine.

> "My father is 101, and he's still composing music. We bought him a keyboard and there he is, switching out one kind of horn for another. It's more efficient."

All of Emerge 2014 was designed to provoke the question: If we humans are in a position to do almost anything with matter, energy and biology, then what should we do?

This is the core question of ethics.

Two scientists from ASU's Biodesign Institute at their hugely popular interactive personalized medicine installation presented the people who crowded around with this quandary: Imagine that at birth, your genome is sequenced and – forever after – disease prevention, detection and treatment are unique to you. Forget routine annual checkups. You now have continuous health feedback through mobile devices and wearables. Is that a world in which you have a vastly healthier you, empowered with the knowledge to transform your life? Or is it a world in which privacy is a distant memory, with large impersonal forces controlling great power and knowledge?

Drone Confidential

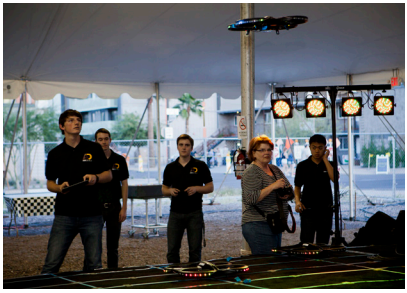
When robots become as integral to your perceptions of "me" as your hand or your arm, you will remember Emerge 2014. That's the time you first saw amazing musicians teaching drones to sing. The choreographed quadcopters performed with *New Yorker*-magazine-immortalized experimental "interspecies" musician David Rothenberg, who traveled to Arizona from Berlin. The multi-talented drones that swarmed out of the ASU labs of Srikanth Saripalli hardly got off easy.

> "General, man is very useful. He can fly and he can kill. But he has one defect: He can think."
> —Bertolt Brecht, "From a German War Primer," 1955

Ethical quandaries arrive when you least expect them. As Rothenberg wrote in Slate:

> "In rehearsing the piece, we had some debate about whether it was better to trust humans or computers to pilot the drones. The programmers shook their heads as the students made all kinds of errors trying

to pilot the machines with their smartphones, and they showed off programs that could make the copters do all kinds of reliable tricks in the air, over and over again. 'See,' they said, 'no human can be as accurate as this.' These are the same people who are programming our cars to drive themselves—'There are some things machines just do better than us.' Meanwhile, the rest of us shook our own heads. We don't even want toy helicopters flying themselves."
—"How to Make Music With Drones," March 19, 2014

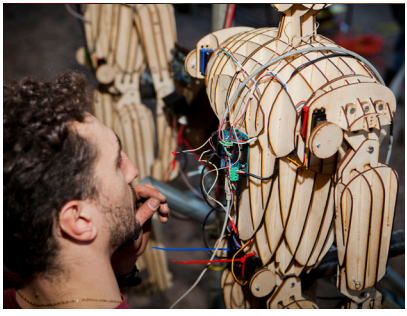


In the end, we trusted human pilots, trained by Saripalli – and the fallibility of both our pilots and the drone hardware itself made the machines seem more loopy, unpredictable and alive. As Rothenberg's psychologically broken drones confessed their wartime crimes, they dipped and swerved and broke formation and even dropped abruptly out of the air. As they danced, they mourned the loss of their innocence. They were only following orders, as soldiers are wont to do.

My Future Frontier/ Mi Futura Frontera

Success, Failure, Transformation

The Arizona borderlands are globally controversial, politically and ethically. Your identity is shaped by your place, as well as whom you're with and your cultural connections. This environment changes its shape and motion in reaction to your personal choices. So did the strange structure created by the science fiction legend Bruce Sterling (our "Visionary in Residence") and the Turin (Italy) Maker Lab, in "My Future Frontier / Mi Futura Frontera" – a vision of borderlands to come.



As Sterling wrote in Slate:

> "Mi Futura Frontera/My Future Frontier is about trans-national clichés. It's about that whirlwind of superstition and stereotype that gusts up whenever you step from one legal realm to another. On the far side of a border-crossing is the soil of

another nation. There's another culture there, offering the potential prospect of another, future 'me.' No matter how quickly you return from such an experience, you're not quite the same guy."

—"Using Art to Cross Borders Into the Future," March 3, 2014

We loved Sterling's piece because it exposed the fictitiousness of national borders, but simultaneously showed how we make them real by shaping our cultural boundaries around them, by stopping short of them, by believing in them. The legal and military armatures we build around these borders aren't only about controlling the flow of people and goods. They are also about calling the borders into reality, reifying them, making them as real physically as they are in our minds.

Alas, this machine broke down somewhere in the translation between northern Italy and the desert. Our best guess: the humanoid, wooden, cowboy-hatted stars of "My Future Frontier" rode to downtown Phoenix in the back of a dusty pickup truck, and one of their more fragile pieces was damaged on the way. Proving once again that the hardest part of making an ironic comment on national borders is getting across to where you're headed to do it.

You n.0

Lance Gharavi, associate professor at ASU's School of Film, Dance and Theatre, wrote in Slate that the most interesting outcome of his collaboration with Srikanth Saripalli, the robot herder of ASU's School of Earth and Space Exploration, was this discovery:

"The theater culture in which I work is certainly different from the culture of science and engineering in which Srikanth and his students work. Yet this collaboration is not as unlikely as you might think. As I said to Srikanth, our superficial differences mask a deeper affinity. We both focus on performance: the performance of materials, technologies, processes, and systems. My theater collaborators and I are just additionally concerned with the performance of organic autonomous systems – namely, people.

The entire team learned a great deal from this collaboration. Srikanth and I hope to continue this research together, and we are pursuing funding to make that possible." – "An Aerialist, Two Clowns, and a Robot Walk Into a Carnival…" March 25, 2014

Saripalli's own research with the Baxter industrial robot is about developing technologies for robot/human interaction in space exploration. The collaboration with performance artists helps to push the limits of how seamlessly robots can adapt to the rhythms of human movement, instead of forcing us to limit ourselves to their kinetic repertoire. Dancing helps establish that, both in space exploration and here on Earth, the future of robotics can remain centered on our needs, our bodies, our sense of space and time. But that decision has to be conscious and deliberate – it's not going to happen unless we make it so.

The image of a dancing Baxter also raises questions about how robots and humans should interact. When we're colleagues, venturing into the farthest reaches of space together, should we just be coworkers, and part ways after we punch the proverbial clock? Or should we socialize, whatever that will mean? Should we dance and sing, tell jokes, make up ludicrous stories? Where should our growing interdependencies with non-human intelligences start, and where should they stop?

Sand Mandala

Perhaps the most-unexpected hit was the Sand Mandala – Tibetan sand painting – created by Ngawang Lama, the Tibetan Buddhist monk from Mustang, Nepal. A Mandala represents rich and rational Buddhist philosophy centered on compassion, the importance of physical reality and universal responsibility. People were three and five deep for the five days he was meticulously working while his partner, Geshe Champa, currently of Phoenix, tirelessly explained the significance of what he was doing. The monks had given the Emerge 2014 theme, "The Future of Me," considerable thought. They created the Mandala of the Medicine Buddha, they explained, because for there to be a "future of me," there had to be a unity of the individual, the society, and even the changing climate. Even some of the non-religious found the aura inescapably powerful. Countless more followed on live-feed Internet video.

The monks used the construction of the Sand Mandala to explore the connections between our sense of self and the need for global responsibility. In a historical moment where our most pressing challenge is to understand that our actions are inextricably linked to global environmental and climatic systems, it seems almost perverse to expend valuable intellectual and spiritual energy drilling down into the intimate mechanics of selfhood. But for the Buddhist monks, we cannot act rationally and selflessly until we move through the self, imposing order and tranquility where there is chaos, confusion and suffering. If in Buddhism the acquisitive self is an obstacle to be overcome, we have to probe that obstacle and map its contours before we can move beyond it.

Digital Tabernacle

Another surprise hit was the "Digital Tabernacle." It aggressively approached not only the question of ethics, but that of sin. What should you do? Is our ever-expanding reliance on our smartphones and gadgets rising to the level of immorality?

As Marcel O'Gorman later wrote in Slate:

> "How do people react? Mostly with terror. Not only are they being hailed unexpectedly by black-robed zealots who aren't afraid to point fingers and make full eye contact. But they are also being asked to partake in a ritual that threatens the very core of their daily existence. In short, we are beseeching them to give up their handheld devices and experience a small portion of their lives as analog penitents, free of digital mediation."
> —"Confess Your Digital Sins," March 20, 2014

Lock away your (de)vices and immerse your soul in contemplation, preached O'Gorman of Waterloo University and his partner, Ron Broglio of ASU.

These Ministers of the Digital Tabernacle aimed to inspire

you to observe a period of digital abstinence and confess your digital sins. Be filled with analog grace and a new light will shine on your tweeting, texting, and selfie-posing. Don't self-document. Repent.

Through playful zealotry, the Digital Tabernacle raises an important question: Do our devices interfere with mindfulness, reflexivity and critical thought? Or are our definitions of these terms merely changing as our minds converge with the "thinking" done by algorithms, processors, feeds and streams?

Ethical conundrums filled the tent. The answers hardly came easy.

The Future's Long Shadow

The most important outcomes of Emerge are the hardest to measure. We staged the Carnival of the Future to create shadow puppets of the future, trying to grapple with the half-seen forms of the world we might want to live in. Even though we did this in live, visceral performance, the questions we posed were immaterial, unmeasurable, and perhaps unanswerable.

The ethical cyborgs asked one young man: What words of comfort do you have for people in the future? He replied:

> "We didn't have any idea what we were doing. We're really sorry."

At Emerge, we believe that forcing people to confront ethical quandaries in person, to experience them sensorially as well as intellectually, can help us figure out what we're doing. To change the future, we need to change the story. Ethics provides a procedure for deciding what the new story should be about – what we should include and what we should leave out, who should do the telling, and how we define a happy ending so we can recognize it when it presents itself.

Emerge is an exercise in speculative ethics, because we believe that to find an elusive future we can live in fairly and equally together, you need to wander away from rational argumentation and venture into the realm of myth, into the science fictional cosmos, a place of productive chaos and cognitive estrangement. You need to enter the carnival.

It's1630. Galileo is prepared to argue that the Earth revolves around the sun. For many of his contemporaries, however, the best arguments against him are not the theological ones of the church, but simple common sense. Anyone can simply stand on solid ground and watch the sun revolve over them: Sun moves, Earth doesn't. Moreover, if he's right, there would be enough wind to blow everyone off the planet, which obviously is not happening. In short, anyone with eyes and a hankering for experimental evidence can see that Galileo is just wrong.

Any discussion of the "self," or related concepts such as "consciousness" or "free will," faces the same problem. The phenomena are complex and, despite challenging the best minds throughout human history, still unexplained. Nonetheless, because everyone has immediate and intuitive access to themselves, everyone knows what consciousness is, knows that they exercise free will, and has common-sense ideas about their "self" that are powerful and unchallengeable. And yet these ideas, clear as they are, are also obviously inadequate – if not seriously delusional.

But just as changing the early European perspective on the universe had deep social and cultural reverberations, technologically driven disruption of our "self," and challenges to what we believe to be our fundamental identity, are potentially very disturbing psychologically and destabilizing socially. Thus, if these concepts are shifting dramatically, it is a serious concern. We can deal with a certain ambiguity about what constitutes our-

selves, and our identities, and our consciousnesses; it is when we are driven too fast and too far beyond that ambiguity that we get into problematic terrain.

Scientific experiments have shown, for example, that under some conditions, the unconscious mind "decides" on hand movements well before the conscious decision to move the hand, suggesting that free will under at least some circumstances is illusory. Experiments with transcranial magnetic stimulation have shown that application of a magnet to a particular location on an individual's skull will result in significant changes in moral judgment, a function that many people associate intimately with their self and conscious behavior. Less esoterically, military training for centuries has been based on the need to change the "self" of individual recruits into integrated units that will follow orders even when there's high risk of death. Studies of mob behavior have long revealed the fact that people's behavior changes dramatically when they're in a crowd: People who are ordinarily nonviolent and friendly all too easily coalesce into lynch mobs. And we're all familiar with the dramatic changes in personality that chemicals, injury, or brain tumors can cause.

Self, consciousness, and free will – easy turf to get lost in. So rather than doing that, let's instead recognize that, whatever else we may be, we are an information-processing species. A self is constructed of information, consciousness is about managing information, and free will, if it is to mean anything, requires us to have and process information about ourselves, our environment, and the (probable) results of our actions. This makes one point crystal clear: Anything that profoundly changes information will profoundly change us.

And it is obvious that the information ecosystems we live in are changing dramatically. Google's executive chairman, Eric Schmidt, is famous for having noted that today we produce as much information in two days as we did from the beginning of civilization to 2003. A more subtle change might be Google itself: In a quotidian and unremarked few years, it has granted each of us the powers of gods. How? It gives us immediate access to the world's accumulated memory – and anyone with that capability even 30 or 40 years ago would have been a deity, or at least a major superhero. It isn't that we necessarily know how to use that superpower, of course. Porn and pouting cats seem to keep most people firmly grounded. And consider augmented cognition, in which cognition occurs at the level of integrated techno-human networks, not at the level of the individual self. So-called augcog is not that strange: Modern cars don't just have speed control, but can maintain safe speeds given the traffic and conditions around them and can park themselves. Google, of course, already has autonomous cars in which passengers select the destination and the car drives; such cars may already be safer than those with humans at the wheel. Because conflict gets more complex, and relevant data streams from sensors, robots, unmanned aerial vehicles, and other sources are increasingly overwhelming to individual soldiers, militaries have been exploring augcog for more than a decade.

The category of "virtual sin" exemplifies another challenge. Is eating "virtual pork"acceptable for Jews? Is "virtual adultery," in which one partner is engaging in virtual sex with someone who is not her partner, grounds for divorce? And, assuming no physical contact occurs as part of the virtual relationship, should the grounds for divorce be adultery or, rather, abandonment? After

all, what appears to be happening is that aspects of one's personality that cannot be expressed in the real world (because, for example, one is married) are expressed in the virtual world, with a consequent loss of time, attention, and personal intensity. In other words, the "self" that one married has been fragmented until, in actuality, one has been abandoned even if the physical wetware remains. Put another way, how many "selves" in how many environments and techno-human networks does any individual have the time and attention to maintain?

A qualitative change in our information environment that is every bit as seismic as the meteor that marked the end of the dinosaurs. Deity-scale information capability. Complexity driving cognition to ever more competent techno-human networks. Perceptual, conscious, and subconscious processing increasingly outsourced to technology systems. Fragmentation of self across avatars in various increasingly engaging virtual realities. But any such list is misleadingly simplistic. The technological evolution impacting the self is not simply a case of interesting but isolated case studies but, rather, represents profound and accelerating evolution across the entire technological frontier. And the conscious self is where these must be integrated, or at least collated.

Whether the evolution of digital selves in response to such foundational technological change is "good" or "bad" is hotly debated, but in the end such debates are beside the point. Information appliances, including sophisticated ones like humans, would be grossly unfit if they failed to evolve under the circumstances. Those of us who grew up under much different conditions can rightly note the differences, but we cannot

thereby claim any moral high ground, nor, for that matter, can we criticize those who develop appropriately for a much different world. Moreover, the degree to which we can shape this digital technological tsunami may be far less than we naively think. That the era of the digital self is upon us is increasingly clear; what that means for the most complex of information processors is only beginning to emerge.

This article originally appeared on Slate's Future Tense channel on February 28, 2014.

There are three places where I unite my time: Austin, Texas; Torino, Italy; and Beograd, Serbia. So I cross a lot of national borders.

At a border, life gets intensely personal. Will these uniformed officials accept my passport, my name, my face? This identity document exists to prove to national authorities that I am me, me, me, and nobody else.

It's an efficient system, although Austin, Belgrade, and Turin are all well known for illegal immigrants. Those people are just as foreign as I am, but they have identity issues. Maybe no legal identities at all.

I generally succeed at passing through these dizzy moments of legal limbo, to experience foreign soil. The legally marginalized migrants also want a future for their individual selves. They generally work for that future a lot harder than I do. But their identity is not legitimized.

The U.S.-Mexican border region is one among many borders in our world, but I find it particularly personal. My mother's people lived in that region for seven generations. I learned from my ancestors that – while it's possible to make one's peace with pretty much any government – it's impossible to appease the shear-zone between two governments. Borders are dynamic and morally contradictory. They process the individual, but they're not built for his participation. You can live near a border, and prosper from tourism and arbitrage, but dwelling within the borderline is metaphysically impossible. A border crossing is a cultural clash.

These experiential musings led me to create an interactive artwork for the Emerge festival at Arizona State University on Friday, March 7. The goal of Emerge is to make the dry and abstract "future" into something immediate, personal, and tangible, that you can get your hands on. This year's theme is "The Future of Me": How much agency will we, as individuals, have in the near future? Will the networks bend every effort to learn our every quirk and serve our every whim? Or will we be like an illegal migrant, who lacks civil rights and a legal ID, a guy with a lot of "future," but not much "me?"

My contribution to Emerge this year is a border machine, "Mi Futura Frontera/My Future Frontier." The installation is powered by open-source software and is arranged to be at least as complex as a typical customs declaration. It's a whirling tower of cultural images, surrounded a jittery pair of marionettes. These polite border-crossing migrants do their best to obey the gestures of the viewer of the artwork. Like most of us in the passport office and the customs waiting queue, they're doing the best to go through the motions. But they're puppets of a system that isn't built for their benefit, and reactions can get out of hand.

"Mi Futura Frontera/My Future Frontier" is about trans-national clichés. It's about that whirlwind of superstition and stereotype that gusts up whenever you step from one legal realm to another. On the far side of a border-crossing is the soil of another nation. There's another culture there, offering the potential prospect of another, future "me." No matter how quickly you return from such an experience, you're not quite the same guy.

This large, kinetic artwork is deliberately made from abject materials available in most any machine shop in the world: plywood, iron pipes and spokes, sandbags, bicycle chain, bolts, nuts, and cheap steel wire.

It also involves also a new and significant device within the electronic art scene, the “Intel Galileo.” Like all Arduino-compatible devices, this Galileo circuit board transforms software impulses into mechanical motions. So the Arduino is a border-crossing device, of a sort – it turns the virtual into the actual.

Arduino gear has become a favorite of hacker-spaces, maker garages, and fabrication labs worldwide. Thousands of foreigners all over the world contribute to Arduino code – Arduino has globalized brainpower. But Arduino also has a homeland: It’s an Italian device. Arduino gear is commonly packaged and shipped from one of my favorite hangouts, the Torino Fablab, the fabrication laboratory of Turin. You see, “Mi Futura Frontera" is itself a border-crossing device. It’s an artwork that migrated from Turin to Phoenix, designed and engineered in one nation, then appearing as a public installation in another.

The Torino Fablab is an electronic light-industry center which sprang up in an abandoned FIAT car factory. It’s a lively place these days, where 20 Maker veterans run the shareable lasers, welders, 3-D printers, drills, saws, and soldering irons. About 300 local people regularly attend the FabLab to swap ideas, test out prototypes, and refine their skills.

The Intel Galileo is a gift, or salute, from Intel to the thriving Arduino craft community. I heartily approve of this bold cross-cultural gesture. It’s constructive and forward-looking.

More people should know about this.

I used to think that border-crossing would make our world flatter, more homogenized — that globalization was the road to the lowest common cultural denominator. But as I get older, and I see more and more future-of-me, I've come to realize that it isn't what happens. Globalization can intensify the local eccentricities.

There's a future after the Emerge event, too. I will hot-foot it out of kindly Phoenix straight to the lemming rush of SXSW Interactive in Austin, where future-minded techies who look, act, and talk just like me arrive in absolute mobs. SXSW is my own demographic as an ever-more-mobile, ever-expanding horde. "Keep Austin Weird" is the local patriotic battle-cry, but hosting this tsunami of high-tech global migrants is the single weirdest thing that the town ever does.

Maybe someday I'll be able to describe what that means and how that feels, but until then, I feel happier just making a machine about it.

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What if Computers Know You Better Than You Know Yourself?

Ed Finn

I recently read about the launches of both an "ultrasecure" mobile phone for protecting privacy and a clip-on camera that takes a picture of everything you do at 30-second intervals. Our cultural relationship with data is more complicated and contradictory than it has ever been, and our debates on the subject almost always center on privacy. But privacy, the notion that only you should be able to control information about yourself, cloaks a deeper tension between information and meaning, between databases and insights.

Our digital breadcrumbs now tell stories about us that are deeply secret, moving, surprising — and often things we don't even know about ourselves. These days when a computer crunches the numbers and tells you "this is who you are," it's hard to contradict because there's more data about you in the machine than there is in your head. Algorithms are most effective at curating the information that's hardest for us to hold in our heads: how long we talk to mom or what day of the week we splurge on an extra cookie.

The idea that a computer might know you better than you know yourself may sound preposterous, but take stock of your life for a moment. How many years of credit card transactions, emails, Facebook likes, and digital photographs are sitting on some company's servers right now, feeding algorithms about your preferences and habits? What would your first move be if you were in a new city and lost your smartphone? I think mine would be to borrow someone else's smartphone and then get

Google to help me rewire the missing circuits of my digital self.

My point is that this is not about inconvenience — increasingly, it's about a more profound kind of identity outsourcing. The topic has come to the forefront for me because my research center at Arizona State University is helping to stage Emerge, an annual event mashing up technology, performance and deep thinking about the future, and our 2014 theme is the future of me. What happens when important parts of "me" exist only online? When hackers took over *Wired* reporter Mat Honan's Google account, they were able to compromise his social media profiles, plaster the Internet with vile messages in his voice and, worst of all, remotely wipe all of his Apple devices, erasing "a year's worth of photos, covering the entire lifespan of [his] daughter." This was identity theft, but it was also a kind of identity lobotomy, destroying parts of Honan's life and, most likely, fundamentally altering who he is.

Horror stories like this only show part of the picture, however. Most of us are not wrestling with identity lobotomy but something more like adolescence, where our data is sprouting up in all sorts of weird and awkward places, pumping out signals about us we can barely understand, much less control. Consider "micro-targeting," where political and advertising campaigns can refine a message for an individual voter with startling precision. The inferences that Google or Netflix or Amazon make about who you are can occasionally be privacy invasions — as various legal disputes demonstrate — but they are also identity problems. Our digital selves shadow us in job interviews, first dates, loan evaluations, and insurance claims, and many of these identities are hidden from us on servers where we are distinctly not invited.

But of course we're not surrendering our iPhones or our cloud-based storage anytime soon, and many have begun to embrace the notion of the algorithmically examined life. Lifelogging pioneers have been it at it for decades, recording and curating countless aspects of their own daily existences and then mining that data for new insights, often quite beautifully. Stephen Wolfram crunched years of data on his work habits to establish a sense of his professional rhythms far more detailed (and, in some cases, mysterious) than a human reading of his calendar or email account could offer. His reflections on the process are instructive: He argues that lifelogging is "an adjunct to my personal memory, but also to be able to do automatic computational history — explaining how and why things happened." We may not always be ready to hear what those things are. At least one Facebook user was served an ad encouraging him to come out as gay — a secret he never shared on the service and had divulged to only one friend. As our digital selves become more nuanced and complete, reconciling them with the "real" self will become harder. Researchers can already correlate particular tendencies in Internet browsing history with symptoms of depression — how long before a computer (or a school administrator, boss, or parent prompted by the machine) is the first to inform someone they may be depressed?

When we start depending on our computers to explain how and why things happened, we've started to outsource not just the talking points but the narrative itself. The machines can be Vogon-esque in their rigidity, like the algorithms that fired a warehouse worker for missing a day when his baby was born. They can also be minutely insightful, like the Netflix system that breaks movies down into 76,897 categories.

In history, in business, in love, and in life, the person (or machine) who tells the story holds the power. We need to keep learning how to read and write in these new languages, to start really seeing our own shadow selves and recognizing their power over us. Maybe we can even get them on our side.

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How to Make Music With Drones
David Rothenberg

The good thing about performing music with drones is that they always show up for rehearsal on time. The bad thing is that they might suddenly drop out of the air and onto your head.

I learned all this while putting together a piece called “Drone Confidential” for Arizona State University’s Emerge, a “Carnival of the Future” that was held in Phoenix recently. Emerge is an annual circus of cool new technologies in performance, dedicated to showing how artists and machines can work together to create something awesome.

In my musical career, I’ve jammed with nightingales, humpback whales, and 17-year cicadas – so when I was asked to do this piece for Emerge, I figured, “Why not?” and got to work on planning. At first I wanted the drones to sing, or at least give voice to their secrets and struggles, but it turned out that even a Bluetooth speaker weighing a few ounces would mess up their navigability. No wonder the real practical drones cost thousands of dollars each.

I couldn’t get away from the idea of remote-controlled killing machines dispatched to war zones to eliminate enemies we are too frightened to confront in person. I know, these killings are supposed to be effective and precise, but there is something genuinely creepy about the process. So I decided that in my piece the drones would be talking – confessing to their crimes. Of course, I know they are only following orders.

In rehearsing the piece, we had some debate about whether it was better to trust humans or computers to pilot the drones.

The programmers shook their heads as the students made all kinds of errors trying to pilot the machines with their smartphones, and they showed off programs that could make the copters do all kinds of reliable tricks in the air, over and over again. "See," they said, "no human can be as accurate as this." These are the same people who are programming our cars to drive themselves — "There are some things machines just do better than us." Meanwhile, the rest of us shook our own heads. We don't even want toy helicopters flying themselves.

In the end we went with the human pilots, trusting our own errors more than programmed precision. The mistakes that happened during performances — dropping to the floor, flying in the wrong direction — made the drones seem all the more fallible and alive. It was hard to tell who was responsible for the flubs: the pilots or the piloted. But the mistakes weren't bad: It is when a drone does something unexpected that it most seems like something worth making music with, dancing with, or engaging with.

But mistakes in the field can end tragically. We can never say it is the fault of the weapon, but always the one who fires it. Emotion, the meaning of music, can be a great problem for strategy, a great problem for war. As Bertolt Brecht said, "General, man is very useful. He can fly and he can kill. But he has one defect: He can think."

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Confess Your Digital Sins
Marcel O'Gorman

A voice cries out in the desert:

"Know thyself, not thy selfies!"

"Digital media will not save you!"

“The zero is not whole and the one is not The One!"

Technically, we're not in the desert – we're in a dusty parking lot in downtown Phoenix. And the voice is not coming from the Prophet Isaiah, but from professor Ron Broglio, whom I've ordained as a Minister of the Digital Tabernacle. As people wander into the massive circus tent at Arizona State University's Emerge: Carnival of the Future, they are greeted by a pair of shifty evangelists preaching the analog Word.

"Confess your digital sins! Lock away your devices!"

How do people react? Mostly with terror. Not only are they being hailed unexpectedly by black-robed zealots who aren't afraid to point fingers and make full eye contact. But they are also being asked to partake in a ritual that threatens the very core of their daily existence. In short, we are beseeching them to give up their handheld devices and experience a small portion of their lives as analog penitents, free of digital mediation.

Behold the sacred liturgy of the Digital Tabernacle:

1) Penitent submits device to the ministers.

2) Ministers read prayer of analog blessing and lock device in Tabernacle.

3) Penitent receives prayer card to provoke analog contemplation.

4) After a while, penitent returns to Tabernacle and confesses digital sins.

5) Ministers read prayer of analog absolution.

6) Ministers cleanse device with Holy Spray and Sacred Cloth of Rubbing.

7) Ministers return device to penitent.

Yes, it's basically a device coat-check and cleaning service. But there's something more serious happening here.

At Emerge, the ministers absolved every filthy digital sin that came their way, from "I don't email my mother often enough" to "I sleep with my device under my pillow even though I know it's bad for me." Some penitents experienced an epiphany at the Digital Tabernacle. As one righteous soul proclaimed: "I was arrogant and thought that I was in control. But it turns out that I needed an education. I could barely survive 30 minutes away from my device. Now I know better and I have nothing but gratefulness in my heart." Amen, brother! We all have insecurities about our reliance on digital devices, a nagging sense that we are slowly losing our souls — but few of us are prepared to admit it.

In a short essay written in 1957, Marshall McLuhan foresaw a "Liturgical Revival" in which electronic media would create new cultural rituals. Today, as we relentlessly consume new media products and services, we simultaneously adopt new rituals and communal practices without even considering their impacts on our brains, bodies, and souls — let alone our physical environments. Digital Tabernacle sheds light on our digital habits, and offers a space for contemplation in a world of online distraction, neuromarketing, and psychotechnology. The project asks us to create new rituals that will save us from the tarnation of digital (de)vices.

I should add that although the Tabernacle preaches digital abstinence, it is not immune to the sin of irony. We preachers wore Autographer lifelogging cameras, which I hacked to look like crosses.

Still, whenever a digital recording device was pointed our way, the ministers reproached it sternly with an outstretched finger and the words: "Don't document! Repent!" This drove many a digital heathen to flee in fear.

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An Aerialist, Two Clowns, and a Robot Walk Into a Carnival...

Lance Gharavi

In his 1984 film *The Terminator* and its sequels, James Cameron imagines a dystopic future in which armies of intelligent robots move with startling suddenness from positions of servility to utter and violent dominance, destroying civilization and driving humankind to the brink of extinction.

This, of course, is pure science fiction. There's little reason to believe things will unfold that way. First, they would take all our jobs and wreck our economy.

This is the nightmare narrative of our future with robots and artificial intelligence. The utopian version of this tale — one accepted by many powerful people in industry and government — involves a progression in which we teach robots and AI, then they teach us, and finally we join with them, become one with them, and seize the reins of human evolution to strike out in a radical new direction. We emerge as hybrid beings, possessed with immense power and nearly unlimited knowledge.

These were the narratives that ran rapidly through my head when Joel Garreau, co-director of Emerge 2014, approached Jake Pinholster and me about creating a show with a robot.

Emerge is an annual festival at Arizona State University that brings together scientists, artists, engineers, and writers to imagine and design the future of the human experience. Jake and I, both professors of theater at ASU, have created original works of performance for each of the previous Emerge festivals, using technologies ranging from architectural projections to

humble Twitter accounts. When Joel approached us, Jake and I had already begun creating a new work for Emerge 2014; this one involved a pair of clowns and an aerialist. Adding a robot to the mix seemed an exciting challenge, both artistically and technologically.

A few weeks later, I walked into the Autonomous System Technologies Research & Integration Laboratory at ASU's School of Earth and Space Exploration. There, I was introduced to Baxter, a humanoid robot created by Rethink Robotics. ASTRIL had acquired Baxter only a few months earlier to work on developing technologies for robot/astronaut interactions in space exploration. I figured if we could get the robot to interact effectively with clowns, astronauts would be a cakewalk. I looked Baxter up and down his ("His"? I guessed male – because patriarchy) red and black body, with its hulking arms and iPad-like face, then turned to Srikanth Saripalli, the director of ASTRIL and a roboticist at SESE.

"Can he juggle?" I asked.

"I … I don't think so," Srikanth said doubtfully.

"Can he fail to juggle?"

Srikanth grinned. "Oh, yes! Spectacularly!"

This realization sparked much of the work that followed, for failure is as interesting and valuable to an engineer as it is to an artist. And this is even more acutely true for clowns. A clown works in failure like Michelangelo worked in marble.

In the ensuing weeks, I worked with our clowns – graduate students Brian Foley and Chelsea Pace – to devise a series

of performed metaphors that addressed the past, present, and future of human/robot relations. Our first question was, “What can this robot do?”

This is almost never an easy question to answer for new technologies, in part because, though capabilities are not unlimited, neither are they certain. One doesn’t so much discover capabilities as produce them. Or rather, one does both. This often involves transforming the technology itself, as well as the processes and means by which you engage the technology. And this is significantly what research in engineering means. It is largely the same in performance.

For instance, Emily McBryan, an undergraduate aerospace engineering student, designed and built two different hands for Baxter. After several failed tests, she constructed new scooplike parts for one of the hands to allow it to more effectively throw objects. Our sound designer Stephen Christensen worked closely with Sai Vemprala, the graduate research assistant who programmed all of the robot’s movements, to design and produce an intuitive interface that allowed us to control Baxter through an iPad. Faced with frustrating lag-time in lab tests, Stephen rewrote the control code several times, radically reducing the delay, and enabling Baxter to respond quickly to the fluid and rapidly changing situations of a live performance.

The theater culture in which I work is certainly different from the culture of science and engineering in which Srikanth and his students work. Yet this collaboration is not as unlikely as you might think. As I said to Srikanth, our superficial differences mask a deeper affinity. We both focus on performance: the performance of materials, technologies, processes, and sys-

tems. My theater collaborators and I are just additionally concerned with the performance of organic autonomous systems – namely, people.

The entire team learned a great deal from this collaboration. Srikanth and I hope to continue this research together, and we are pursuing funding to make that possible. Aside from the genuine and serious advances we made in robotics and control technologies, aside from what we learned about collaborative processes across fields, I came away from the project with at least two (rather more whimsical) insights.

Firstly, teaching a robot to pop and lock is more difficult that one might expect. Humans still do "the robot" better than actual robots. A comforting irony.

Secondly, a robot throwing rubber ducks into a clown's pants is as comically sublime an act as I could wish for – though to make it truly worthy of MOMA-level art, we'd need to do it for, say, six hours.

And who needs dystopian or utopian tales when you have that?

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emerge.asu.edu