

UC SANTA BARBARA

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## **UC Santa Barbara History Professor's Book Elucidates, Celebrates 'Visioneers'**

At the 2013 South by Southwest conference in Austin, Tex., entrepreneur and technology designer Elon Musk, founder of PayPal, Tesla Motors, and SpaceX, showed a packed, rapt crowd video of his latter company's newest project: a reusable rocket that can leave and return to Earth intact, landing as softly as a helicopter.

In comments that subsequently dominated media both social and mainstream, Musk also spoke about his hopes for accessible space travel "to extend the life of humanity," pointing to the impending threat of climate change.

Talk about déjà vu.

Gerard K. O'Neill, an American physicist who spent three decades on the faculty of Princeton University, proposed much the same -- and for similar reasons -- 50 years ago. In September 1974, *Physics Today* magazine published O'Neill's paper, "The Colonization of Space." The piece described space colonies as the solution to Earth's greatest challenges, such as "protecting the biosphere from damage caused by transportation and industrial pollution" and "preventing overload of Earth's heat balance."

In a fascinating new book, UC Santa Barbara history professor W. Patrick McCray offers an examination of O'Neill and other radical innovators who never quite got their due.

"The Visioneers: How a Group of Elite Scientists Pursued Space Colonies, Nanotechnologies, and a Limitless Future" (Princeton University Press, 2013) is a history of -- and, in turn, an homage to -- these "modern utopians" who believed their technologies could transform society.

Equal parts visionaries and engineers, McCray's visioneers were futurists, ace self-promoters, and indefatigable optimists. Their schemes were not pie-in-the-sky; these Ivy-trained experts had hard science on their side. Yet their grand plans were never fully realized, impeded by skeptical colleagues, staid politicians, and, perhaps, their own zeal.

"Visioneers want to find the one thing that's going to fix the problem, and they're often trying for the grand slam home run rather than trying to hit singles," McCray said. "They want to hit the ball out of the park, which is maybe not the best approach to dealing with the problems that society faces. But the futures they envisioned are not failed futures -- they had an influence and an impact on where we are today."

The book focuses primarily on two key figures -- physicist O'Neill and his onetime protégé Eric Drexler -- whose paths briefly crossed, and whose fates would take the same course a decade apart.

O'Neill's devotion to the idea of colonizing space gained intense popularity in the media, landed the Princeton professor funding from NASA, and made his book a best-seller. But a skeptical U.S. government refused to fund what came to be seen as a fantasy.

Drexler followed a similar trajectory. Part of the early- and mid-1970's "pro-space movement," he was among those who worked with O'Neill on a prototype of an electromagnetic catapult meant to deliver raw materials into space. Then his interest shifted to what he called molecular engineering -- known today as nanotechnology.

"His vision was a radical one, not like what we're doing here today," McCray said of Drexler. "He envisioned nanobots -- self-replicating nanoscale devices able to build

anything from the ground up -- and computer-controlled machines operating at the molecular scale."

As O'Neill had before him, Drexler attracted a lot of attention, wrote articles and a best-selling book, and developed a public following. But when the mainstream science and engineering community started talking about a national nanotech initiative, "it wasn't the version of nanotech that Drexler was talking about, and for years, he was marginalized," said McCray. "Many of his supporters likened him to technology aficionados working in their parents' basements.

"We can look back at these ideas people had of the future that seem pretty far out there, but as a historian part of my job is taking these ideas and contextualizing them," McCray continued. "Even though we don't have these worlds that O'Neill and Drexler imagined, we have close cousins to it. We have Elon Musk and SpaceX. He's a progeny of O'Neill in some ways. We have private space development, and scientists who are developing nanoscale machines of modest capability."

The book ends with a discussion of technological ecosystems, whose inhabitants include big universities, patent lawyers, and big corporations. And of course, "among the interstitial bits and pieces," as McCray put it, there are the visioneers.

"Visioneers are important for the health of that ecosystem," McCray said. "They help set the boundaries of what might be possible, and popularize those boundaries, thereby getting mainstream scientists and engineers pushing back, saying 'No, we can't do that,' or walking to the fenceline to see what they can do." McCray's research for "The Visioneers" was funded by UCSB's Center for Nanotechnology in Society.

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