to search for transit events — brief dips in the brightness of stars that occur when planets pass in front of them. To track how well citizen scientists can spot transits, and to measure the sensitivity of the system to different kinds, the Planet Hunters team inserts fake planet signals alongside the genuine data and measures how good people are at detecting them. In another quality-control measure, multiple users do the same task on the same data, so that mistakes are averaged out. And because users log in to use the system, the researchers can track which citizen scientists are best at which tasks and then give extra weight to results from the best performers.

The sheer scale of the projects can create quality-control challenges. The eBird project at Cornell uses citizen scientists to document the presence, absence and abundance of species across the United States. It receives 25 million observations a month, which are reviewed by a team of 500 volunteers, handpicked for their experience. Each reviewer must sift through 4% of the observations to validate them, in essence looking at hundreds of thousands of observations. Project organizers are currently thinking about new ways to manage the big data sets, by either reviewing less or automating more.

"You are getting the information that you need at the same time that you are getting people involved."

Scientists also have to face the challenge of recruiting volunteers and keeping them engaged. "The science has to be romantic, in a way, so that people want to support the research behind it," says Jason Osborne, president and co-founder of Paleo Quest, a citizen-science organization focused on palaeontology. Projects have to be interesting, tangible and involve discovery, he adds. In an offshoot of Paleo Quest called SharkFinder, for example, Osborne and co-founder Aaron Alford identify layers of rock riddled with shark fossils and take large samples from river swamps and other remote environments. The researchers then distribute the samples in kits to US classrooms. Any fossils that students discover are sent to the University of Maryland in College Park, where palaeontologists led by Bretton Kent verify the findings. The project currently samples fossil formations along the east coast of the United States, but Osborne hopes to expand his sampling work to Panama and other countries. "You put Panama in the kit, and kids are like, 'Wow, I have a piece of Panama on my desk, and I am looking for fossil remains'," says Osborne, noting that kids also love handling prehistoric fossils. "There has got to be that kind of wow factor." And if they discover a new species, Osborne's citizen scientists might be named on a publication — or even be given the opportunity to name the species.

Whatever a volunteer's motivation — even if it is just the joy of participating — scientists have to understand and nurture it. For Old Weather, Brohan's team came up with a ranking system. Citizens receive the title of cadet when they join. After transcribing 30 pages of logs, they are promoted to lieutenant. The person who transcribes the most pages on a ship becomes the captain. Social media and online forums let the participants talk to each other.

Another way to keep volunteers engaged is to identify the best and invite them to do more. Scott Stevens, a research associate at the Cooperative Institute for Climate and Satellites in Asheville, North Carolina, works for a project in which citizen scientists classify images of storms. His team discovered that one-quarter of the data were coming from a handful of 'power users', who had classified more than 20 images each. In fact, a single citizen scientist contributed a full 7% of the activity on the website, more than the next five power users combined — and greater than all the least active half of the user base.

"Both these one-hit wonders and the super-users are important to us," says Stevens, whose team wants to create something like Brohan's ranking system to reward the best and most committed. As projects evolve, organizers can contact those super users and invite them to participate at a higher level, perhaps by helping to analyse data or to manage groups of other citizen scientists.

Finally, there is the challenge of getting citizen-science data through peer review. But that barrier is diminishing. "I have never come across a furious reaction against the idea of this," says Lintott. "You just have to test your model as you would had you written a new computer code."

Publications using data from citizen science are becoming more common, and even encouraged. Researchers at Princeton University in New Jersey, for example, have used data from Nature's Notebook to expand a model of the timing of leaf-bud bursting from the Harvard Forest area in Massachusetts to the entire eastern seaboard of the United States. The team published its expanded model this year (S.-J. Jeong *et al. Geophys. Res. Lett.* **40,** 359–364; 2013). Not only did peer reviewers welcome the citizen-science data, but one actually gave advice on how to use the citizen-science model more effectively, says Weltzin.

If all goes well, citizen science is a way to communicate science, engage in outreach and accomplish research aims. "You are getting the information that you need at the same time that you are getting people involved," says Weltzin. "It is like playing Whack-a-Mole with all hammers out. You meet all of your objectives at one time." ■

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SEQUESTRATION

Staff cuts likely

US universities and research institutes will remain in stable financial health despite federal budget cuts, but staff reductions are likely, says a report by Moody's Investors Service, an international credit-rating agency based in New York. In *The Sequester Series: Limited Impact on US Universities and Related Not-for-Profit Organizations*, published on 28 March, the agency notes that universities and research institutes will see an overall 5% cut in federal funds this year. The report is meant to reassure investors in the higher-education sector, but says that lay-offs, mainly of non-tenured researchers, could be needed to manage the cuts. Institutions are likely to increase their focus on interdisciplinary research and extramural collaborations to increase revenue and share costs, says Edith Behr, vice-president of Moody's.

EUROPEAN UNION

Easier migration

Foreign researchers and students would find it easier to stay or work in the European Union (EU) under a proposed law. Legislation now in the draft phase would ensure that EU member states issue decisions on admission applications within 60 days; would permit researchers and students to move between states for 6–12 months or for the entire study period for Marie Curie or Erasmus Mundus fellows; and would let students and researchers stay in the EU for up to a year to find a job or start a business. The European Parliament and the Council of the EU are reviewing the proposal, which could be adopted by early 2016. Current regulations are "very fragmented", says Michele Cercone, European Commission spokesman for home affairs. "This will fill a gap."

MEDIA

Online journal club

A US medical journal is the first to use the Journal Club Live online platform, which lets participants discuss papers with their authors in real time. *Fertility and Sterility* has streamed two sessions of Journal Club Live on YouTube and will run a third in May, says platform developer Steven Palter, the journal's new-media editor. Invited panellists take part in a video chat and YouTube viewers submit questions. Panellists and viewers for the first two sessions came from the United States, India and Spain. "This opens the discussion into a global collaboration," says Palter.