TALKING BUSINESS Redeveloping one of New Orleans' biggest eyesores isn't easy 3E

SPOTLIGHT Creator of coveted pillows expands with new collaborations 9E

CAN TULANE RESEARCHERS

'CHANGE THE WORLD'?



STAFF PHOTOS BY CHRIS GRANGER

Jackson Smith, a Tulane University chemistry doctoral student working on the Genesis Mission project, handles materials inside an oxygen- and moisture-free glove box filled with argon gas. The controlled environment allows researchers to safely work with chemicals that react with normal air.

Team hopes AI will speed up the search for one of science's holy grails

BY RICH COLLINS
Staff writer

IDEAS & INNOVATION

More than a century ago, a Dutch scientist named Heike Kamerlingh Onnes earned a Nobel Prize in physics by discovering the world's first "superconductor," a material that can transfer electricity without heating up and losing energy.

Since that breakthrough, researchers around the world have identified thousands of similar materials that have been instrumental in creating some of science's modern marvels, including MRI machines that use superconductor-powered magnets to create detailed images of the inside of the human body.



Members of Tulane's Genesis Mission research team, led by professor Jianwei Sun, second from left, examine a 3D model of a known superconductor.

The only problem with all of those materials? They have to be very, very cold to become superconductors, which is why finding one that works at higher temperatures has been one of science's most elusive goals for years.

Now, a team of Tulane University scientists is trying to prove that artificial intelligence can speed up that search and give the U.S. a boost in the global competition for AI-fueled scientific breakthroughs in the process.

In July, Tulane physics professor Jianwei Sun and his team were among 278 awardees to beat out roughly

➤ See **RESEARCHERS,** page **2E**

$421M jury award against Blue Cross heads to La. high court

BY STEPHANIE RIEGEL
Staff writer

Nearly two years after an Orleans Parish jury rendered a $421 million judgment against Blue Cross and Blue Shield of Louisiana, finding the insurer shortchanged a New Orleans surgical hospital on thousands of reconstructive breast surgeries, the Louisiana Supreme Court is preparing to take up the landmark case.

On Tuesday, the state's high court is scheduled to hear oral arguments in the long-running litigation between St. Charles Surgical Hospital and Center for Restorative Breast Surgery, a privately owned surgical center, and the state's largest insurer.

In October 2024, a jury ruled that Blue Cross committed fraud by authorizing some 7,800 surgeries from 2015-23 then paying only about 9% of the bills, on average. Blue Cross denied the allegations, arguing that because the hospital is not a member of its provider network, it had no contractual obligation to pay anything.

Earlier this year, the Louisiana Fourth Circuit Court of Appeals overturned the jury award — the highest ever against Blue Cross and among the highest in the state's history — and sent the matter back to the lower court for a new trial.

Both sides in the dispute have since asked the Supreme Court to take up the matter. The hospital is seeking to reverse the Fourth Circuit ruling and reinstate the original judgment. Blue Cross wants the case, which has been litigated twice before, to be dismissed altogether.

The state's insurance industry is closely eyeing how things play out. In a state known for large jury awards, industry experts say the nearly half-billion-dollar judgment — which, with interest, now tops $655 million, court documents show — could have a chilling effect on the market and potentially drive up premiums.

"Louisiana already faces a property-insurance crisis," the Louisiana Association of Health Plans

➤ See **BLUE CROSS,** page **2E**



STAFF FILE PHOTO BY MICHAEL JOHNSON

On Tuesday, the state Supreme Court is scheduled to hear oral arguments in the long-running litigation between St. Charles Surgical Hospital and Center for Restorative Breast Surgery, a privately owned surgical center, and the state's largest insurer, Blue Cross and Blue Shield of Louisiana.

RESEARCHERS

Continued from page 1E

5,000 other applicants for a grant from Genesis Mission, a $5 billion multiagency federal initiative to use AI for scientific discovery. Two teams at LSU are also participating in the sprawling program created last November by the Trump administration, which earlier had cut funding for some university research.

The Tulane team, which is partnering on the project with the Oak Ridge National Laboratory in Tennessee, has nine months to spend $750,000 in a race to prove AI's value to their work. At stake is a second phase of funding that could unlock as much as $15 million for Tulane in what's become an increasingly competitive university research environment.

Sun said a bigger incentive is the chance his team could help researchers get one small step closer to a groundbreaking discovery.

"Finding a high-temperature superconductor would change the world just like the Copper Age or Iron Age did thousands of years ago," he said during an interview with his team earlier this month. "I'm very excited about demonstrating that AI can accelerate this type of discovery."



STAFF PHOTOS BY CHRIS GRANGER

Jackson Smith, a Tulane University chemistry doctoral student working on the Genesis Mission project, uses a torch to melt quartz tubing to make a container for high-temperature chemical reactions. A team of Tulane scientists is trying to prove that artificial intelligence can speed up the search for superconductors and give the U.S. a boost in the global competition for AI-fueled scientific breakthroughs in the process.

Finding the 'holy grail'

In addition to their vital contribution to MRI machines, superconductors are used to improve the performance of particle accelerators used to study the building blocks of matter, and they can be found in some quantum computers and special power systems.

In each scenario, these materials only function at temperatures colder than outer space or under pressure thousands of times greater than the deepest part of the ocean, which means engineers have to create expensive systems to maintain those conditions. The superconducting wires inside MRIs, for instance, are encased in a cryostat — essentially a fancy thermos — that's filled with liquid helium to act as a coolant.

These limitations are why the search for a superconductor that works in warmer conditions and in a lower pressure environment takes on such weight.

"It would be like finding the holy grail of science," said Daniel Straus, a Tulane assistant professor of chemistry and a member of Sun's team.

The thirst for a breakthrough was evident three years ago, when researchers in South Korea set off a frenzy among their fellow scientists — and Silicon Valley investors — by announcing they'd found a superconductor that was stable at room temperature. Ultimately, when attempts to reproduce the results failed, the discovery was declared a bust, and that team went back to square one.

Scientists have, over time, found superconductors that work at higher temperatures than their predecessors from a century ago — but still nowhere near conditions found naturally anywhere on Earth.

That breakthrough remains a dream that experts say could pave the way for superefficient power grids; tiny, hyperefficient electronics and motors; and even trains that run via "magnetic levitation." It could also unlock advances in insanely complicated and powerful quantum computers that could, among things, make data centers obsolete.

Straus said superconducting power lines could also make it possible to transmit electricity over long distances with minimal energy loss, which means utilities could build nuclear power plants "in the middle of nowhere" so there's less danger to people if there's an accident.



Smith aligns a crystal for an X-ray diffraction measurement, a technique used to determine the structure of materials synthesized.



Smith uses a torch to melt quartz tubing to make a container for high-temperature chemical reactions.

'The ultimate goal'

On a recent weekday afternoon, as thousands of undergrads strolled across Tulane's campus in the sweltering heat, Sun's team of chemists, physicists and computer scientists were gathered around a conference table on the second floor of the Stanley Thomas Building, one of several that houses the university's roughly 3,000-student School of Science and Engineering.

Partners from the Oak Ridge National Laboratory, a high-tech research facility with its origins in the World War II-era Manhattan Project, joined the conversation via video conference.

It was the Genesis Mission group's first "all hands" meeting, and by the end of the conversation, team members had signed off on a plan of attack for the coming months that capitalizes on their different areas of expertise as they compete to unlock a second tranche of funding.

The first step will be for the team's physicists and computer scientists to write algorithms that will sift through massive databases of existing materials to identify the ones that have the potential to be superconductors.

"Instead of starting from scratch and saying, 'How many oxygens am I going to put in this?' we find something that someone has made but didn't report if it was a superconductor," said Jackson Smith, a Ph.D. student of chemistry.

"Based off of what AI says, we can narrow down the search faster with AI than with human eyes," he said.

But using computers to aid the search isn't as simple as typing a question into a ChatGPT search box. Instead, the computer scientists and AI specialists have to create elaborate "quantum-mechanical simulations" that help predict how atomic and subatomic matter might behave. Logging into a state-owned "supercomputer" dubbed LONI (the Louisiana Optical Network Initiative) will cut the time it takes to run these complicated algorithms from months to days, Straus said.

Aron Culotta, a Tulane professor of computer science, believes the tools will make a "huge impact" as his team combs through curated repositories like the Inorganic Crystal Structure Database and the Cambridge Structural Database, which both compile details about the atomic structure of materials from more than a century of scientific research.

"AI is good at sifting through lots of information and finding patterns," he said. "There's a lot of room to make the process faster and more effective while humans stay in control."

After identifying promising materials, the researchers will recreate them in Tulane's labs by combining different chemical compounds and heating them in special furnaces. Then the most promising materials studied in Tulane's labs will go for further study at Oak Ridge, which has highly specialized equipment for that purpose.

"It is impossible to just use theory alone, like computations, to predict a new superconductor," Straus said. "We have to make them and test them."

By next March, at the six-month mark of Sun's project, the team hopes to show that AI was able to identify at least a handful of existing materials that have superconductive properties.

"The goal is to demonstrate accelerated discovery, compressing what would normally take 10 or 20 years into that time," Straus said.

If second-phase funding is unlocked, Culotta said the team could scale up by looking for new materials that haven't ever been studied and automating more of the process.

"We've already got plenty of superconductors that require impractically low temperatures to operate," he said. "Finding ones that function at higher temperatures is the ultimate goal."

Email Rich Collins at rich.collins@theadvocate.com.

BLUE CROSS

Continued from page 1E

said in a "friend of the court" brief filed in the case. "If this Court does not put an end to this litigation and dismiss (the case) once and for all, the State will be on the brink of a health-insurance crisis too."

James Williams, the hospital's attorney, declined to comment.

Blue Cross, in a statement, said, "Louisiana Blue has always been confident in its position and appreciated receiving the Fourth Circuit Court of Appeal's decision reversing the judgment. Throughout this process, we have remained fully committed to improving the health and lives of Louisianians by ensuring access to high quality, affordable care."

Networks and contracts

The upcoming hearing before the state's high court is the latest installment in a yearslong legal battle between Blue Cross and the surgery center, which performs cutting-edge reconstructive surgical techniques on about 1,000 cancer patients a year, most from out-of-state.

Problems between St. Charles Surgical Hospital and the insurer began in 2007, when the hospital dropped out of the Blue Cross network because it felt its reimbursement rates were too low. Insurance companies create networks of doctors and hospitals, which agree to offer discounts in return for greater patient volume. Patients who go to providers outside of their network typically agree to pay higher out-of-pocket costs.

In the years that followed, the hospital continued to treat Blue Cross patients because the surgeries were authorized by the insurance company. But the surgeons received only a fraction of the charges they billed, the hospital has said.

Blue Cross countered that authorizing a treatment does not guarantee payment and that insurers do not have a set reimbursement rate that they pay out-of-network providers. Rather, they negotiate individual deals with brokers or employers.

Blue Cross also argued that its actions do not constitute fraud, noting in court documents that it successfully defended two similar suits brought by St. Charles Surgical Hospital in federal court in the early 2010s.

'Elements of fraud'

The judgment in the complex case, tried over three weeks in Orleans Parish Civil District Court Judge Sidney Cates' courtroom, came after less than two hours of jury deliberations.

Among the many issues Blue Cross raised on appeal, besides arguing that the hospital failed to prove the fraud allegation, was that the trial court improperly instructed the jury about what constitutes fraud.

A three-judge appellate panel in March agreed, finding that "the trial court's jury instruction omitted … an essential element of a fraud claim … a legal error that was exacerbated by its submission to the jury of an inadequate jury form."

As a result, the panel ruled, "no weight should be afforded to the jury's verdict."

Still, the Fourth Circuit said the case should be retried anyway because "the nature and magnitude of the underlying dispute at issue here make deciding the issues presented on a cold record impossible."

Industry ramifications

The hearing comes as employers around the state, who help cover the cost of health insurance for more than 40% of all people in Louisiana, are negotiating new benefits plans for 2027. Experts say they're in for sticker shock.

Insurance premiums for employer-sponsored health plans rose 15% on average in 2026 over the year before. Increases are not expected to be quite as steep in 2027, though they could top 10%.

Insurance industry advocates have said the reinstatement of the near-record jury award in the Blue Cross case would scare away potential insurers and "cause expenses for the state's existing health-insurance plans to skyrocket," according to the Association of Health Plans brief.

"After all, why would a company choose to do business in a State where it cannot enforce its contracts?" the brief argues. "The result would be further-diminished competition in a State that already has one of the least competitive commercial health-insurance markets in the country. And it is Economics 101 that less competition leads to higher prices."

Email Stephanie Riegel at stephanie.riegel@theadvocate.com.

