

own history.”

The two paintings were part of a trove of artwork that French investigators uncovered in a restorer’s workshop in 2019. Of some 600 paintings, dozens appeared to be mid-level masterpieces from the late nineteenth and early twentieth century. But experts questioned the works’ authenticity because the paint seemed relatively fresh.

To investigate the potential forgeries, the French government’s Central Office for the Fight against Illicit Trafficking in Cultural Property (OCBC) called on Beck. Her team selected a few works, including an impressionist garden scene and a pointillist port landscape, to test. At the OCBC office, the researchers used scalpels to remove samples, including a small bit of fibre from the canvases.

Advances in the field

All living things take in carbon, including radioactive carbon-14, from the atmosphere and from food. When a plant – such as linen or hemp, commonly used to make canvas – dies, the carbon-14 that it incorporated continues to decay. Radiocarbon dating measures what’s left to estimate the time that’s passed, says Mariaelena Fedi, a physicist at the National Institute for Nuclear Physics in Florence, Italy. The technique gives an absolute earliest date of an artwork, because there could be years between harvesting linen for a canvas and making the painting.

Atomic-bomb testing, which began in the 1940s and took off in the 1950s, bumped up the amount of carbon-14 in the atmosphere beyond naturally produced levels. Carbon-14 peaked around 1964 and tailed off after a partial ban on nuclear tests. Researchers can easily identify materials containing modern bomb-derived radiocarbon because their carbon-14 concentrations are higher than pre-1950s levels.

Beck’s team tested its samples to see whether they bore the signature of that bomb-derived radioactive carbon-14. In the laboratory, the researchers cleaned and dried the material, whittling down several milligrams into around one milligram of carbon that was pressed into a graphite puck to be measured with accelerator mass spectrometry.

The canvas fibres from both the impressionist and pointillist paintings clearly contained carbon from either the mid-1950s or after the year 2000, the researchers reported. (This is because the carbon-14 concentrations they measured could correspond to either side of the atomic bomb peak.) Another fibre, plucked from the varnish of the pointillist painting and perhaps coming from a brush, also dated to after 1950. Beck acknowledges that, ideally, the team would do further chemical analysis to support its findings, but the researchers were limited by the tight time frame of the investigation.



L. BECK

Beck’s team removed a fibre from the canvas to test the painting’s authenticity.

Although this seems to be the first report of using radiocarbon dating to identify faked artwork in a police investigation, researchers have been laying the groundwork for the past decade.

Fedi and her colleagues made the first report of radiocarbon dating to detect a forged painting in the Peggy Guggenheim Collection in Venice, Italy, in 2014. The team collected snippets of the canvas and dated them to after the presumed artist’s death – concluding that the painting had been forged².

In 2019, Laura Hendriks and colleagues used a known forgery of a village scene to test a radiocarbon dating method that used a much smaller sample size than previous techniques. Hendriks, a chemist at the University of Applied Sciences and Arts of Western

Switzerland in Fribourg, converted a sample of the scene’s oil paint to carbon-dioxide gas before introducing it to the mass spectrometer. The team was able to date the forgery using only micrograms collected from the painting³. The tiny sample was “just a few crumbs of dust, basically”, Hendriks says.

Such advances are good news for the field. There’s a huge need for objective tools to suss out fakes, Fedi says, and radiocarbon dating is excellent when combined with other methods and the expertise of art scholars who can help to interpret the history of these complex objects.

1. Beck, L. et al. *Forensic Sci. Int.* **333**, 111214 (2022).

2. Caforio, L. et al. *Europ. Phys. J. Plus* **129**, 6 (2014).

3. Hendriks, L. et al. *Proc. Natl Acad. Sci. USA* **116**, 27 (2019).

RESEARCHGATE DEALT A BLOW IN COPYRIGHT LAWSUIT

Court ruling says that the academic-networking website is responsible for uploaded papers.

By Diana Kwon

A landmark court case in which two major academic publishers sued the popular website ResearchGate for hosting 50 of their copyrighted papers has come to a close – although both sides say that they will appeal. The court in Munich, Germany, has not only

prohibited ResearchGate from hosting the papers, but also ruled that it is responsible for copyright-infringing content uploaded on its platform. The decision has the potential to set a precedent for further restrictions on the site, which has 20 million users worldwide.

Neither side emerged a clear winner in this case, says Nancy Sims, a librarian at the University of Minnesota in Minneapolis who

specializes in copyright issues. “Each party got some pieces that were very favourable to them and some pieces that were less favourable to their claims.”

Elsevier, which is based in Amsterdam, and the American Chemical Society (ACS), in Washington DC, filed the lawsuit against ResearchGate in a regional court in Munich in 2017, alleging that the site had made copyrighted material freely available. ResearchGate said that it could not be held responsible for the content, which was uploaded by authors.

“We are pleased with the verdict,” says a spokesperson for the Coalition for Responsible Sharing, a group of publishers – including Elsevier and the ACS – that was formed in 2017. “The clear aim of the legal action was to clarify the responsibilities of ResearchGate for the content that it illicitly distributes on its site, which it does for its own commercial gain.”

“We believe that the outputs of scientific research, the majority of which is funded by public money, should be shared as openly as possible and we’ll continue to support researchers in sharing their work easily and legally,” says a spokesperson for ResearchGate. They add that it is up to publishers to work with platforms to remove uploaded content, and that in the years since the case was first brought they had introduced software that could help to prevent the sharing of copyrighted material. In a public statement posted after the Munich court’s 31 January ruling, ResearchGate said that it would appeal against parts of the decision.

Wins and losses

ResearchGate has had a complicated relationship with academic publishers since its foundation in 2008. Many researchers use the platform to upload and share documents, including their published research. As well as initiating legal action, publishers have been sending take-down notices to the site for years, demanding that it remove paywalled articles.

The Munich lawsuit focused on 50 articles on the site, all of which have since been removed. The court ruled not only that the uploaded articles breached the publishers’ copyrights, but also that ResearchGate was responsible for the content on its platform. “Only a sample of 50 articles was included, but the verdict speaks to the responsibility of the site in general,” says the spokesperson for the Coalition for Responsible Sharing.

However, the direct implications for any article other than the 50 named in the lawsuit are unclear, says Guido Westkamp, who studies intellectual property and comparative law at Queen Mary University of London. If the reasoning applied in the court’s judgment remains unaltered after an appeal, the precedent will also apply – in Germany, at least – to any future lawsuits against ResearchGate, he says. But the ruling is “far from a blocking

order”, he adds. “In principle, any other content is subject to a new lawsuit.”

The court rejected the publishers’ request to be paid damages, noting that they did not have sufficient evidence to show that standard copyright-licensing agreements, which are typically signed only by a paper’s corresponding author, prove that all authors agree to transfer ownership to the publisher. The publishers have said that they plan to appeal against this decision.

In the years since the lawsuit was filed, the academic publishing world has undergone a sea change. A growing open-access movement has led many publishers to make more of their articles freely available. And while Elsevier and the ACS have been locked in a legal battle with ResearchGate, several other big publishers, such as Wiley and Springer Nature, have instead partnered with the platform to enable it to share published papers. (*Nature*’s news team is editorially independent of its publisher, Springer Nature.)

In the European Union, there has also been a shift in copyright law. One article of sweeping copyright legislation that came into effect last year makes content-sharing platforms responsible for content uploaded by their users. That could make ResearchGate liable for damages in

the future, Westkamp says. ResearchGate has stated that it believes it is not subject to these rules because of the “nature of [its] business”. Nevertheless, the platform has developed software that matches rights information from publishers to papers during the uploading process, to prevent researchers from posting content that they are not permitted to share.

Public-interest argument

ResearchGate is embroiled in a similar lawsuit with the same two publishers in the United States. The site potentially has a stronger case in the US court, because decisions could hinge on the issue of fair use rather than copyright law alone, Westkamp says. “The public-interest argument would be way stronger in the States than it is in Germany,” he says. ResearchGate could argue that copyrighted papers should be made available on its platform for the sake of freedom of access to knowledge.

In the long term, he says, it is up to publishers to decide how to deal with ResearchGate. “From a purely commercial point of view, you don’t want competition,” he says. But attempts to “eradicate” the platform could anger the authors and members of the scientific community on whom publishers rely.

THIS US SUPREME COURT DECISION COULD DERAIL BIDEN’S CLIMATE PLAN

Controversial lawsuit has put the US government’s ability to slash carbon emissions on the line.

By Jeff Tollefson

The US Supreme Court heard oral arguments on 28 February in a controversial lawsuit that could deal yet another blow to President Joe Biden’s climate agenda. Depending on how the court rules, the lawsuit has the power not only to prevent the US Environmental Protection Agency (EPA) from regulating future greenhouse-gas emissions, but also to potentially reshape other US agencies’ regulatory powers.

The unusual case hinges on a years-long legal tussle over two EPA policies crafted under former presidents Barack Obama and Donald Trump that sought to regulate power-plant emissions in opposing ways. Neither policy ever took effect, and it’s that fact that sets this case apart: normally, the Supreme Court would not agree to hear regulatory cases in which there is no regulation to debate. The group of Republican-led states and coal

companies suing the EPA, however, are raising the spectre of future regulations that could hamper a crucial sector of the US economy – the electricity industry.

“This is not about stopping climate-change efforts,” West Virginia attorney-general Patrick Morrisey, a Republican, said in a statement released after the arguments this week. “The future of our nation is at stake. This case will determine who decides the major issues of the day.”

The Biden EPA and its allies – including and public-health advocates – see it as a brazen attempt to restrict the government’s power over industry and pollution control. “The arguments being raised here really are breathtaking in terms of trying to limit the government’s ability to protect public health and welfare,” says Sean Donahue, a lawyer with Donahue, Goldberg & Littleton in Washington DC, who represents the group weighing in on behalf of the EPA.