



Adriana Serquis is the former head of Argentina's National Atomic Energy Commission.

large power plants can't be built. Nuclear scientists have been working for decades to create this type of reactor, and countries, including Argentina, have been in a race to get theirs fired up quickly. CAREM, a prototype, would use uranium fission to supply around 30 megawatts of electrical power. If successful, it could be scaled up to larger, commercial versions supplying 300 megawatts of electric power. More than \$600 million has been invested into CAREM since construction began in 2014, but another \$200 million to \$300 million is needed to finish it.

"It has less electrical production capacity than a nuclear power plant, but it's also cheaper and safer," says Tomás Avallone, a chemist and nuclear-reactor operator at the CNEA. It could bring power to 300,000 people, he says.

Another stagnating project is RA-10, a 30-megawatt reactor that would use neutron beams to produce medical radioisotopes. Scientists could also use RA-10 to conduct materials research. "It is a multi-purpose reactor," says Rodolfo Kempf, nuclear-waste manager at the CNEA. The main construction on RA-10 has been completed, Kempf says, but its instruments haven't been installed.

Argentina has so far invested more than \$400 million in building the reactor, and another \$80 million is needed. The commercial sale of the reactor design should provide a significant return on investment, say researchers who spoke to *Nature*.

Privatization push

The Milei administration has been advocating for the privatization of science and education in Argentina. In April, it sent a bill to Congress that includes a list of state companies to be fully or partially privatized. Nucleoeléctrica

Argentina, a state-run firm based in Buenos Aires that oversees the country's three nuclear plants, is on the list to be partially privatized. If this comes to pass, the government would maintain the majority of Nucleoeléctrica

shares, and its vote would be needed for actions that include expanding the capacity of a power plant.

Alfredo Caro, a nuclear physicist and former director of the CNEA's Bariloche Atomic Centre, estimates that a 30% stake in Nucleoeléctrica would be worth between \$700 million and \$1 billion. If that stake were sold, it might allow the government to finalize the construction of CAREM and RA-10, as well as to complete a planned upgrade of the Atucha I power plant, located about 120 kilometres northwest of Buenos Aires, to extend its lifetime, he says. "A partial privatization could help the sector carry on," Caro says, "but only if the funds that are raised remain in the sector and are not spent on other areas of the state" – a big 'if', given the financial crisis in Argentina. The country's gross domestic product is expected to drop by 3.3% this year, according to the Organisation for Economic Co-operation and Development.

Officials at Argentina's Secretariat of Energy and Nucleoeléctrica didn't respond to questions from *Nature* about their plans for the nuclear sector. Meanwhile, the bill to privatize state companies has been approved by the lower chamber of Argentina's Congress, and will now be considered by the Senate.

FRANCE'S RESEARCH MEGA-CAMPUS FACES LEADERSHIP CRISIS

The contest to elect the next president of Paris-Saclay University has collapsed, amid an ongoing row.

By Barbara Casassus

The board of directors of Paris-Saclay University, one of Europe's biggest research campuses, has failed to elect a president after three rounds of voting. The result reflects an ongoing row over the leadership and management structure of Paris-Saclay, which was formed by merging more than a dozen institutions in 2020.

The two candidates had disagreed about how best to solve problems around staff morale and working conditions at the university but, in a vote on 30 April, neither received enough support to be named president. Yves Bernard, an electrical engineer and former director of Polytech Paris-Saclay, one of the institutions that merged to form the university, won more votes than former president Estelle Iacona in all three voting rounds, but failed to score the 19 out of 38 votes needed for an outright victory.

The stalemate means the recruitment process must start afresh. Paris-Saclay's temporary administrator, Camille Galap, who has been at the helm since Iacona's term ended in March, has said that a new call for candidates will be published as soon as possible.

"Clearly, the recruitment process will take quite some time," says Patrick Couvreur, a pharmacologist at Paris-Saclay. "It is not good news for the university, after all the work that has been accomplished to give it an international dimension." Couvreur supported Iacona for the presidency.

Flawed organization

Paris-Saclay accounts for around 13% of French research and brings together 220 labs, nearly 50,000 students, 8,100 researchers and members of academic staff and 8,500 technical and administrative staff members. The mega-campus has arguably achieved its goal of shining on



Paris-Saclay University formed from a merger of numerous institutions.

the world stage: it was the first French university to appear on the Academic Ranking of World Universities' top 20 list, in 2020, and has done so every year since, placing 15th in 2023.

But Paris-Saclay's complex structure has led to a number of issues for its researchers. Paris-Saclay completely subsumed ten faculties and institutes of the Paris-Sud University, while four of France's *grandes écoles* – elite higher-education institutions – along with the Institute of Advanced Scientific Studies (*Institut des Hautes Études Scientifiques*) and two associate universities were brought under the same banner, but retained control over their budgets and recruitment.

The leadership has become increasingly multilayered, says Couvreur, which has increased the number of managers and the administrative burden on staff at all levels. "This is leading to burnout, and is a disincentive to young scientists, who complain they have to undertake work they weren't hired for."

Unfavourable conditions

In 2021, a study by Paris-based human-resources consultancy Degest, seen by *Nature*, concluded that working conditions for staff members had deteriorated since the merger. Despite a massive communications campaign, staff had only a hazy idea of what the Paris-Saclay project was all about, the study said. They also lacked motivation because they felt management did not listen to them, and they questioned the purpose of a number of plans, such as creating links between the various components of the institution, and creating new graduate schools and a bachelor's-degree institution. Some researchers feared a lack of resources for research, excessive time spent on coordinating operations and bidding for funding, competition between teams for the

cash available and heavier administrative workloads.

The two presidential contenders had quite different visions for the future of the university, and views on how to address its problems.

SCIENTISTS MOVE CLOSER TO ULTRA-PRECISE 'NUCLEAR' CLOCK

Timekeepers based on energy shifts in atomic nuclei could transform fundamental-physics research.

By Elizabeth Gibney

Physicists have taken a major leap towards making an entirely new type of clock – one based on tiny shifts in energy in an atomic nucleus. In principle, a nuclear clock would be even more precise than the world's current best timekeepers, known as optical clocks, and less sensitive to disturbances.

A nuclear timekeeper could also allow physicists to study fundamental forces of nature in new ways. "We will be able to probe scenarios of dark matter and of fundamental physics that are currently inaccessible to other methods," says Elina Fuchs, a theoretical physicist at CERN, Leibniz University Hannover, Germany.

The long-sought breakthrough – made by a collaboration between the Vienna University of Technology and Germany's national metrology institute, the PTB, in Braunschweig – involved

Bernard calls for a federated rather than centralized structure, with individual institutions working side by side. The distance of decision-making centres and central services from labs and teaching entities complicates management and procedures, Bernard says.

Iacona's expired term as president began after she took over the post from education and research minister Sylvie Retailleau, who headed Paris-Saclay until 2022. In her reelection campaign, she said she is against "massive change" and rejects the idea of returning to a federated structure.

"I am in favour of adjusting what we have already in order to build an integrated – not a centralized – structure, where we all decide on policy together, and award the same degrees at each level," she says.

The university's board of directors is divided on which is the best approach, and so far shows no signs of rallying behind a single candidate. It is possible that a future contest will include new contenders. Iacona is undecided about whether she will continue her reelection bid, but Bernard intends to stand again. "I can't identify any particular point in my programme that posed a problem," he says, adding that he needs "to think about that before deciding on any adjustments".

using an ultraviolet laser to prompt a nucleus of the radioactive metal thorium-229 to switch between energy states. The frequency of light absorbed and emitted by the nucleus functions as the clock's tick. The researchers published their work on 29 April (*J. Tiedau et al. Phys. Rev. Lett.* **132**, 182501; 2024).

"This is major," says Adriana Pálffy-Buß, a theoretical physicist at the University of Würzburg in Germany. Driving the transition with a laser is "the milestone you need to say 'I'll be able to build a clock'." "It is a culmination of nearly a half a century of effort," says Olga Kocharovskaya, a physicist at Texas A&M University in College Station.

Precision timing

Optical clocks keep time so well that they waver by just 1 second every 30 billion years or so. Their ticks are governed by the frequency of the visible light needed to shift an electron

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