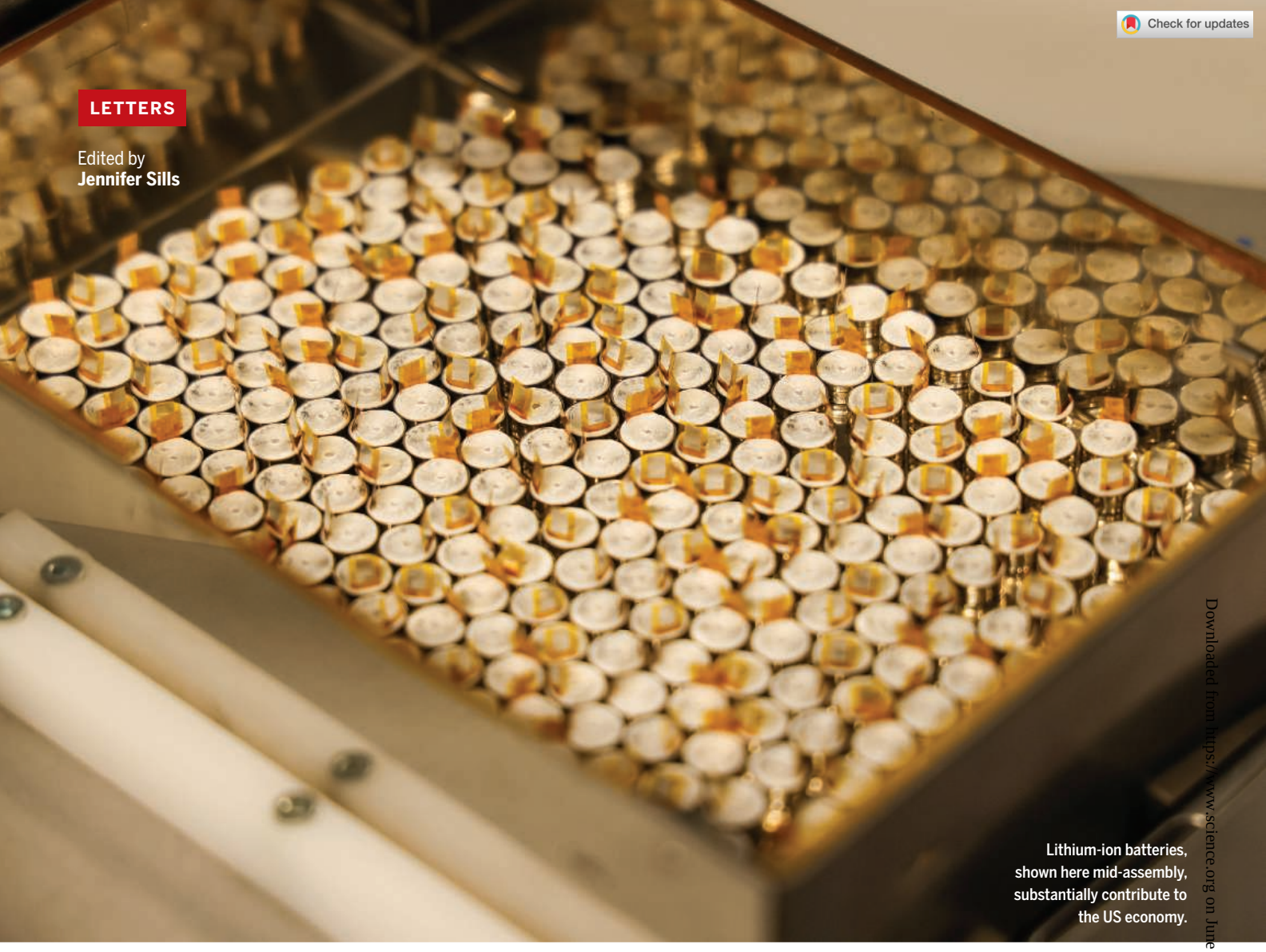

Lithium-ion batteries, shown here mid-assembly, substantially contribute to the US economy.

PHOTO: BLOOMBERG VIA GETTY IMAGES

US must support chemistry research

As chairs of US-based chemistry departments, we are deeply concerned about federal decisions to decrease overhead rates (*1*), reduce scientific funding (*2*), lay off program managers at scientific agencies (*3*), and restrict diversity, equity, accessibility, and inclusion initiatives (*4*). These shifts threaten the strength of the US research enterprise and the nation's role as an economic and technological leader.

Chemistry research drives advances in medicine, energy, materials science, and environmental sustainability. The chemical industry alone contributes more than US$600 billion annually to the US economy and supports more than 4 million jobs (*5*). Federally funded academic research in chemistry has directly led to groundbreaking discoveries in pharmaceuticals [such as the cancer treatment drug paclitaxel (*6*, *7*)], renewable energy [such as lithium-ion batteries (*8*)], and advanced materials [including polymers such as polypropylene carbonate (*9*)], fueling entire sectors of the economy.

The chemistry departments that produce these innovations rely on stable research funding to maintain laboratories, support faculty and student researchers, and sustain critical infrastructure. Overhead is essential for maintaining the facilities and administrative support required for groundbreaking discoveries. Without adequate funding, universities will struggle to engage in high-impact research, diminishing the ability of the US to lead in emerging technologies and address global challenges.

Each year, US institutions award more than 20,000 chemistry degrees at the undergraduate and graduate levels (*10*), producing a workforce essential to industries ranging from biotechnology to semiconductors, along with graduates that go on to health sciences professional programs. However, uncertainty in research funding discourages students from pursuing these careers, weakening the talent pipeline that is crucial for economic growth and national security. Moreover, restrictions on programs aimed at broadening participation in science threaten the global competitiveness of US science by hindering efforts to attract the brightest minds from all backgrounds (*11*).

Federal leaders should uphold commitments to scientific research by ensuring robust and stable funding across all US agencies, maintaining institutional indirect cost recovery rates to support the infrastructure necessary for discovery, and protecting policies that promote an inclusive and thriving scientific workforce. Failing to support the scientific enterprise will erode decades of progress in research and innovation, ceding leadership in key technological areas to global competitors.

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Protect transgender scientists

Transgender and gender nonconforming (TGnC) people are a primary target of the Trump administration. Multiple executive orders seek to erase TGnC protections; mandate denial of gender identity; and ban diversity, equity, and inclusion (DEI) (*1*). Changes to federal funding policies related to TGnC individuals and DEI threaten to curtail academic diversity and freedom (*2*). Institutions have been hesitant to resist, but for many TGnC scientists—especially TGnC individuals of color, immigrants, and those with disabilities—invisibility is not an option. Anticipatory obedience (*3*, *4*), and even passive allyship, is insufficient; institutions must abandon neutrality and defend targeted communities to minimize further harm (*5*, *6*). As queer and TGnC scientists, we call on researchers at all levels—from undergraduates to university presidents—to take direct, consistent, and rapid action.

Institutions must respond to attacks on the human rights of TGnC people (*1*), including the right to be seen before the law as themselves and the right to free movement and residence (*7*, *8*). Recent policy changes prevent TGnC people from obtaining accurate gender markers on legal identification, including passports (*9*). Institutions should therefore avoid requirements for federal identification to access health care, education, and employment and should empower individuals to review, correct, and expunge personal data. Institutions should protect TGnC individuals, particularly immigrants, against law enforcement data requests and doxxing attacks. Corresponding resources, such as legal assistance, should be freely available to all affiliated personnel to protect themselves and their communities.

The Trump administration has eliminated federal funding of research on, and health care for, TGnC individuals, as well as DEI efforts supporting TGnC scientists. Dozens of LGBTQ+-related grants have been canceled, with specific focus on TGnC projects (*10*), and the Trump administration is attempting to eliminate gender-affirming care from the Affordable Care Act and Title IX protections (*11*, *12*). With support from state and local governments, institutions should commit to continued insurance coverage for TGnC health care and offset the impact of federal cuts with additional grants and funding. Institutions must support TGnC and other marginalized scientists by securing their safety and privacy; their access to legal aid and health care; and their opportunities in education, employment, and society.

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PAST AS PROLOGUE

Wind turbines have been built near the mudflats that the author remembers from childhood.

Remembering China's coastal mudflats

I was born in a small fishing village on the mudflats of the Yellow Sea in central China. When I was young, my father, a farmer, shared with me his appreciation of the mudflats, which were lush with reeds and filled with flocks of flying birds. The vast sea and rich tidal flats provided abundant shellfish and fish to meet the protein needs of local communities during those impoverished years, but as I grew up, the health of the land deteriorated.

My parents taught me that knowledge can change a person's fate and make the world a better place. Thanks to their encouragement, I excelled in my studies and became the first university student from our village. Driven by a deep love for my birthplace and its vulnerable ecosystems, I pursued a PhD in ecology.

In the decades since, rapid economic development in China has completely transformed my hometown's coastal landscape. The mudflats have been converted into farmland and aquaculture ponds, and chemical plants and paper mills now occupy the reed wetlands. Intensive corporate farmland, including the land my father used to own, is covered by rows of wind turbines that surround the formerly tranquil habitat of red-crowned cranes. The soaring orioles and flourishing grasses my father and I admired together have vanished.

I now lead projects focused on mudflat ecological restoration. My team explores nature-based solutions to restore native vegetation and works to mitigate pollution from chemical and paper mill waste. During the summer, I visit my hometown with my family. My father takes my daughters to the seaside with a small bucket for fishing and tells them about the landscape of my childhood: the pink saltwort, the lush green reeds, the white egrets and red-crowned cranes, and the numerous scuttling crabs. I hope that my work will help my daughters remember this mudflat, as my father and I do, and carry with them an everlasting nostalgia for this land.

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CALL FOR SUBMISSIONS

Past as Prologue is an occasional feature highlighting the role of family history in the life of scientists. What role did your family background play in your decision to pursue science, your field, or your career? Submit your story to http://cts.sciencemag.org