



During this tiny moment—much less than 0.1 seconds after the universe was born—the universe stretched out like a balloon blown up in an instant. It went from being microscopic to the size of a soccer ball or even bigger in no time at all. Think about how fast that is. It's like watching a grain of sand become a galaxy in a snap.

Why did this happen? That's the mystery I'm trying to understand. Some scientists think it happened because of a strange kind of energy that pushed everything apart. This energy made space itself expand faster than the speed of light! (Don't worry—nothing inside space was moving faster than light, just space itself growing, which is allowed in physics.)

This sudden growth smoothed out the universe, like when you stretch a wrinkly sheet and all the bumps disappear.

But wait — how do we even know this happened?

Nowadays, scientists look at a kind of “afterglow” of the Big Bang, called the Cosmic Microwave Background, or CMB for short. It's like the baby picture of the universe, taken when it was only 380,000 years old (our universe right now is 13.8 billion years old). If we take the current universe as a 30-year-old adult, the CMB photo was taken when it was 18-minutes-old). This faint glow is everywhere in space, and it tells us a lot!

The CMB shows tiny temperature bumps — like little fingerprints of the universe—that match what inflation predicted. These bumps helped galaxies form later. And inflation helps explain why the universe looks so flat. Without inflation, it would be hard to explain why the universe isn't super curvy like a basketball.

Besides, inflation might've created gravitational waves, tiny ripples in space itself! They're like the echoes of inflation—waves caused by the violent stretching of space. Scientists are trying to catch these waves with super-sensitive instruments. It's like

listening for the faint whispers of the universe's first heartbeat. If we find them, that would be huge proof that inflation really happened.

This is exactly what happened in 2015 – in 4 years for you now – when gravitational waves were detected by LIGO for the first time, marking the beginning of a new era in our understanding of the universe. For the first time, humanity was able to hear the universe to listen to the faint, ancient whispers of space-time itself. It wasn't just a scientific breakthrough; it was a poetic moment, a shift in how we explore and understand the cosmos. This inspiring moment triggered me to dive into the field.

What gets me excited is imagining how everything — galaxies, stars, planets, even you and me — came from that tiny moment. I'm inspired by the idea that the whole universe was once so small, and in a blink, it became everything. The idea that we can look up at the sky, study ancient light, and figure out what happened when the universe was less than a trillionth of a second old is also a lot of fun.

Right now, I'm exploring the theory of inflation, building models that are both realistic and really cool to help us understand this early time of our baby universe. At the same time, I'm trying to figure out some of the biggest mysteries in space, including dark matter and dark energy. These are mysterious parts of the universe that we can't see directly, but they affect everything around us. Solving these puzzles is one of the most important quests in cosmology!

You might think scientists just spend all day working with complicated math and equations, but actually, it's like producing an incredible movie playing inside our minds. When we change the models and parameters, it's like writing the script for the story of tiny universes — and who knows, maybe one of those stories is a twin of our own real universe!

This is how imagination and intuition come alive, and I'm sure you're already a master of both. We're super lucky to be living in this golden age of cosmology. With every passing year, our tools get sharper, our questions get deeper, and the mysteries grow

even more fascinating. So don't hold back — share your ideas, spread your curiosity, and let your imagination wildly grow.

And another advice is: keep asking questions. Never stop wondering how things work. Even when something seems too hard (like quantum fields or curved space), just keep digging and try to imagine them in your mind. The universe is full of mysteries, and it's waiting for people like you to uncover them. And remember: you don't have to be the smartest in the class. You just have to be the most curious and the one who spends the most time on the topic you are interested in.

*The universe got huge in a blink. Who knows what you could become in the blink of a few years?*

Stay curious,

Future You

The grammar was checked by Grammarly and ChatGPT