

F A C I N G T H E F U T U R E

Art and Technology in the 21st Century

The Hirshhorn Museum and Sculpture Garden in Washington, DC, strives to embrace the 21st century. To accomplish this, we must discuss new technologies and investigate their artistic potential. In fall 2016, three panel discussions, under the title “Art + Science,” brought together scientists from leading American universities and artists from “Suspended Animation,” a group show that investigates new forms of embodying the physical world in digital space. The series explored crucial questions about creativity, technology and humanity in order to discover the future potential—and pitfalls—of digital tools in both science and art.

By Gianni Jetzer



Recent advances in cutting-edge visual computing have opened up radical possibilities for artists and scientists alike. Facial substitution, interactive narratives and artificial intelligence (AI) are now available as tools, allowing artists to create avatars and interactive scenarios in their works, or even deploy AI for more intensive projects.

Former president of Rhode Island School of Design, John Maeda, remarked in a guest blog for American Scientist: “Art and science. To those who practice neither, they seem like polar opposites, one data-driven, the other driven by emotion. One dominated by technical introverts, the other by expressive eccentrics. For those of us involved in either field today, we know that the similarities between how artists and scientists work far outweigh their stereotypical differences.”¹



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Installation view of “Suspended Animation” at Hirshhorn Museum and Sculpture Garden, Washington, DC, 2016. Courtesy Hirshhorn Museum and Sculpture Garden.

(This page, left)
MATTHIAS NIESSNER, slide illustrating the Face2Face technology. Courtesy Matthias Niessner.

(This page, right)
JOSH KLINE, *Hope and Change*, 2015, mixed media. Installation view of “Suspended Animation” at Hirshhorn Museum and Sculpture Garden, Washington, DC, 2016. Courtesy the artist and Hirshhorn Museum and Sculpture Garden.



Both art and science are dedicated to asking the big questions placed before us: “What is true? Why does it matter? How can we move society forward? Both search deeply, and often wonderingly, for these answers. We know that the scientist’s laboratory and the artist’s studio are two of the last places reserved for open-ended inquiry, for failure to be a welcome part of the process, for learning to occur by a continuous feedback loop between thinking and doing.”²

To investigate the parallels in contemporary art and frontline technology, the Hirshhorn Museum and Sculpture Garden laid out three topics conferred by artists and scientists in “Art + Science.”

Digital Doppelgänger

Josh Kline + Matthias Niessner

For the first panel discussion, Josh Kline met with Matthias Niessner, visiting assistant professor at Stanford University, whose work digitally fabricates reality and manipulates video in real time. He presented a project called Face2Face, which captures a source subject's facial movements with a webcam and maps the actions onto the face of any human figure in a target video sequence in real time. To accomplish this, Niessner uses a method called “non-rigid model-based bundling” to track the faces of both source and target. Such a method scours the target video's moving sequences to retrieve mouth shapes that best fit the source's movements, which are then warped for the best possible fit in the final output. The result is then rendered atop the target video stream and matched with the proper lighting conditions.³

To illustrate the efficiency of Face2Face, Niessner performed a live demonstration in which he mapped human reactions onto figures in YouTube videos in real time. The result was stunning, with frightening implications—we can now put any words in the mouth of anyone.

Josh Kline's multimedia practice has been described by *The New Yorker* as a “persuasive admixture of real and surreal, dark humor and formal inventiveness.” He draws inspiration from advertising, social media and the latest technological trends. By using 3D printing and

video editing—including emerging facial substitution tools—Kline reflects on technology's impact on social and political spheres.

For *Hope and Change* (2015), the work shown at the Hirshhorn Museum, Kline hired David Meadvin, a former speechwriter for the Obama administration. Together, they rewrote President Barack Obama's 2009 inauguration speech as though he had accomplished all goals outlined in his first presidential campaign. An impersonator, Reggie Brown, then performed the speech, with the president's face digitally mapped onto Brown's.⁴ *Hope and Change* signifies the future potential of digital manipulation, though its flaws undercut the work's believability.

There are different approaches to facial substitution technology in art and science. Kline and Niessner discussed the different approaches to facial substitution technology in science and art. While Niessner aims for seamless animations, Kline uses the imperfections of shareware as artistic means to question our perception and the credibility of the media we consume. Kline is fundamentally critical of technology and its implications for personal identity and civic engagement, whereas Niessner weighs technological strides in a pragmatic way. He said in the *Washington Post*, “We're not trying to help people fake things. We're really on the other side, trying to help people figure out what's going on and what we can do with digital data. Digital data is just bits and bytes.” Most of the audience members saw animated face substitution as an ominous venture.



¹ John Maeda, “Artists and Scientists: More Alike than Different,” *Scientific American Blog Network*, <https://blogs.scientificamerican.com/guest-blog/artists-and-scientists-more-alike-than-different/>.

² Ibid.

³ Matthias Niessner, “Face2Face: Real-time Face Capture and Reenactment of RGB Videos,” June 2016, <http://www.graphics.stanford.edu/~niessner/thies2016face.html>.

⁴ “Josh Kline draws inspiration from current events,” *Smithsonian Hirshhorn Museum and Sculpture Garden Tumblr*, April 26, 2016, <http://hirshhorn.tumblr.com/post/143433134254/josh-kline-draws-inspiration-from-current-events>.

(Left to right) Ian Cheng, Charles T. Rubin and Gianni Jetzer, during panel “Art + Science” at Hirshhorn Museum and Sculpture Garden, Washington, DC, 2016. Courtesy Hirshhorn Museum and Sculpture Garden.



Computing Emotion

Antoine Catala + Fox Harrell

For the second panel, artist Antoine Catala met with Fox Harrell, an associate professor of digital media at the Massachusetts Institute of Technology. Fox is a computer scientist who develops artificial intelligence, and works in MIT's Comparative Media Studies Program. The title of this panel was "Computing Emotion," and the pair discussed storytelling and the ways digital media can trigger empathy.

Antoine Catala uses a variety of media, including animation, pneumatic sculptures and holograms, to create illusory encounters and investigate the limits of perception in a digitally enhanced world. In his new installation, *The Pleasure of Being Sad* (2016), the artist imagines a late capitalist society, in which people repress sadness and depression in favor of manic happiness and endless productivity.

"The Pleasure of Being Sad" is the title of Catala's fictional ad campaign ostensibly launched by a progressive government agency to encourage its citizens to reconnect with sadness. Incorporating advertising strategies of the future, a breathing mechanism provides anthropomorphic features to a billboard screen. The film projected onto the billboard's wavering surface is given an eerily human appearance.

Fox Harrell's scientific pursuits lie in the relationship between imaginative cognition and computation. He uses computer science, cognitive science and digital media arts to develop new forms of computational narrative, gaming, social media and other digital media.

According to Harrell, the ubiquity of computational media will enable a wide range of new narrative forms. He begins by uncovering the most basic narrative imaginings in human cognition, which provide the framework and building blocks for algorithmic and conceptual representations of such conceptions. These patterns can be reconfigured as computer code to develop hardware and software that can dynamically annotate, reconfigure and generate computer graphics based on user input. This technological development is based on one core idea: computational representations are inseparable from fundamental expressions.⁵

Harrell's research runs counter to traditional computer science, which overlooks the consequences and interpretations of humanistic productions. He said, "We must see the technical and expressive questions as intertwined." With that in mind, the results of Harrell's research can be applied in diverse circumstances, from the organization of digital photo albums based on a personal narrative, to the design of education curricula.⁶

For Harrell, art creates interactive narratives on the screen; Catala challenges our relationship with technology by employing high and low tech in his artwork. They found common ground as they discussed how technological representation improves or hinders our understanding of human emotions and the natural body.

Artificial Intelligence

Ian Cheng + Charles T. Rubin

The last panel of "Art + Science" brought together artist Ian Cheng and Charles T. Rubin, political science associate professor at Duquesne University. Rubin's recent research and publications focus on emerging technologies, including nanotechnology and artificial intelligence. The artist and scientist discussed their approaches in examining the shifts in human nature as the birth of artificial intelligence becomes increasingly likely.

Ian Cheng studied cognitive science at the University of California, Berkeley. He creates characters imbued with basic behaviors in a virtual world, but leaves them to influence each other without human interference. *Emissary in the Squat of Gods* (2015), the first episode in a series of works dedicated to the history of cognitive evolution, begins with the premise that ancient humans were not conscious. It was inspired by the views of a controversial American psychologist, Julian Jaynes (1920–1997), who wrote that ancient humans experienced vocal hallucinations during moments of stress. These voices, Jaynes believed, were of past authorities, such as parents, rulers or celebrities. Such experiences would then force ancient humans into reactions against the unknown.

Emissary in the Squat of Gods places an ancient community in a vulnerable position—they face volcanic annihilation. At the same time, an emissary's consciousness emerges. The simulation that embodies the community as a whole occupies the same landscape as the emissary's personal narrative, and these two elements destabilize and mutate each other. As witnesses, we observe rudimentary social life's adaptation—or even death—under conditions of confusion and stress.

Between 30 to 50 characters live in the simulated world of *Emissary in the Squat of Gods*, but the emissary is our protagonist and we follow her actions closely. While the other characters wield only basic intelligence, much like the characters in the video game *The Sims*, the emissary is much sharper. Cheng points out that *The Sims* was

one of the first video games to treat intelligence not only as a personal trait, but suffused it into objects that exist within the environment. Hence, intelligence is not a projection of inner smartness, but is derived from relationships with the other elements in our world.

The emissary needs to organize this community, though they do not always cooperate and follow her lead. With open-ended dynamics based on decisions made by artificial intelligence, this simulation is forced together with the emissary's deterministic narrative. Cheng's work is about these two forces sculpting each other, competing for dominance under various conditions.

Charles T. Rubin is the author of *Eclipse of Man: Human Extinction and the Meaning of Progress*. In his presentation, he asked us to reflect on why we are so intent on replacing human relationships of care, love and pleasure with machine interactions. He also wondered if this course of action sets us up for double failure. Rubin said, "It will be bad if, in some manner, these artificially intelligent machines end up disappointing their dependent human users for an eventually revealed lack of humanity; and it will be bad if the machine never disappoints because it is just good enough, because our expectations for our relationships have been reduced just enough, and the very satisfaction gained from the machine relationship forecloses any desire for the richer possibilities of human relationships."

Cheng and Rubin also discussed the risks and dangers of artificial intelligence, as well as its prospective benefits for humanity. That pointed us to new opportunities for crossing technological boundaries, but also brought up a series of social and ethical questions regarding new advancements. Together, scientists and artists are at the forefront of examining the implications of technologies still unknown.

"Suspended Animation" is on view at the Hirshhorn Museum and Sculpture Garden through March 12, 2017.



Installation view of **IAN CHENG's** *Emissary in the Squat of Gods* (2015) for the exhibition "Suspended Animation" at Hirshhorn Museum and Sculpture Garden, Washington, DC, 2016. Courtesy Hirshhorn Museum and Sculpture Garden.

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⁷ "Ian Cheng. Emissary in the Squat of Gods," Fondazione Sandretto Re Rebaudengo, accessed November 29, 2016, <http://www.fsrr.org/mostre/ian-cheng/?lang=en>.

⁸ Ian Cheng, "Coming soon—Emissary forks at perfection, live simulation and story, 2015–2016," Ian Cheng, accessed November 29, 2016, <http://www.iancheng.com/>.