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## Space exploration

# Paralympian joins new astronauts

European Space Agency plans to explore the feasibility of sending a “parastronaut” to space

Alex Wilkins

THE European Space Agency (ESA) has announced its newest astronauts, including the first ever astronaut with a physical disability.

John McFall, who is from the UK, had his right leg amputated after a motorcycle accident at age 19. He is a surgeon who has represented Great Britain and Northern Ireland as a Paralympic sprinter.

The other astronauts are engineer and pilot Sophie Adenot from France, aerospace engineer Pablo Álvarez Fernández from Spain, biomedical engineer Raphaël Liégeois from Belgium, doctor Marco Sieber from Switzerland and astronomer Rosemary Coogan from the UK.

“My research is in galaxy evolution, so I’ve always been interested in space and space science,” says Coogan. “This is really taking it to the next level.”

ESA also announced 11 astronauts who will enter its new astronaut reserve, which is made up of people who completed the selection process, but weren’t chosen for full-time service.

“This selection was about talent and about capabilities to be a fantastic astronaut, but I’m also very proud that it happens to be a very good distribution of genders,” ESA director-general Josef Aschbacher said at a press conference on 23 November.

After announcing last year that it would be selecting new astronauts for the first time since 2008, ESA received more

### ESA’s newly recruited career astronauts and reserve astronauts

than 22,500 applications from 25 countries, 17,126 of which were from men and 5397 of which were from women.

There were 257 applications specifically for the role of “parastronaut”, which ESA confined to people with “lower limb deficiencies”. This was defined as either a “single or double foot deficiency” through the ankle or below the knee, a pronounced leg length difference or a height below 130 centimetres.

The role of parastronaut isn’t a guarantee for space flight,

according to ESA, but instead is a “feasibility project” where ESA will assess spacecraft and procedural adaptations for a possible space mission.

The successful astronauts had to make it through six stages. After the initial screening, the first group of candidates went for a full day of psychological performance testing to see if they could cope with the stresses of space flight. This group was then whittled down to just over 400 people, who then went for more psychological interviews and group tests. Those who passed took medical tests and, if they passed, were invited to a final round of recruitment interviews.

“It feels as though we’ve been tested on everything imaginable really, from physics and maths skills to memory, psychology, interaction with others, medical, enthusiasm, everything I can think of,” says Coogan.

The successful applicants will undergo a year-long basic training course at ESA’s European Astronaut Centre in Cologne, Germany. ■



ESA - P. SEBIROT

## Health

# Specific brain markers found for ADHD in children

A STUDY of more than 7800 children has found that those with attention deficit hyperactivity disorder (ADHD) can have a smaller outer layer of the brain and specific neural connections not seen in those who don’t have the condition. The findings suggest that brain imaging could help diagnose ADHD.

Brain features of ADHD have previously been identified in small studies. Now, Huang Lin at the

Yale School of Medicine and her colleagues have confirmed that certain features involved in impulse control, short-term memory and concentration located in the prefrontal cortex are linked to ADHD. They did this by analysing MRI brain imaging data from more than 7800 children aged 9 or 10.

The researchers trained a machine-learning artificial intelligence to form links between brain characteristics and whether someone had ADHD. This involved giving it the brain imaging data of around 80 per cent of the children, including numerical data such as

the size, surface area and neural connectivity between brain regions, along with their ADHD status.

When the trained AI looked at data from the remaining 20 per cent of participants, it was able to identify 60 per cent of children with ADHD and 56 per cent of children who didn’t have ADHD. The results were presented at a Radiological Society of North America meeting in Chicago on 27 November.

**“We show that certain brain features linked to ADHD are distinct enough for an AI to make predictions”**

“We show that certain brain features linked to ADHD are distinct enough for an AI to make predictions,” says Lin.

“It is great having such a large sample, particularly with a high number of females with ADHD, who tend to be underrepresented in ADHD research,” says Tim Silk at Deakin University in Melbourne, Australia. However, the predictive ability of the AI is little better than the toss of a coin, he says.

Still, being able to scan for brain signatures could make diagnosis of ADHD more objective, says Lin. ■  
Carissa Wong