

# THOUGHT EXPERIMENTS

Ed Finn

## DREAMING UP A CENTER FOR SCIENCE

## AND THE IMAGINATION

It all started a few months before I arrived at Arizona State University. Neal Stephenson was on a Washington, D.C., panel with the university's president, Michael Crow. Stephenson was talking about how dystopian our visions of the future are, and how we seem to have lost sight of our ability to think and do "big stuff": the Apollo Program, national infrastructure projects, and the microchip, for example. Crow responded that maybe it's the science fiction writers who are letting us down by failing to conjure up grand, ambitious futures that will inspire us to get out there and make them real. Stephenson perked up at that one, and the two began to talk about how we might get science fiction writers actively involved in shaping the future.

That was the conversation that landed on my desk when I joined ASU as a University Innovation Fellow in July 2011. Stephenson and Crow were interested in building a real connection between science fiction and the industries of science, and the challenge was to come up with an idea for doing it in a university setting. This new project would need to address very broad, public goals while remaining relevant within a research and teaching institution.

The two-page overview of the Center for Science and the Imagination was surprisingly easy to write. I found just the right quote from Albert Einstein: "Imagination is more important than knowledge." A few paragraphs about how the center would bring together science fiction writers and scientists, imaginers and engineers, and we were off to the races. Crow liked it. Stephenson liked it (though he corrected an embarrassing *Star Trek* mis-reference). I started building a coalition of interested parties at and beyond ASU. Something like a hundred meetings later, the center was born.

The Center for Science and the Imagination has a simple goal: get people thinking more creatively and ambitiously about the future. I see this mission as having two interlocking halves. First, we need to share a broader sense of agency about the future. It's not something people in white coats are cooking up in a lab somewhere; it's not something that will be announced by a glitzy product launch in New York or Silicon Valley. In fact it's not a single thing at all, but a spectrum of possibilities. And whether we consciously accept it or not, we are all making choices that shape the future we are creating together.

Second, we need to become more comfortable with the tools we have for envisioning that future. The reason I put imagination in the title of the center is that we all have access to this shared space for creative problem solving. I'm a humanities guy (my Ph.D. is in American literature, I worked in journalism, I wrote a collection of poetry as an undergrad), but I don't want the center to turn into another art vs. science debate club. Imagination is the key to moving forward in every discipline, even though the language of professionalism in many of them forbids or discourages unorthodox thinking. So I hope the center can become a vehicle for radical thought experiments, odd conversations, and, most importantly, a safe venue where anyone can take intellectual risks.

So how are we doing it? We're starting with a couple of core projects that function as intellectual supercolliders bringing some unusual minds into contact. Hieroglyph is the direct descendant of that initial conversation between Neal Stephenson and Michael Crow. Stephenson assembled a group of fellow science fiction writers interested in taking on the challenge of writing near future, techno-optimistic fiction: the better dreams that we will need to build better futures. The project puts these writers in conversation with scientists and engineers to find radical new technologies, "moonshot ideas," that we could implement now or in the very near future.

Hieroglyph is exciting for a number of reasons. First, it takes advantage of the natural affinity between science fiction writers and researchers (indeed, a number of our collaborators, like Gregory Benford, wear both hats with aplomb). The sense of wonder that drew many people into science and engineering in the first place is a crucial ingredient in what we call the imagination. Second, Hieroglyph asks everyone to step outside of their comfort zones a little bit and try something new. We are asking writers to explore the very near future, which is much harder than setting your story a long time ago in a galaxy far, far away. We ask scientists and engineers to share cutting-edge research with outsiders who bring a very different frame of reference to their work. Third, we ask everyone to do this online, on a web platform that we hope will evolve into a thriving community for creative disruption <<http://hieroglyph.asu.edu>>.

But I think the most exciting element of Hieroglyph is the way it will encourage all of us to expand our thinking about the future by pointing out just how broad and open the space of human possibility is. Our writers, scientists, and engineers are primarily talking about concepts that we could put into action now, or in a few years, if we just set our minds to it. For example, Neal Stephenson is working with a structural engineer, Keith Hjelmstad, on an idea for a fifteen to twenty kilometer tower. It would not depend on any magical new carbon nanomaterials or hand-waving physics, but rather on high-grade steel and solid engineering. These two started with a simple question: how tall can we go? The topic, it turns out, is not much discussed among engineering faculty or students, and the answers cannot be found by turning to chapter 2 of one's structural engineering textbook (and Hjelmstad should know, since he wrote that textbook).

The project will wind up as a book published by HarperCollins, an anthology of fiction that explores the boundaries of the human possibility space. But I think the process of bringing these different thinkers together will create its own little dynamo for better dreams. I hope this is the first of many Hieroglyph publications. It's a project that harnesses some of the energy at the core of science fiction as a genre and formalizes something that science fiction writers and readers have been doing (mostly informally) for generations.

It's hard to overestimate the power of science fiction to shape our thinking about the future. The stories that appear first in magazines like *Asimov's* circulate and recirculate, becoming films and television shows, inspiring comic books and games, ultimately creating iconic visions of the future that become deeply embedded in our cultural psyches. These are the "hieroglyphs" that lend their name to our project: Asimov's robots, Heinlein's rocket ships, and *Star Trek's* communicators are all examples of ideas that profoundly shape our thinking about technology and human progress. Sometimes these connections have direct, traceable histories, like the coining of the term cyberspace, but often they function as accumulations of ideas, iterations of designs, ongoing conversations that gradually resolve, like an impressionist painting, into a collectively authored vision. We might trace our thinking about the contemporary Internet to E.M. Forster's "The Machine Stops," or to Vannevar Bush's Memex, or to Vernor Vinge's "True Names," but the actual technology inherited ideas from each of these intellectu-

al threads, and many others as well.

The instigating role of science fiction in all of this relies on its function as a series of shared thought experiments: a genre that marries scientific research and cultural extrapolation with human-readable (and usually human-centric) narratives. We need stories to buy into new ideas because a good piece of fiction allows us to step into an entire world. Science fiction crowdsources the work of imagining the details, of filling in the corners of the future, and at the same time it presents a set of intellectual blueprints for how the pieces might fit together. When we pour ourselves into these stories as readers and fans, when we debate them and evaluate their strengths and weaknesses, we take on a fundamental agency and start thinking about the future as something we are responsible for. It isn't called the literature of ideas for nothing.

Of course, people have been hopping the low wall between science and science fiction for decades. But there are moments when this kind of juxtaposition is especially valuable, especially necessary. As we were developing plans for the Center for Science and the Imagination, it quickly became clear that we are in one of those crucial moments in the zeitgeist. On the one hand, new startup-style approaches to science are flowering, most notably Craig Venter's genomics outfit, the X-Prize Foundation, and Elon Musk's growing empire of Things That Go. On the other, we see a renewed national focus on big problems and ambitious solutions, not just because the problems are serious, but because our current educational models are leaving future generations ill-prepared to solve them. This puts our center in close spiritual alignment with the institutional spearheads of this shift: the Grand Challenges initiatives of the White House, DARPA, and the National Academies of Engineering.

This zeitgeist of ambitious creativity means that we have been able to build on a core premise of our model: broad and unusual partnerships. We are delighted to be working with Solve for X, a program of the Google X Labs, on videos and projects that exemplify "moonshot thinking" about our biggest problems. Their recently launched Solve for X site features breakthrough ideas in all sorts of arenas, including talks from both of our original provocateurs, Neal Stephenson and Michael Crow <<http://www.solveforx.com>>.

And it only makes sense that we are close collaborators with Intel's resident futurist, Brian David Johnson, and the Tomorrow Project, their platform to spur fresh conversations about the future. As the hosts of Tomorrow Project USA, we are promoting conversations with students and writers across the planet interested in issues of sustainability, ethics and new ways to frame our collective future <<http://us.tomorrow-projects.com>>.

A number of these collaborations came together at the beginning of March 2013 for Emerge, an event that combines elements of a science fiction convention, world's fair, media arts festival, philosophy conference, and psychological experiment. The tagline is "artists and scientists redesign the future" and our theme for the year was "the future of truth." The core mission of Emerge is to gather interesting people to collectively create tangible experiences of the future in a series of workshops and shared conversations. For the Center, the event is an opportunity to experiment with radical collaborations face to face, letting participants hash out their own means of sharing information, playing together, and cooperating to meet the challenge of imagining wild new visions of the future.

In the runup to Emerge, Bruce Sterling served as the Center's Visionary in Residence, creating a set of "petroglyphs" that laser-etched contemporary symbols onto Arizona rock. Legendary Hollywood designer Syd Mead talked about his work on *Blade Runner* and many other films. SF author Nalo Hopkinson co-led a workshop on the future of work songs and children's games with Caitlin Burns, a producer at the media

consultancy Starlight Runner. Cosmologist Paul Davies, who is literally the guy they call if SETI ever finds something, discussed the tricky question of whether the universe is real or just a *Matrix*-like simulation. In all, over two hundred artists, engineers, scientists, writers, designers, scholars, and makers of various kinds created a series of installations, performances, and objects that embodied possible futures of truth.

Like the rest of the work of the Center, I'd like to see Emerge grow in the coming years, creating satellite events around the world and defining a digital collective of thinkers and creators working together year-round. With my co-directors in other units here at ASU, we aim to make Emerge into a well-known destination for strange and profound encounters with the future.

As we grow, I'd like to see the Center take on a number of new roles as a kind of distributed Santa Fe Institute for creative thinking about science, linking together researchers, artists, museums and science centers, policy-makers, and, most importantly, the students everywhere who will be building the world for us in another few years. A key part of this process is the realization that there are many groups, and indeed many science fiction writers—Kim Stanley Robinson, for instance—who are already thinking hard about humanity's near future in creative and compelling ways. Our aim is not to reinvent the wheel but to work with groups like the actual Santa Fe Institute to build a broad network of people and ideas.

Emerge, Hieroglyph, and most of the work I've described above will start by reaching broad national audiences, or very specific professional groups, but how will the Center engage directly with students?

The most immediate way is through teaching. That idea of holding the future in your hands, the design fiction model espoused by Bruce Sterling, Julian Bleecker, and other friends of the Center, is a major influence on another new initiative I will be pulling together this summer called Prototyping Dreams. This is an introductory class I'll be teaching this fall with no prerequisites, built on the question "how do you build your dreams?" Students will start off with paper and pencil, move through virtual modeling, and end up with physical fabrication and 3D printing. The goal of the course will be to develop a series of prototypes that are functional stories, effectively sharing their creators' visions of the future with a wide audience.

The course will be taught in my primary home department, the School of Arts, Media and Engineering (I also have an appointment in the Department of English). AME has a wonderful new degree program called Digital Culture intended to give students the critical and practical skills they need to be creative producers and effective actors in our increasingly mediated world. So with any luck my Prototyping Dreams class will include students interested in design, engineering, writing, music, and many other subjects. Working in teams, they will recreate the broader spirit of the Center's enterprise, bringing disciplines and multiple forms of creativity together, and they will make some really cool stuff.

As the Center continues to grow, we will also develop a series of course modules and teaching elements that others can adapt into their own curricula. Already this year we've established a partnership with the Grand Challenge Scholars Program in ASU's Fulton Schools of Engineering, an exciting new effort to help promising freshman engineers stay focused on the dreams that led them to engineering in the first place: solving the world's most serious and complex problems. The Grand Challenge Scholars all take a class together where they collaborate on imagining a solution to one of these problems and offer an empirically based prediction for when the problem will be solved. What really lights them up, though, is when they write a science fiction story to go along with their research. There's a growing realization in the engineering community at ASU that writing—even science fiction!—can be a transformative way

to think through ideas and get other people excited about them.

As work on Hieroglyph moves forward I look forward to developing course modules based on story ideas and research from the project. The tower story that Neal Stephenson is working on, for example, could lead to a course that uses the tower as a case study for all kinds of questions: aerodynamics and climate science, structural engineering, geography and seismology, natural resources and sustainability, economics and regional development, urban planning, astrophysics, and, of course, the cultural and perhaps religious questions of how such a structure would fit into human society. By encouraging students to grapple with all these issues, asking them to reach beyond their comfort zones as young scientists, historians, or what have you, we can empower them to think big for themselves.

Another educational challenge that the center will take on in the years ahead is to reach younger students at the K-12 level. These kids are in many ways our perfect audience since they have not yet been taught that they need to choose between science and the humanities. They still can, and often do, say that they enjoy every subject in school. That playful approach to learning is something we at the university level can certainly learn from, and I'd like to find ways to adapt our teaching modules to high school, middle school, and younger audiences. We had one very successful high school class visit earlier this year from Northpoint Expeditionary Learning Academy in Prescott, Arizona, and we look forward to establishing new connections with local educators and students.

There are more things we have in mind, but this rundown offers a representative sampling of the many ways in which we seek to emancipate the future. One of my primary goals in the next few years is to develop the Center and Hieroglyph websites into active platforms for new communities of thought. We've experienced a tremendous outpouring of interest and support for both projects since they launched and I'd like to make sure we keep building systems that invite real collaboration and input from the science fiction community.

This is personally exciting for me because veteran readers of science fiction are among the best-trained potential participants in our ongoing series of thought experiments, creativity derbies, and zany idea bazaars. As a scholar of contemporary American literature I can say that there are very few fields of writing with such a dynamic interchange between fans and authors. The social fabric of magazines like *Asimov's*, conventions, reviews, and all sorts of literary experiments is a huge part of why so many famous SF authors started out as fans. This is a community that celebrates one of the ground truths of contemporary publishing: readers and writers are working together as never before.

That spirit of collaboration for the noble purpose of expanding our intellectual horizons is exactly what we're trying to achieve here in Tempe, Arizona. I think I might have the best job in the world, and the most fun part of it is bringing new readers, thinkers, tinkerers, fans, philosophers, writers, and makers into the fold. It's a conversation that we really can't have without you. Won't you join us?

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