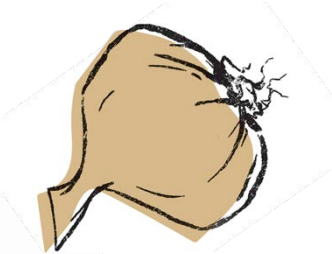


How to think like a **food futurist**

SPC Advance Master Class

October 7, 2019

Max Elder, Food Futures Lab

Institute for the Future

FOOD FUTURES LAB | iftf.org

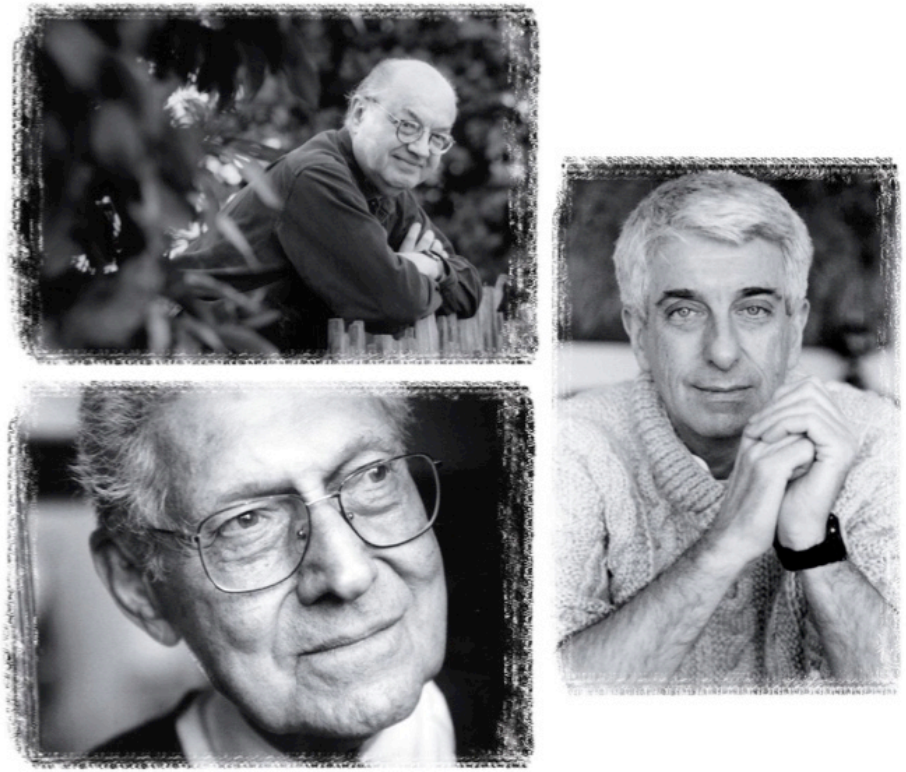
INSTITUTE FOR THE FUTURE

No one can predict the future.

is an independent, non-profit strategic research group with 50 years of forecasting experience. Our mission is to help organizations, communities, and individuals think systematically about the future.

INSTITUTE FOR THE FUTURE

was founded in 1968 by a group of former RAND Corporation researchers with a grant from the Ford Foundation to take leading-edge research methodologies into the public and business sectors.



Paul Baran, Olaf Helmer, & Jacques Vallee

IFTF works across industries

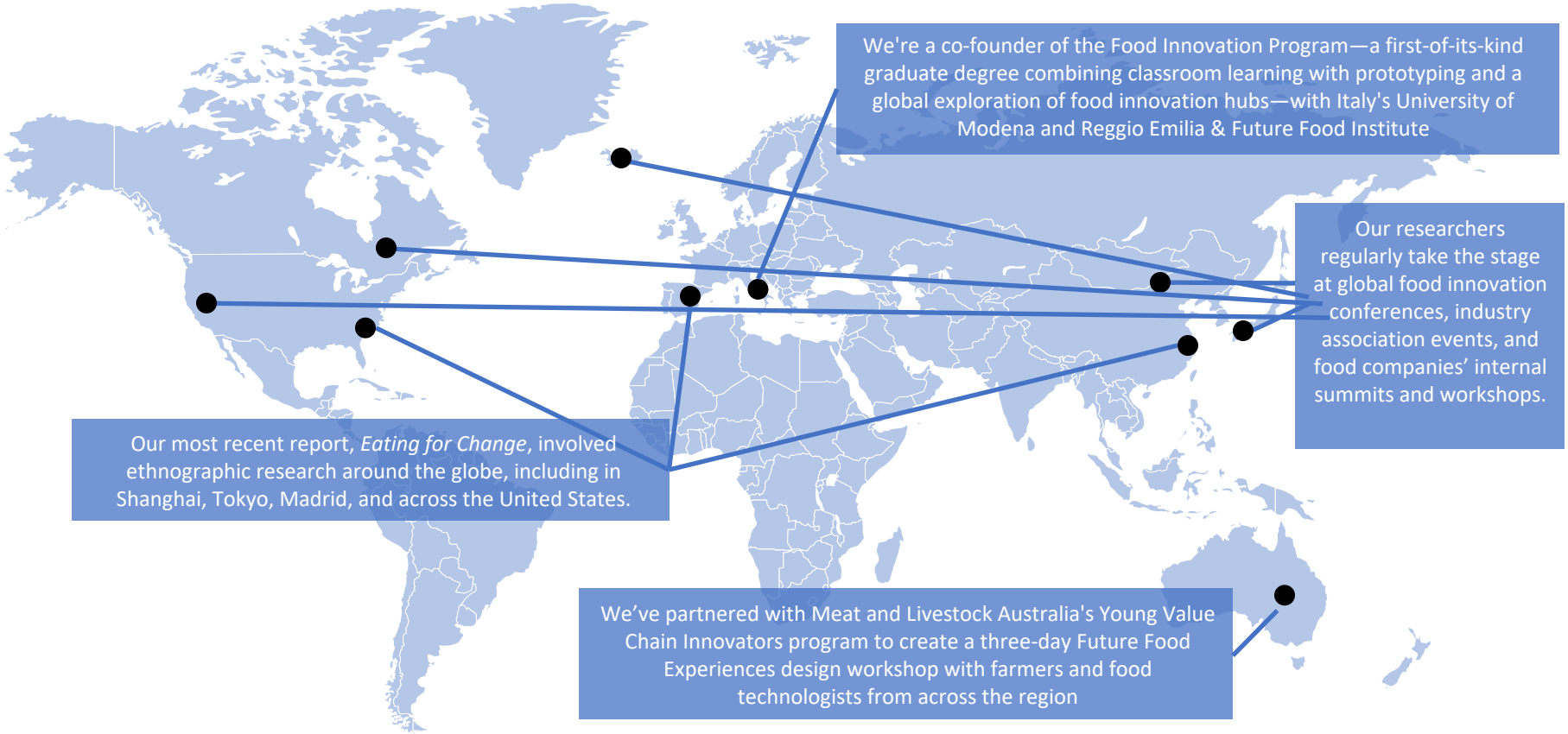
FOOD
FUTURES LAB | iftf.org

Mission of the Food Futures Lab

- Cultivate a community of change-makers who **use food as a medium for innovation.**
- Provide **tools for thinking about the future**.
- Take **a food systems view** of change.
- **Challenge assumptions and reveal new opportunities** to make a resilient, equitable, and delicious future of food.

FOOD FUTURES LAB | iftf.org

We have a global reach



We're a co-founder of the Food Innovation Program—a first-of-its-kind graduate degree combining classroom learning with prototyping and a global exploration of food innovation hubs—with Italy's University of Modena and Reggio Emilia & Future Food Institute

Our researchers regularly take the stage at global food innovation conferences, industry association events, and food companies' internal summits and workshops.

Our most recent report, *Eating for Change*, involved ethnographic research around the globe, including in Shanghai, Tokyo, Madrid, and across the United States.

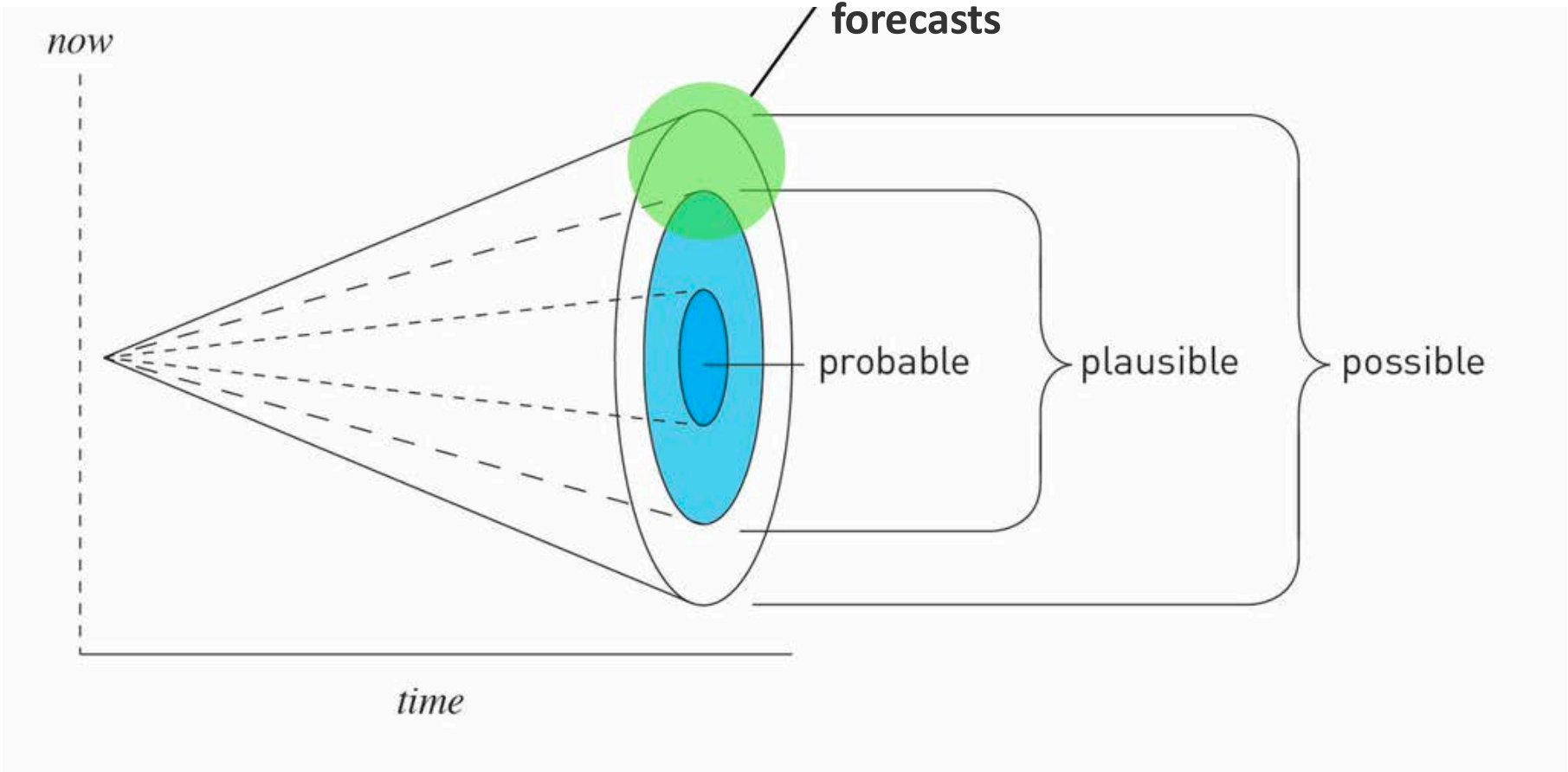
We've partnered with Meat and Livestock Australia's Young Value Chain Innovators program to create a three-day Future Food Experiences design workshop with farmers and food technologists from across the region

FOOD FUTURES LAB | iftf.org

We work across the food value chain

Foresight is the process of turning facts about the present into clear and actionable views of the future.

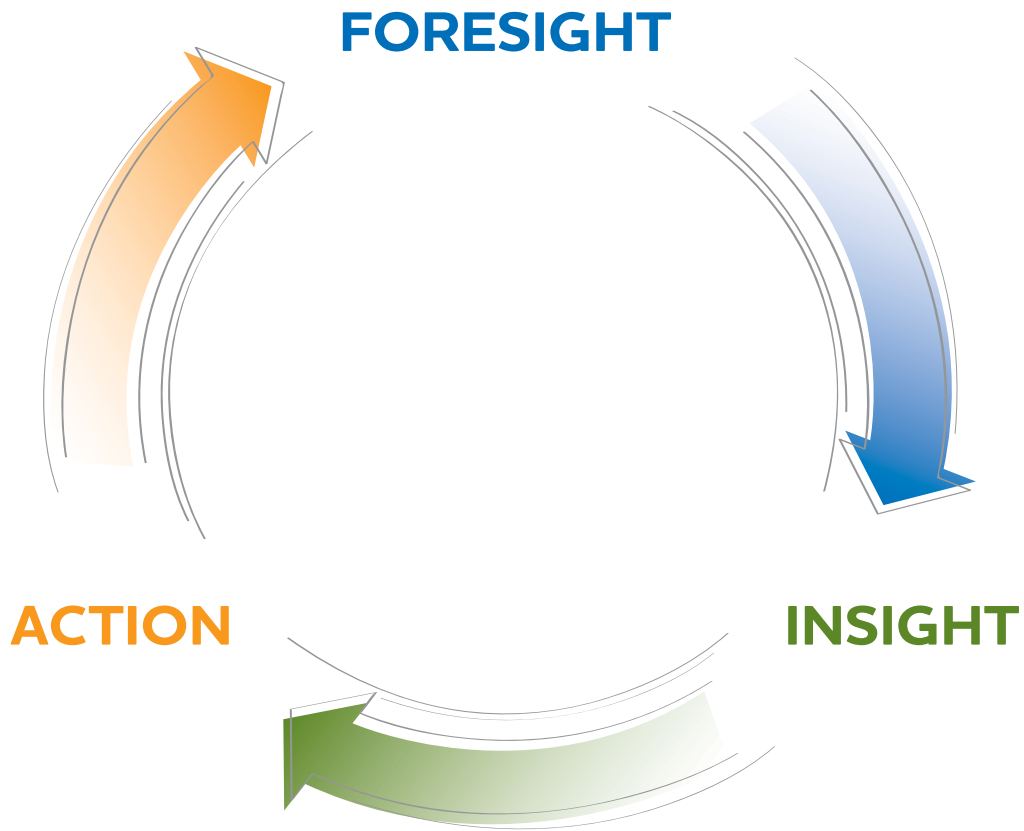
Cone of Possibility



Jamais Cascio
IFTF Distinguished Fellow

“We shape tomorrow through the choices we make today. Or to flip that around, we can make better decisions now if we consider the different ways in which these decisions may play out.”

IFTF's process



Thinking about the future is difficult.

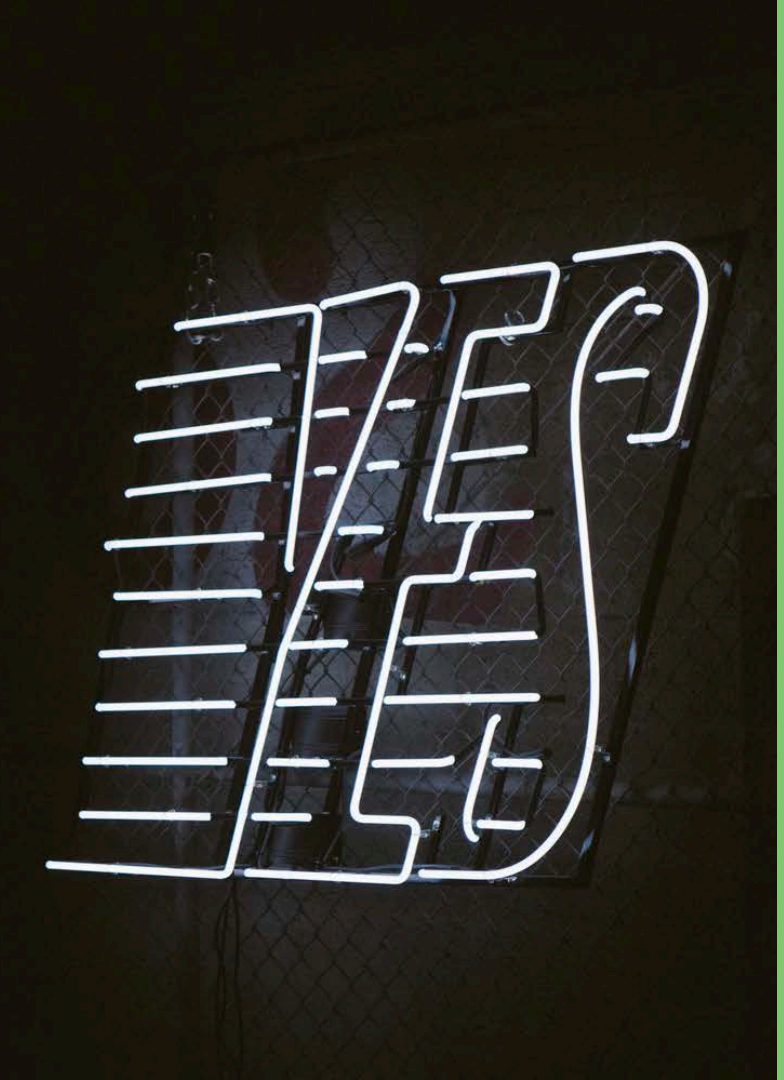
Really difficult.

Our brains are biased when we think about the future

- Projection Bias
- Confirmation Bias
- Authority Bias
- Past Experience Bias
- Optimism Bias
- Precision Bias
- Techno-Centric Bias

Projection Bias

- We have a tendency to project our current feelings, preferences, and attitudes into the future as though our future tastes will match our current ones.

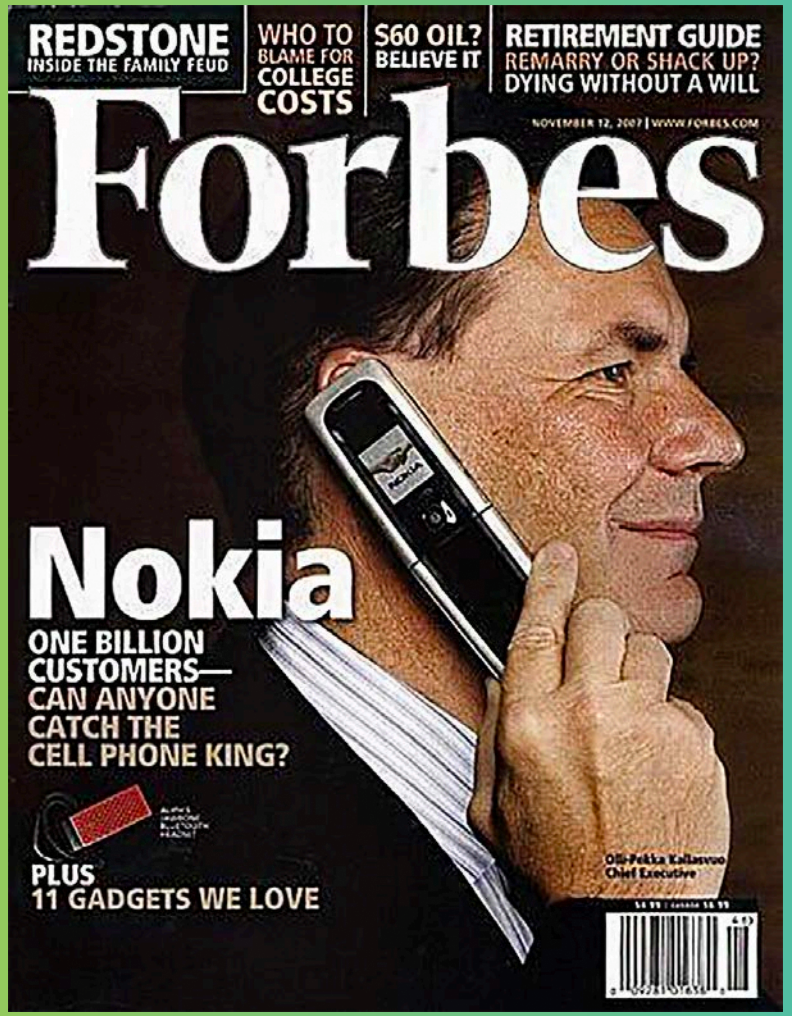


Confirmation Bias

- We have a tendency to “to search for, interpret, favor, and recall information in a way that confirms one's preexisting beliefs or hypotheses.”
- The effect of this bias is often strongest for emotional issues or deeply-held belief systems.

Authority Bias

- We tend to “attribute greater accuracy to the opinion of an authority figure (unrelated to its content) and be more influenced by that opinion.”
- The 1961 Milgram experiment at Yale University first established this effect.


REDSTONE
INSIDE THE FAMILY FEUD
WHO TO BLAME FOR COLLEGE COSTS
$60 OIL? BELIEVE IT
RETIREMENT GUIDE
REMARRY OR SHACK UP?
DYING WITHOUT A WILL
NOVEMBER 12, 2007 | WWW.FORBES.COM
Forbes
Nokia
ONE BILLION CUSTOMERS— CAN ANYONE CATCH THE CELL PHONE KING?
PLUS
11 GADGETS WE LOVE
Olli-Pekka Kallasvuo
Chief Executive

Past Experience Bias

- We often use our experiences from the past to imagine possible futures.
- This is usually a helpful mental trick, but greatly limits our ability to think creatively about different possibilities.

Optimism Bias

- We tend to “believe that we are less likely to experience a negative event.”
- This bias has been demonstrated across genders, ethnicities, and ages.

SCIENCE

Humans Are Bad at Predicting Futures That Don't Benefit Them

Unrealistic optimism makes people think bad things are less likely to happen to them than to others, and it hampers their decision-making.

CAROLINE BEATON NOV 2, 2017

"Psychology research indeed suggests that **the more desirable a future event is, the more likely people think it is.** […] Conversely, the more someone dreads or fears a potential outcome, the less likely they think it is to happen."

Precision Bias

- We tend to think that precision metrics are more accurate than imprecise numbers.
- This is also known as the numeracy bias.

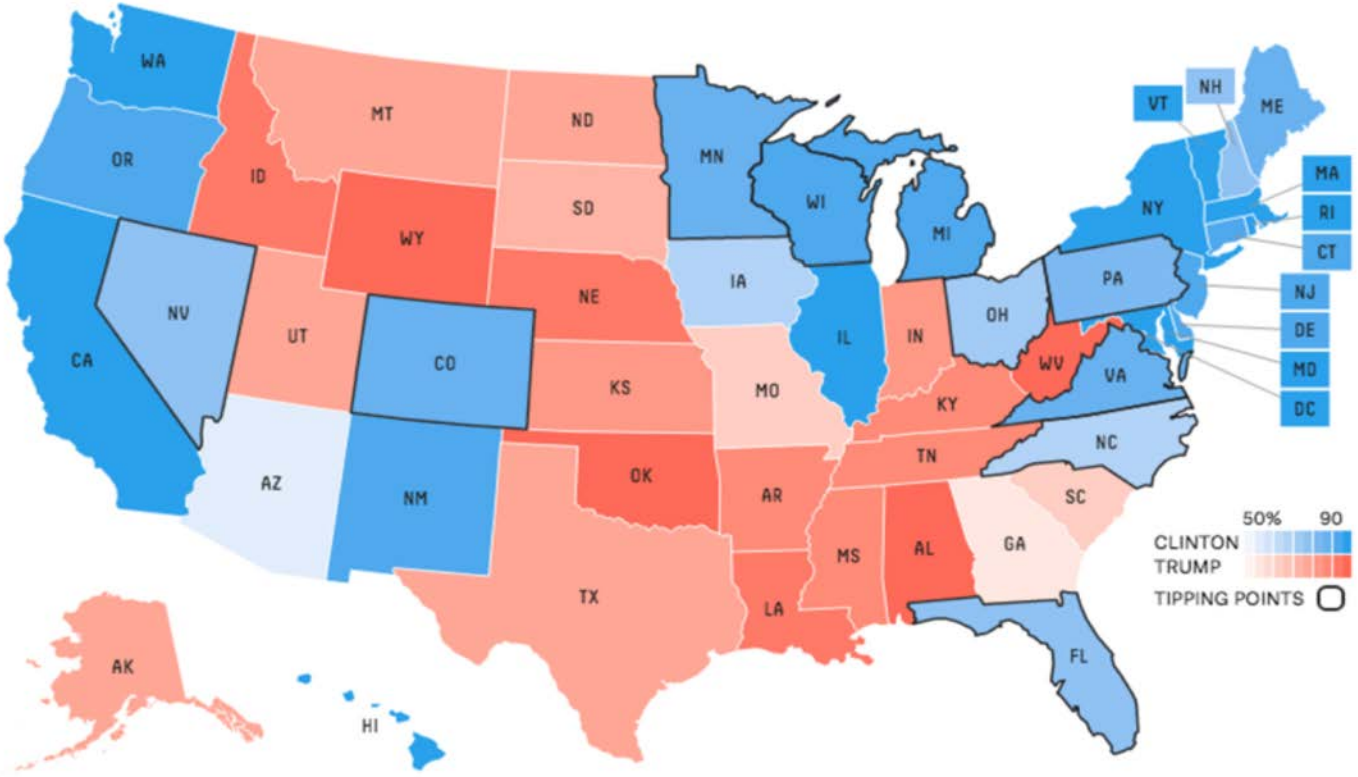
Chance of winning

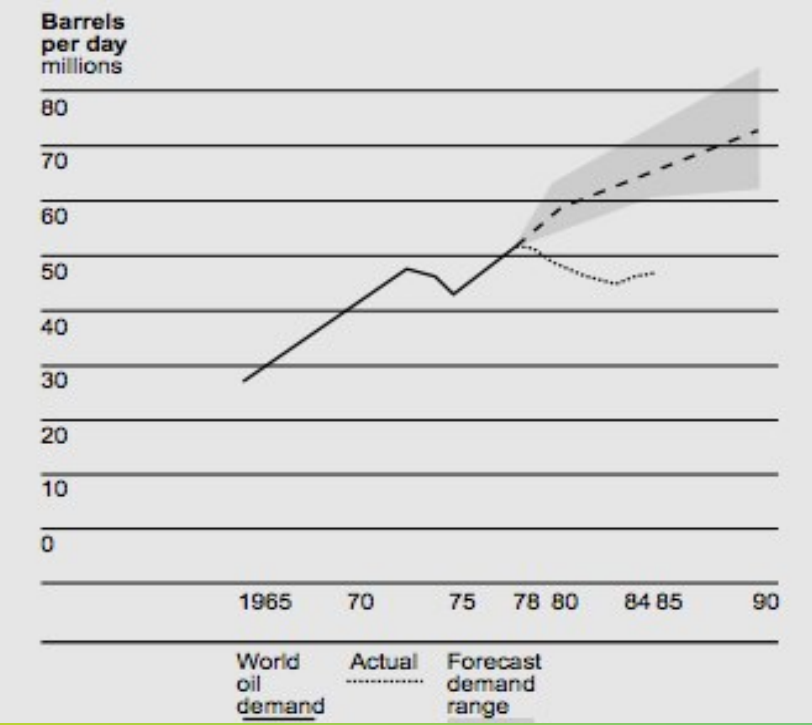
Hillary Clinton

84.6%

Donald Trump

15.4%





projected oil demand vs. actual demand, 1965 - 1990

"The better approach, I believe, **is to accept uncertainty, try to understand it, and make it part of our reasoning.**"

- Pierre Wack

From "Uncharted Waters Ahead" HBR, 1985.

Techno-Centric Bias

- It is easier for us to imagine new technology futures than it is for us to imagine new social futures.


--- CLOSER THAN WE THINK!
by Rodebaugh
TV INSTRUCTOR
TEST QUESTIONS
ELECTRONIC NOTEBOOK
© 1960 by The Chicago Tribune. 12-18

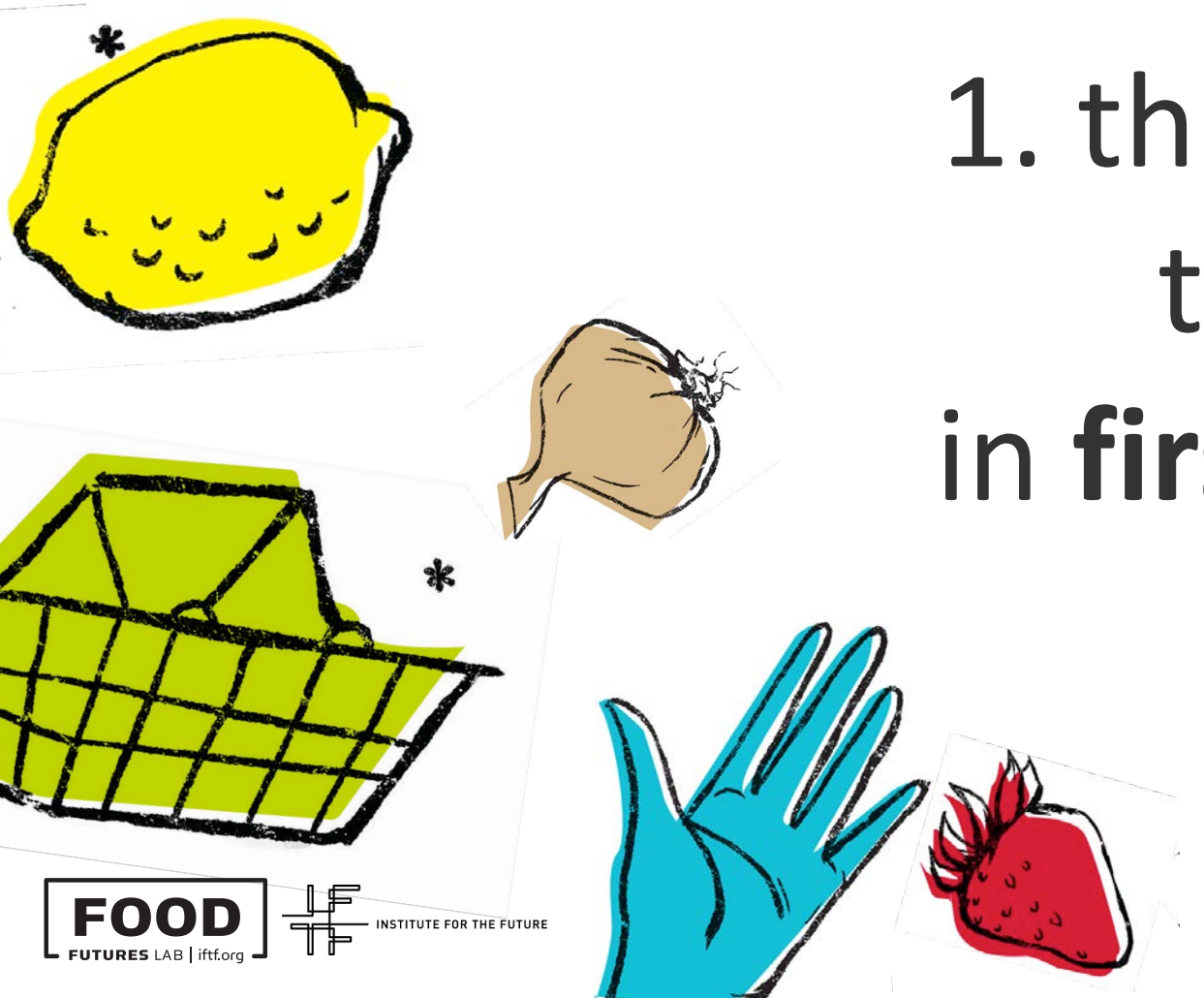
Five ways to think like a **food futurist**

FOOD FUTURES LAB | iftf.org

INSTITUTE FOR THE FUTURE

5 ways to think like a food futurist

1. Think about the future in first person
2. Scan and analyze signals of change
3. Combine signals to reveal unexpected possibilities
4. Draw out consequences of change
5. Tell the future as a story



1. think about the future in **first person**

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Jane McGonigal
IFTF Director of Games Research and Development

“To create something new, or make any kind of change, you first have to imagine how things can be different… the future is a place where everything can be different.”

The neuroscience of thinking about the future

Problem: Our brains aren't wired for thinking about ourselves in the future.

The future you is a stranger.

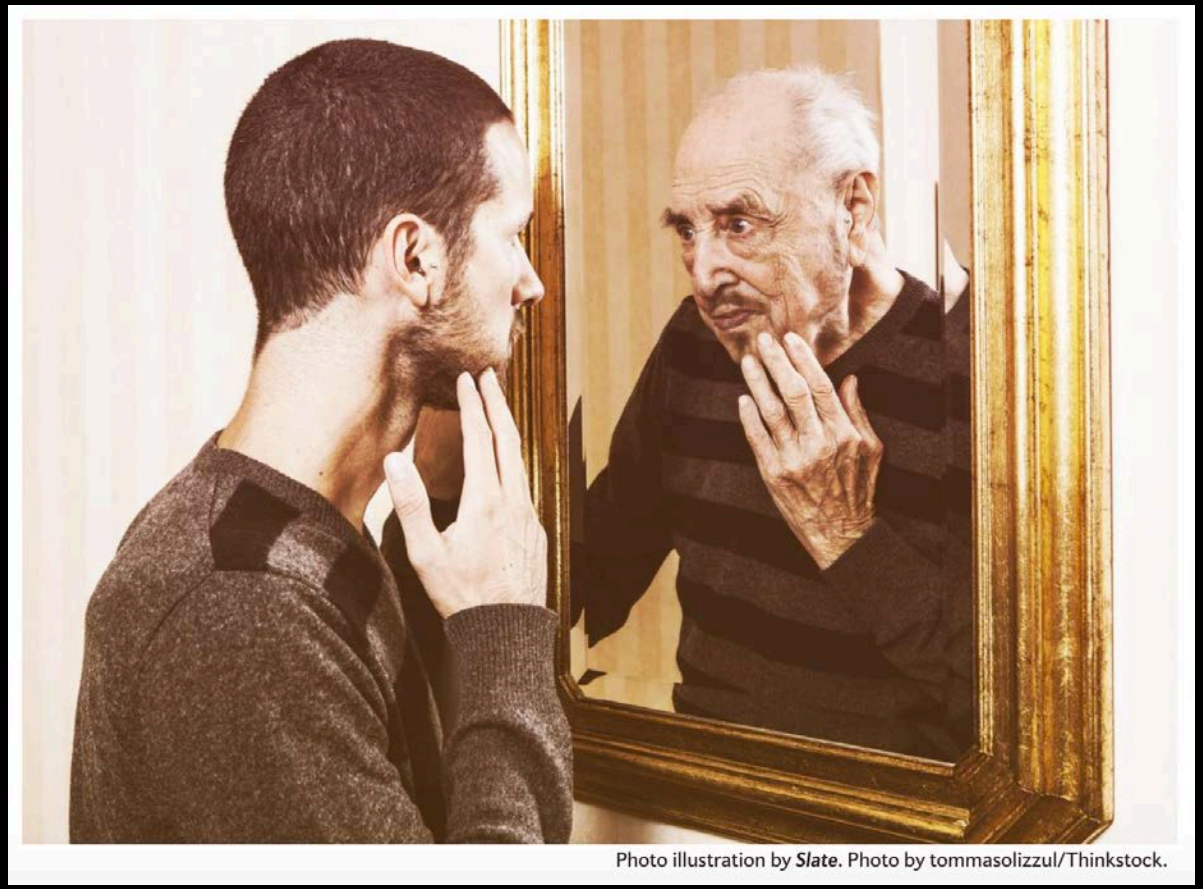

Photo illustration by ***Slate***. Photo by tommasolizzul/Thinkstock.

The neuroscience of thinking about the future

- Typically, when you think about yourself, a region of the brain known as the medial prefrontal cortex, or MPFC, powers up.
- When you think about other people, it powers down.
- And if you feel like you don't have *anything* in common with the people you're thinking about? The MPFC activates even less.

The medial prefrontal cortex

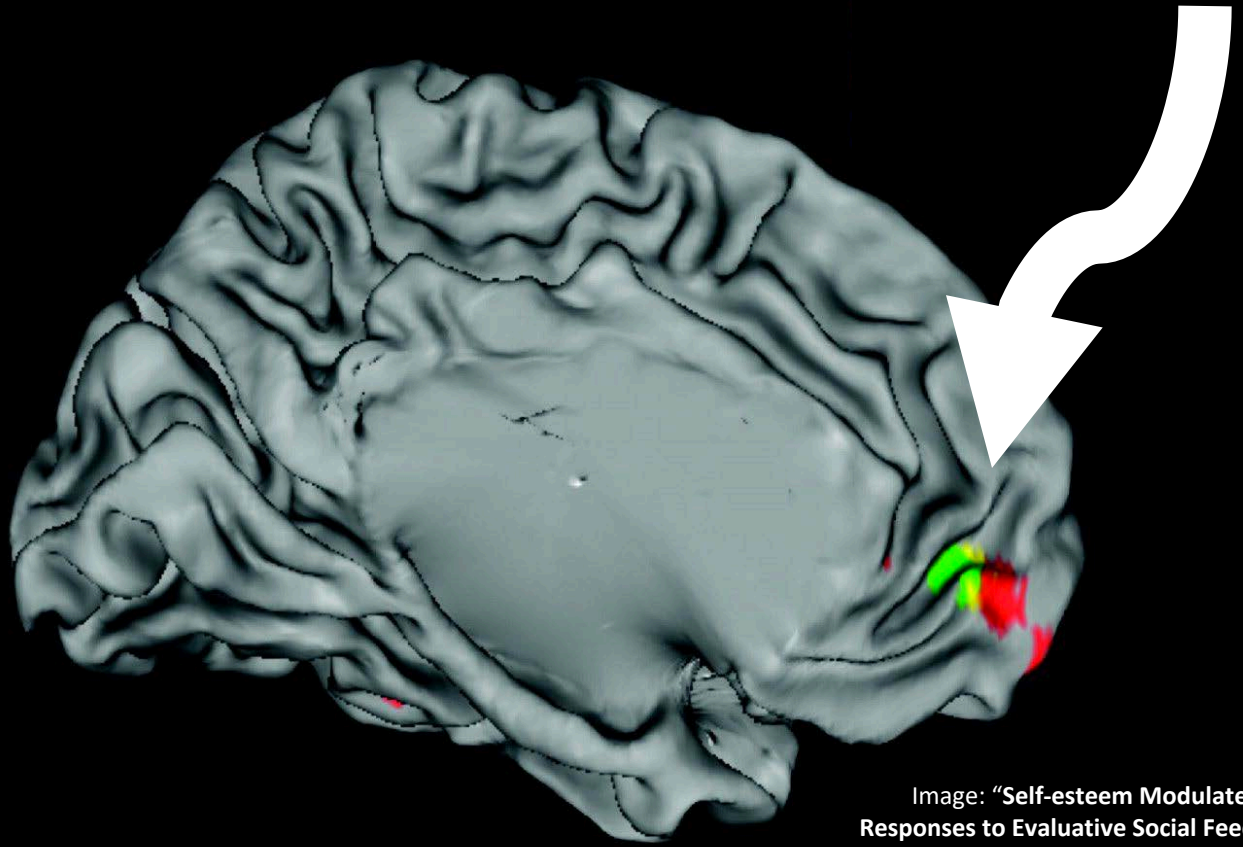

Image: "**Self-esteem Modulates Medial Prefrontal Cortical Responses to Evaluative Social Feedback.**" Cereb Cortex (2010) 20 (12): 3005-3013.

The neuroscience of thinking about the future

- The further out in time you try to imagine your own life, the less activation you show in the MPFC.
- Your brain acts as if your future self is someone you don't know very well and, frankly, someone you don't care about.
- Studies have shown that you can close this gap in the *short-term* by doing one thing: **think about the future in first person.**

a future in facts

If we maintain a business-as-usual approach, there will be a 40% gap between freshwater supply and demand in 2030.

Source: 2030 Water Resources Group

a first-person future

Imagine it’s 2030.
How old are you?
Where are you?
Now imagine you’re thirsty, but have no water to drink. What **one word** describes how you feel?

The neuroscience of thinking about the future

- Thinking about the future in first person makes your brain work harder to imagine that future – to imagine that things could be different.
- This boosts creativity and imagination.

- **Your Turn!**
  - How old will you be in 2029? Where will you be living? With whom? What will you be doing?

2. scan & analyze **signals of change**

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Wendell Bell
Professor Emeritus at Yale University in *Foundations of Futures Studies*

"There are no future facts."

There are TRENDS:
patterns of change from which
you can extrapolate with confidence

Institute for the Future
focuses on DISRUPTIONS:
breaks in the patterns of change

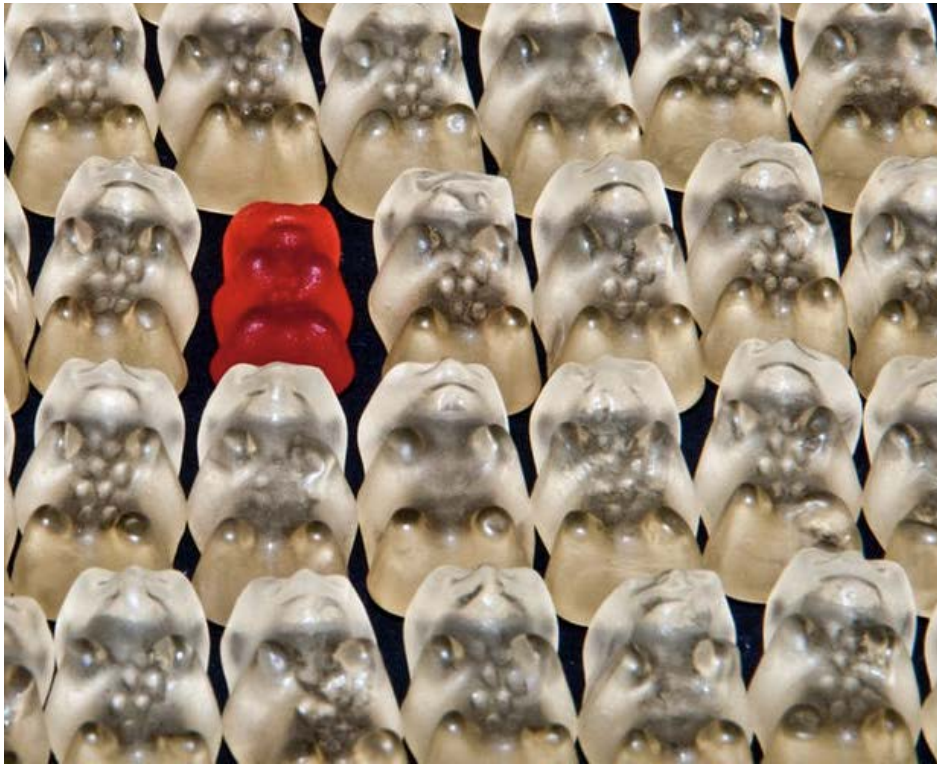
We focus on the intersections of disruptions

William Gibson
Science fiction writer

“The future is already here — it's just not very evenly distributed.”

identify disruptions by looking for signals

- Signal of change: A small or local innovation with the potential to scale in size, impact, and geographic distribution
- Signals are data points for the future



analyzing a signal of change

- Does it suggest a change of scale?
- Does it spark a redefinition of existing boundaries?
- Does it have the potential to spread virally?
- Does it shift worldviews for a significant group of people?
- Does it point to a strong shift in identity?
- Does it challenge traditional authority?

Teaching computers to find risky farms

WHAT

Concentrated Animal Feeding Operations, as defined by the US Department of Agriculture, are animal feeding operations housing 1,000 or more animals for at least 45 days per year. No one knows how many CAFOs exist. We do know they place an extensive burden on the environment. Two Stanford University professors used machine learning to analyze USDA satellite imagery and identify CAFOs in North Carolina. They found 15% more poultry CAFOs than manual surveys had mapped.

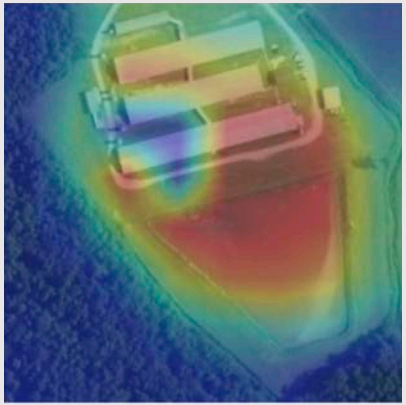
SO WHAT

An accurate and efficient map of industrial animal feeding operations will help regulators assess each farm's environmental risk. As climate-induced extreme weather events become more frequent, these risk assessments will be essential in ensuring a safer and more environmentally-friendly future of food.

Swine

Original Image

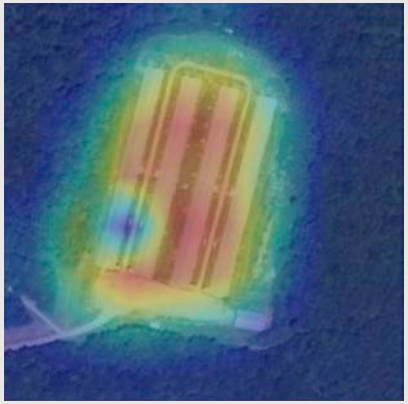
Modeled Image



Poultry

Original Image

Modeled Image



National Agriculture Imagery Program/USDA

Creating positive spillover effects from simulations

WHAT

Researchers at Drexel University have created a brain training game called DietDash during which players navigate a grocery store aisles and try to avoid sugary food. Overweight players lose an average of 3.1% of their body weight after eight weeks of game play.

SO WHAT

Simulations and games can be used to impact real-world behavior. As more of our foodscapes are modeled and advanced simulations are run by companies, researchers, and eaters, we'll have real-world spillover effects that help create our preferred futures.

Evan Forman, Drexel University

Spreading in-store surveillance systems

WHAT

Kroger and Walmart are installing cameras throughout select stores. Kroger has embedded discreet cameras with facial recognition software in price displays on shelves to identify the age and gender of shoppers. Walmart has high-resolution cameras to monitor their produce before it becomes overly ripe or bruised.

SO WHAT

Modeling impacts of food systems and climate will involve not only agricultural production but also food retail environments. As retail outlets become digitized and imbued with ambient monitoring systems, we'll have larger and larger datasets about food purchasing to use in our simulations.

The Associated Press

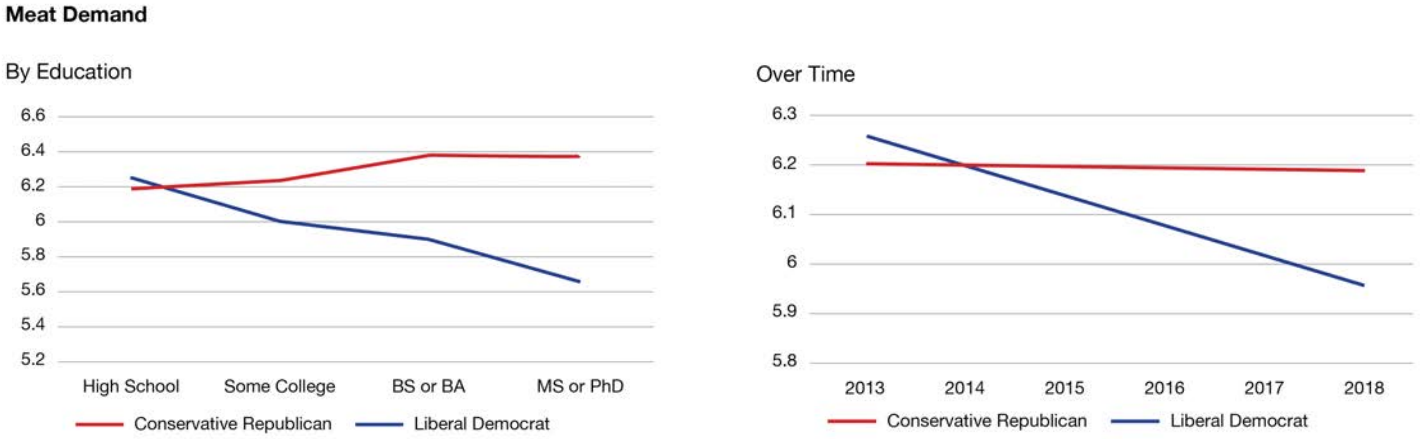
Growing political polarization of meat

WHAT

Food and Agriculture economist Jayson Lusk's longitudinal Food Demand Survey has found that in America, beef demand is higher for conservative Republicans than liberal Democrats and that polarization is increasing over time.

SO WHAT

Understanding the identity politics behind eating meat is going to be the most essential component of designing any behavior change campaign. Increased polarization may force more companies into needing to take a stand on the issue.



Jayson Lusk

Better soil makes better snacks

WHAT

Varietal Crop Crackers are designed around supporting crop rotation, an age-old technique for maintaining soil health. For one of their cracker flavors, Dark Northern spring wheat, Huntsman millet, and Bravo flax are used in the recipe to create demand for sets of crops that make up a crop rotation. These crops work synergistically to promote healthy and productive soils while sequestering atmospheric carbon.

SO WHAT

Varietal is bringing superior flavor to well-established, simple snack categories to get the mass market to support regenerative agriculture. One of the ways they do this is by building a conversation around the idea that food that promotes soil health not only benefits the planet, but benefits taste buds. Building market demand can support farmers to transition current monocropped acreage into more diverse mixes to promote soil health.

Alpha Food Labs

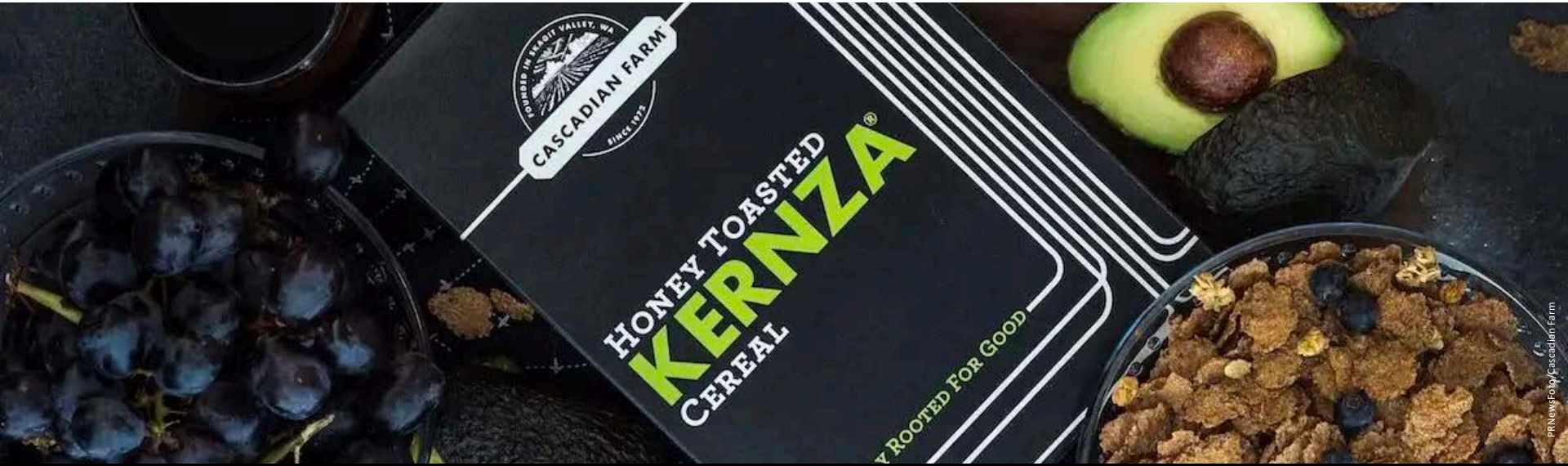
Climate-resilient food hampered by climate disruptions

WHAT

General Mills' Cascadian Farms was set to be the first major brand to launch a product with the soil-enhancing perennial grain, Kernza. However, bad weather ruined most of this year's crop. They instead launched a very limited release of Honey Toasted Kernza along with a crowdfunding campaign to support further research by The Land Institute.

SO WHAT

Efforts to implement climate-friendly agriculture may be thwarted by climate change along the way. Looking for innovative funding models can help de-risk the transition for CPG companies to establish an adequate supply and scale up ingredients that sequester carbon and improve soil health.



PRNewsFoto/Cascadian Farm

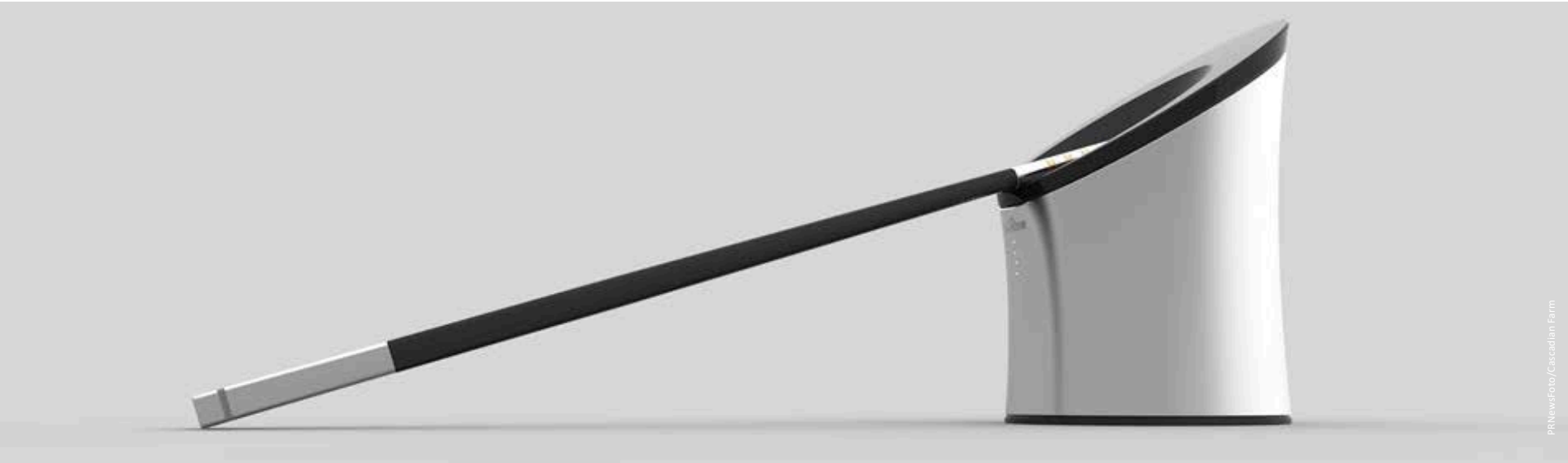
It’s your turn!

- I’m going to show a few signals of change.
- I’ll tell you the ‘what’ & then I want to hear how you make sense of what the signal might mean for the future (the ‘so what’).

WHAT

SO WHAT

Baidu launches smart chopsticks



PRNewsFoto/Cascadian Farm

WHAT

SO WHAT

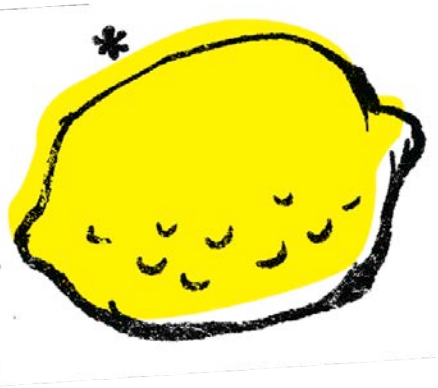
Bettinger Lab designs ingestible sensors

WHAT

SO WHAT

Campbell's Customer Service defends commercial with gay dads

Image: Huffington Post



3. combine signals to reveal **unexpected possibilities**

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Jim Dator
Director of Hawaii Research
Center for Futures Studies,
University of Hawaii

“Any useful statement about the future should at first seem ridiculous.”

future food experiences

designing good food for the 21st century

The future offers opportunities to invent new rituals, create new markets, pursue new goals, and even rewrite the rules that govern our food system. This map gives 12 provocations for designing food futures across three zones of innovation—human, food, and context—with signals from today that bring them to life. Combining provocations across three zones will help you uncover unexpected possibilities for food experiences in the coming decade.

human zone of innovation

PROGRAMMABLE PHYSIOLOGY

Toward personalized approaches to nutrition & health

Commercializing epigenetic sequencing tools

In 2016, Cambridge Epigenetix raised $21 million to develop epigenetic sequencing tools. If the regulatory and privacy challenges of direct-to-consumer genetics tools are any indication, these are likely to face hurdles in the coming decade.

TechCrunch, Cambridge Epigenetix

Programming human development with diet

A study of women in The Gambia found maternal nutrition and body mass index at conception predicts infants' epigenetic patterns.

Nature; Image source: Rebecca Cheney

Designing synthetic epigenetic interactions

Duke University bioengineers are developing synthetic epigenetics, the design of artificial epigenetic pathways to regulate gene expression for intended outcomes. The researchers suggest that the CRISPR/Cas9 genome editing tool could allow for targeted changes at multiple sites simultaneously.

Clinical Epigenetics; Image source: Wikimedia

AUGMENTED SENSORIUM

Toward a neuroscience of evolving sensory perception

Optimizing flavor perception through neurogastronomy

In 2015, chefs teamed with food technologists, neuroscientists, and physicians to create a meal that would taste good to people experiencing taste and smell alterations caused by chemotherapy. Such efforts could make for more intense or entirely new flavors even for people with their full sensory capacity.

International Society of Neurogastronomy

Training the senses with video games

Swedish researchers are combining brain-training video games with smells to improve the sense of smell and help change food behaviors associated with flavor perception and memory, such as managing cravings and encouraging children to try new foods.

Malmö University; Our Unique Sense of Smell research group; Image source: Flickr User Korbin

Transmitting senses directly to the brain

DARPA is developing an implantable neural interface that will augment human senses by communicating between the brain's electrochemical language and digital bits and bytes to transmit high-resolution audiovisual information—and potentially smells and tastes—directly to the brain.

DARPA, The Next Web, Newsweek

WEARABLE DATA

Toward the body as landscape for food information & expression

Informing with temporary body art

The Soba Allergy Tattoo Checker, a temporary tattoo featuring Japanese artistic motifs, enables tourists in Japan to check for a buckwheat allergy before eating soba dishes, pointing to a future in which body art embedded with epidermal electronic sensing and transmitting capabilities enable insights at the moment they're needed.

J. Walter Thompson; Image source: epson tamago

Counting calories with intelligent wearables

AutoDietary, a device developed by engineers in the U.S. and China, uses a microphone worn near an eater's neck, a library of chewing sounds, and an app to algorithmically detect the food its wearer chews with about 85% accuracy and estimate calories consumed.

IEEE Sensors Journal

Visualizing personal data with conductive materials

The EighthSense jacket is made with conductive fabric that changes color based on electrical brain activity transmitted from an EEG reader attached

food zone of innovation

COGNIFIED FOOD

Toward artificial intelligence for every food designer

Analyzing plant development with pragmatic AI

Tel Aviv-based Prospera uses computer vision and deep learning algorithms to help farmers analyze plant development and optimize water and nutrients at the scale of a small field.

agweb.com

Building an ontology for food informatics

The uc_Eating ontology, developed by Dr. Matthew Lange at UC Davis, seeks to create a food systems-wide, standardized ontology for health, nutrition, food science, agricultural, and environmental data.

github.com

Training robotic cooks with AI

Zoe McCarthy, a researcher at UC Berkeley, is using a combination of virtual reality and motion capture technologies to train robots to complete human tasks. With the addition of AI, these systems will be programmed for human-like reflexes. Zoe suggests the first application could be for training robots as cooks in homes, factories, or restaurants.

ENGINEERED ECOSYSTEMS

Toward closed-loop food production systems

Building bioreactors at scale

University of Bath's Marianne Ellis is creating a program to understand the fundamental biological requirements of scaling cultured meat to enable modeling of the energy inputs and outputs, safety, and costs of cellular agriculture—calling for a multidisciplinary engineering approach.

newhamwet.org; Image source: flickr user mjanicki

Growing a generation of indoor farmers

Square Roots trains young entrepreneurs to farm using climate-controlled hydroponic vertical farms the size of a shipping container that can produce the equivalent yield of two acres of land.

squarerootsgrow.com

Simulating effects of variables on agriculture

The Agricultural Production Systems sIMulator (APSIM) models effects of variables such as soil, climate, and management decisions for agriculture and was used at a 2016 conference in Pakistan to understand how to reduce deforestation and pollution while increasing small farmers' incomes.

bnwcordec.com

SCALABLE FOOD JUSTICE

Toward anchor institutions as hubs of food system reform

Implementing policies and infrastructure to scale regional food

New York City overhauled procurement policies, pledging to buy more local food for the 250 million meals it serves annually. A planned $20 million distribution facility nearby will reduce bottlenecks between farmers and city eaters to help achieve the city's goals.

civileats.com

Tapping smallholder farms to feed schools

A 2009 Brazilian law requires that at least 30% of the budget for its 45 million daily school meals be spent on produce from smallholder farmers. This not only guarantees family farmers and cooperatives a local market but also helps expand land rights.

nature.com; Image source: sweetgreen

Farming for the city and an education

context zone of innovation

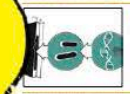
FOOD INSTABILITY

Toward innovation & improvisation for global food security

Titling land on the blockchain

BitFury is partnering with the Republic of Georgia to pilot a project to securely and transparently record land titles on the blockchain. An estimated $20 trillion in untitled land worldwide includes vast tracts of arable land that's the foundation of the global food web.

Forbes



Ensuring food safety with microbes

The Arsenic Biosensor Collaboration at Cambridge University is developing an inexpensive, handheld microbial biosensor that detects arsenic in water—just one of many devices likely to empower individuals to test their own food and water.

arsenicbiosensor.org

Improvising urban food by neighborhood

The Hood Health Handbook helps people living with the unique challenges facing low-income people of color in large U.S. cities to find and make healthy food while sustaining their livelihoods and identity.

The Source

BRANDED BIOZONES

Toward new models to elevate food provenance

Developing a local microbial terroir

A study by Hungarian and Chinese biologists entitled "How to assemble a beneficial microbiome in three easy steps" points to an emerging library of theoretical and practical frameworks for cultivating and potentially branding local microbial terroir.

Ecology Letters Journal; Image source: Modern Farmer

Scaling farm-to-fork experiences

Can you replicate and brand the special relationships that chefs have begun to create with local farmers to produce farm-to-fork experiences at scale? Tender Greens is a chain of casual dining restaurants that's attempting to do just that with restaurants and farmers in four West Coast regions.

Tender Greens

Connecting eaters to places digitally

Even established brands are looking for ways to connect eaters to their local biozones. In 2016, McDonald's UK launched a virtual reality campaign, Follow our Foodsteps, to highlight young British and Irish farmers producing food for its restaurants.

Huffington Post

AUTOMATED RESTAURANTS & RETAIL

Toward self-managing food services

Automating fast food production

Momentum Machines is developing a first-of-its-kind robotic restaurant in San Francisco. The machines can slice ingredients, grill patties, and assemble up to 400 burgers per hour.

technician.io

Automating urban food trucks

In a project called Autonom, a group of artists in Toronto conceptually prototyped the autonomous food cart that makes its daily circuit, delivering consistent, high-quality food to customers along its route without much human help.

Sophia Fesch

Automating grocery stores

Oasis 24seven in Des Moines, Iowa, is piloting a 260-

4. draw out **consequences of change**

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Kathi Vian
IFTF Distinguished Fellow

> “We don’t assume there’s one future reality to be discovered, but rather a field of possibilities, and [as futurists], we help people exercise their imagination muscles to widen that field of possibilities.”

drawing out consequences of change

- As we move from signals and possibilities into more complex forecasts about possible futures, chains of “if, then” statements can help build a useful picture about the future.
- Explore consequences across a variety of domains: policy, environment, markets, communities, families

draw out consequences

Ammonia fertilizer plants shut down for summer maintenance and stay closed longer than normal due to high natural gas prices

natural gases aren't split into NH3 and CO_2

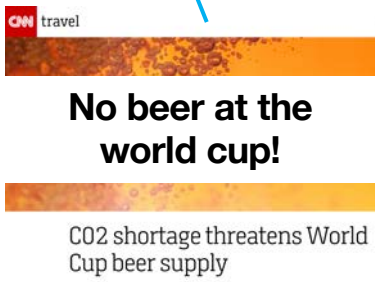
CO_2 isn't captured and liquified

CO_2 shortage across Europe

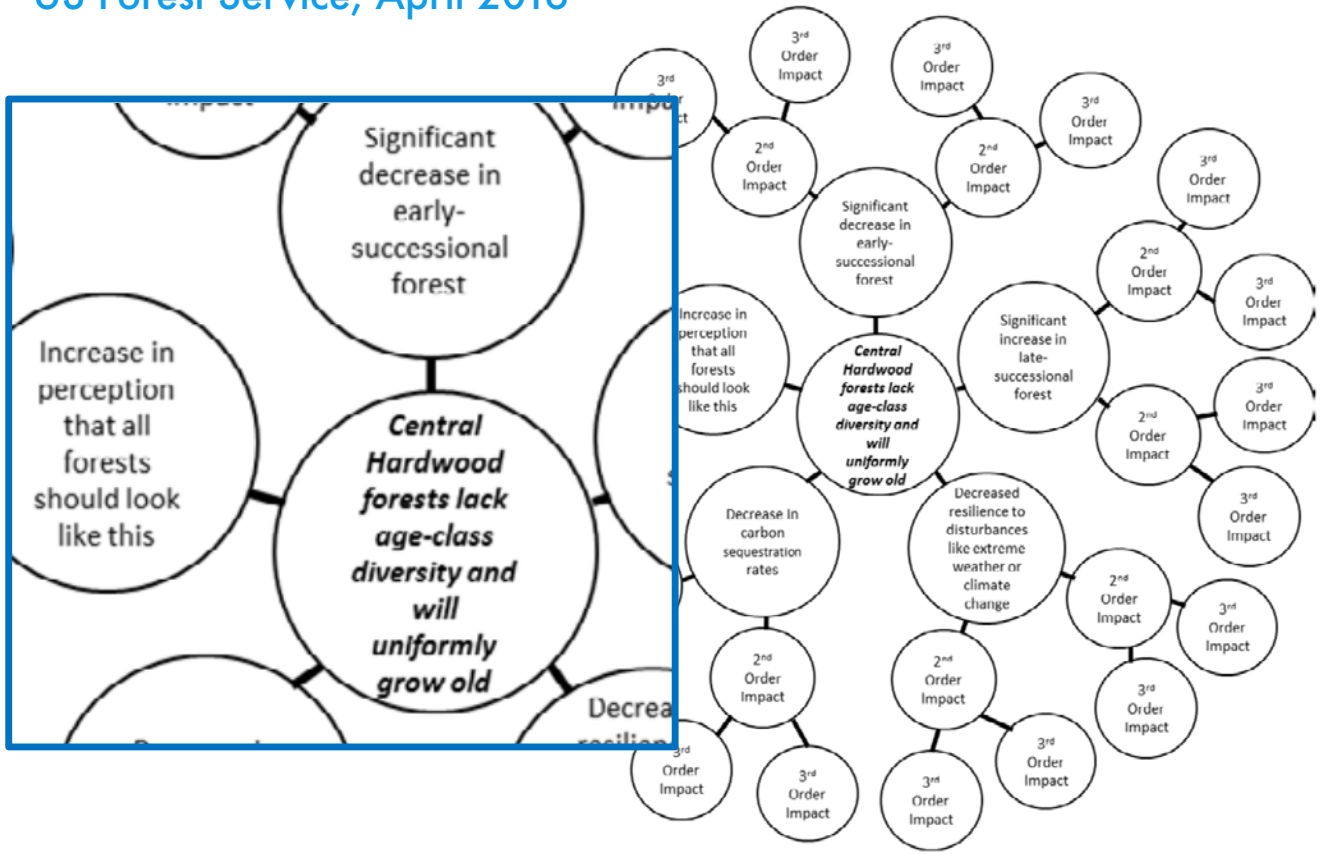
Animals can't be stunned for slaughter

Packaged foods can't be preserved

Beverages can't be carbonated



Draw Out Consequences:
US Forest Service, April 2016

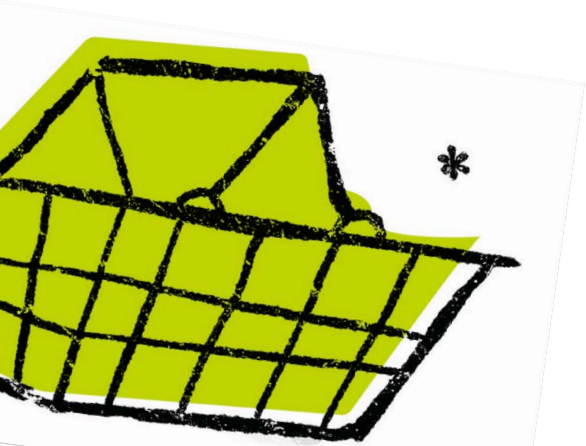


1st order Decreased resilience to many types of future forest disturbance

2nd order More uncertainty for industry re: timber supply (declining forest-based industry)

3rd order Declining quality of local school districts where mills are located because of reduced tax revenues

5. tell the future **as a story**



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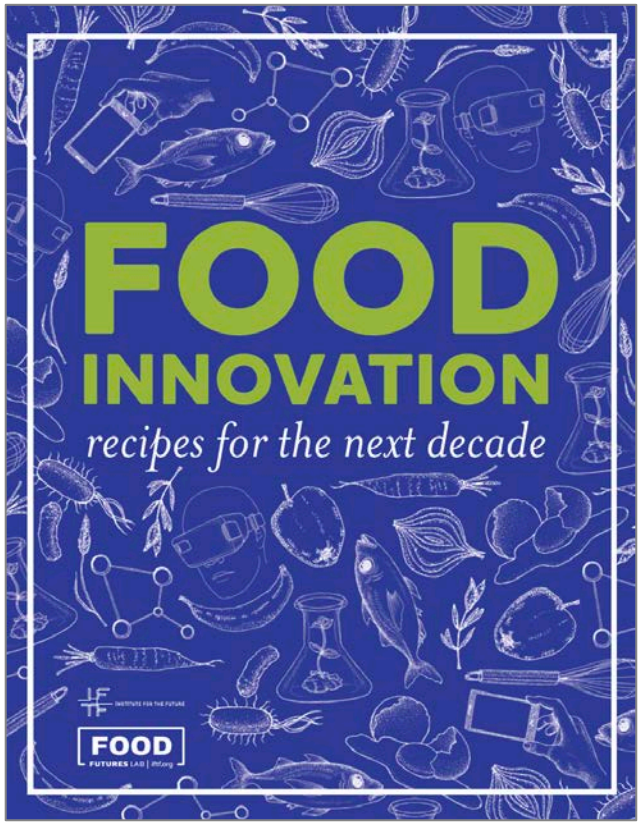
Bob Johansen
IFTF Distinguished Fellow

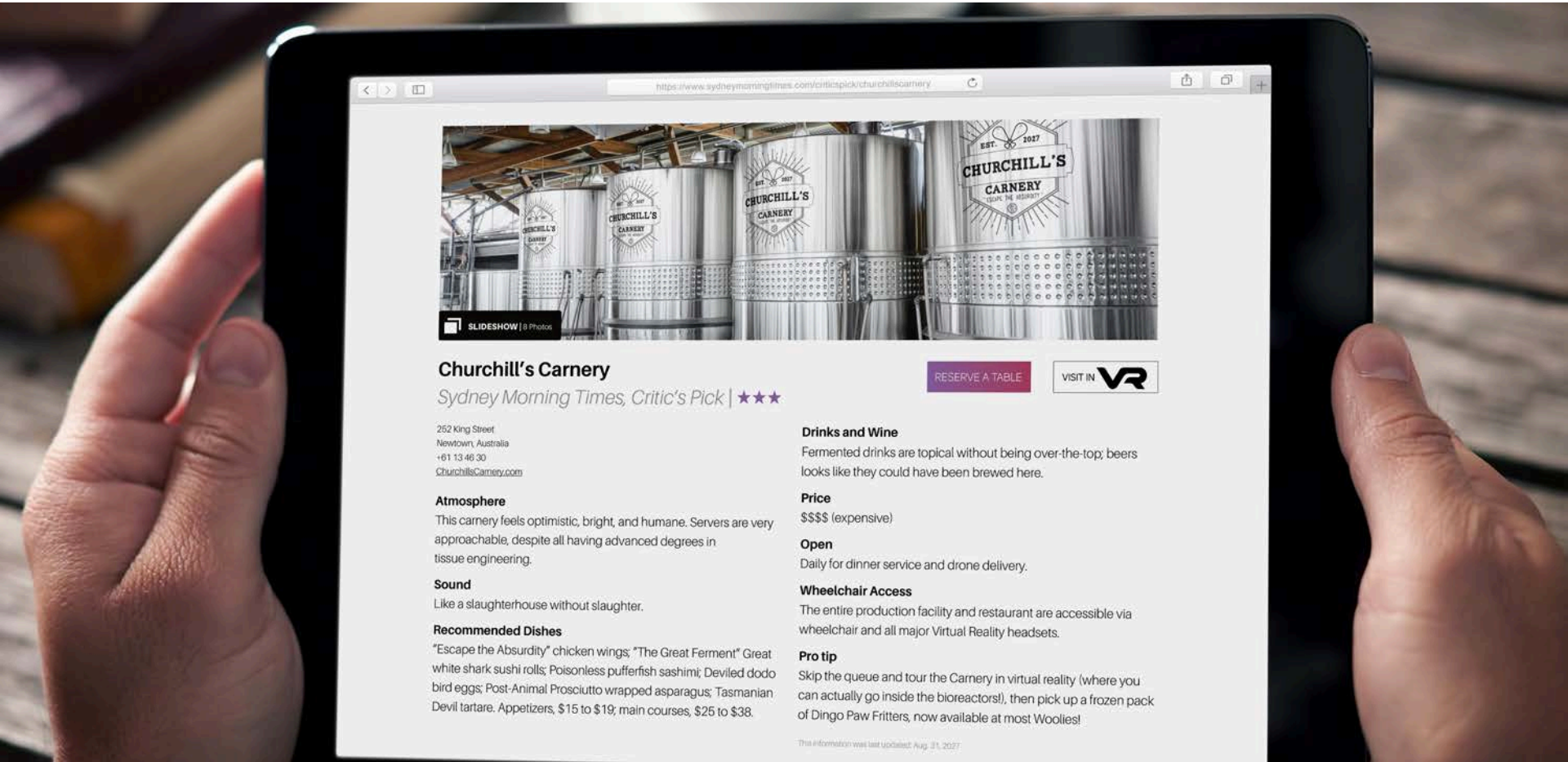
“The story is the biggest motivator for change. A good forecast is nothing but a story from the future that provokes insight. And then once you have the insight embodied, you need a story that carries that insight to others. Stories create clarity.”

we tell forecasts as narrative stories



as visual artifacts from the future

as visual artifacts from the future



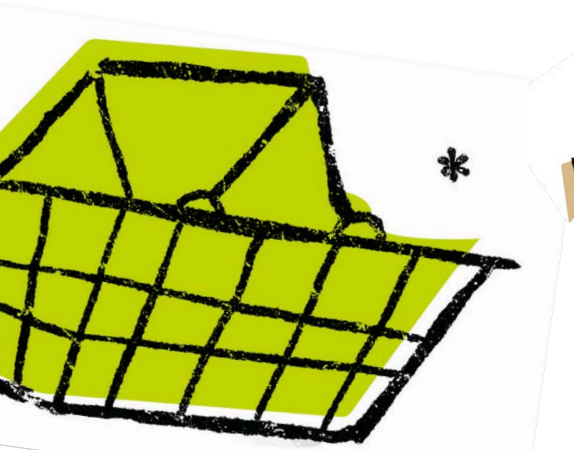
and as Edible Futures

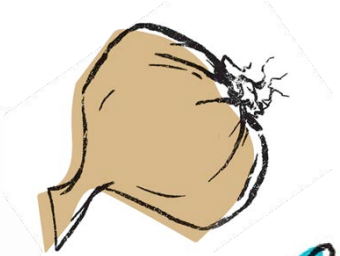
and as Edible Futures

5 ways to think like a food futurist

1. Think about the future in first person
2. Scan and analyze signals of change
3. Combine signals to reveal unexpected possibilities
4. Draw out consequences of change
5. Tell the future as a story

Keep building your **foresight mindset**





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