

## Science & Technology Briefs

### U.S. Nuclear Program ‘Not Even in the Race’ Compared to China

The U.S. Nuclear Regulatory Commission recently rejected Oklo Power Company’s application (for “lack of information”) to build and operate a revolutionary 1.5 MW compact fast reactor. Oklo is among the group of startups—including NuScale—that could initiate a renaissance in America’s nuclear power industry with small modular reactors (SMRs).

In a Jan. 31 [article](#) *Forbes* energy analyst Robert Bryce railed against U.S. incompetence, comparing the U.S. program with that of China, whose new high-temperature, gas-cooled reactor (HTGR) has recently been connected to its power grid and is now producing power. Bryce says the U.S. is not only losing the race, it’s not even in the race to begin with:

“To have a race, the competitors have to be assembled at a starting line. The hard truth for the U.S. nuclear sector is that bureaucratic inertia is preventing it from even approaching the starting line. Put short, while the U.S. dithers on regulatory matters, China is racing ahead with cutting-edge reactor designs that are safer and more flexible than the reactors now in use. According to Bloomberg, China now has 46 reactors planned or under construction. Meanwhile, here in the U.S., exactly two reactors are under construction.”

Perhaps it is because Bryce’s argument is made in “clean energy” climate-change terms, that the passion required to move the nation full steam ahead for fission and fusion is languishing. China doesn’t have that problem.

### Many Asteroids Are Closer Than You Think

Through the Jet Propulsion Laboratories’ Center for Near Earth Object Studies, NASA closely monitors the many asteroids that may orbit anywhere near Earth. The Center uses data from thousands of computerized telescopes to make comprehensive impact hazard assessments in support of the agency’s Planetary Defense Coordination Office at NASA Headquarters in Washington.

A [paper](#) published in February 2022 in the scientific journal *Icarus* by a group of NASA-backed scientists, warns of a potential “blind spot” in the eastern portion of the night sky. Several agencies have reported on these findings:

*Sputnik News*: “Due to the peculiarities of Earth’s elliptical orbit around the Sun and the planet’s eastward spin, some space objects might appear stationary when looked at through a telescope. Normally, near-Earth objects (NEOs) appear as drifting westward in the sky, but around half of them approaching the planet ‘from the east’ might fall into this blind spot and remain undetected for a long period of time.

“The computerized system of telescopes ignores ‘stationary objects’ so that supernovas would not confuse it. Yet, this contingency also allowed for [asteroid] 2019 OK to remain undetected instead of being spotted a month ahead of its passage near Earth. That means that this specific portion of the sky will have to be looked at more closely.”

NASA’s Jet Propulsion Laboratory: “Near-Earth objects are asteroids

and comets with orbits that bring them to within 195 million km of the Sun, which means they can circulate through the Earth’s orbital neighborhood. Most near-Earth objects are asteroids that range in size from about a few meters to nearly 40 km across.

“The orbit of each object is computed by finding the elliptical path through space that best fits all the available observations, which often span many orbits over many years or decades. As more observations are made, the accuracy of an object’s orbit improves dramatically, and it becomes possible to predict where an object will be years or even decades into the future—and whether it could come close to Earth.”

On Jan. 18, a large asteroid, 999 m in diameter, named 7482 (1994 PC1) passed by Earth at a distance of about 2 million km (about 5 times farther away than the Moon), travelling at about 72,400 kilometers per hour.

NASA’s Double Asteroid Redirection Test (DART) mission, launched Nov. 24, 2021, will test the ability of a direct crash of DART into an asteroid to successfully nudge it off its trajectory. Its target is the asteroid Dimorphos, the moon of a larger asteroid, Didymos. (Neither is a threat to Earth.) If the test is successful, this could be a viable strategy for diverting genuine threats.

The DART system will use particular stars to assist navigation to its target:

“On Tuesday, Dec. 7, the [DART] spacecraft popped open the circular door covering the aperture of its DRACO telescopic camera and, to everyone’s glee, streamed back the first image of its surrounding environment. Taken about 2 million miles (11 light

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seconds) from Earth—very close, astronomically speaking—the image shows about a dozen stars, crystal-clear and sharp against the black backdrop of space, near where the constellations Perseus, Aries and Taurus intersect.”

DART is scheduled to reach Dimorphos on Sept. 26, 2022. More on the DART mission is available [here](#).

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## American Scientists Rally Against ‘Woke’ Public School Math

California’s effort to win the race to the bottom of math education may have been jammed up, thanks to two open letters signed by almost 3,000 teachers, mathematicians, and others in California and across the nation.

In January, the California Department of Education (CADOE) produced a [working draft](#) of the new Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve. The CADOE has opened a 60-day period of public comment which has elicited immense criticism of both the overall tone of the document, as well as specific curriculum changes. The *stated intent* of the new 396-page *Framework* is to narrow the achievement gap between underprivileged children and those who are more affluent. However, the *real effect*, if implemented, will be to reduce access to an already terribly inadequate mathematics curriculum for all students, and replace the teaching of math with emotional discussions about dead-end subjects such as climate change and white privilege.

The most controversial tenet of the new *Framework* is that it discourages youth from getting to calculus during high school. It advises, among other things, that the way to give under-

achieving youth a better edge on math (or, “make math more equitable”) is to have all students take the same math classes up to 10th grade, and delay Algebra I until 9th grade.

The *Framework*’s primary author, Stanford University Professor Jo Boaler, has stated that “the push to calculus is deeply inequitable and has kept out students of color and girls for generations now.” What remains of the math classes will be focused on “data science” (e.g., compiling data into Excel spreadsheets and building PowerPoint presentations) infused with “trauma-informed pedagogy,” “environmental and social justice,” “contributions that historically marginalized people have made to mathematics,” and a rejection of the “ideas of natural gifts and talents.”

Though the *Framework* was to be implemented by the end of 2021, an Open Letter to Governor Gavin Newsome, Superintendent Tony Thurmond, the State Board of Education, and the Instructional Quality Commission, published by the Independent Institute, prompted CADOE to delay the *Framework*’s adoption until May 2022.

The [Open Letter](#), titled, “Replace the Proposed New California Math Curriculum Framework,” had been signed by 1,210 math professionals who work in California as of Dec. 7, 2021.

“Open Letter on K-12 Mathematics,” a follow-up [letter](#), published in early December 2021, addresses the national trend in math reforms, and targets the California *Framework* by name. It now has 1,545 signatures. That letter reports that these reforms, if implemented, will effectively privatize advanced primary school math education, since private schools will not have to follow the new guidelines.

It is unclear what will happen to the *Framework* between now and May, but

it is garbage and should be scrapped. As a single-issue fight, however, it misses the more important point: Mathematics as taught today merely teaches students to memorize and regurgitate rules, devoid of the process that led to those rules.

A real math education would seek to have the student recreate the discoveries that generated modern civilization, such as Nicholas of Cusa’s solution to the isoperimetric problem, Archytas’s doubling of the cube, and Carl Gauss’s proof of the Fundamental Theorem of Algebra. In reliving these discoveries, students would learn all the math mechanics they get in primary school along the way, but they would also become the reproducers of modern human culture, and producers of its future.

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## Turkey Inaugurates World’s Longest Suspension Bridge

On March 18, the Çanakkale 1915 Bridge, the world’s longest suspension bridge, spanning the Dardanelles strait, was inaugurated and opened to road traffic in a ceremony led by Turkey’s President, Recep Tayyip Erdoğan. The bridge took five years to build.

The main span is 2,023 meters, surpassing by 32 meters Japan’s Akashi Kaikyō Bridge. The Çanakkale 1915 Bridge carries three lanes in each direction, connecting the Gelibolu district of the northwestern Turkish province of Çanakkale on the European side and the Lapseki district on the Anatolian side. It is the centerpiece of the planned 321-km Kinalli-Balikesir Motorway.

March 18 marked the 107th anniversary of the 1915 Çanakkale Victory and Martyrs’ Day against the British and French during World War I.