The *inside* track

Members of the US National Academy of Sciences have long enjoyed a privileged path to publication in the body's prominent house journal. Meet the scientists who use it most heavily.

BY PETER ALDHOUS

In April, the US National Academy of Sciences elected 105 new members to its ranks. Academy membership is one the most prestigious honours for a scientist, and it comes with a tangible perk: members can submit up to four papers per year to the body's high-profile journal, the venerable *Proceedings of the National Academy of Sciences* (PNAS), through the 'contributed' publication track. This unusual process allows authors to choose who will review their paper and how to respond to those reviewers' comments.

For many academy members, this privileged path is central to the appeal of PNAS. But to some scientists, it gives the journal the appearance of an old boys' club. "Sound anachronistic? It is," wrote biochemist Steve Caplan of the University of Nebraska, Omaha, in a 2011 blogpost that suggested the contributed track could be used as a "dumping ground" for some

papers. Editors at the journal have strived to dispel that perception.

With PNAS currently celebrating its centenary, the news team at *Nature* decided to examine the contributed track, both to assess its scientific impact and to see which members use it most heavily and why. After analysing a decade's worth of PNAS papers, we found that only a small number of scientists have used the track at close to the maximum allowable rate. The group includes some of the biggest names in science, and six are past or current members of the journal's editorial board. These scientists say that the main motivator for using the contributed track is an intense frustration with the peer-review process at other high-profile journals, which they argue has become excessive and laborious.

Our analysis also suggests that the efforts by PNAS to prevent abuse of the contributed track and to boost the quality of papers published by

this route are bearing fruit. Although contributed PNAS papers attract fewer citations than those handled through the journal's standard review process, the gap has narrowed in recent years. "We have worked really hard at this," says Alan Fersht, a biophysicist at the University of Cambridge, UK, one of PNAS's associate editors and a heavy user of the contributed track.

A PRIVILEGE TO PUBLISH

An inside track to publication for academy members rests deep in PNAS's DNA. The journal was established in 1914 with the explicit goal of publishing members' "more important contributions to research" in addition to "work that appears to a member to be of particular importance". That remit led to the creation of two publishing tracks: contributed and 'communicated' papers (manuscripts sent by non-members to colleagues in the academy, who would shepherd them through review).

Who are the power users?

Just 13 members of the US National Academy of Sciences consistently published three or more papers per year in the 'contributed track' at PNAS* during the past decade. 'Other' papers include direct submissions, reviewed in the normal way, and papers contributed or communicated by other members.

- Nobel prizewinner
- Member of PNAS editorial board
- Former member of editorial board

*Proceedings of the National Academy of Sciences; [‡]Total includes one paper submitted in 2003.

These two tracks were the only ways to get a paper into *PNAS* until 1995, when biochemist Nicholas Cozzarelli of the University of California, Berkeley, took over as editor-in-chief and introduced 'direct submissions', which are handled more like papers at other journals. Direct submissions must pass an initial screen by a member of the editorial board, after which they are assigned to an independent editor — either an academy member or a guest editor — who organizes peer review.

Starting in 1972, the journal placed limits on the number of contributed papers that an academy member could submit, and the current annual cap of four was imposed in 1996. Then in 2010, *PNAS* abolished the communicated track, which was already declining in popularity¹. Today, more than three-quarters of the papers published in the journal are direct submissions. These papers are much less likely to be accepted than those contributed by academy members. Only 18% of direct submissions were published in 2013, whereas more than 98% of contributed papers were published, according to figures on the journal's website. (The one caveat is that *PNAS* has no data on how many papers intended for the contributed track receive negative reviews and never get submitted.)

Despite the impressive acceptance rate for contributed papers, the data collected show that many eligible scientists choose not to submit papers through this track. Of the more than 3,100 academy members who could have used the contributed track between 2004 and 2013, fewer than 1,400 scientists did so. (This might in part reflect where researchers from different fields prefer to publish their work; the academy draws its members from all disciplines, including researchers from fields such as astronomy and mathematics, who rarely send their papers to *PNAS*.) Most members who used the contributed track did so sparingly: the majority published on average fewer than one contributed paper per year. Only a small group consistently used the track at close

to the allowable maximum: from 2004 to 2013, 13 scientists each contributed more than 30 of their own papers. This roster includes some of the best-known people in contemporary science (see 'Who are the power users?').

Some of these researchers, such as Solomon Snyder, a neuroscientist at Johns Hopkins University in Baltimore, Maryland, rarely or never publish in *PNAS* except through the contributed track. But others, including immunologist Tak Mak at the University of Toronto in Canada and cancer researcher Carlo Croce at

at *PNAS*. *Cell* declined to provide figures. However, comparing across journals is difficult because each has different policies on when a revised manuscript is considered a 'new' submission.

Still, many of the contributed track's power users believe that increased competition for space in high-profile journals has allowed editors and reviewers to become more demanding. "Being able to publish four high-profile papers with much less grief than the usual high-prestige journal — that's worth some-

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Ohio State University in Columbus, also regularly send in direct submissions.

Having control over the review process brings advantages. Those who work across disciplinary boundaries say that being able to choose your own reviewers is the best way to ensure that referees actually understand the material. "Chemists have no idea about glyco-biology," says Chi-Huey Wong of the Scripps Research Institute in La Jolla, California, who studies the chemistry and biology of sugars.

But for others, including Croce, who consistently hits his annual allocation of four contributed papers per year, the track's appeal boils down to one word: speed. Several of the contributed track's most regular users say that they have had papers held in limbo for up to two years at *Nature*, *Science* or *Cell* while the manuscripts went through multiple reviews and revisions. "In two years, you can be scooped over and over and over," says Croce.

Science and *Nature* each provided figures for median time passed between submission and publication for recent papers, which suggest lag times greater than for contributed articles

thing," says Snyder. Some of the power users, including Snyder and Mak, add that the contributed track benefits postdoctoral researchers or students in their laboratories who are searching for jobs and need high-profile publications more quickly than the review time at *Nature* or *Science* would allow.

Complaints about nitpicking reviews at *Nature* and *Science* go hand-in-hand with the charge that the editors at these journals are in thrall to trendy areas of research. "Very often what seems to be fashionable is not very good science," says Croce.

SPECIAL ACCESS

The problem for most scientists looking to advance their career, however, is that they do not have the option of turning to *PNAS*'s contributed track. No wonder, then, that successive editors-in-chief have been dogged by the view that *PNAS* is a club for academy members. "We want to remove this perception," says current editor-in-chief Inder Verma, a gene-therapy researcher at the Salk Institute for Biological Studies in La Jolla.

The steady growth of direct submissions bears witness to efforts by Verma and his predecessors to make the journal attractive to scientists who are not academy members (see 'A changing journal'). "When I was editor, I was very concerned about the abuse of members' privilege," says Randy Schekman of the University of California, Berkeley, a former *PNAS* editor-in-chief, under whose watch communicated papers were abolished (see *Nature* <http://doi.org/d22bqx>; 2009). Academy members were consulted on that decision, and it was a popular one — probably because it freed members from having to deal with submission requests from colleagues.

But it would be far more difficult to convince members to give up their own publishing privileges. Even the contributed track's critics accept that it is here to stay, at least for the foreseeable future. "I'd just do away with it," says applied physicist David Weitz of Harvard University in Cambridge, Massachusetts. "But it's something that many members of the academy have viewed as their prerogative." Weitz, who sits on the *PNAS* editorial board, publishes some of his best work in the journal, but has a policy of never using the contributed track. "I don't want to have a special 'in,'" he says.

The contributed track's most enthusiastic users argue that their papers get thoroughly reviewed. "The referees I choose are people I hardly know but who can give the best review of the papers — so I don't get egg on my face," says Fersht. "It's not a free ride," agrees Mak, who adds that his haul of contributed *PNAS* papers should be viewed against his high productivity overall. His laboratory published more than 300 original research papers over the same decade. Many of the other power users head similarly productive labs.

PNAS has also tried to limit conflicts of interest by barring members from picking recent collaborators to referee their papers. Current rules prohibit members from choosing any scientist they have worked with in the past four years. The journal's editorial board can also step in to block contributed papers if it feels that members are abusing their privileges, a process that Schekman says took a considerable amount of time and effort during his tenure. Telling big-name scientists — some with egos to match — that their work isn't up to snuff can be difficult. "We would challenge these papers, and people would take umbrage and personally attack me," says Schekman. "It was discouraging to have to deal with that, but I was unbowed." Verma continues the fight, taking a wry view.

"Every member of the academy is a legend in their own mind," he jokes.

As well as providing oversight for the contributed track, the nearly 200-strong *PNAS* editorial board includes some of the track's most enthusiastic users. Our analysis shows that almost half of those who contributed more than 30 papers over the past decade are current or former members of the board — including Fersht, Mak and Snyder. These scientists work hard for *PNAS*: none more so than Snyder, who has organized the review of hundreds of direct-submission papers over the past decade.

Verma is adamant that there is no preferential treatment for those who sit on the journal's editorial board. Still, he acknowledges that the perk of the contributed track helps to

and communicated papers². (By the time Rand and Pfeiffer published their analysis, *PNAS* had already decided to abolish the communicated track.)

Although citations are not the only way to judge the impact of papers, they are the most readily available and widely researched measure. We repeated and extended Rand and Pfeiffer's analysis, considering papers published from 2004 to 2011. Overall, the conclusion was the same: the difference between citation rates for directly submitted and contributed papers was not large — controlling for other factors such as discipline, contributed papers garnered about 4.5% fewer citations — but it was statistically significant. *Nature's* analysis also suggests that the gap in citation rates between directly submitted and contributed papers has been narrowing, and this does not seem to be because more-recent papers have yet to acquire enough citations for the difference to show.

Viewed in this light, the journal seems to be making progress with its efforts to eliminate the abuse of publishing privileges by academy members. And Verma vows to keep up the pressure. He is now encouraging academy members to list the reviewers for contributed papers, taking the lead by doing so for his own most recent contribution³. Such transparency, he hopes, will hold everyone to rigorous standards.

Verma also wants to eliminate what some scientists see as a vestige of the old communicated track — an option to request a 'prearranged editor' from the academy. One in five direct submissions published in 2013 used a prearranged editor, and the acceptance rate for these papers is higher than for other direct submissions. "More and more the playing field will be levelled," says Verma.

As *PNAS* marches into its second century, debate about its idiosyncratic publishing mechanisms is sure to continue. But for those who benefit from the journal's distinctive approach, *PNAS's* quirks are inherent to its appeal. "The last thing we need, I think, is less diversity," argues Nobel-prizewinning neuroscientist Thomas Südhof of Stanford University in California. "Turning *PNAS* into a standard journal, in my view, would make it unnecessary." ■

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A changing journal

The number of direct submissions to *Proceedings of the National Academy of Sciences* has been increasing steadily over the past decade. Communicated papers were phased out in 2010, but the contributed track has remained constant.

explain how the journal can operate without professional editors. Fersht agrees: "Members are willing to act as editors, and part of it is because they know they are able to publish their own papers." Verma says that more than 1,200 members of the academy responded to the call to edit one or more papers in 2013, and he argues that collective editing by leading scientists is the journal's main strength.

But all of that does not quell criticism of the contributed track, and there is evidence that contributed papers have less impact than those reviewed in the usual way. In 2009, psychologist David Rand and evolutionary biologist Thomas Pfeiffer, then both at Harvard University, looked at citations to papers published in *PNAS* between June 2004 and April 2005. Controlling for factors such as scientific discipline and time elapsed since publication, the pair found that contributed papers were cited less often than direct submissions

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For more information
on how the analysis
was done, see:
go.nature.com/gm7ode

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