



Mathematician and pianist **Eugenia Cheng** on the joy of category theory, freezing Brie and getting to do everything she wants in life, apart from appearing in a shampoo advert

### As a child, what did you want to do when you grew up?

I wanted to be a mathematician, a pianist, a pastry chef, a newsreader, a *Blue Peter* presenter, be on a TV cooking show, be in a shampoo advert. I have managed to do some version of quite a few of these while mainly being a mathematician and pianist – apart from the shampoo advert.

### Explain your work in one easy paragraph.

My research is in category theory, a branch of (very) abstract mathematics that is about understanding how it all works. I like to say it is the “mathematics of mathematics”. I believe that mathematics is the core of thinking: it is everything that is logical. Not everything in life behaves according to logic, but it is important to understand which parts do.

### Why did you choose this field?

I think I never stopped being the toddler who keeps asking the question “Why?”. For me, mathematics provides the most satisfying and irrefutable answers to that question, and category theory does that inside mathematics.

### Did you have to overcome any particular challenges to get where you are today?

Oh my goodness, where to start? I have faced the expected quantity of challenges through being a woman and non-white. But probably the biggest was discovering that the normal academic career path didn't suit me, and deciding what to do about that.

### What achievement are you most proud of?

I'm most proud of building a portfolio career that perfectly suits my combination of abilities.

### Were you good at science at school?

I suppose I was, but I didn't really enjoy it. It involved too much memorising. I liked physics in principle, but felt we were told things without explanation, so I turned to mathematics.

### If you could send a message back to yourself as a kid, what would you say?

Just hang on. When you are an adult, you can sleep when you like, be as untidy as you like and eat chocolate for breakfast.

### How has your field of study changed in the time you have been working in it?

Category theory was quite niche and considered too abstract, even by mathematicians, when I started working on it. But it has become remarkably pervasive, not just in pure maths but also theoretical physics, computer science and even biology, chemistry and engineering. I didn't expect that. I am motivated by its powers of illumination, and the breadth of topics it is able to illuminate is very exciting.

### If you could have a conversation with any scientist living or dead, who would it be?

I would like to talk to mathematician Emmy Noether about how she kept going through all the obstructions and oppression she faced: for being a woman, a Jew and then having a tumour.

### What scientific development do you hope to see in your lifetime?

Feeding all the hungry people in the world.

### Do you have an unexpected hobby, and if so, please will you tell us about it?

I make my own chocolate from raw ingredients, and temper it by hand.

“The biggest challenge was discovering that the normal academic career path didn't suit me, and what to do about that”

### What is the best thing you have read or seen in the past 12 months?

***Becoming Ms Burton: From prison to recovery to leading the fight for incarcerated women* by Susan Burton (pictured) and Cari Lynn.** This deeply inspiring book tells a story that needs to be heard so much – about the way black people are disadvantaged by the structures of American society, as well as by systems and individuals.



### OK, one last thing: tell us something that will blow our minds...

The other day I told someone that I often freeze Brie and it is perfectly fine after thawing, and their mind was blown. ■

Eugenia Cheng is Scientist in Residence at the School of the Art Institute of Chicago. Her latest book *The Art of Logic* is out now in paperback

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