



Introduction

Merging art and design in foresight: Making sense of *Emerge*

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ABSTRACT

Emerge: Artists and Scientists Redesign the Future, hosted by Arizona State University in 2012, united artists, engineers, bioscientists, social scientists, storytellers and designers to build, draw, write and play with the future. Over three days, and in nine different workshops, participants created games, products, monuments, images and stories in an effort to reveal the texture and feel of emergent futures. The *Emerge* workshops drew from a burgeoning field of future-oriented methods that infuse art, design and information technology into the development and delivery of scenarios and design fictions – a constellation of practices I call “mediated scenarios”. This introduction and the articles in this special issue, work to make sense of these emerging practices, and of *Emerge* itself, in order to develop appreciation of this rising genre. In doing so, the papers in this issue ask critical questions about the nature of these novel forms of foresight practice and investigate the trade-offs and potencies involved in the workings of mediated scenarios.
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1. The ‘F’ word

“Fiction has to be plausible, reality doesn’t.” Steward Brand

“Dream intensively.” Michael Crow

“There is something very personal and human about wonderment.” – Bruce Sterling

“Objects are carriers of ideas and emotions.” Sherry Turkle

“It’s not about the world of design. It’s about designing the world.” Bruce Mau

“I’ve started referring to the future as the ‘F word’.” Neal Stephenson

These quotes were featured at the *Emerge: Redesigning the Future* exhibition, presented at the ASU Art Museum in summer 2012 and featuring discoveries and creations generated during *Emerge: Artists and Scientists Redesign the Future*. This event, hosted by Arizona State University, united artists, engineers, bioscientists, social scientists, storytellers and designers to build, draw, write and play with the future. Over three days, and in nine different workshops, participants created games, products, monuments, images and stories in an effort to reveal the texture and feel of emergent futures. These experiments in future thinking aimed to prompt ethical reflection, asking: “In what directions are science and technology heading? What kinds of societies, cities, homes, even people will they lead to? And, most important, is that what we – the people – want?” The *Emerge* event kicked off with nine presentations about emerging technologies such as nanotechnology and robotics that then served as fodder for nine 1.5-day workshops, in which participants used future-oriented methods to consider the implications of such research.

The *Emerge* workshops drew from a burgeoning field of future-oriented methods that infuse art, design and information technology into the development and delivery of scenarios and design fictions – a constellation of practices I call “mediated

scenarios". This introduction and the articles in this special issue, work to make sense of these emerging practices, and of *Emerge* itself, in order to develop appreciation of this rising genre. In doing so, the papers in this issue ask critical questions about the nature of these novel forms of foresight practice and investigate the trade-offs and potencies involved in the workings of mediated scenarios.

The novel methods deployed during *Emerge* draw on the narrative strength of scenarios but 'mediate' the scenarios by, for instance, visualization techniques, simulation models, material prototypes, gaming architectures, or facilitated experiences. The *Emerge* workshops, designed as social science experiments, led to presentations on the third day of *Emerge* to a large public audience. In this Saturday event workshop report-outs were complemented by keynote speeches by world-class future-oriented thinkers: Stewart Brand (*The Whole Earth Discipline*), Bruce Sterling (*The Difference Engine, Beyond the Beyond*), Sherry Turkle (*Alone Together: Why We Expect More from Technology and Less from Each Other*), Bruce Mau (*Incomplete Manifesto for Growth, Massive Change Network*), Neal Stephenson (*Snow Crash, The Diamond Age, Reamde*) and ASU President Michael Crow. The finale to *Emerge*, titled *Immerge*, involved an evening of performances and installations that brought the themes explored in the workshops to life through an immersive, carnivalesque glimpse into the future created by audio, theatrical and visual programming that shifted with the ebb and flow of audience participation. Over the course of three days, *Emerge* engaged over 700 faculty, students, professionals and members of the local community in an exploration of the future of technology and society.

Within two months after *Emerge*, the gallery presented an interactive experience that sought to enable diverse audiences to experiment with alternative modes of looking at the future (Bryne, Davies, Kelliher, & Selin, 2012; see Fig. 1). The exhibition was presented through four main environments. The first focused on narrative and invited museum visitors to imagine the look and feel of the future and to envision how their families, work lives, and relationships might be different. Several *Emerge* workshops explored the narratives and emotions our future lives might hold, asking what kinds of stories will become commonplace, and what the texture and pattern of everyday life will be. To represent aspects of these workshops in the gallery space, we set up a writing desk inviting visitors to write their own letters to the future and posted a large erasable white-board where visitors could complete the last panel of a sci-fi comic strip sketched out in an *Emerge* workshop. Whether considering Arizona's energy future or the development of empathic robots, participants emphasized the importance of imagining the future in technicolor, with images, sketches and stories.

The second area of the gallery focused on hand-on experiences. During the *Emerge* event, participants dug deep into the everyday objects and places we take for granted – thinking with their hands and designing the mundane surroundings of tomorrow. Some worked on a small scale: cups, flowers, snacks and scratch cards. Others thought of the monumental, asking what large symbolic tributes might endure beyond our contemporary civilization. The gallery space re-created these opportunities by creating a station at which visitors built objects of clay that one might find in the future, displaying them in small backlit cubicles for others to contemplate.

Exploring the kind of future we want shouldn't only involve our minds, hands, or eyes, so the area of the gallery focused on embodiment. Here we shared the *Emerge* workshops in which participants used their whole bodies to investigate potential futures, through games – virtual or real-world – or within immersive spaces (as in the *Emerge* workshop that used a geodesic dome to immerse participants in the immensity of the universe, to trigger discussion of our future place in it). The last area of the gallery featured the installations, architectural projections, and costumes of fantastical creatures featured in *Immerge*, on the final evening of *Emerge*.

But before the event itself and the museum exhibition sprang to life, there was an intellectual groundwork in place: underpinning the event are a set of reflections on the nature of technological change, the role of anticipation in society, and the importance of innovation in the practice of foresight. This introduction offers a genesis story of *Emerge* in order to make



Fig. 1. *Emerge: Redesigning the Future* exhibition at the ASU art museum.

explicit the conceptual underpinnings of the event and to set the broader context for the articles featured in this special issue. Yet, like most origin stories, there are several that might be told – in this case, one by each of the co-directors of *Emerge*. One would be about the ASU's Digital Culture program, which is housed within the School of Arts, Media and Engineering then under the helm of Thanassis Rikkakis, who led much of *Immerge* and provided the fabrication facilities, 3D printers, Digital Culture Ranch, and all manner of art and design talent. Another story would showcase ASU's willingness to incubate original ideas and experiment boldly. Author Joel Garreau co-directed *Emerge* with an eye toward making it loud and clear that, as one of the nation's largest universities, ASU is a place that breaks down the barriers between those making the future and those thinking about what it all means. The third story, and the anchor for this special issue, relates to the research on future-oriented deliberation that is housed within ASU's Center for Nanotechnology in Society (CNS-ASU)¹. The seeds for *Emerge* can be found in a research program that I lead in CNS-ASU that focuses on theorizing anticipation and developing novel foresight methodologies.

This introductory piece first describes the intellectual roots of *Emerge* in the context of research on technology in society, public engagement with science and technology, and novel approaches to foresight. I then frame the *Emerge* workshops through the notion of mediated scenarios, providing some methodological scaffolding for what took place during the event. With the macro composition and principles in place, I move to describe the concepts and key methods of each *Emerge* workshop. Along the way, the papers of this special issue are fitted into this broader context, and questions for ongoing research are raised.

2. Cultivating the theoretical landscape of *Emerge*

"It's all gardening," said Stewart Brand on the third day of *Emerge*, suggesting a metaphorical lens for reconsidering the looming challenges of climate change, biodiversity loss, rising rates of cancer, and other crises endemic to the earth's life support systems being out of balance. Brand, the founder of the *Whole Earth Catalogue*, looks toward technology and geo-engineering for adaptation. As a counter point, *Emerge* participant Sander Van der Leeuw (then the dean of ASU's School of Sustainability, and an archeologist used to thinking in large swathes of time), posits instead that it is rapid technological innovation that has gotten us into this thicket of wicked problems. Instead, he argues, what is needed is a measure of humility, a revitalized approach to anticipation, and a focused intentionality when it comes to technological advance (Van der Leeuw et al., 2011). The optimism and skepticism bundled into these two very different positions aside, what both thinkers are confronting is the role of technology in society and the search for a better way to govern our human, ecological and technological systems. Talk of the future is quickly transformed into talk about technology, but the idea is not to naively succumb to relentless expectations of momentum or inevitability, but instead to treat technology as the social project that it is, asking questions about which technologies, for whom, why, and toward what ends. Such questions were at the core of *Emerge*.

While I find Brand's argument – which likens geoengineering to ancient practices of taming nature – problematic, instead of taking that provocation up here, I'd like to steal the metaphor and use it for my own purposes – namely, to explain what *Emerge* was intended to be, and how it was produced, from a CNS-ASU perspective. Gardening, as the process of caring for a space and its organic and inorganic inhabitants, is helpful to describe what went into crafting the environments that were the *Emerge* workshops. Here I'm particularly inspired by a magnificent Japanese garden in Freestone, CA, where cultivation and control equal serenity. The land has been planned, plotted and prodded with precision to create a very specific kind of experience. It, like the workshops created during *Emerge*, is a highly curated environment.

The *Emerge* workshops can be thought of as conceptual and physical spaces, painstakingly designed and meticulously prepared so as to nurture a particular atmosphere for reflection. As in the garden, boundaries are put in place, and then carefully maintained, such that a route through the space is at least partially determined. In the *Emerge* workshops, participant experiences were curated through process facilitation, the use of materials and technologies, control of who is in the room, and by constraints on time. In the garden, experience is similarly staged, for instance by placing stepping stones in such a way to require slowness, curving a path so that a showy plant is in the line of sight, or intentionally choosing rocks with acoustic qualities in order to amplify the trickle of a waterfall. Interaction with the garden is not open-ended or 'natural', but rather highly designed. Similarly, *Emerge* workshops could not be a conversation about just anything, in any way. The event was framed following much bloodshed among the organizers over language. Careful agendas were crafted. Rooms were set up in this way or that. Workshops were composed of people with particular sets of expertise. There is thus deliberateness to both the garden and the *Emerge* workshops: both are carefully prepared environments. Both are future-focused, with a sustained effort to bring about an envisioned goal as seeds are planted to bloom, wither or propagate. Both are tended spaces, curated with attention toward creating an immersive experience, a respite from the wild.

Before the event took place, organizers worked out a framing for the event as a whole:

¹ CNS-ASU was a primary sponsor of the event, contributing about one-fifth of the hard funds. Other sponsors at ASU were the Herberger Institute for Design and the Arts, the Office of the President, The Prevail Project of the Sandra Day O'Connor College of Law, the School of Sustainability, the Ira A. Fulton Schools of Engineering, and ASU LightWorks, as well as Intel from outside ASU. The three prime developers and organizers of *Emerge* were CNS-ASU's Cynthia Selin, Thanassis Rikkakis (Director of the Herberger Institute School of Art, Media + Engineering (AME) and the Herberger Institute Digital Culture Initiative), and Joel Garreau (Lincoln Professor of Law, Culture and Values at the Sandra Day O'Connor College of Law).

“Science and technology are changing our lives. They are transforming our minds, our possessions, and the very landscapes we inhabit. In which directions are they heading? What kinds of societies, cities, homes – even people – will they lead to? Are these the futures that we want? While what lies ahead is always uncertain, we need to interrogate today’s choices, asking how they set us on trajectories into the future. To do this, we need new kinds of conversations – new interactions that can make sense of the human dimensions of technological change. Merging the arts and sciences is one way to enrich our understanding of plausible futures and collectively work towards sustainable futures.

What can scientists and engineers tell us about emerging possibilities? Can storytellers help us think about the scenarios for our lives? How do we make those futures democratic and ensure that science is kept accountable? Artists and designers need to challenge our assumptions, offer new perspectives and immerse us in startling possibilities. We’ll combine cutting-edge theory with experimental practice and science, future studies, participatory democracy and design. *Emerge* is focused on building teams around problem solving not specialties.” (“*Emerge*” website)

There are several important conceptual points underneath this framing which can be traced to CNS-ASU, a prime sponsor of *Emerge* and my own intellectual home. The three concepts that follow can be thought of as the theoretical landscape supporting *Emerge*.

First, technology is not considered to be gadgets or unbridled systems of progress, but as a domain of human choice and agency (Allenby & Sarewitz, 2011). Technology cannot be assessed or imagined apart from social and cultural values, but is rather a matter of co-production. What we have learned from decades of studying the sociology of technology is that new technologies are made, not born, and therefore could be made differently. There is little, in terms of technological advancement, that can be understood as inevitable.

Each *Emerge* workshop was intended to be a critical engagement with emerging science and technology that could tell, through diverse media, stories about alternative futures without devolving into techno-scientific fantasy. Thus the presentations about emerging technologies at the start of *Emerge* were broad and provocative, collecting an odd assortment of telepathic monkeys, gas pooping microbes, and augmented soldiers. The presentations were designed to be triggers for reflection, meant to be opened up, critiqued and subjected to scrutiny through attention to issues of sustainability, ethics, and justice.

A second idea underpinning *Emerge* is that technological development and scientific progress should not be left solely to the experts, but should be a more regularized concern of civic life and public deliberation. CNS-ASU works with the idea of Real Time Technology Assessment (RTTA; see Guston & Sarewitz, 2002) as a means of enabling the democratization of science and technology. RTTA involves processes that draw in the public and other stakeholders in collaboration with scientists and engineers to interrogate the desirability and value of emerging technologies (Guston, 2014a). Over the years this has, for instance, involved exploring human enhancement with citizens (Hamlett, Cobb, & Guston 2008), reconsidering science fiction in light of participatory technology assessment (Miller & Bennett, 2009), working with informal science educators and museum professionals (Bell, 2009), developing online platforms for debating nanotechnology (Selin & Hudson, 2010), and developing novel immersive, future-oriented approaches to public deliberation (Davies, Selin, Gano, & Pereira, 2013; Selin et al., under review). Most simply, the idea is that we need all sorts of different people and perspectives to discuss responsible innovation. Radical participation in the interface between technology and society is important to ensure that we self-consciously nudge technology toward positive societal outcomes and steer it clear of harm to the best of our abilities.

Emerge was thus designed to broaden participation, moving beyond an expert model to include people from different disciplines, cultural backgrounds and professional experiences. Just as a garden is planted with attention to color, composition and complementarity of different species of plants, the *Emerge* workshops were populated with futurists and historians, ecologists and narrative non-fiction writers, engineers and artists. We, as organizers, worked to balance age, gender and ethnic diversity in each workshop. We also sought to balance the groups in terms of ‘makers’ and ‘thinkers’ (though well aware that these distinctions are not mutually exclusive). Each workshop lead was charged with creating highly participative atmospheres that could harness the collective intelligence of the group.

Third, the framing of *Emerge* includes a deep appreciation of uncertainty, which builds out from CNS research on anticipation and advancing future-oriented methodologies (Selin, 2008). Here uncertainty is conceived not as something to be disciplined, but rather reckoned with as an ordinary facet of contemporary life. Here the future is conceived of not as a predictable sequence of events that can be envisaged through probabilistic models, but rather as a terrain to be contemplated and critiqued. The focus is on plausibility rather than probability (Ramirez & Selin, 2014).

Within CNS-ASU, I lead a research program on Anticipation and Deliberation, which shifted in 2010 to focus on the role of mediation in foresight – in particular on the kinds of new mediated spaces that can be designed to think about the future of emerging technologies. One impetus for this work was derived in part from experiences with InnovationSpace, a design program in which students work to develop future products (Selin & Boradkar, 2010). InnovationSpace revealed that like scenaric thinking, design thinking will often surface ethical issues surrounding emerging technologies. Yet with design thinking, we come to this better understanding through methods that are tactile and material, visual and graphical, virtual and simulated, experiential and kinetic. In 2011, CNS-ASU developed the concept of ‘material deliberation’ (Davies, Selin, Gano, & Pereira, 2012) in order to gain theoretical traction in investigating how to move “beyond discourse” within

deliberation, and thus to incorporate the material, visual, and affective to increase the experiential richness and contextual relevance of future-oriented processes. We began experimenting with using walking tours, crowd-sourced photography and image-based deliberation (Davies et al., 2013) – work that fed into some of the object- and image-oriented futuring methods used during *Emerge* and which eventually led to another CNS-ASU project involving mediated scenarios, the Futurescape City Tours.

Emerge involved discussion of both the kinds of futures that are being created by emerging technologies, and their desirability and implications. Significantly, this discussion involved hands-on construction and creative interventions. As such, the workshops were an important example of future-oriented discussion and deliberation that shifts from the purely logical, discursive, and technical to incorporate attention to the material, affective and creative aspects of the futures afforded by contemporary scientific research. Building on our theoretical work, we used *Emerge* as a case study of such future-oriented deliberation, and developed a research engagement around it that sought to explore how the quality of deliberation is affected by the incorporation of the material, affective and creative.

These ideas are encapsulated in the concept of anticipatory governance (Guston, 2014b), which guides much of the work at CNS-ASU and offered some stability to *Emerge*. CNS is built on the framework of anticipatory governance, which takes building capacity in society for better future-oriented thinking as a foundational goal, and thus seeks to nurture “the ability of a variety of lay and expert stakeholders, both individually and through an array of feedback mechanisms, to collectively imagine, critique, and thereby shape the issues presented by emerging technologies before they become reified in particular ways” (Barben, Fisher, Selin, & Guston, 2008: 992). Relying on models or experts to grapple with the implications of emerging science and technology is insufficient; rather, good governance is a matter of extending the conversation to new audiences and unlikely players.

It is also worth noting that ASU as an institution questions the entrenched habits of the academy and prioritizes “intellectual fusions”, “use-inspired research”, and “social embeddedness”. The atmosphere at ASU – a place with Schools of Human Evolution and Social Change and of Sustainability, as well as a Center for Science and the Imagination – enabled something as strange and unwieldy as *Emerge* to bloom. Daring, unconventional research and engagement need the right climate. Without it, novel ideas and experiments won’t thrive. Readers of *Futures* will probably appreciate that futures research falls through the cracks in many institutions, but ASU is primed, mostly through the leadership of President Michael Crow, to embrace futures thinking, among dozens of other modalities, as an essential ingredient for coping wisely with socio-technical change.

3. Deliberating futures: the *Emerge* workshops

With CNS-ASU’s intellectual scaffolding in place, the *Emerge* workshops can be viewed as unusual social science experiments investigating novel practices of foresight. The use of the word ‘experiment’ is used lightly here, as we did not have controlled settings, nor were the workshops repeatable in any scientifically exact sense. Rather the notion is meant to draw attention to the way in which the workshops were an opportunity to test out and study the cutting edge of foresight practice. As detailed in both Davies et al. and Kelliher and Bryne in this issue, the *Emerge* workshops were carefully observed and documented so as to offer rich descriptions of the workings and dynamics of each of the methods. Workshop leads were selected due to their exemplary futures work, their commitment to long-term thinking, or because of an expressed interest in integrating futures thinking into their own practice and scholarship. As mentioned earlier, participants for each workshop were also carefully selected and placed in a workshop based on their disciplinary background, thematic expertise, and technical or artistic skills. All workshops began in the afternoon of Day 1 and had to yield a public offering (presentation, performance, demonstration, etc.) on Day 3.

As in a garden, which has constraints with regard to the grade of the land, the climate, and the soil and light conditions, we too, as organizers, set up constraints for the *Emerge* workshops: the processes were to facilitate grappling with socio-technical change and should be interdisciplinary and highly participative. While the choice of the method was left to the workshop lead(s) – though also often heavily debated and conceptualized with organizers prior to the event – *Emerge* had a clear futures bent. Some workshops opted for the far future, considering civilization change, or first dipped back 100 years to then look 100 years out, while others opted to look out over a period of three years, 15 years, or an open-ended timespan. *Emerge* also billed itself as a design fiction event, setting up an overarching methodological frame for the workshops (embraced to greater or lesser extents).

As Joel Garreau (co-director of *Emerge* 2012) explains, design fiction is:

“... the craft of evoking potential futures by dumping novel imaginations in our laps. Design fictions are not ‘fictions’ in the usual sense – stories with a beginning, middle, and an end – but story-generators. They might be physical objects that suggest what our world might soon be like, or videos that evoke that future world, or images that disrupt assumptions about where our lives are heading.

Design fictions are intentionally created as visitations from the future. These visions usually fire aspirational responses: they prompt us to think about the future, and want to know more about it. Imagine, for example, we had dumped an iPad in your lap twenty years ago. You’d want one, and be hungry to know more about the future from whence this came. They can make us wonder whether we want a world where panda jerky is commonplace, or where only vestiges of our civilization remain.

This is why design fiction was at the heart of *Emerge*. The objects, images, and stories developed in *Emerge* are inspired intersections between the visions of artists and scientists redesigning the future. Design fiction is about creating things that trip up our everyday thought processes, generating creative ideas about the kind of future we want.” (Bryne et al., 2012).

For science fiction author Bruce Sterling, design fiction is “the deliberate use of diegetic prototypes to suspend disbelief about change.” While the term ‘diegetic prototypes’ has been batted around in attempts to define design fiction, the term originated with Kirby’s work (2010) in referring to “cinematic depictions of future technologies . . . that demonstrate to large public audiences a technology’s need, benevolence and viability” (p. 43). Although Kirby’s diegetic prototypes have a promotional goal, in *Emerge* the use of the notion of design fiction as a methodological frame was more of a provocation, and to create the expectation of critique and subversion. Following Bleecker (2009), design fiction is “meant to encourage truly undisciplined approaches to making and circulating culture by ignoring disciplines that have invested so much in erecting boundaries between pragmatics and imagination.” (p. 4). The production of design fictions – as 3-D material prototypes, films, narratives and hands-on experiences – during *Emerge* was intended to open up the imagination, disturb habits of thinking, and reflect critically and collectively about socio-technical change. What follows is a brief description of the future-oriented methods deployed in the *Emerge* workshops.

3.1. Corner Convenience

Corner Convenience (AKA “Literally Creating the Future”), led by Julian Bleecker and Nick Foster of the Near Future Laboratory, was driven by the observation that the final resting place for many world-changing innovations is the counter of the corner convenience store. “The Corner Convenience is a vault containing the treasures of great, world-changing innovations throughout all histories. Truly. We should see our Corner Convenience as a living Neighborhood Museum of Innovation” (Bleecker, 2012). In a disposable form, you might find: fire (cigarette lighters), birth control (condoms), reading glasses (generic spectacles), power (batteries), and effective analgesics (aspirin). The workshop thus focused on the near term in order to consider the trajectory of future products – those that may eventually become mundane, and specifically those everyday technologies that have a dual function (e.g., TicTacs with pheromones, whiskey with caffeine). Workshop participants brainstormed potential future products, mocked them up in Photoshop, revised actual products, and shot a short film in a local convenience store. Of particular interest was the use of material prototypes and the film, which worked to simulate ordinary experiences of what today would be considered extraordinary technologies.

Here *Emerge* participants engaged in what Bleecker calls object-oriented futuring, “a kind of story-telling practice, crafting material visions of different kinds of possible worlds and through those visions doing more than presenting an inert, lifeless object. Rather, design can turn ideas into material, but also insert that material into a larger setting with broader social contexts and consequences, and through that create a compelling story about a possible future” (Bleecker, 2008).

3.2. Seeing beyond ourselves: present as past, speaking to the future

The *Seeing Beyond Ourselves* workshop was developed by Julie Anand, a mixed media artist and photography professor, and artists Daniel Cavanaugh, Edgar Cardenas and Nic Wiesinger. They asked: “What do we have to say to people living beyond the span of our own lifetimes? How will our culture(s) be understood through the distance of history?” The idea here is that our visions of the future are reflections, mirrors of our cultural values. Traveling backwards (capturing images of 1912) and forwards in time (letters to the future) can help us to notice current moral commitments and our lock-in to the present. The workshop activities involved different strategies for thinking through time: participants wrote letters to the future, discussed the cultural trends of the coming century, and selected contemporary artifacts which might endure in strange or surprising ways. In advance, participants were asked to photograph “contemporary artifacts that may be illuminating with regards to understanding our culture(s) by future civilizations. You might choose something ubiquitous, vividly contemporary, something clearly on its way toward obsolescence, or something you imagine will be “strange” through the lens of a future perspective.”

One segment of the workshop focused on explicating the values tied to our notions of change by decontextualizing everyday artifacts. As the organizers explained: “With the future strangeness and relevance of the here and now in mind, participants will select artifacts from our present civilization that may be illuminating to future civilizations. We will create forensic photographs of such objects, using both studio lighting on real objects and images stripped of their context from the internet and re-represented. Images may be pristine, or may be captioned with ironic or straight interpretive information.” The results of these reflections are collected in a self-published book containing images of everyday objects augmented by provocations about future worlds, e.g. ‘mining landfills will be common.’ The group also interviewed members of the public about their imaginations of the future and created a short video (Anand, Cardenas, Wiesinger, & Cavanaugh, 2012).

3.3. Sci-Fi prototyping

The Sci-Fi Prototyping Workshop, led by futurist Brian David Johnson of Intel’s Tomorrow Project, explored the relationship between science fiction and science fact by developing fictional narratives based on new technologies. This workshop used science fiction as a learning tool to rehearse, critic and investigate plausible new technologies and products

and the ways in which they might be used. Using the “Sci-Fi Prototyping” framework (see page # of the special issue) for generating stories, the participants looked to current science and engineering research and developed out the worlds they might lead to. They were asked to notice the human questions and problems as an anchor point to their stories, and to explore a “scientific inflection point” which would propel the plot for the short stories, short films, artwork and comics that they conceived and executed.

This workshop leveraged futuristic storytelling to bring in the human dimensions of technological change. As Delany said, quoted in a recent *Smithsonian Magazine* collection of more utopic science fiction stories: “The variety of worlds science fiction accustoms us to, through imagination, is training for thinking about the actual changes – sometimes catastrophic, often confusing – that the real world funnels at us year after year. It helps us avoid feeling quite so gob-smacked” (Gunn, 2014). The idea here is that technology does not arise in a vacuum but is always connected to human relationships that are evolving, messy and often contrary. However, as Michael Burnam-Fink explores in this special issue, the method itself, while helpfully requiring a strong narrative component, lacks critical reflexivity about technology and falls short as a highly participative method.

3.4. Humanist narratives for energy

The Humanist Narratives for Energy workshop asked: “How will Arizonans produce and consume energy in 2050?” Led by Gary Dirks of ASU Lightworks and Clark Miller, professor of political science, and facilitated by Claudia Murphy and Lynn Carruthers, this workshop involved an in-depth discussion of plausible energy futures, developing four scenarios based around critical uncertainties. Following a traditional scenarios approach derived from the intuitive logics school (Bradfield, Wright, Burt, Cairns, & Van Der Heijden, 2005), each scenario weaves together social, political, technological, environmental and economic drivers that could influence what the energy landscape looks like in 2050. In these four accounts, key dilemmas around energy are drawn in sharp relief.

The scenarios, as explained in more detail in Miller et al. (in this issue) explored different ways that the quest for renewable energy might play out in Arizona. One scenario asked: What if Arizona has enough sunlight to power the entire United States – do we want to? The ‘Hippies and Cowboys’ scenario imagines a limited energy supply driving businesses to leave Arizona. Another scenario pursued the question: What if Arizona was not able to invest in its energy infrastructure, how would you respond? The ‘Green Silicon Valley’ scenario imagines advances in solar energy technologies that are more affordable and are widely taken up. These scenarios were featured in the *Emerge: Redesigning the Future* gallery in viewfinders (see Fig. 2) alongside a glass jar for museum visitors to vote on the factors that they think will have the strongest impact on the future of energy in Arizona (Fig. 3).

- INVESTMENT: Level of investment in new energy technologies
- CITIZEN INVOLVEMENT: Citizen involvement in energy related decisions
- OPENNESS OF MARKET: Openness of market to new energy platforms and paradigms
- CLIMATE CHANGE: Degree of climate change disruptions
- NATURAL RESOURCES: Availability of natural resources (water, gas, coal, etc.)
- POLITICAL WILL: Political will to create sustainable energy policies

The goals of this workshop, as explained by Miller et al. (in this issue), were to change the narrative around energy in Arizona. The workshop was more overtly political than the rest of *Emerge*, given that it was part of a larger ecosystem of



Fig. 2. Scenario viewfinders.



Fig. 3. Voting on scenario drivers.

activities that work to re-frame the conversation about energy and to open doors for a broader, more public, conversation about renewables in Arizona. Of particular interest for Miller et al. is the way that scenarios are markedly different from the more standard technocratic decision support tools typically used in the energy sector. These tools yield views of the future from “ten thousand feet” and are regularly devoid of people. Scenarios are interesting to shift the public conversation around energy as they can put the social on equal grounds as the technical.

3.5. *The people who vanished*

The People Who Vanished workshop was led by Stuart Candy and Jake Dunagan, two ‘experiential futurists’ with interests in design-oriented futures and future-oriented design. The workshop used the history of the native Arizonan people the Hohokam, the ‘people who vanished,’ to tell the story of a mysterious symbol that appears at the decline of civilizations. The idea here was to provoke imagination by creating a fiction around collapse, asking audiences to suspend disbelief and imagine that our society is on the edge of collapse. How could this be true? What other signs of collapse are evident in society?

The People Who Vanished created a monumental design fiction artifact to catalyze a sort of ‘archeological moment’ around re-perceiving life in Phoenix as we find it today. As explained by the workshop leads: “From time to time in the course of human experience, a discovery is unearthed which overturns the accepted view of the world. In the history of culture such a moment may be so significant that it’s as if the very ground on which we stand had suddenly shifted beneath our feet. The People Who Vanished will be a participatory, transdisciplinary and creative playshop aiming to stage just such a transformative discovery.” As the design fiction played out in the public presentation on Day 3, *Emerge* participants recreated evidence from the historical record to show that a distinctive symbol has appeared as a harbinger of collapse or dissolution. They then constructed the symbol, as a monumental scale symbol on the mountain towering over ASU and as a light installation during *Immerge*. *Emerge* audiences could wander out of the theater space on Saturday and serendipitously discover this sign of collapse for themselves.

This workshop took inspiration from the notion of “experiential scenarios,” a method that offers a corrective to projections of change that are often inaccessible, impersonal and irrelevant (Candy, 2010). The idea is that people cannot relate to numerical or statistical representations of change, and that instead what is needed to spark the critical imagination is a lived experience, an enactment of change, in the present to offer a more tangible, emotional experience of a future world.

3.6. *Starting with the universe*

The *Starting With the Universe: Design Science Now* workshop used a ‘GeoDome’ immersive environment to give participants an experience of the immensity of the universe, asking them to use this encounter to think about what a sustainable future might look like. Led by Gretchen Gano, who is a scholar of the work of Lewis Mumford, Ned Gardiner, the Visualization Project Manager at NOAA’s (National Oceanic and Atmospheric Administration) Climate Program Office, and David McConville, a media artist and then President of the Buckminster Fuller Institute, the workshop deployed a combination of immersive visualization tools (to “make the invisible visible”) and world café-style, small-group inquiry.

Through these techniques, participants sought to embrace, as explored by Gano (in this issue), ‘comprehensiveness’ as a design paradigm. Participants were asked how they might develop the habit of doing comprehensive, anticipatory design through individual, organizational, institutional and sectoral change. Inspired by Buckminster Fuller’s Design Science process, the workshop built on the activities of the Worldviews Network – a collaboration of institutions committed to integrating visual systems and design thinking. While highly focused on facilitated discussion, this workshop began with a shared experience of the cosmos inside the geodesic theater of the ‘GeoDome’, and thus explored the use of embodied prompts to induce deep reflection.

3.7. *I know where we stand*

Participants in the *I Know Where We Stand Game* developed a community-building game – ‘EMERGency’ – using ASU motion capture technology and direct game play. Ken Eklund, a game and interaction designer best known for his historical pre-enactment game ‘World Without Oil’, and Mina Johnson-Glenberg, an ASU researcher with the Situated Multimedia Arts Learning Lab (SMALLab), led this workshop. Both are committed to harnessing the power of play and developing socially meaningful games. The workshop leads seized the opportunity to merge both indoor and outdoor play by engaging *Emerge* participants in the development of a game combining real world activities with an immersive mixed-reality game space, SMALLab, which can track movements in a 3-D space. The players considered the following scenario: “It’s the future. You know where everyone is. How does this change how you do your work, live your life, spend your money, gather information, share knowledge, and express your politics? Will “playing with others” be the norm?” The game was built around a set of hidden padlocks, located around the ASU campus, which outdoor players would search for, find, and report to indoor team mates inside the SMALLab space, who would then use this information to strategically navigate around the interactive game space. The overarching game narrative involved three teams struggling to survive a disaster and needing to cooperate to find the locks outside that would deliver the resources (food, water, medicine) they needed to keep everyone alive. The three teams would each hide one third of the locks themselves, and the locks thus represented local knowledge of critical resources, which could be traded, hidden from, or otherwise negotiated with the other teams.

By drawing on the tools of embodied gaming, this workshop explored how to create the games that collectively might bring on the “Triumph of the Commons.” With the use of diverse media, props, and technologies, this workshop offered CNS researchers an intimate opportunity to notice how space, materiality and gaming architectures affect the deliberative capacity of a group.

3.8. *Games and impact*

The *Games and Impact* workshop was led by Sasha Barab & Alan Gershenfeld, both of whom are ASU professors and game designers. The idea here was that virtual games are learning tools that can help to simulate plausible futures, mocking up new ways that people and nature might interact. In an effort to harness the appeal and compelling mechanics of virtual games for assessing the implications of emerging technologies, this workshop designed the initial specs for a game focused on 3-D printing. The game presented a world in which people can design products and have them printed on demand on a 3-D printer. While regularly discussed as a key ingredient of the next technological revolution, DIY manufacturing through 3-D printing also holds some risks and some surprising potential systemic effects. As noted by Lee Hartwell, the Nobel Prize winning scientist who joined the *Emerge* workshop, such distributed making of consumer products has implications for sustainability and the natural world. What would you make if you could make anything?

In response to such questions, *Emerge* participants conceptually developed a virtual world and a situation in which the player is to buy a gift for their beloved, with the gift tailored to their mate’s ecological and political values. Thus, to play well, you must review the product’s material forms, life cycle and carbon footprint to select a winning gift. Through the game play, the risks and benefits of a future product can be assessed, modified, and connected with social values. Underpinned by ideas about the future of sustainability, this workshop explored how choice, agency and material resources might be transformed as the Maker movement evolves.

3.9. *Crafting archeology from the future*

The *Crafting Archeology from the Future* workshop used clay and 3D printing techniques to build objects from the future. The emphasis was on thinking with your hands, and then telling a story based on what you came up with. Led by Dave Conz, CNS-ASU research professor, and Daniel Erasmus, scenario planner, participants imagined and created prototypes of artifacts from the future. Here it is taken for granted that objects offer a more immediate way for people to interact with an alternative world: beginning with meditations in clay, the participants “thought” scenarically with their hands to develop artifacts that might populate the future. They then presented these objects to people on Mill Avenue in Tempe, asking for their interpretations. In this way, the prototypes became centerpieces for an appraisal of future technological artifacts and their uses, abuses, (dys)functions, hack-abilities, lifecycles, and disruptive potentials. The objects were printed in 3D and participants developed gallery-style object labels (see Fig. 4) describing the function, meaning and historical context of the artifact.



Fig. 4. Timeless Cup c2032.

Timeless Cup (c. 2032)

Porcelain embedded with neuro-sensors

Sam Chung, Carlo Sammarco

This cup was designed to bring together past and present. The handled side references the ornamental and labored qualities of historical vessels, while the simpler side channels the more efficient design of the present. One can experience past, present, or both at the same time, depending on which side one drinks from the cup.

The cup's rim is embedded with a neuro-sensing material that is activated by touch and liquid. Once one touches the lip of the cup, and liquid passes over the rim, the sensors engage the cerebral cortex of the user's brain, and heightens a memory of drinking the same beverage from an earlier time in one's life. The cup thus functions to bring back lost experiences and create awareness of the passing of time.

The idea behind this workshop is that while most foresight tools rely on our analytical minds, we also have other intelligences that are more tactical and intuitive. Coupled with this creative encounter with the future, the workshop asked participants to consider that the objects surrounding us speak volumes about what we want and where we are going. This workshop thus connected tightly with the notion of "material deliberation" developed by CNS researchers, in that the object provides a grounded entry point for deliberation about the social value and political dimensions of emerging technologies, as well as with CNS's interest in DIY manufacturing and hacker spaces.

3.10. Immerge: the finale

Emerge concluded with the *Immerge* interactive multimedia performance. While *Emerge* offered the opportunity to explore the future in innovative ways, *Immerge* engaged visitors to create a new myth of renewal for the digital age. Members of the public interacted with installations, architectural projections, giant spiders, and other fantastical creatures, all within a multi-layered sonic environment generated by live musicians. An interdisciplinary team of ASU faculty and student artists collaborated to produce this immersive and carnivalesque narrative performance, in which bubbling streams of water transformed a desolate environment.

4. Making sense of *Emerge*

The articles in this special issue offer a starting point from which to better understand evolving practices of foresight that came about during *Emerge*. Each take a different vantage point to track what transpired at *Emerge*. Two articles look at the event as a whole. Davies and I trained a team of ethnographers – largely graduate students from around ASU – in ethnographic (participant observation) techniques. Ethnographers were then located in each of *Emerge*'s nine workshops, observing them with an eye to the material culture they involved, the meanings participants constructed, and the dynamics of participation. The research team produced a dataset of several hundred pages of field notes, notes from informal interviews, and research photos and sketches (see Davies et al. in this issue). The *Emerge* ethnography yielded important

findings about the limits of facilitation, revealing that the intention of *Emerge* to create radically participative spaces for reflection about values and technology was not always met. The idea was not to leave deliberation up to experts, or to designers, but to be inclusive and collaborative, and in practice this occurred unevenly in the workshops.

Another large-scale documentary effort was made by Aisling Kehllier and Daragh Byrne, who were then both with the School of Arts, Media and Engineering at ASU. In an approach grounded in design fiction and research as practice, they demonstrate how foresight as a practice-led field can be studied by sharing the online platform that they used to track the happenings at *Emerge*.

The following three articles dive into a particular *Emerge* workshop in order to uncover the dynamics and results of that engagement. Burnam-Fink explores the importance of narrative in scenario development and investigates the trade-offs and upsides of the ‘science fiction prototyping’ approach. Miller et al. delve into the backstory of the energy scenarios workshop, making a case for the importance of futures thinking that can withstand contemporary opportunities and inherited agendas. Lastly, Gano explores the thinking underpinning the ‘Design Fiction Now’ workshop, tracing the legacy of Buckminster Fuller and seeking to revitalize his approaches within the future community.

One theme not pursued in the articles, but lingering on my mind as an organizer of *Emerge*, takes us back to the garden metaphor. *Emerge* as a whole can be viewed as an intervention – an attempt to intervene in habituated ways of thinking that underpin most forays into the future. Through structuring workshop experiences, effort was made to level the playing field, to raise quiet minds, and be inclusive of the opinions of critical minorities. The gallery was designed to encourage lively debate and interaction. These efforts worked well in some cases, but in others the intention was obscured and the structures failed to support inclusive participation, critique of socio-technical systems, and a more nuanced approach to futuring. As with the arduous work of trellising plants, taming flowerbeds, or pruning trees, one can work to move away from nature, but sometimes the wild will have its way. The *Emerge* workshops inevitably involved a tricky balance and nagging trade-offs between providing a framework (centralized, top-down, principled) and allowing things to be open-ended (bottom-up, emergent and surprising). This speaks both to the level of guidance that we offered to the workshop leads beforehand, and to how the workshops were run over the two days. For instance, the *Corner Convenience* workshop started with a well-defined concept and a very clear sense of what was to be accomplished. The *Games and Impact* workshop required game design expertise and programming skills and was thus not able to be as participatory as originally hoped. On the other hand, the *Artifacts from the Future* workshop had an open-ended atmosphere and an emergent structure, thus requiring high levels of trust from participants that it was developing into something productive. Similarly there was a free-form feeling to the Saturday presentations. As organizers, we did not know what would come together, how coherent it would be, or if it would be, after all, good or interesting; we were bound, then, to be startled. As with most gardens, *Emerge* yielded what was sown, but also burst forth with surprises.

In the end, hope is planted in a garden. The soil is prepared, the layout is designed, the flora selected with expectations for an end result. Promises are made and much effort is exerted in good faith that one day the vision will be realized. An imagined future is planted, and time must pass to reap what is sown. *Emerge* has become an annual event at ASU, with the

2013 edition focusing on ‘The Future of Truth’, the 2014 event on ‘The Future of Me’, and the 2015 edition looking at ‘The Future of Choices and Values’. Its continued reiteration and development provides new opportunities to study future-facing events. It is important to keep a scholarly eye leveled on it in order to understand how, why, when and with whom foresight events, whether large-scale or intimate, can become opportunities to hone practice and share insights within the future studies community. ASU has provided, through *Emerge* and the infrastructure at the CNS-ASU, an important research site to explore the institutionalization of future-orientation within the academy. What follows then, is an invitation, a modest contribution to futures practice, and an attempt to show how one event drew more communities into future-oriented thinking.

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