Vesalius Innovation Awards

Impactful technology and the Research World

The Vesalius Innovation Awards is a yearly event hosted by Karger Publishers which honours young and innovative start-up companies in the fields of health and open science. The award's name comes from the 16th-century physician Andreas Vesalius, a pioneer in the field of human anatomy, whose work revolutionised medicine for generations to come. This article features interviews with the three finalists of the 2022 Vesalius Innovation Awards: scientifyRESEARCH, SciScore and imagetwin. We discuss how their platforms impact the research world and their perspectives on the impact of technology on the future of research.

scientifyRESEARCH

The first problem facing many researchers is to secure appropriate funding. Even once they find an appropriate opportunity, the application process is a challenge. scientifyRESEARCH helps address this by providing a database of open research funding calls, as well as organising webinars and producing publications to demystify research funding. Kate Gardner, Co-founder of scientifyRESEARCH, discusses their work in more detail below.

Could you tell us about the work of scientifyRESEARCH and the services you offer?

At scientifyRESEARCH, our mission is to connect researchers with funding information; our vision is for a world where the best research and the most promising researchers are funded.

We launched our research funding database in 2021. It is open, curated and structured in a way that makes it easy for researchers to find relevant research funding opportunities. Researchers have confirmed that it's much easier, and they're grateful to have a simple way to quickly find new funding options – often opportunities they've never seen before. We have tailored content alerts to send emails to researchers each time a relevant opportunity is posted. We will soon be launching a premium version of our database which will allow users to find funding even faster with additional search filters and added functionality.

We're changing the way researchers approach research funding by helping them discover new, global funding opportunities. There is an imbalance among funders. The famous funders receive a majority of the applications, leading to a hypercompetitive funding environment. Our database increases awareness and helps researchers identify suitable funding opportunities.

In addition to our database, we provide webinars throughout the year to discuss research funding, eg, we host webinars annually on International Women's Day to share information about women's funding opportunities, and we've hosted webinars for diabetes research funding and climate research funding to just name a few! We collaborate with active researchers as guest speakers to bring these webinars to their networks.

Our blog features interviews with funders and funding recipients as well as relevant content to demystify the funding applicant process, and we're working to bring more science communication and varied content to our blog this year. We also regularly post events about research funding and research upskilling to help researchers with oversight of useful events.

Through all our offerings, our goal is to empower researchers with information to help them save time through easily identifying the right funding opportunities and therefore have more time for research.

How does your technology platform improve the research process today?

Great research starts with funding. Funding is the beginning of the research cycle and fundamental to ensuring research can continue to solve our global challenges. We believe that the complexity of the challenges we face today as a society requires large-scale collaborations.

We also believe that fair and effective research funding starts with all qualified researchers having access to research funding information. Our database ensures that globally, researchers have easy access to relevant funding information.

What are your perspectives on how advancements in technology will impact research in the future?

Technology should enable researchers to focus on research, it should not add more bureaucracy. Technology should make every aspect of the research process faster and more efficient. In an ideal world, researchers should have all relevant funding information at appropriate times. Grant applications should focus on the scientific rigor of the proposal rather than any formatting requirements. Literature search should be complemented with information synthesis, and the information support should also accompany experimental designs; it should be super easy to find and compare reagents, and more.

The human brain can achieve amazing things – if only it has the right support from technology and does not become overburdened by technology or any bureaucratic requirements imposed by institutions!

As scientifyRESEARCH, we strongly believe that technology plays an integral part in empowering researchers and human ingenuity. This partnership between human ingenuity and technology is fundamental to advancing the UN's sustainable development goals.

> ## scientifyRESEARCH: Our goal is to empower researchers with information to help them save time through easily identifying the right funding opportunities.

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SciScore

Understanding how the work has been performed is a vital part of any published research, ensuring its transparency and reproducibility. However, as research becomes advanced so too do the requirements of a methods section. SciCrunch help address this. Their tool, SciScore, allows publishers to easily review the components of a methods section, highlighting whether any are missing. We spoke to CEO Anita Bandrowski to find out more.

Could you tell us about the work of SciScore and the services you offer?

SciScore is an academic artificial intelligence robot that detects whether the methods section of a medical, biomedical, or life sciences paper addresses consensus rigor and reproducibility criteria (eg, NIH, MDAR, ARRIVE, and CONSORT criteria, Landis et al, 2013). The tool will tell the user whether the text contains things like a statement about blinding, replication, randomisation of subjects, or sufficient information about antibody reagents. It is tuned to work with authors before they publish to help them address things they might not remember to put into the paper.

While AI-driven tools can perform a wide range of tasks, for many human input and review is still required.

reagent is problematic, such as a cell line that has been 'mis-diagnosed' or had become contaminated.

One society publisher asks authors to meet a particular numerical score before the paper is accepted for publication. The score can be met in many ways, but the effect seems to be that most authors have to think a little more than they might normally think about rigor and reproducibility before they publish.

Tools like SciScore are able to do routine tasks like checking if there is a catalog number and an RRID (Research Resource Identifier) associated with each plasmid, antibody, model organism, or software project. These tasks are so mundane that they can be hard for humans to perform reliably, as they can easily be forgotten or overlooked. Though these tools can help, the AI revolution is still far from being able to interpret scientific studies correctly, a task that remains uniquely human.

> **SciCrunch: The AI revolution is still far from being able to interpret scientific studies correctly, a task that remains uniquely human.**

How does your SciScore platform improve the research process today?

SciScore works within preprint and publishing platforms, allowing reviewers and editors to see reports for each paper. If manuscripts are missing parts that should be addressed by authors, editors can ping authors whether a particular rigor criterion, such as the Institutional Review Board statement, should be included in the study. Authors can be alerted if a particular

What are your perspectives on how advancements in technology will impact research in the future?

SciScore is an AI tool, and we hope that this tool is useful to publishers and authors in the same way as Grammarly and autocorrect are now commonly used. AI is a technology that is finally making a significant impact on the research world, but like every other tool, it has both benefits and drawbacks.

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SciScore

imagetwin

Selective and outright falsified results have been a consistent problem for as long as research has been published. Imagetwin helps to counter this by analysing the images included in research papers. As new advances such as AI image generation improve, the need for such intelligent safeguards for ensuring the validity of research. Co-Founder Patrick Starke, discusses the work of imagetwin below.

Could you tell us about the work of imagetwin and the services you offer?

Imagetwin is the solution to detect manipulations and duplications in figures of scientific articles. By comparing the figures with a database of existing literature, problematic images will be identified within seconds for all kinds of scientific image types.

A significant proportion of academic manuscripts contain image-related problems like manipulation and plagiarism. Unfortunately, even though automated solutions for text plagiarism now exist, there was no such solution for images in the past. Manually checking images for integrity issues is time-consuming and expensive, and besides the lack of trained experts, many problems remain undetected.

Imagetwin solves this issue by offering automated detection of problematic images, using state-of-the-art AI-technology. The software examines papers within seconds and compares them against a database of millions of previously published articles.

We started imagetwin as a research project at the Vienna University of Technology, Austria, in 2016. After six years of development, the solution is now available to the scientific community and helps universities, publishers, and research institutions worldwide to ensure science's integrity.

How does your software platform improve the research process today?

With the increasing number of academic publications every year, it is challenging

to ensure good quality standards. Imagetwin addresses this issue and supports universities and publishers on their mission to ensure the quality and trust in science. By identifying integrity issues, imagetwin reduces the number of unethical and flawed publications. In the past, too many research projects were based on poor papers, wasting time and money which could have been spent on more promising research. Identifying incorrect academic papers before publication will help reduce this problem.

But misdirected follow-up research is not the only problem. It is also important that problematic papers are screened out before publication, as retractions months or years later lead to enormous reputational damage for universities, publishers, and scientists. Furthermore, the necessary investigations that lead to a retraction

publications like paper mills. The authors of these articles have become much better at faking academic results over the past years and will likely continue to improve. I believe equipping reviewers with the right tools can be the key to identifying these fraud cases.

One of the biggest challenges in the future of academic publishing will be deep fakes, which are entirely artificially created images. These images are tough to identify using the current standard methods. We all see the overall improvement of AI over the last years, with examples like ChatGPT. Because fraudulent scientists will use these new technologies to create their fake papers, I believe it is essential that we utilise new technologies to combat these frauds and ensure the quality and trust in science.

> **imagetwin: It is essential that we utilise new technologies to combat these frauds and ensure the quality and trust in science.**

are associated with immense costs, up to one million USD in severe cases. All these negative effects can be prevented if we identify fraudulent research before it is published.

What are your perspectives on how advancements in technology will impact research in the future?

Technological advancement will play a vital role in the evolution of research over the upcoming years. Due to the increasing amount of data, support from new technologies will become crucial. But it is essential to create a synergy between these technologies and existing human expertise to exploit the full potential of improvement.

In our field of research integrity, for example, it is getting much harder for experts to identify fraudulent
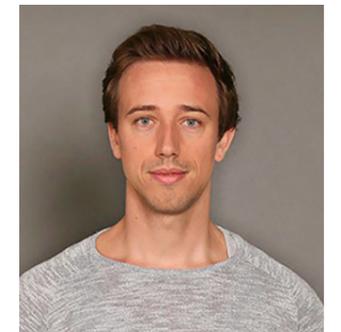
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