pairs of γ-ray photons produced with combined energies of 750 gigaelectronvolts when the LHC smashes protons together. The fact that two separate detectors spotted it at almost exactly the same energies gives some hope, but anomalous signals such as this often show up in experiments only to later vanish back into the noisy background.

Still, people at CERN, the European particle-physics lab that hosts the LHC, have scarcely talked about anything else since. And theoretical physicists around the world have gone into overdrive: more than 200 papers have been posted online with theories that could explain the particle. One possibility is that it could be a heavier cousin of the Higgs boson; another, even more tantalizing one, is that it is a type of graviton, the particle hypothesized to carry the force of gravity. If so, it could point to the existence of extra dimensions of space beyond the familiar three.

Some have discounted the outburst of preprint articles as merely an attempt by authors to rake up citations. One physicist has even done a quantitative comparison of this spike in activity with other fads that have come and gone in the past (see M. Backović Preprint at http://arxiv.org/abs/1603.01204; 2016), charting theorists' initially exploding, then fading, interest. But describing theorists' interest as 'ambulance chasing' is a bit unfair. To paraphrase Albert Einstein, if people knew what they should be looking for, it wouldn't be called research.

And particle physicists' excitement is understandable, if tempered by caution. For decades, their field has been finding evidence for the standard model of particle physics, a collection of theories that was put together in the 1970s and has been more successful than anyone expected. The current generation of young physicists was not even born when particle accelerators produced their last genuinely surprising results. Meanwhile, searches for physics beyond the standard model have so far come up empty — at accelerators such as the LHC but also in many tabletop experiments and at detectors built underground or sent into space to look for dark matter. The most notable exception to the standard model's standard fare has been the discovery, beginning in 1998, that the elementary particles called neutrinos spontaneously oscillate between their three known types, or flavours — something that the original version of the standard model had not predicted. That breakthrough earned two physicists a well-deserved Nobel Prize last year.

"The LHC is now providing the opportunity of a lifetime to break entirely new ground."

The LHC is now providing the opportunity of a lifetime to break entirely new ground. In 2015, it restarted after a long shutdown that brought the energies of its collisions to a record 13 teraelectronvolts, from 8 TeV. This has put much more massive particles in reach — if any exist — but it will be the last substantial jump in collider energies in a generation. More-powerful machines, if they ever see the light of the day, will take decades to plan, develop and build.

The good news is that whether the new particle exists or the data bump is a statistical anomaly is not a question that will leave us hanging for long. The LHC experiments had time to observe only relatively few collisions in their first 13 TeV run last year, before the experiment shut down for its winter recess.

At a meeting in the Italian Alps that starts on 12 March, LHC researchers might present fresh analyses of those data that could provide more clues. And the machine will begin to collect vastly more data in April. If the bump seen last year was an anomaly, it should go away by the summer. If not, stay tuned for some interesting announcements at the next round of conferences. ■

Gene intelligence

The risks and rewards of genome editing resonate beyond the clinic.

Last month, one of the top intelligence officials in the United States warned that genome-editing technology is now a potential weapon of mass destruction. Techniques such as the emerging CRISPR–Cas9 system, US director of national intelligence James Clapper warned in an annual threat-assessment report to the US Senate, should be listed as dangers alongside nuclear tests in North Korea or clandestine chemical weapons in Syria (see go.nature.com/jxuyev).

The headline message might scream 'overreaction' — and indeed most serious science commentators seem to have assumed as much and ignored Clapper's hyperbole — but the terms he used to describe the technology seem uncontroversial. The US spooks describe the "broad distribution, low cost, and accelerated pace of development" of gene editing, and say that its "deliberate or unintentional" use could have "far-reaching economic and national security implications".

"Research in genome editing," the threat assessment continues, "increases the risk of the creation of potentially harmful biological agents or products." And Clapper, naturally, points the finger at science in nations "with different regulatory or ethical standards than those of Western countries". But for a glimpse of just how far-reaching the "deliberate or unintentional" use of gene editing could be, he need only look over his shoulder.

Last year, scientists in California reported that they had used gene editing (together with another new biotechnology called gene drive) to introduce a mutation that disabled both normal copies of a pigmentation gene on a fruit-fly chromosome. The change made the insects turn pale yellow — as did their offspring, their offspring's offspring and so on. The change was so powerful that, had any of the California flies escaped, it has been estimated that somewhere between one in five and one in two of all the fruit flies in the world would be yellow today. The flies did not escape — but then, weapons of mass destruction are a political problem because they exist, not because they are deployed.

CRISPR EVERYWHERE
A *Nature* special issue
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Clapper was anxious about the implications of gene editing because of its dual-use possibilities. But a binary outcome is inadequate for describing the spectrum of ways in which the CRISPR–Cas9 system is changing science and could benefit scientists and the public. In a special issue this week, we examine some of these (see page 155).

Much of the early attention has focused on the prospect of human-embryo modification. The issues that such 'germline' changes could raise for current and future generations have, rightly, been intensely debated. But the uses of CRISPR–Cas9 with early promise are those in laboratories, not clinics — and in human somatic (non-reproductive) cells, bacteria, viruses, animals and plants, not in human germ cells. A pair of News Features starting on page 156 explores these scenarios.

Genome editing is a science for which the alarm about how it could go wrong has largely lagged behind the hype over what good it could achieve — at least before Clapper had his say. And much of the hype has come from those in the know. The speed at which the biological community has adopted gene editing, and the range of applications that it is being used for, speak volumes about its potential. The possibilities — human–animal chimaeras for organ transplants, climate-change-proof crops, eradication of disease vectors — seem endless.

Among the many unknowns that swirl around the future of gene editing is the reaction of the wider public. To their credit, some scientists and organizations are making attempts to foster openness and discussion, on the topic of gene drives, for instance. It is crucial that these deliberations continue, and that such environmental issues are kept scientifically and ethically distinct from concerns relating to clinical applications. ■