

## EDITOR'S JOURNAL

# Searching for a New Protopia

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Few Americans (aside from *Issues* readers) had science and technology policy top of mind when they went to the polls on November 5. Even so, the future of one of the most ambitious science policy agendas in recent memory hung in the balance. Whether measured in the hundreds of billions of dollars allocated by the Biden administration's legislative agenda, or the dozens of reports and proposals released by the White House Office of Science and Technology Policy, the aspirations of the last four years were high. Spurred by the collapse of supply chains during the pandemic, industrial policies were implemented to create new semiconductor fabrication plants, innovation engines, technology hubs, a bioeconomy, and an energy transition. It was an audacious attempt to use science and infrastructure funding to set a course toward new jobs, new technologies, and better social outcomes.

With Donald Trump's reelection, it is unclear if any of the policies upholding that imagined future will survive. Since the National Science Foundation (NSF) was founded 75 years ago, science has enjoyed relatively bipartisan support, especially whenever the word *competitiveness* is in the air. The coming year will test that precedent. Conservatives' proposals published before the election suggested shuffling off the National Institute of Health's \$34 billion grants budget into state block grants, eliminating ARPA-E at the Department of Energy, constricting government research on climate

change, reeling in NSF's new Technology, Innovation, and Partnerships (TIP) directorate, and capping the indirect costs given to universities to support research infrastructure. Further changes are said to be under consideration at NASA, and there is talk of prohibitions on diversity, equity, and inclusion (DEI) initiatives across government, military, education, and the research enterprise. Whatever their effects on research, these proposals are sure to affect many people.

But presidents never get everything they want. How will Congress respond? In the past, even though science has been a low priority for policymakers, its saving grace has been that it has also generally been a politically sensible thing to do with taxpayers' money. Although policymakers have long debated whether science produces useful knowledge, they have consistently acted as if funding science was useful to them. Money and opportunities could be steered to their districts, narratives of progress could be constructed between university laboratories, Washington, and home. And every once in a while a transistor, a jet engine, or a gene sequencing technology came along to reshape the economy of Dallas, Dayton, or San Diego.

And the mystique of science has often come to policymakers' rescue when the country has worried about threats to national security or competitiveness, and few other positive policy choices were to be found. Describing the relationship between government and science after

World War II as a “romance,” *Science* journalist Dan Greenberg wrote that the honeymoon was over by the mid-1950s, when the secretary of defense quipped that “basic research is when you don’t know what you’re doing.” Sputnik, Greenberg wrote, “sent the pendulum flying back,” and the marriage survived. This has happened many times: with the establishment of SEMATECH in response to competition from Japan in the 1980s; after the 9/11 attacks; following the 2009 *Rising Above the Gathering Storm* report on US competitiveness in science and technology; and again with the CHIPS and Science Act after the COVID-19 pandemic. The question is not whether the pendulum will swing again, but what will its return bring with it?

In this issue, editor Molly Galvin interviews incoming National Science Board chair Darío Gil. Gil, whose day job is senior vice president and director of research at IBM Research, describes a transformed funding landscape where the federal government provides only 25% of the \$800 billion the country invests in research and development. Industry, not government, is now the biggest player, and the new challenge is to coordinate this vast and unwieldy conglomerate to geopolitical greatness. Recalling the age of Sputnik, Gil and others are calling for a new National Defense Education Act to begin the education of a competitive STEM workforce in kindergarten and continue long after college graduation. If previous threats to the nation were external, today’s are an anxious swirl of competition from China and social disorganization within the United States. Gil proposes that this changed global environment also requires new institutions, such as a NATO for science. “If the currency of power is increasingly becoming science and technology, how are we going to handle that?” he asks.

The science policy of the Biden administration didn’t always have a satisfactory answer for that question, but it did have strategies. With appropriations (though not allocations) of money in the name of competitiveness, the administration used the old model of science politics to its advantage while deploying new strategies such as NSF’s TIP directorate and templates for technology-led regional economic development aimed at a variety of social and geopolitical goals. Now, as scientists and government officials reinvent these politics and policies for a new era, the country will also need to tell a new story about where we’re going.

The story that got us here, Gil points out, was written by Vannevar Bush. Bush was born in 1890, the year the US Census Bureau famously declared that the Western frontier was closed. It is ironic that 135 years

later, we’re still claiming to be on a collective national quest for what Bush called the “endless frontier”—echoing the notion of a brutal horse-and-wagon past while struggling to articulate a hopeful vision of a technology-entwined future on a planet that feels much smaller.

Of course, the scientific enterprise has been reinventing itself all along, and this issue contains multiple essays documenting this process and considering what insights we might glean for the future. Reinventing research security, John C. Gannon, Richard A. Meserve, and Maria T. Zuber argue, requires adopting changes not only at universities, but also at university-associated start-ups. In another essay, Robert A. Brown describes how research universities have taken wildly divergent paths toward financial stability since 2008, creating a new landscape that displays both potential and peril. At the University of California, Los Angeles, notes Sergio Carbajo, researchers are teaching STEM students critical theory, broadening their thinking as well as traditional conceptions of diversity. And, Adam Briggles writes, some controversies that are presented to the public as scientific struggles over so-called facts and evidence hide deeply held ethical, metaphysical, and religious convictions that can only be adjudicated by the skills of the humanities—and the heart.

And as for that new narrative about where we’re going as a nation, in an essay on using science fiction to interrogate science and technology policy, Ed Finn explains why collaborating on storytelling can bring about a sense of common purpose. “The point of *Star Trek* was not to offer a detailed road map from the Apollo program to the warp drive—the point was to change how audiences feel about the future; to create a complex and compelling *protopia*: a future in which things are not perfect, but keep getting better.” *Star Trek* debuted in 1966, and it is as far away from our current time as the closing of the frontier was to the end of the Second World War. Science and technology’s next *protopia* is ours to write.

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Since the Winter 2007 edition, *Issues* has featured artwork curated by J. D. Talasek and Alana Quinn, who run Cultural Programs of the National Academy of Sciences. It is their keen aesthetic sensibility, amplified by that of designer Fabio Cutró and coordinated by managing editor Jason Lloyd, that has given the last 71 editions of *Issues* their uniquely beautiful look and humanist sensibility. In this issue, you’ll find an extra dose of art from the Getty Foundation’s PST ART: *Art & Science Collide*—an effusion of coordinated exhibitions happening now in the Los Angeles area.