

in Oncology, a network that works with the NCI to develop and conduct cancer clinical trials.

Elizabeth Jaffee, a cancer immunologist at the Johns Hopkins School of Medicine in Baltimore, Maryland, who leads US President Joe Biden's cancer advisory panel, says Bertagnolli has a knack for bringing companies, government agencies and patient-advocacy groups together to accomplish her vision. This skill will serve Bertagnolli well as she steps up to oversee research that is beyond her field of immediate expertise and pushes Congress to fund the agency.

In December, Bertagnolli announced that she had been diagnosed with breast cancer. At an American Association for Cancer Research meeting in Orlando, Florida, this month, Bertagnolli said that her treatment had gone well and that her prognosis is "incredibly good".

"It's not a walk in the park," she said of the experience. "But I've had tremendous support." Bertagnolli also noted that she was a participant in a clinical trial to develop a new diagnostic approach.

Challenges ahead

That it has taken more than a year to find Collins's replacement has raised some concerns, given the NIH's broad research portfolio and its role in funding COVID-19 research.

The potential nomination coincides with House Republicans vowing to investigate the NIH's role in relation to the COVID-19 pandemic. The Senate confirmation process for NIH directors is usually uncontroversial, but some worry that the politicization of science during the pandemic might have eroded the bipartisan support that the NIH has typically received.

The next NIH director will have their work cut out for them: not only will they have to manage congressional probes, but researchers have called on the NIH to take bold action to bolster the diversity of the biomedical workforce, quicken the pace of innovation and ensure the agency continues to fund research at a rate matching inflation.

Lawrence Shulman, a clinician and specialist in health-services research at the University of Pennsylvania in Philadelphia, says that Bertagnolli is a visionary leader. "It's like a chess game, she's always thinking several steps ahead," he says. "She has a long experience of understanding cancer medicine from the trenches but also understands how large organizations work."

In particular, Shulman says, her push to accelerate clinical trials and diversify the populations enrolled in trials at the NCI, which is based in Bethesda, Maryland, will be a welcome change if applied to the NIH at large.

The White House and Bertagnolli did not immediately respond to a request for comment. The NIH referred *Nature* to the White House for comment.

AI SCIENCE SEARCH ENGINES EXPLODE IN NUMBER

Tools powered by large language models are intended to help researchers digest or do science.

By Katharine Sanderson

As large language models (LLMs) gallop ever onwards – among them GPT-4, OpenAI's latest incarnation of the technology behind ChatGPT – scientists are beginning to make use of their power. The explosion of tools powered by artificial intelligence (AI) includes several search engines that aim to make it easier for researchers to grasp seminal scientific papers or summarize a field's major findings. Their developers claim the apps will democratize and streamline access to research.

But some tools need more refinement before researchers can use them to help their studies, say scientists who have experimented with them. Clémentine Fourrier is a Paris-based researcher who evaluates LLMs at Hugging Face, a company in New York City that develops open-source AI platforms. She used an AI search engine called Elicit, which uses an LLM to craft its answers, to help find papers for her PhD thesis. Elicit searches papers in the Semantic Scholar database and identifies the top studies by comparing the papers' titles and abstracts with the search question.

Variable success

Fourrier says that, in her experience, Elicit didn't always pick the most relevant papers. The tool is good for suggesting papers "that you probably wouldn't have looked at", she says. But its paper summaries are "useless", and "it's also going to suggest a lot of things that are not directly relevant", she adds. "It's very likely that you're going to make a lot of mistakes if you only use this."

Jungwon Byun, chief operating officer at Ought, the company in San Francisco, California, that built Elicit, says: "We currently have hundreds of thousands of users with diverse specializations so Elicit will inevitably be weaker at some queries." The platform works differently from other search engines, says Byun, because it focuses less on keyword match, citation count and recency. But users can filter for those things.

Other researchers have had more positive experiences with the tool. "Elicit.org is by far my favourite for search," says Aaron Tay, a librarian at Singapore Management University. "It is close to displacing Google Scholar as my

first go-to search for academic search," he says. "In terms of relevancy, I had the opposite experience [to Fourrier] with Elicit. I normally get roughly the same relevancy as Google Scholar – but once in a while, it interprets my search query better."

These discrepancies might be field-dependent, Tay suggests. Fourrier adds that, in her research area, time is crucial. "A year in machine learning is a century in any other field," she says. "Anything prior to five years is completely irrelevant," and Elicit doesn't pick up on this, she adds.

Full-text search

Another tool, scite, whose developers are based in New York City, uses an LLM to organize and add context to paper citations – including where, when and how one paper is cited by

"A year in machine learning is a century in any other field."

another. Whereas ChatGPT is notorious for 'hallucinations' – inventing references that don't exist – scite and its 'Assistant' tool remove that headache, says scite chief executive Josh Nicholson. "The big differentiator here is that we're taking that output from ChatGPT, searching that against our database, and then matching that semantically against real references." Nicholson says that scite has partnered with more than 30 scholarly publishers, including major firms such as Wiley and the American Chemical Society, and has signed a number of indexing agreements – giving the tool access to the full text of millions of scholarly articles.

Nicholson says that scite is also collaborating with Consensus – a tool that "uses AI to extract and distil findings" directly from research – launched in 2022 by programmers Eric Olson and Christian Salem, both in Boston, Massachusetts. Consensus was built for someone who's not an expert in what they're searching for, says Salem. "But we actually have a lot of researchers and scientists using the product," he adds.

Like Elicit, Consensus uses Semantic Scholar's data. "We have a database of 100-million-plus claims that we've extracted

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from papers. And then when you do a search, you're actually searching over those claims," says Olson. Consensus staff manually flag contentious or disproven claims – for example, that vaccines cause autism, says Olson. "We want to get to a state where all of that is automated," says Salem, "reproducing what an expert in this field would do to detect some shoddy research."

Meghan Azad, a child-health paediatrician at the University of Manitoba in Winnipeg, Canada, asked Consensus whether vaccines cause autism, and was unconvinced by the results, which said that 70% of research says vaccines do not cause autism. "One of the citations was about 'do parents believe vaccines cause autism?', and it was using that to calculate its consensus. That's not a research study

giving evidence, yes or no, it's just asking what people believe."

Mushtaq Bilal, a postdoctoral researcher at the University of Southern Denmark in Odense, tests AI tools and tweets about how to get the most out of them. He likes Elicit, and has looked at Consensus. "What they're trying to do is very useful. If you have a yes/no question, it will give you a consensus, based on academic research," he says. "It gives me a list of the articles that it ran through to arrive at this particular consensus."

Azad sees a role for AI search engines in academic research in future, for example in replacing the months of work and resources required to pull together a systematic review. But for now, "I'm not sure how much I can trust them. So I'm just playing around," she says.

Sampson, a sociologist at Harvard University in Cambridge, Massachusetts.

During the first year of the COVID-19 pandemic, the size of the US prison population dropped by at least 17%: courts in almost every state closed, admissions fell to about 30% of pre-pandemic levels and roughly 200,000 people were released.

To investigate the impact of this change on the racial composition of prisons, researchers in biology, mathematics, data science and history compiled more than 20 years' worth of demographic records on prison populations in all 50 states and Washington DC.

Black and Latino people are disproportionately incarcerated in the United States relative to their share of the general population. The researchers found that the proportion of incarcerated Black people had been decreasing in the seven years before 2020 (see 'Prison disparities'). In March 2013, Black people accounted for about 41.6% of prison populations. By March 2020, the percentage had fallen to 38.9%. But by November 2020, during the height of COVID-19 restrictions, the percentage of incarcerated people who were Black climbed back up to 39.8%.

Surprising reversal

To explain the reversal, the researchers examined racial differences in admissions, releases and sentencing. Neither admissions nor releases alone could explain the trend.

The team found that the trend could be explained largely by the longer sentences that Black people receive, on average, combined with the pandemic-induced reduction in admissions. "Black people are, on average, serving sentences that are 20% longer than white people," says study co-author Brennan Klein, a network scientist at Northeastern University in Boston, Massachusetts.

The team found that the proportion of imprisoned people who were Latino increased as well, but not by as much as the proportion of those who were Black. This was mainly because the differences in sentencing for Latino people compared with white people vary between states. For example, in Illinois, both Black and Latino people serve longer sentences than white people do, but in Texas, white and Latino people's sentences are similar.

By the end of 2021, the proportion of incarcerated people in the United States who were Black or Latino had returned to pre-pandemic levels, as admission rates began to increase. But the study's authors hope their results will help to reshape how the criminal-justice system addresses racial inequalities. "We can look at the way that we sentence people, who we sentence and how long we sentence people. And that alone will help us reduce these really alarming disparities," says Elizabeth Hinton, a historian at Yale University in New Haven, Connecticut, and a co-author of the study.

RACIAL INEQUALITIES DEEPENED IN US PRISONS DURING COVID

The proportion of incarcerated people who were Black and Latino increased during the pandemic.

By Myriam Vidal Valero

The COVID-19 pandemic brought about the largest decrease of the US prison population in the country's history. Now, newly compiled data show that white people disproportionately benefited from this reduction.

Around the pandemic's start in early 2020, the proportions of Black and Latino people in the US prison population began to increase, while the proportion of white people started

decreasing. The researchers who made the discovery, published on 19 April, attribute it largely to the shorter sentencing, on average, that white people receive in US courts (B. Klein *et al. Nature* <https://doi.org/j6rr>; 2023). (Although the word 'Latino' is used throughout this story, the study included women, men and other genders where data were available).

"This finding is somewhat unexpected because of the progress that's been made in recent decades in reducing prison populations and racial disparities in them," says Robert

PRISON DISPARITIES

During the height of pandemic restrictions, the proportions of incarcerated people in the United States who were Black and who were Latino* rose, while the proportion who were white fell.

