Work

Reddit's many 'subreddit' communities offer channels for discussing science and are of interest to social-media scholars.

HOW SCIENTISTS ARE MAKING THE MOST OF REDDIT

As X wanes, researchers are turning to Reddit for insights and data, and to better connect with the public. **By Hannah Docter-Loeb**

It has been almost 18 months since Elon Musk purchased Twitter, now known as X. Since the tech mogul took ownership, in October 2022, the number of daily active users of the platform's mobile app has fallen by around 15%, and in April 2023 the company cut its workforce by 80%. Thousands of scientists are reducing the time they spend on the platform (*Nature* **613**, 19–21; 2023). Some have gravitated towards newer social-media alternatives, such as Mastodon

and Bluesky. But others are finding a home on a system that pre-dates Twitter: Reddit.

The site was founded in 2005, originally as one all-encompassing forum where users (known as redditors) could post content such as links, texts, images and videos. Anonymous user upvote (or downvote) and comment on each other's content, deciding on what performs well enough to reach others' feeds.

Today, Reddit is divided into communities, called subreddits, each with volunteer

moderators who review content. These subreddits have names that begin with 'r/' and are devoted to all sorts of subjects, such as literature, solo travel and Washington DC. Reddit is regularly irreverent: r/trees is for people to share content about marijuana, whereas r/marijuanaenthusiasts is the place to look at trees. It is sometimes dangerous — some communities have amplified conspiracy theories. And there are subreddits devoted to science, ranging from the broad r/science to

more specific ones, such as r/bacteriophages.

As of December 2023, according to Reddit's own statistics, the site had 73 million daily active users, more than 100,000 active communities and had amassed over 16 billion posts and comments. In February 2024, it was the eighth most visited website in the world, ahead of both Amazon and TikTok (see go.nature.com/3tugxbq). And on 20 March, the company floated on the New York Stock Exchange, where it was initially valued at US$6.4 billion. With most researchers now needing to pay to download useful amounts of data on X, Reddit is another option to survey the Internet hivemind. Although changes made last year threaten researchers' ability to pull data as easily as they once did, Reddit says access to its data continues to be free for non-commercial researchers and academics.

"As the social-media landscape started changing, we really started thinking about the other spaces besides Twitter that people are using," says Nicholas Proferes, a social media researcher at Arizona State University's School of Social and Behavioral Sciences in Phoenix, who co-authored reviews on the use of Reddit for research[1,2]. Here, *Nature* reports on how Reddit is providing scientists with continued avenues for connecting with other researchers, gathering data and engaging with the public.

Networking and collaboration

Yvette Cendes's journey on Reddit began in 2014. Cendes, who is currently a postdoctoral scholar at the Harvard–Smithsonian Center for Astrophysics in Cambridge, Massachusetts, found herself with some downtime during her PhD studies in astronomy, and started poking around on the platform. She

came across a thread in which users were panicking over how imminent γ-ray bursts from supernovae were going to wreak havoc and kill people — something that she knew to be untrue. She resolved to jump into the comments and clear things up, and this was the start of her science-communication career.

Since then, Cendes has made a name for herself on Reddit and even created her own subreddit, with nearly 17,000 members. "It's a very good way to get good knowledge out there," she says.

Scientists also use Reddit to get tips and tricks from other scientists. The r/biotech subreddit features news about biotechnology innovations and career advice; r/datascience is a community specifically for data-science professionals. There's even a subreddit devoted to electron microscopy, from which users can seek guidance on the technology.

Not everyone is as forthcoming with their names and credentials on Reddit, which can make networking a bit more challenging than on other sites, says Cendes. But the pseudoanonymity can also be beneficial. Groups such as r/labrats offer safe spaces for scientists to discuss their research or dilemmas with others of similar backgrounds (and these groups are sometimes used by science journalists looking for article ideas). The anonymity provides some protection for people to post without fear of retaliation, and to seek counsel. In one discussion, for instance, a user laments how their principal investigator published a paper based on their research without giving credit, and considers hiring legal support.

Reddit can also be a great jumping-off point for early-career scientists or those trying to pivot between specialties. Kevin Ortiz

Ceballos, a graduate student at Harvard University's Department of Astronomy, happened upon one of Cendes' posts about how to become an astronomer back when he was in secondary school. He credits it with helping him to switch from literature to physics and eventually astrophysics. Engaging in conversations about professional astronomy before entering the field himself was a huge asset.

"The fact that Yvette made it so accessible gave me the tools I needed to take the necessary steps to study and prepare what I needed to get into astronomy grad school," he says. The two have since connected in person, and even collaborated on a project that was recently submitted for publication.

With all of its subspaces, Reddit can be overwhelming at first. Cendes encourages potential users to take it slowly, find the communities they are most interested in and go from there — putting keywords in the search function and perusing the different subreddits that come up.

Research and analysis

The information embedded in posts and comments from Reddit's millions of users can also be a treasure trove for researchers studying online behaviours. In 2022, NASA collaborated with master's students at the University of British Columbia in Vancouver, Canada, to use Reddit data to locate landslides (see go.nature.com/3tlum6t). The team scraped the site for mentions of 'landslide', before analysing and validating relevant mentions to add to the NASA landslides database. According to the team, this verification was needed because a Reddit post about the song 'Landslide' by the rock band Fleetwood Mac might "give us insight about the changes and challenges of life, but it doesn't do much for global disaster detection".

A 2021 review[2] in *Social Media + Society*, co-authored by Proferes, chronicled 727 manuscripts published between 2010 and 2020, that made use of Reddit data. These studies spanned all sorts of disciplines — from computer science to medicine to social science.

One reason that Reddit is ripe for research is that there are few bureaucratic hurdles to clear compared with what's required for other studies involving human beings. "It is a publicly accessible web forum in the US and so is not considered to be human-subjects research," says Proferes. Institutional review boards view Reddit research as "exempt from ethical review", he says.

However, Proferes and his co-authors emphasize the need for intentionality and sensitivity when collecting data from the site. Consider a subreddit such as r/opiates. Data on substance use are often difficult to procure from in-person interviews or other social science methods, but because of Reddit's anonymity, people are more open to sharing such information on the platform. However,

Yvette Cendes discusses astronomy as a science and a career on Reddit.

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Research findings derived from Reddit posts should be shared with users, says Sarah Gilbert.

using the subreddit for research could be seen as invasive by a community that considers itself a semi-private anonymous support network. Certain communities on Reddit are also wary of scientific researchers.

The 2024 review co-authored by Proferes[1] lists some of these considerations and suggests steps such as obfuscating usernames in published work and collaborating with moderators.

"Academia and data populations have a very sore history of, frankly, academics coming in and just taking," says Proferes. The online community "is not getting any benefit whatsoever. It is very exploitative. There's some real historical reasons, too, why folks may be highly suspicious or dubious about researchers coming in, even in these digital spaces."

"It's really easy when you're working with these large data sets to just think of the data points in them as literal data," says Sarah Gilbert, research director of the Citizens and Technology Lab at Cornell University in Ithaca, New York, and a co-author of the review. "Spending time in the community and learning the norms and actually reading it, it turns that data into people. It gives a better sense of who is going to be included, more like human-subject research."

Gilbert also recommends sharing whatever published research comes out of trawling through Reddit data with those who provided the information. "Hopefully what you learnt is beneficial to the community so they can see data is used for something," she says.

Connecting with non-scientists

Reddit can be a way for scientists to use their expertise to answer any questions the general public might have, says Cendes. She is a regular on r/space, educating users about topics such as the James Webb Space Telescope.

Kelly Zimmerman, a PhD candidate in ecology at Montclair State University in New Jersey, has connected with and educated other users on Reddit. When she started on the platform about 12 years ago, she mostly used it to find journal articles of interest on r/ecology and r/biology. But, like Cendes, she noticed how curious users were about scientific topics that were in her area of expertise, and she now often engages in discussions on subreddits such as r/whatisthisbug.

> ### "As the social-media landscape started changing, we really started thinking about the other spaces."

Although she previously used X, Zimmerman thinks that Reddit provides a more engaging experience. "I felt like I was just talking into a void — there wasn't a lot of response on Twitter," she says.

One way for scientists to try their hand at science communication on Reddit is through 'ask me anything' (AMA) sessions, in which researchers answer users' questions in their own time. Moderators pull in verified researchers to provide responses — even renowned theoretical physicist Stephen Hawking participated. (To schedule an AMA with r/askscience, you can e-mail the moderators.)

With both AMAs and general discussion forums, there is an art to making sure that information is communicated effectively and succinctly. "We're trying to keep it as scientific as possible, but in layman's terms, so that non-scientists can understand cutting-edge science that's coming out right now," says Zimmerman, who also moderates

some science subreddits.

Nathan Allen, a synthetic chemist based in Milwaukee, Wisconsin, and a former moderator at r/science, likens it to writing a persuasive e-mail. "On Reddit, you have got to convince the general public that this has some general interest to them, and you've got to develop it and build the message and make sure people stay on point," he says. "You get a lot of practice writing concise explanations of complicated things that people who aren't necessarily scientists are able to digest and understand."

When using Reddit in any capacity, Zimmerman encourages scientists to make sure to read the rules before making a post or comment, and to mind their manners, just as they would on any other social-media platform. "Be polite," she says. "Just because you're an anonymous username doesn't mean you should be rude to other people."

Jennifer Cole, a biologist and anthropologist at Royal Holloway University of London, notes that using Reddit for scientific communication is not without its problems. Moderators do a lot of work behind the scenes and often face a torrent of abuse for trying to maintain standards, says Cole. And although using people's real names can help with credibility, it can also make academics and experts targets for harassment and abuse. Although the site does not provide support for users who experience abuse, a spokesperson for Reddit noted that the platform has policies to prohibit both harassment and the sharing of personal or confidential information, and that these policies are enforced by the internal safety teams.

It can also be used to spread falsehoods. R/conspiracy has repeatedly posted misinformation about COVID-19 and vaccines. Climate deniers are also present on the platform, although a decade ago the science forum specifically banned climate change deniers. Asked about misinformation, the Reddit spokesperson said that because Reddit is governed by upvotes and downvotes, quality and accurate information tend to rise to the top.

Interviewees agree that Reddit is at its core a social media platform, and social media has the potential to be toxic. But when scientists engage, there's also a lot of great scientific communication and debunking of misinformation. "Don't be afraid to talk to the people," Zimmerman says. Those "who are not scientists are just as curious as we are. There's nothing special about being a scientist. We are like everybody else, and sometimes folks forget that."

Hannah Docter-Loeb is a freelance writer based in Washington DC.

1. Fiesler, C., Zimmer, M., Proferes, N., Gilbert, S. & Jones, N. *Proc. ACM Hum. Comp. Interact.* **8**, 5 (2024).
2. Proferes, N., Jones, N., Gilbert, S., Fiesler, C. & Zimmer, M. *Soc. Media Soc.* https://doi.org/10.1177/20563051211019004 (2021).