**Our Travels through Time:**

**From ‘covering’ in the shadows to ‘uncovering’ in the light.**

A conversation with Lynn Conway

Many thanks for inviting me to speak with you today. Joining with yet another welcoming community has deep meaning for me, bringing a kind of closure I couldn’t have dreamt of decades ago.

I’m also amazed at the rapid social progress so many communities of ‘former outsiders’ are now making in our travels through time. Even with setbacks now and then, we’ve entered an era of historic techno-social change . . . enabling ever more people to open the doors to personal freedom and full participation in life.

LGBT people are in the vanguard of this social renaissance, as they move from “covering” in the shadows to “uncovering” out in the daylight.

Social teamwork and technology are enabling more of us to find our voices, our communities, and our rightful places in the world. In return, our experiences and impacts fuel ever-more-rapid techno-social change.

But where’s this all headed? While exciting, many find rapid change scary. They don’t want to be left behind as trains leave the station. But which train to take, and when to jump on? After all, early ones can run off the rails! How to plan? Position for careers, and more? How to keep up?

Also, what we’ve seen so far is only the beginning. A huge incoming wave of techno-social innovation will soon sweep through . . . lifting all our lives onto an even higher plane.

So, how can we visualize what’s going on? How can we prepare to surf and stay on top of that incoming wave? Let’s begin by reflecting on my own awakening about all this back in 2013, in Washington DC, as described in an essay I wrote shortly afterwards . . . (on web)

**2. “**[**The Many Shades of ‘Out’**](http://www.huffingtonpost.com/lynn-conway/the-many-shades-of-out_b_3591764.html)**”: Washington DC, June 13, 2013**

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, worse yet, institutionalized and forced to undergo electroshock therapy in a mental hospital.

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 psychiatry’s pathologization of gender variance.

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 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 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. Visualizing age-differentials in LGBT social-emergence**

When we returned home, I began wondering about and reflecting on the very different ways those millions of LGBT people were experiencing the present . . . based on their ages and the decades they’d become socialized. Once tuned into that idea, I couldn’t help but notice age-differentials jumping out in national media stories.

**7-19-13:  The Advocate: "Finding Role Models for My Trans 5-Year-Old:**

**It's a different, better world for young transgender kids", by Gendermom**

<http://www.advocate.com/commentary/2013/07/19/op-ed-finding-role-models-my-trans-5-year-old>

"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.”

**7-26-13: NY Daily News: "Transgender teen lovebirds find happiness with each other . . . "**

<http://www.nydailynews.com/life-style/transgender-teens-find-happiness-article-1.1410225>

"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.

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

**6-07-13: CNN: "Former Navy SEAL comes out as transgender . . . "**

**(Anderson Cooper Interview)**

<http://www.cnn.com/2013/06/07/us/transgender-veteran/index.html>

<http://cnnpressroom.blogs.cnn.com/2013/06/06/part-i-of-andersoncoopers-exclusive-interview-with-transgender-former-navy-seal-kristen-beck/>

"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.""

**7-12-13: Edge Boston: “New Study: LGBT Seniors Struggle with Suicide”, by Matthew S. Bajko, Bay Area Reporter**

<http://www.edgeboston.com/news/national/146904/new_study:_lgbt_seniors_struggle_with_suicide>

"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, noted Meyer. That can exacerbate their risk for depression, she added, causing them to consider suicide."

**4. Mass social migration from Mass-Media to Social-Media**

With that as background, let’s begin visualizing the huge techno-social changes happening all around us . . . as a result of large migrations from Mass-Media to Social-Media. We learn a lot by noticing the inter-generational and international cross-currents in this accelerating trend . . .

What we’ll begin to notice is that many top-down, over-controlling, authoritarian institutions are sinking into a rising sea of agile, participatory, egalitarian, supportive, entrepreneurial, competitively-cooperating meritocracies.

**The Perils and Possibilities of Transgender Visibility**

By [Lisa Stulberg](http://www.huffingtonpost.com/lisa-stulberg) Assoc. Prof., Sociology of Education, NYU Steinhardt, 04/04/2014

<http://www.huffingtonpost.com/lisa-stulberg/the-perils-and-possibilit_b_5074266.html>

Lisa’s powerful article talks about how it’s . . . “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 the role for increasing trans inclusion in mainstream media . . . others found it recklessly stereotypical, a gross misrepresentation of transwomen’s lives.

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

Transgender actress [Laverne Cox](http://www.lavernecox.com/), of Netflix’s series "Orange Is the New Black," became a vocal activist for trans justice.

[Janet Mock](http://janetmock.com/), a transgender writer-activist write a *New York Times* bestselling autobiography ([*Redefining Realness*](http://janetmock.com/books/)).

And supermodel [Geena Rocero](http://nymag.com/thecut/2014/04/transgender-model-geena-rocero-on-her-ted-talk.html) came out as trans in her [2014 TED talk](http://www.ted.com/talks/geena_rocero_why_i_must_come_out).

Visibility alone doesn’t ensure progress but has the potential to eviscerate loneliness, build community and irrevocably change hearts and minds.

Trans visibility in particular demonstrates how **creative change** **can now come from** those who’ve been most severely marginalized . . .

*Now consider . . .*

**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](http://valleywag.gawker.com/techcrunch-disrupt-kicks-off-with-titstare-app-and-fa-1274394925/all).

“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](http://www.businessinsider.com/why-im-finished-defending-sexism-in-tech-2013-9): “I thought that we didn’t need more women in tech. I was wrong.”

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 powerful voice for women who were so demeaned . . .

*But now, consider this! . . .*

**From Silicon Valley To White House, New US Tech Chief Makes Change**

NPR November 04, 2014

<http://www.npr.org/sections/alltechconsidered/2014/11/04/360430620/from-silicon-valley-to-white-house-new-u-s-tech-chief-makes-change>

“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](http://www.whitehouse.gov/blog/2014/09/04/president-obama-names-megan-smith-us-cto-alexander-macgillivray-deputy-us-cto), where's she's now the country's chief technology officer . . .

The topic of [women in tech](http://www.npr.org/tags/221437017/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 Smith’s story, widely amplified by social media, gives lie to the misogynist pranks of the nerds, who’ll never go as far in life.

*And then THIS came along! . . .*

**Russia removes statue after Apple CEO comes out**

AP November 3, 2014

<http://www.usatoday.com/story/tech/2014/11/03/tim-cook-russia-apple/18424361/>

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 . . . not only in Russia . . . but all around the world!*

*Meanwhile, the social age has only just begun . . . Imagine what’ll happen as the tide of techno-socio-innovation really comes in!*

**5. The Incoming Wave of Innovation: What’s happening here?**

There’s a big story here, and I’m currently researching and lecturing on it. For an overview of the details, see this recent lecture:

Lynn Conway, “Our Travels Through Techno-Social Space-Time: Envisioning Incoming Waves of Technological Innovation”, 2016 Magill Lecture, Columbia University, March 23, 2016 (95 PPT Slides; 75 Min. Lecture)

<http://ai.eecs.umich.edu/people/conway/Memoirs/Talks/Columbia/2016_Magill_Lecture.pptx>

Jesse Adams, “**Magill Lecture**: Visionary Engineer **Lynn Conway** BS’62, MS’63 **Heralds Dawn of the Techno-Social Age**”, Columbia Engineering, April 7, 2016

<http://engineering.columbia.edu/visionary-engineer-lynn-conway-bs%E2%80%9962-ms%E2%80%9963-heralds-dawn-techno-social-age>

In a nutshell, it’s happening because of the embedding of increasingly powerful modular microsystems into, and animating, almost everything.

Folks working in microsystems have seen bits and pieces of this coming for many years . . . in ever-widening array of innovations in microelectronics, [MEMS](https://www.memsnet.org/about/what-is.html), [nanotechnology](http://science.howstuffworks.com/nanotechnology.htm), micromachining, [micropackaging](http://www.i-micronews.com/advanced-packaging/), [3D printing, and additive manufacturing](http://en.wikipedia.org/wiki/3D_printing).

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

That's about to change as smart phones (Google’s [ARA](http://www.projectara.com/)) and wearables become [LEGO-like](http://en.wikipedia.org/wiki/Lego) [assemblies](https://www.youtube.com/watch?v=oDAw7vW7H0c) that can be reconfigured via modular micro-hardware Apps to meet individual and group requirements.

The wide-social-media-visibility of HW Apps will lead to the embedding of very-low-cost interconnected microsystems to animate wearable technology, [medical devices](https://www.youtube.com/watch?v=NqDqhzJzQ1U), automobiles and mobility technology, homes, robots, drones, environmental infrastructure and beyond . . .

But where will all the innovators come from? Fortunately, [a wave of change](https://www.youtube.com/watch?v=U6FvJ6jMGHU) is also sweeping our universities. Leading engineering and business schools are increasingly exploring [experiential learning](https://www.youtube.com/watch?v=u96I_5fcB6A), [flipped courses](https://www.youtube.com/watch?v=tkd-srAj0E8), MOOCs, SPOCs and [blended learning](http://video.mit.edu/watch/blossoms-using-geometry-to-design-simple-machines-with-professor-daniel-frey-3626/) -- emphasizing entrepreneurial, [multidisciplinary](https://www.youtube.com/watch?v=293KKDBHGc0), problem-solving in [exploratory team-projects](https://www.youtube.com/watch?v=YqF_mfbF6Kk) . . . motivating more students towards real-world, user-engaged, team-problem-solving to create products that meet deep [human needs](http://www.bloomberg.com/news/2014-01-17/google-unveils-smart-contact-lens-project-to-monitor-glucose.html).

As a result, we'll see a refactoring, reshoring, dispersal and market-democratization of manufacturing, leading to the rise of many novel forms of specialized component-integration and subassembly shops -- with user-community involvements, creative quick-turnaround partial 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?

Some answers: the [commingling of design automation and social-media technology](https://www.youtube.com/watch?v=HsOjdbK3E94) will take us way beyond current "design and planning tools" into multi-technology "exploration infrastructure” for [user-engagement](https://www.youtube.com/watch?v=YZCX-izCYMk), [interactive market development](http://www.usaid.gov/div/portfolio/solar_sister), user-driven technology evolution.

At the same time, [collaborative learning](http://www.scoop.it/t/leadership-trust-and-e-learning), crowdfunding, crowdsourcing, [meta-level team design support](https://www.youtube.com/watch?v=Zm37gHpnf-I), [IP marketing and validatio](http://www.semiwiki.com/forum/content/section/1642-ipnest.html)n, [agile project methods](https://www.youtube.com/watch?v=sy0-VhKAr7s) and more . . . will enable all 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](http://www.youtube.com/watch?v=44o75Mm-1p4), as ever more people migrate from being isolated consumers of mass-produced goods and entertainment towards being [entrepreneurial](https://www.youtube.com/watch?v=TFfWwOCP1TA) and [participatory customizers](http://3dprintingindustry.com/2013/10/18/printers-pearce-interview-3d-printers-peaces-dr-joshua-pearce/) of their habitats and life experiences.

**6. How can we “catch the incoming wave” . . . and have fun learning, teaming up, going 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.

Many emerging guidebooks, tools and media also hold clues . . .

*Here are some books I’ve gained cool insights from:*

[Charles Duhigg’s](http://en.wikipedia.org/wiki/Charles_Duhigg), [*The Power of Habit: Why we do what we do in life and business*](http://charlesduhigg.com/the-power-of-habit/) . . . Provides powerful guidance on how to edit old habits and create new ones . . . instead of being trapped into running around in circles . . .

[Robin Chase’s](http://www.robinchase.org/#every-day-create-the-world-you-want-to-live-in) (of ZipCar fame) [*Peers Inc: How People and Platforms Are Inventing the Collaborative Economy and Reinventing Capitalism*](https://www.amazon.com/dp/B00TT1VTA6/ref=dp-kindle-redirect?_encoding=UTF8&btkr=1) . . . a great introduction to the emergence of platform-based Cooperative Capitalism . . .

[Julian Stodd’s](http://seasaltlearning.com/about/), [*The Social Leadership Handbook*](http://julianstodd.wordpress.com/2014/09/10/the-social-leadership-handbook-launching-today/) . . . provides a sharable social-framework based on Engagement, Narrative and Technology . . . shows connections among Questioning, Learning, Doing, Refining, Narrating, Curation, Storytelling, Sharing, Collaboration, Co-Creation, Social Reputation and Social Capitol

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 “open social reputations” as learners, sharers, helpers, contributors, innovators, leaders and explorers . . . rather than merely individually seeking money, material things, formal positions and trappings of power.

By so doing, we’ll steadily increase our social agility and our opportunities for teaming up with cool people, going on explorations, enjoying exciting adventures, and leaving tracks behind!

**7. Stepping into the Unfolding Future**

By connecting the dots . . . it’s becoming clear that this is the “Big One.” The techno-social-exploration ‘Gold-Rush’ has begun . . . and it’s exponentiating due to the gain in the exploration-ecosystems emerging 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.

**Corporate employee-advocacy groups can help take the lead in this,** by bringing the highly-correlated social-factors of **diversity, inclusion, innovation and productivity** “out into the open” in modern corporations.

***Remember*:** If you want to change the future, imagine it and start living as if you’re already there!

***And have no fear*:** Embrace and enjoy the escalating rate of techno-social change, for it brings a truly amazing side effect: It will enable us to live far further into the unfolding future than we ever dared to imagine!”

The decades ahead are going to be quite an adventure!

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