



Jocelyn Bell Burnell discovered pulsars as a PhD student at the University of Cambridge, UK.

## BREAKTHROUGH PRIZE

# Pulsar discoverer wins \$3-million prize

*Jocelyn Bell Burnell to use cash to promote diversity in science.*

BY ZEEYA MERALI

Fifty years after discovering pulsars — compact rotating stars that emit beams of radiation — astrophysicist Jocelyn Bell Burnell has been awarded one of the most lucrative prizes in science: a US\$3-million Breakthrough prize. Thought by many to have been snubbed for a Nobel prize for the discovery, Bell Burnell, 75, has been recognized by the Breakthrough committee with a special award in fundamental physics both for her scientific achievements and for her “inspiring leadership” over the past five decades.

“I cannot think of a more deserving scientist to win this prize,” says Chiara Mingarelli,

an astrophysicist at the Flatiron Institute in New York City. “In addition to being both a pioneer and a giant in the field, Bell Burnell is the highest calibre role model — a champion for women in science.”

Bell Burnell, now at the University of Oxford, UK, and the University of Dundee, UK, was “totally surprised” to learn about the prize, which was announced on 6 September. “For once in my life, I was speechless,” she says. She is already in discussions with the national physics institutes in the United Kingdom and Ireland about using the prize money to create PhD studentships for people from under-represented groups in science. “Diversity is very important,” says Bell Burnell. “This also

recognizes that I did my most important work as a student.”

The Breakthrough prizes were launched in 2012 and are funded by entrepreneurs including Google co-founder Sergey Brin. Awarded in fundamental physics, life sciences and mathematics, they are usually handed out in December, based on selections made after an open nomination process. But the selection committee can decide to make special awards. Previous special awards have been given to Stephen Hawking and to the Laser Interferometer Gravitational-Wave Observatory collaboration for the discovery of gravitational waves.

Pulsars are dense stars, consisting mostly of neutrons, that rotate at a precise rate, emitting radiation as they spin. In 1967, Bell Burnell, then a PhD student at the University of Cambridge, UK, under astronomer Antony Hewish, was analysing hundreds of metres of chart paper containing data collected by a radio telescope in Cambridge when she noticed some mysterious recurring smudges. She was able to characterize these as signs of radio pulses emanating from a spinning star: the pulsar. “The discovery is a testament to her curiosity, her determination and her creativity,” says Mingarelli.

In 1974, Hewish shared the Nobel Prize in Physics with fellow radio astronomer Martin Ryle, for pioneering research in astrophysics. Hewish was cited for his “decisive role in the discovery of pulsars” — while Bell Burnell was overlooked. Bell Burnell herself has previously stated that she does not mind the oversight because she understands that Nobel prizes are not usually awarded to research students.

Her discovery still rings out half a century on, notes Mingarelli. For instance, earlier this year, NASA scientists demonstrated the feasibility of using pulsars to navigate, with their SEXTANT experiment on the International Space Station. The idea is that future robotic spacecraft could use the clockwork-like arrival times of X-rays emitted from pulsars to triangulate their locations. ■

## INFORMATION

# Google enters data ecosystem

*Dataset Search could be especially helpful to cross-disciplinary researchers.*

BY DAVIDE CASTELVECCHI

Google has unveiled a search engine to help researchers locate online data that are freely available for use. The company launched the service on 5 September, saying that it is aimed at “scientists, data journalists, data geeks, or anyone else”.

Dataset Search, now available alongside Google’s other specialized search engines,

such as those for news and images — as well as Google Scholar and Google Books — locates files and databases according to how their owners have classified them. It does not read the content of the files themselves in the way search engines do for web pages.

Experts say that it fills a gap and could contribute significantly to the success of the open-data movement, which aims to make data freely available for use and re-use.

Government agencies, scientific publishers, research institutions and individual researchers maintain thousands of open-data repositories worldwide, containing millions of data sets.

But researchers who want to know what types of data are available, or who hope to locate data they know already exist, often have to rely on word of mouth, says Natasha Noy, a computer scientist at Google AI in Mountain View, California. ▶