the Mayo Clinic Web site to release a paper on heart valve injury associated with the fen-phen diet drug combination. And *JAMA* used the Internet last summer to distribute a paper on the adverse effects of a drug for hypertension. Lundberg says publishing online allowed the journal to post the full text, "bango, the same afternoon" that it cleared his desk. "Everybody responded beautifully, and we felt really good," Lundberg says.

Does this new use of the Internet augur a major change in the way biology journals handle newsy reports? Lundberg is doubtful. High-priority articles are rare, he says, and *JAMA* is not planning to follow the ACS's lead yet and routinely post articles online before they appear in print. Kassirer, who says he tries "not to be too stiff-necked" about the rules, says things may change "over time ... but at the moment, we are holding to our Ingelfinger rule."

But some are ready to chuck tradition. *PNAS*'s Cozzarelli, for example, would gladly go to early release on the Internet. "I believe that online preprints have made the embargo obsolete," he says, and he'd like to rid science of the embargo system's "arbitrary" rules. But for many writers and editors struggling to keep up with science news, embargoes remain, as a biotech reporter says, a "necessary evil" that make the job more manageable. **–ELIOT MARSHALL**

With reporting by James Glanz.

EMBARGOES
MEETINGS

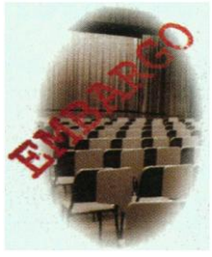
Scientific Meetings Produce Clash of Agendas

Sponsors want publicity, journals don't want to be preempted, reporters want stories, and scientists can be caught in the crossfire

All the pressures inherent in the embargo system converge at scientific meetings, often producing conflict and confusion. Scientists want to communicate their results freely, and meeting sponsors want maximum publicity for results presented there. But these goals can clash with the desire of publishers to see that papers due to appear in their journals are not preempted. Scientists are often caught in the middle, uncertain of the rules, and fearful of losing a publication if they make the wrong move.

Almost all journal editors say they don't want to impede scientific discourse. Physical science editors have gone furthest in this regard, permitting scientists to hold press conferences at meetings even if they have a paper under review or in press. *Science* Editor-in-Chief Floyd Bloom says *Science* tries to explain its policy in "big, bold, block letters": Authors are free to discuss whatever they wish at meetings. But they're asked not to take part in a press conference or distribute a manuscript until the week before the paper will appear, at which point the journal distributes copies to journalists who agree to honor the embargo. Researchers are free to clarify points from their talks with journalists provided they don't go beyond the material they presented. *Nature* Editor Philip Campbell says scientists are "absolutely free" to say what they want at meetings. "The general principle is that we do not get in the way of intrascientific communication." He adds, however, that "we do not like [authors] going into details in the press in a way that helps the press preempt the publication over and above what they've said in the talk."

"We've never had a problem with people describing their data at a meeting," says Jerome Kassirer, editor of *The New England Journal of Medicine*: "That bugaboo has been around for a long time, but I don't think it's real." Indeed, even the famous Ingelfinger rule says that meeting presentations do not constitute prior publication. George Lundberg, editor of *The Journal of the American Medical Association*, says: "Basically, whatever authors have presented in their talk to colleagues is fair game and can be reported and should not be held against those authors at all."



That sounds clear enough, but sometimes conflicting pressures on scientists can be intense. Take the case of Donald Umstadter, a physicist at the Center for Ultrafast Optical Science at the University of Michigan, Ann Arbor. Two years ago, Umstadter gave a talk at an American Physical Society (APS) meeting about his recent success in accelerating electrons to high energies using laser pulses. He was also asked by officials at the American Institute of Physics (AIP), which promotes APS conferences, to repeat the substance of his talk in a briefing with reporters. Umstadter, however, had a paper in press at *Science*. "Of course I knew about the embargo policy," says Umstadter. "So I called [*Science*] and asked if it would be OK if I participated in this press conference." He was advised that it would be fine to give the talk but not to hold the press conference. He complied.

The decision led to discussions between Judy Franz, APS executive officer, and Richard Nicholson, executive officer of the American Association for the Advancement of Science, which publishes *Science*. "I thought of it as the policies of *Science* magazine interfering with the open exchange of information in our meeting," says Franz. "It made us uncomfortable to have some secrecy imposed." Phillip Schewe, AIP's chief science writer, who had asked Umstadter to hold the press briefing, was later quoted in the *APS News* saying the decision "amounts to an act of extortion: Forgo a press conference or possibly forfeit your paper in *Science*." But Schewe concedes that his objection to embargoes has limits: APS embargoes material to be discussed at meeting press conferences. "If reporters have bought a plane ticket to come to the meeting, we have a special proprietary feeling in hanging onto that information," he says.

Paula Tallal, a neurologist at Rutgers University in Newark, New Jersey, was caught in a similar situation when she presented a paper at the Society for Neuroscience meeting in November 1995. Tallal discussed a technique she and Michael Merzenich of the University of California, San Francisco, had developed for training learning-disabled children. At the time, a paper on the work was under final review at *Science*, and Tallal was worried that if her talk got too much attention, *Science* might kill the paper.

Reporters from *The New York Times*, *Newsday*, and other media were "all over my poster," she says. The society's public affairs chief, Joe Carey, was trying to get her to give a press conference, but she canceled. Tallal recalls that a representative of her sponsor, the Dana Foundation, was trying to steer the publicity to television. Tallal was so concerned, she says, that she dodged reporters' questions, refusing to clarify her results for *Newsday*'s Jamie Talan. But Tallal had already discussed her work with a reporter for *The New York Times*, Sandra Blakeslee, on the understanding that Blakeslee would not go to press before the official publication date. When Blakeslee announced in a tense encounter in front of Tallal's poster that she intended to publish a story on the research from the meeting, Tallal recalls, "I nearly had a nervous breakdown."

Blakeslee says she had "sat on that story for a year" before the neuroscience meeting: "I had visited [Tallal's] center at Rutgers. I had met the children. I had talked to the parents. I

had the neuroscience. I had it all." When she realized that Tallal's results were being displayed in four abstracts and a poster, Blakeslee says she decided that "to wait an extra 3 weeks ... just didn't seem right." The *Times* published Blakeslee's detailed story. *Science* agreed that it did not constitute an embargo break and published Tallal's paper about a month later (*Science*, 5 January 1996, p. 77).

Sometimes, however, a low-key warning can be enough to persuade a researcher not even to give a talk at a scientific meeting. That apparently happened in two cases involving *Cell*. Molecular biologist Nathaniel Landau and his colleague Richard Koup had found a mutation in human cells that enabled patients to resist the AIDS virus, and Landau wanted to present the data at the international AIDS meeting in Vancouver, Canada, in 1996. But because Landau had submitted a paper to *Cell*, he first checked with *Cell* Editor Benjamin Lewin. Landau recalls a polite but unnerving reply: Presenting the data, he was told, "might make it a little more difficult for us to publish your paper." That was all it took to silence him.

In an earlier case, a colleague of James German of the New York Blood Center in New York City decided not to give a scheduled talk on the discovery of a Bloom's syndrome gene at a meeting in 1995 after getting advice from Lewin. German, whose group had a paper pending at *Cell*, says, "*Cell* didn't threaten us," but Lewin did telephone, and the talk was canceled (*Science*, 10 November 1995, p. 909). In an e-mail, Lewin declined to discuss with *Science* these cases or any of *Cell*'s policies on embargoes.

"The journals are very powerful," Landau says. "At *Science*, *Nature*, or *Cell*, if the editor says to you, 'We want you to do this,' or 'We don't want you to do this,' you kind of have to do it, because ... it might jeopardize your paper." —ELIOT MARSHALL

With reporting by James Glanz.

EMBARGOES
▶ ASTRONOMY

A Media Darling Thrives on Publicity

In astronomy, where funding can depend on press clips, embargoes and a tradition of rapid communication are sometimes in conflict

Knowledge is power, as the philosopher and statesman Francis Bacon realized in the 16th century. Embargoed knowledge can bring even greater power—as science administrators, publicists, and journal editors have realized in the late 20th century. The practice of embargoing information to increase its impact touches all scientific disciplines. But nowhere do embargoes, and the people who enforce them, influence the public release of results as completely as in the publicity-saturated field of astronomy.

Only in astronomy could one research team's looming press conference—an event orchestrated by NASA—force another team to forgo peer review before publicizing its new discovery. Only in astronomy could the potential loss in press coverage caused by a leaky embargo raise concerns about the continued funding of an experiment costing hundreds of millions of dollars. And perhaps only in astronomy could one team's results be unveiled at an embargoed press conference as a "first" when another team had submitted similar results to a journal months earlier.

All of these things have happened in astronomy in the past year. And although it is difficult to imagine the same problems arising in, say, condensed-matter physics, the difference is only one of degree: As a media darling, astronomy simply faces an outsized version of conflicts that are cropping up in many fields. The magnifying glass of astronomy shows that embargoes and publicity change how scientists communicate with each other, how they assign priority for discoveries, and how they secure funding for projects.

As in other fields, the institutions that impose the embargoes—in this case NASA, the sponsors of astronomy meetings, and journals such as *Science* and *Nature*—are often in conflict, and astronomers can get caught in the crossfire. At the same time, the wide availability of information on the Internet and at conferences is making it more and more difficult to keep stories secret while they are under embargo. Indeed, some of the field's most prestigious journals, including *The Astrophysical Journal*, have decided that it's so hard to maintain secrecy that they have relaxed once-strict rules against prepublication publicity.

Behind the jockeying for press attention lies one factor that sets astronomy apart: Publicity can be closely tied to funding. Guenter Riegler, chief scientist for mission operations and data analysis in the Office of Space Science at NASA headquarters in Washington, D.C., confirms that potential and actual media attention, under the rubric of "public outreach," plays a role in determining the fate of satellites that have been proposed or are already flying. "When we review various missions side by side to see which ones we should continue and which ones not, that's one of the considerations we give," he says. "That's a part of our formal policy."

But whereas Riegler says success in the media is a "small component" in determining that fate, an internationally known astrophysicist says pressure to promote the agency is intense in a climate in which NASA operating funds are chronically scarce. "Officials from NASA headquarters come to the user groups for the different missions and tell them flat out, 'If you want your mission to continue, you'd better get more prominent press coverage than you have up to now. You're not keeping up; television is everything,' " says this astrophysicist.

National press coverage can also ensure prosperity for university research programs, says Charles Telesco, an astronomer at the University of Florida, Gainesville. After his team's work was written up in a *Newsweek* cover story, says Telesco, funds, university resources like graduate students and equipment, and the benefits of visibility flowed more freely from state foundations, deans' offices, and at least one national funding agency. But Telesco says the publicity came at a price: To keep up with NASA's publicity machine, his group had to bypass peer review at a scholarly journal before promoting its results.

The story began on the night of 18 March, when Telesco, Ray Jayawardhana of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, and others, using a telescope at the Cerro Tololo Inter-American Observatory in Chile, saw a dusty disk where planets might be forming around a star called HR 4796A. After some deliberation, the team decided to submit its results to either *Science* or *Nature*—journals with relatively quick turnaround times. But Telesco soon discovered that those publication times would not be quick enough: He learned not only that a team including Michael Werner of the California Institute of Technology in Pasadena had photographed the same disk at about the same time using the Keck II Telescope in Hawaii, but also that NASA—whose "Origins" program funded the team's work—had scheduled an embargoed press conference on Caltech's results for 21 April.

That put Telesco in a difficult position: If