

or superfoods. The standard of writing was impressive, and the scope of ideas inspiring.

The winner is a compelling essay by Yasmin Ali, a PhD student at the University of Nottingham, UK. Ali submitted a thought-provoking piece on Beethoven, her brother's hearing loss and the science she hopes will one day cure it. It stood out to the judges as a reminder of why many scientists do research: to make the world better tomorrow than it is today.

All essays were judged by a group of *Nature* editors. The top ten submissions were then ranked by three members of a separate judging panel: Magdalena Skipper, editor-in-chief of *Nature*; Faith Osier, an immunologist and researcher at the KEMRI–Wellcome Trust

Research Programme in Kilifi, Kenya; and Jess Wade, a physicist at Imperial College London. All submissions were kept anonymous throughout the process.

We also selected two runners-up. Physicist Robert Schittko at Harvard University in Cambridge, Massachusetts, proposes that nuclear fusion could offer a solution to the climate crisis, in a piece that effortlessly mixes grand

ambition with gentle humour. And chemist Matthew Zajac at the University of Chicago in Illinois wrote a powerful personal account of why he wants to see advances in the field of same-sex reproduction.

The results show that today's young scientists have a wealth of ideas, talent and conviction that research can transform their world. We look forward to seeing what they do next.

Beethoven's dream

The composer wished for a cure for his hearing loss. Soon, research could make it a reality for my twin brother – and millions more. **By Yasmin Ali**

In 1802, under a June Sun, a 31-year-old Beethoven paced through the countryside around Vienna. Rays of sunshine pierced through the trees, the hard soil crunched beneath his feet and birds conducted their own orchestra. But Beethoven didn't marvel at these details; he was preoccupied by thoughts of suicide. Some years earlier, he had started to lose his hearing, and although it wasn't yet severe, he was still struggling immensely with his condition. Living with hearing loss made his life a "wretched existence" that drove him into despair, he wrote. He still persevered with his work, and went on to create timeless music. But he found little joy in the process.

I observed a similar struggle at first hand, as my twin brother Islam, when we were 18 years old, started to lose his hearing. I noticed changes in his personality, too. He was always the outgoing troublemaker, but became quiet and withdrawn. Because hearing loss isn't visible, I didn't know what he was going through, which also made it difficult for me to be there for him.

Today, 466 million people worldwide have disabling hearing loss, and over 900 million are expected to have it by 2050, according to the World Health Organization. Its impact is often underestimated compared with other disabilities, but people with hearing loss constantly experience communication difficulties in their everyday lives. They often mishear speech and find it very difficult to follow conversations. These miscommunications can lead to individuals feeling isolated as they struggle to take part in social interactions, ultimately leading

them to withdraw from society. As Helen Keller once wrote: "Blindness cuts us off from things, but deafness cuts us off from people."

To this day, there is still no cure for sensorineural hearing loss (the most common type, and the one Beethoven had). We have advanced technological devices that amplify sound, such as hearing aids and cochlear implants, but these still don't restore hearing. In my and my brother's lifetimes, I'd like to see research make that possible.

Sensorineural hearing loss occurs as a result of damage to the inner ear organ, called the

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cochlea, which has intricate sound-sensing hair cells that are responsible for hearing. In humans and other mammals, any damage to hair cells is irreversible. Other animals, such as birds, fish, amphibians and reptiles, can spontaneously regenerate their cochlear hair cells, meaning that any hearing loss they develop is only temporary.

Scientists have been studying the regeneration process of hair cells in non-mammals, and have identified various genes and proteins that have central roles. These can be targeted to stimulate support cells in the cochlea to in turn create more hair cells and replace those that died.

Some of these cell therapies have been

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successful in restoring the hearing of mice and guinea pigs: a breakthrough! These advances have led to the development of more therapies, and one such therapy is now being tested for the first time in humans. The REGAIN clinical trial (REgeneration of inner ear hair cells with GAMma-secretase INhibitors), an international collaboration led by researchers at University College London, is testing a molecule called γ -secretase inhibitor that could potentially restore hearing by encouraging supporting cells to transform into new hair cells themselves.

If it works, such a scientific advance could transform hearing health care as we know it. My own research investigates the impact hearing loss has on people's mental well-being. Many people share Beethoven's despair when they realize that their hearing can't be restored. Hope is an essential element for good mental health.

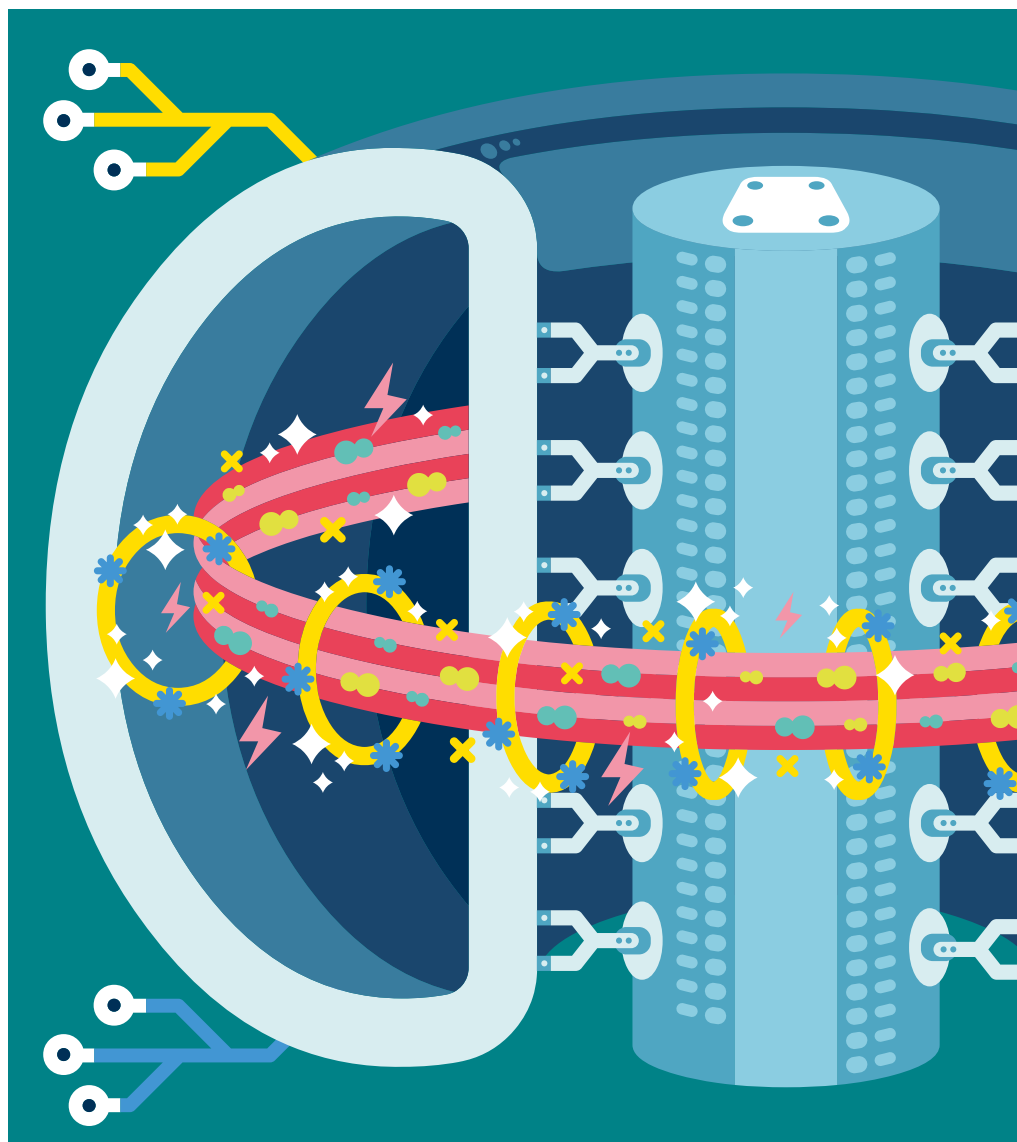
Other members of the deaf community see themselves as a cultural minority, rather than as a disabled group to be 'cured'. My and other scientists' research aims to help those who feel disadvantaged by deafness and want to be able to hear.

Islam and I come from interracial parents, so we look very different. I have white, freckled skin, and his is olive (he gets perfect suntans, and I turn into a tomato). I have blue eyes, and his are hazelnut. I have normal hearing, whilst he has severe hearing loss. He and I have shared the many chapters of our lives, and when things became difficult as his hearing declined, what helped us cope was being able to make sense of it all together. Communication, self-expression, hearing and being heard (even through sign language) are basic human needs. I hope that when I voice support to my brother in the future, that he'll be able to hear it, receive it and not feel alone.

When Beethoven lost his hearing, he secluded himself from society – but one thing that gave him strength was the hope that his hearing could be regained one day. But each medical remedy he attempted failed. In 1802, he wrote: "But, think that for six years now I have been hopelessly afflicted, made worse by senseless physicians, from year to year deceived with hopes of improvement, finally compelled to face the prospect of a lasting malady (whose cure will take years or perhaps be impossible)."

Beethoven's dream of regaining his hearing did not come true for him, but through the scientific advance of regeneration of hair cells, it could become a reality 217 years after his June walk. On his deathbed, it is said that Beethoven's last words were "I shall hear in heaven!" Luckily for us, those facing hearing difficulties could soon be able to hear on Earth.

Yasmin Ali is a PhD student studying mental health and hearing loss at the University of Nottingham, UK.



Power play

Nuclear-fusion power plants could be part of a solution to the climate crisis. **By Robert Schittko**

If primary sources can be believed, I conducted my first experiment with a high-power energy source at the tender age of one.

It was New Year's Eve 1995, and I had somehow gained possession of two silver objects I now know were screws, when my wandering gaze was captured by a snake-like item emerging from a wall. At its end, which I was about to learn was the head of an extension cord, there were two tiny openings, whose black interiors stood out daringly against the white backdrop of a piece of plastic. Utterly unaware of the cautionary tale I was about to write, I abandoned all hesitation. I took one last

breath, homed in on my target, and shoved the two silver objects into the two little holes, thus producing the first – but, fortunately, not the last – negative result of my newfound career.

Twenty-four years later, my parents and I have fully recovered from our respective shocks, I am still playing around with hazardous equipment – currently as a physicist at Harvard University in Cambridge, Massachusetts – and the mishandling of energy sources on a far larger scale is now threatening not just my existence but that of tens of thousands of species worldwide. Unlike toddler-me, today, we cannot plead ignorance. Even if global warming is kept to 1.5 °C above