

Our Travels Through Time

By Lynn Conway



Keynote Talk Transcript

[NOGLSTP Out to Innovate 2014 & oSTEM 4th National Conference](#)

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1. Opening . . .

Many thanks to the organizers of this [wonderful conference](#) for inviting me to speak with you today. This has such a great meaning for me. As a coming home into a welcoming community, it brings a kind of closure I couldn't have dreamt of years ago.

As I reflect on my first [Out-to-Innovate in 2012](#), I'm totally amazed at the rapid progress our community is making . . . in our travels through time.

We've clearly entered a period of historic techno-social change . . . enabling ever more people to open the doors to personal freedom and full participation in life. By moving from "[covering](#)" in the shadows to "[uncovering](#)" out in the daylight, LGBT people are in the very vanguard of this social renaissance.

Vision, teamwork and technology are enabling us, and other former 'outsiders' of all kinds, to find our voices, our communities and our rightful places in the world.

In return, our accumulating experience and collective impact are fueling ever-more-rapid techno-social change.

But where is this all headed? While exciting, many on the sidelines find the prospects scary. They don't want to be left behind [as the trains leave the station](#). But which trains to take, and when to jump on them? After all, the early ones [could run off their rails!](#) How to plan? How to position for careers, and more? How to keep up?

Ah, but what we've seen so far is only the beginning. [A huge incoming wave of techno-social innovation](#), now just over the time-horizon, will soon sweep through . . . lifting all our lives onto an even higher plane.

But how can we visualize what's going on? [How can we prepare to surf this incoming wave?](#) That's what I'd like to explore today.

Let's begin by reflecting on my own awakening about all this, back in 2013 in Washington DC.

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2. “The Many Shades of ‘Out’”

On a sultry June afternoon, as my husband and I strolled towards the White House East Entrance, I reflected back to the time of my gender transition, in 1968.

Shamed as a social outcast, I'd lost my family, my friends and all social support. I'd been [fired by IBM](#), and [lost a promising computer research career](#). In many jurisdictions, I could have been arrested and charged as a sex offender, or institutionalized in a mental hospital and forced to undergo [electroshock therapy](#) or worse.

Evading those fates, I completed my transition and [began building a career in a secret new identity](#), starting at the bottom of the ladder as a contract programmer. Even then, any 'outing' could have led to media exposure, and I'd have become unemployable, out on the streets for good. The resulting fear channeled my life into 'stealth-mode.' I covered my past for over 30 years, always looking over my shoulder, as if a foreign spy in my own country.

But this was June 13, 2013, and what a contrast it was. My husband Charlie and I, along with many other activists, advocates and allies, were about to join the [President's White House Reception](#) in celebration of LGBT Pride Month. The atmosphere was full of joy and hope for the future. As we waited for the President, I reflected further.

I had been 'out' for 15 years now, or so I'd thought: [out on the Internet](#) to inform colleagues about my past, out as an [advocate for transgender people](#), out as an activist against the [psychiatric-pathologization of gender variance](#) (video).

It was one thing to hide in the back-rooms of [Xerox Palo Alto Research Center](#) decades ago, launching innovations as the hidden-hand [behind the VLSI microelectronics revolution in Silicon Valley](#) - a revolution that's changed the world forever. I didn't mind being almost invisible in my field back then or that [no one had a clue what I was really doing](#), much less who was doing it. I was thrilled to even have a job.

But 'out' has many shades of grey -- and even in very recent years I kept on partly covering, shyly holding back, lingering in the darker shadows. Although times had changed, I'd clung to old habits.

Down through the years [no one could explain](#) how the VLSI revolution actually happened. The results were simply taken for granted. Although I'd gained vital knowledge about generating such engineering paradigm shifts, I feared that my personal history would loom large in people's minds, and obscure any attempts at explanation.

It wasn't till 2012 that I finally got up the nerve to [write and publish a career memoir](#), to begin telling the story of how the VLSI revolution came about . . .

As the president entered the room, I glanced around and took in the joyful vibes. As he began to speak, I grasped

the reality of how far we'd come. Times had more than changed: a fresh wind was sweeping through our society, especially amongst the younger generations.

Then I thought of the millions of other LGBT people out there. I tried to envision the enormity of lifelong struggles against stigmatization and ostracism, of losses of families and employment, [of their oppression by having to 'cover'](#), often not fully engaging life nor being known for who they were, what they'd done, who they loved or who loved them.

In a flash, I visualized the vastness of “[The Many Shades of ‘Out’](#)” down through time. And then it hit me: we've come so far, so fast, that ever so many others could begin shedding old habits too.

After all, freedom isn't just an external concept, framed by our laws. It's a gift of the spirit that we must give ourselves, in this case by going towards brighter shades of 'out'.

Bottom line: If you want to change the future, start living as if you're already there.

3. Envisioning age-differential effects in LGBT social-emergence and LGBT social-perspectives

When we returned home, I began wondering about and reflecting on the very different ways that all those millions of LGBT people were experiencing the present . . . based on their ages and the decades when they'd become socialized. Once attuned to that idea, I couldn't help but notice age-differentials jumping out in stories emerging in national media. Here are excerpts from some of them:

"Finding Role Models for My Trans 5-Year-Old: It's a different, better world for young transgender kids", by Gendermom, *The Advocate*, July 20, 2013.

"Something is going on here. My theory is that we've arrived at a tipping point.

I shudder when I think what it would have been like five years ago. Had my child been born just a few years earlier, my local support group for parents of trans kids wouldn't yet exist . . . My child and I would have been on our own, groping around in the dark . . .

Now there are conferences and even summer camps specifically devoted to kids like mine . . . and I'm watching the world change right before my eyes . . . "

"Transgender teen lovebirds find happiness with each other . . . ", *New York Daily News*, July 26, 2013

"The Tulsa, Okla., teens have been together for a little over a year. They met at a transgender support group while they were each transitioning to the opposite gender, and it wasn't long before they fell in love . . .

And after years of pain, the couple seems to have finally found happiness, both with themselves and with each other.

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"Being transgender myself, I understand Arin probably better than anybody else, how good he feels and how complete he feels," Katie said.

"Former Navy SEAL comes out as transgender . . . " Anderson Cooper Interviews Kristin Beck, CNN, June 7, 2013

"Though she's felt trapped in the wrong body since grade school, Beck didn't come out until after she left the military in 2011. Doing so earlier would have been too big a risk. Transgender men and women are banned from service.

"That's a chance that if I took it, I might be dead today," she said. "There's a lot of prejudice out there. There's been a lot of transgender people who are killed for prejudice, for hatred . . ."

Beck says she doesn't need people to love, or even like, her. "But I don't want you to beat me up and kill me. You don't have to like me, I don't care. But please don't kill me."

"New Study: LGBT Seniors Struggle with Suicide", by Matthew S. Bajko, Edge Boston, July 12, 2013,

"Isolated from family and largely living alone, LGBT seniors in San Francisco contemplate taking their own life at an "alarming" rate, a new study has found.

It is estimated there are anywhere from 18,000 to 20,000 LGBT seniors living in San Francisco, with the population increasing each year as the median age of the city's residents grows older.

Executive Director Eve R. Meyer said the survey finding "tragically, I think, is not surprising because for a lot of LGBT seniors the living arrangements they have enjoyed change and living independently often becomes an option not available to them and they are often forced to live in extended care facilities of one kind or another."

In such a setting many LGBT seniors are pushed back into the closet, fearful of telling staff or other residents about their sexual orientation or gender identity . . . That can exacerbate their risk for depression, she added, causing them to consider suicide."

Thus we visualize the very different experiences of LGBT people during their parallel travels through time . . . based on their own generation's experiences during socialization.

4. The mass migration from mass-media to social-media

While reflecting on all that, let's begin visualizing the vast techno-cultural transformation now happening all around us . . . as a result of mass social migrations from mass-media to social-media.

As a result, many top-down, over-controlling, authoritarian institutions [are sinking into a rising sea](#) of agile, participatory, egalitarian, supportive, entrepreneurial, competitively-cooperating meritocracies.

We can learn a lot about all that by observing the intergenerational and international cross-currents as this trend accelerates . . . so let's look at some recent examples:

"The Perils and Possibilities of Transgender Visibility", by Lisa Stulberg, Huffington Post, June 4, 2014.

Lisa's powerful article talks about how transgender visibility "is simultaneously fraught with danger, incredibly exciting, and potentially radical . . .

How Jared Leto's Oscar for his role . . . in "Dallas Buyers Club" led to complex discussions about trans visibility . . . many lauded his role for increasing trans inclusion in mainstream media . . . others found the role dehumanizing, recklessly stereotypical, and a gross misrepresentation of transwomen's lives.

Meanwhile, high-profile trans women activists are bringing wide mainstream attention to their experiences and their politics:

*Transgender actress Laverne Cox, of Netflix's series "Orange Is the New Black," is a vocal activist for trans justice. Janet Mock, a transgender writer-activist has written a New York Times bestselling autobiography *Redefining Realness*. And supermodel Geena Rocero just came out as trans in her 2014 TED talk.*

Visibility alone does not ensure progressive social change . . . But visibility has the potential to eviscerate loneliness and to build community . . . and the power to irrevocably change hearts and minds.

For trans visibility in particular, there's something more: Trans visibility demonstrates how creative change can come from those who've been severely culturally and politically marginalized . . .

While pop culture can dangerously affirm . . . stereotypes that dehumanize . . . it can also make us confront our ignorance, confront each other, ask questions we didn't even know existed, and feel with every fiber of our being."

In this we see how the modern trans-emergence has been hugely empowered by the community's embracing and leveraging of emergent social-media technology, and how we've been out-front, surfing that wave ever since.

Now consider this . . .

"Technology's Man Problem", by Claire Cain Miller, New York Times, April 5, 2014.

"Elissa Shevinsky can pinpoint the moment when she felt that she no longer belonged . . . while at a friend's house Sept. 8, 2013, watching the live stream of the TechCrunch Disrupt Hackathon.

Two young Australian men stood behind the podium to give their presentation.

"Titstare is an app where you take photos of yourself staring at tits," one began, as photographs of women's chests on a cellphone flashed on the screen behind him. After some banter, the other concluded, "This is the breast hack ever."

The crowd — overwhelmingly young, white, hoodie-wearing men — guffawed. Something in Ms. Shevinsky's mind clicked. If ever there was proof that the tech industry needed more women, she thought, this was it.

Shevinsky wasn't the only one disgusted by the presentation. Twitter lit up with outrage. She joined in, writing a blog-post manifesto: "I thought that we didn't need more women in tech. I was wrong."

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Today, even as so many barriers have fallen — computer engineering, the most innovative sector of the economy, remains behind . . . A culprit, many people in the field say, is a sexist, alpha-male culture that can make women and other people who don't fit the mold feel unwelcome, demeaned or even endangered."

Again, note how social media provided a powerfully amplified voice to all women so demeaned . . .

Now consider this:

"From Silicon Valley To White House, New US Tech Chief Makes Change", NPR, November 4, 2014.

"Megan Smith . . . just moved from a top job at Google in Silicon Valley, where she was vice president of Google X, to the White House, where she's now the country's chief technology officer . . .

The topic of women in tech is on many minds lately. Every other industry once dominated by men — finance, law, medicine — has come closer to parity. Tech, meanwhile, seems to be going backwards.

"I almost call it death by a thousand cuts" Smith says . . . when you look at it in the aggregate, it's really a lot of unconscious bias."

Smith, a lesbian who was CEO of Planet Out, managed to get by past people's biases and brought her passion in climbing to lead Google X, the division of Google that rolled out self-driving cars, and becoming U.S. CTO . . .

Smith is a gay woman scientist, which could make her a potential outsider on a few levels. Instead, she's as inside as a tech leader can be, even bounding around the White House with ease . . ."

Thus we see how Megan's story, widely amplified by social media, gives lie to the misogynist pranks of nerds who'll never fly as high in life.

And then THIS came along! . . .

Russia removes statue after Apple CEO comes out", USA Today/AP, November 3, 2014

A six-foot statue of an iPhone on a St. Petersburg university campus has been taken down "in response to last week's announcement by the CEO of Apple that he is gay."

In a statement, authorities "described Tim Cook's revelation "a public call to sodomy". . . and said they were taking down the statue "because it violated Russia's law protecting minors from homosexual propaganda."

Apple declined to comment on the removal of the statue, which featured former CEO Steve Jobs."

Think of the cross-currents of messages this sends to the younger generations. And not only in Russia, but all around the world!

But the social age has only just begun . . . Imagine what'll happen to top-down over-controlled nations like Russia as the tide of techno-socio-innovation really comes in!

5. The Incoming Wave of Innovation: Embedding Modular Interconnected Microsystems to Animate Almost Everything

Those of us working in microsystems have seen bits and pieces of it coming for many years . . . an ever-widening array of innovations in [microelectronics](#), [MEMS](#), [nanotechnology](#), [micromachining](#), [micropackaging](#), [3D printing](#), and [additive manufacturing](#).

However, the micro-results have been deeply embedded within final products such as smartphones, autos, aircraft and other macroscale systems . . . and the underlying explosion of microworld innovations has remained out-of-sight, underappreciated by the public and underexploited by entrepreneurs.

That's all about to change as smart phones (such as Motorola's [Project ARA](#)) and watches and [glasses](#), become [LEGO-like customizable assemblages](#) that can be reconfigured via modular micro-hardware Apps to meet individual and group requirements.

The wide-social-media-visibility of HW Apps in smart phones, watches and glasses will lead to embeddings of very-low-cost interconnected microsystems to animate wearable technology, [medical devices](#), [personalized technology](#), [automobiles](#), [mobility technology](#), [homes](#), [robots](#), [drones](#), environmental infrastructure and beyond . . . It will also trigger innovations [back within micro-making and manufacturing technology itself](#), closing the loop and providing [cybernetic](#) "intellectual gain" in the [techno-social exploration](#) of microworld empowerments.

But where will all the innovators come from? Fortunately, [a wave of change](#) is sweeping our universities. Leading engineering and business schools are increasingly exploring [experiential learning](#), [flipped courses](#), [MOOCs](#), [SPOCs](#) and [blended learning](#), emphasizing entrepreneurial, [multidisciplinary](#), user-centered problem-solving in [exploratory team-projects](#).

Many incoming students have also gone to [LEGO Camps](#), done [3D scanning](#) and [open-source 3D-printing](#), used [Raspberry Pi's](#) and [Arduino](#), worked in [FAB LABS](#) and participated in [robot competitions](#) and the [Maker Movement](#) . . . motivating increasing numbers towards real-world, user-engaged, team-problem-solving to create products that truly meet deep [human needs](#).

But what tools will these innovators use? We're witnessing a revolution in design tools for user-engaged 3-D [visualization](#), [design](#), [modeling](#), [simulation](#) and [prototyping](#), just in time to support participatory user/designer/fabricator explorations into [how to embed microsystem functionality](#) in and "animate" all sorts of [new macroscale products in clothing, homes and offices, automobiles and structures](#).

As a result, we'll see a refactoring, [reshoring](#), dispersal and market-democratization of making and manufacturing, leading to the rise of many novel forms of specialized [logistics](#), component-integration and [subassembly shops](#) . . . with user-community involvements, creative quick-turnaround [modular customizations](#) and [order-to-delivery times](#) becoming vital market success factors.

But how will companies connect and thrive within this massive, rapidly-evolving, collaborative-competitive industrial ecosystem? The answer: [hybridizations of design automation and social-media technologies](#) will take us way beyond design tools into multi-tech "exploration infrastructure" . . . where [user-engagement](#), [interactive market development](#), user-driven technology evolution, [collaborative learning](#), [crowdfunding](#), [crowdsourcing](#), [meta-level team design support](#), [IP validation and marketing](#), [multi-dimensional supply-chaining](#) and [agile project methods](#) will [enable participants](#) to dramatically scale-up their connectivity and impact.

As the incoming wave of innovators, investors, social infrastructure, design tools, manufacturers, products and markets crests it will trigger disruptive change . . . moving societies toward more [diverse, egalitarian, inclusive and thriving futures](#).

In the process, the arts will merge into STEM and [STEM will become STEAM](#) as they say at the [Rhode Island School of Design](#) . . . as artists, artisans, musicians, performers, videographers, writers, designers, makers, engineers and scientists together apply "STEAM POWER" in their shared exploration of what it's possible to do!

6. How can we "catch such incoming waves" and have fun learning, teaming, exploring and leading in the Social Age?

It's not going to be hard, if you're "open to it" and want to be a "player"!

The emerging participatory communities will welcome you in . . . All you have to do is [be curious](#), [be excited about learning new things](#), [be unafraid to be a beginner at new things](#), and be eager to join new teams, learn the ropes, and contribute however you can. There are also many emerging guidebooks, tools and media that hold clues . . . For example, I recently gained some cool insights from:

[Charles Duhigg's book *The Power of Habit: Why we do what we do in life and business*](#) . . . containing powerful guidance on how to edit old habits and create new ones . . . how to stop old habits that are just taking you around in circles . . . and jump into new habits that'll keep you on the front of the wave . . .

And [Julian Stodd's book *The Social Leadership Handbook*](#) provides an evolving, sharable, visual social-framework based on "Engagement, Narrative and Technology" . . . helping us see connections among questioning, learning, doing, fixing, editing, narrating, curating, storytelling, sharing, collaborating, co-creating and building communities, social reputations and social capital.

As the Social Age unfolds and the authoritarian, top-down institutions of the past fade . . . ever more of us will focus our attention on building social reputations as learners, helpers, sharers, contributors, innovators, leaders and explorers . . . rather than merely individually seeking money, material possessions, formal positions and the trappings of power.

By so doing, we'll steadily increase our social agility and our lifelong opportunities [for teaming up with cool people](#), [going on explorations](#), [enjoying exciting adventures](#), and [leaving tracks behind!](#)

7. Reflections on what lies ahead

By connecting the dots . . . it's becoming clear that this is the "Big One." [The microworld-exploration 'Gold-Rush' has begun](#) . . . and it's exponentiating due to the gain in the exploration-ecosystems emerging in '[Silicon Valleys](#)' '[Maker Valleys](#)' and '[Artists Valleys](#)' all around the world . . . as they simultaneously exploit and expand the techno-social infrastructure of the emerging Social Age.

Furthermore, this revolution in human enterprise is technologically, economically, politically and socially inevitable, [because the long term success of humanity](#) depends upon sustainably providing ever-more infrastructural functionality and life empowerment per person, while consuming ever-less energy and ever-less material resources per person.

It can also move societies towards more diverse, inclusive and thriving futures, as ever more people migrate from being isolated consumers of mass-produced goods and entertainment towards being innovative, [entrepreneurial](#) and [participatory customizers](#) of their own habitats and life experiences.

So remember: If you want to change the future, start living as if you're already there!

And have no fear: Embrace and enjoy the escalating rate of techno-social change. After all, it has the truly wonderful side effect . . . [of enabling us to live far further into the unfolding future](#) than we ever could have imagined!"

[It's going to be an incredible adventure!](#)