

Go! Physimon

Dear 12-year-old Me,

It's been a long time. I'm you, more than ten years in the future.

You might be surprised by the title, "**Go! Physimo!**" It's a word I created by combining *physics* with the Chinese pronunciation of *dream* ("meng"). I still remember how much you loved watching Pokémon. You admired Ash because he never stopped traveling, even after losing again and again. Back then, we secretly imagined that science could be an adventure just like that. Instead of collecting Gym Badges, we would explore the mysteries of the universe and uncover the hidden rules of nature. One day, we would become a true "Master of Physics."

I know exactly what you're doing now. You're probably carrying that little hammer in your backpack again, following Dad through forests that were once an ancient seafloor. While everyone else sees ordinary stones, you're searching for fossils and wondering what stories they might tell. At night, your mind is full of questions. How did life begin? Why does the universe exist? What invisible rules connect everything around us?

Please don't ever stop asking those questions. As you grow older, some people will tell you what a girl should be like. Others may quietly make you wonder whether your dreams are too unrealistic or whether science belongs to someone else. There will be moments when you feel lonely or think you should become more "normal." But none of those voices will ever be stronger than your curiosity. It will always lead you back to the questions that truly matter.

And one day, something wonderful will happen. You will realize that you don't have to wait for someone else to answer your questions.

You can build the tools to find the answers yourself. Remember when you wished you had magical glasses that could see things nobody else could?

Well... you eventually build them.

One day, you will build your own microscope. Not the kind you use in school. Do you remember the cells you looked at in science class? They never moved. By the time you saw them, they had already been preserved and stained, almost like butterflies

carefully pinned inside a museum display. They were beautiful, but their story had already ended.

A living cell is almost invisible because it is nearly transparent, just like a clean window.. To make cells easier to see, scientists usually add colorful dyes that work like highlighters, making different parts of the cell stand out.

But there is a problem. Those dyes can sometimes change how the cell behaves. I wanted to watch the story while it was still being written. Instead of changing the cell, I use something that is already there—light. Imagine standing beside a quiet pond. If you throw one small stone into the water, ripples spread outward. If you throw in a second stone, the two sets of ripples meet. Sometimes they make bigger waves, and sometimes they almost cancel each other out. Light behaves in almost exactly the same way. Scientists call this phenomenon interference.

Now imagine shrinking that pond until it is smaller than the width of a human hair. Instead of throwing stones, I shine an extremely thin and perfectly controlled beam of light onto the cell. You can think of it as an incredibly straight and focused flashlight whose light doesn't spread out as it travels. Scientists call this special beam a laser. Most of the light reflects from the glass beneath the cell, just as sunlight reflects from a window. But a tiny amount of light also bounces off a tiny particle inside the cell. When these two reflections meet again, they interfere with each other, just like the ripples on the pond.

Now comes the surprising part. Even if that particle is far too small for an ordinary microscope to see, it still changes the interference pattern ever so slightly.

It is like knowing an invisible fish is swimming beneath the water—not because you can see the fish itself, but because you notice the tiny ripples it leaves behind. That tiny change is enough. By measuring those tiny changes very carefully, my microscope can detect objects much smaller than what ordinary microscopes can normally observe, all without adding fluorescent labels or dyes. Instead of changing the cell so that it becomes easier to observe, I simply watch it as it naturally is.

But making beautiful pictures is not why I build this microscope.

The real goal is to watch tiny particles moving inside a single living cell.

Imagine a busy city during the day. Thousands of delivery trucks travel through the streets carrying food, packages, building materials, and messages. A living cell is surprisingly similar. Some carry nutrients. Some deliver messages. Others recycle waste or transport the materials that keep the cell alive. If we can watch those tiny "delivery trucks" moving through the city of a cell, we can begin to understand the hidden rules that keep life running.

When you were twelve, you searched for stories hidden inside ancient rocks.

Years later, you will still be searching for hidden stories.

The only difference is that they are no longer written in fossils. They are written inside living cells.

You will discover that science is not only about equations or experiments. It is about having the courage to keep asking questions that nobody knows how to answer yet. You will fail many times. Some experiments will refuse to work. Some nights in the laboratory will feel endless. But every once in a while, you will suddenly see something that almost nobody in history has ever seen before. Those moments make every failure worthwhile.

So keep asking impossible questions.

Keep wondering.

Keep exploring.

One day, you'll realize that the greatest adventure was never becoming a scientist.

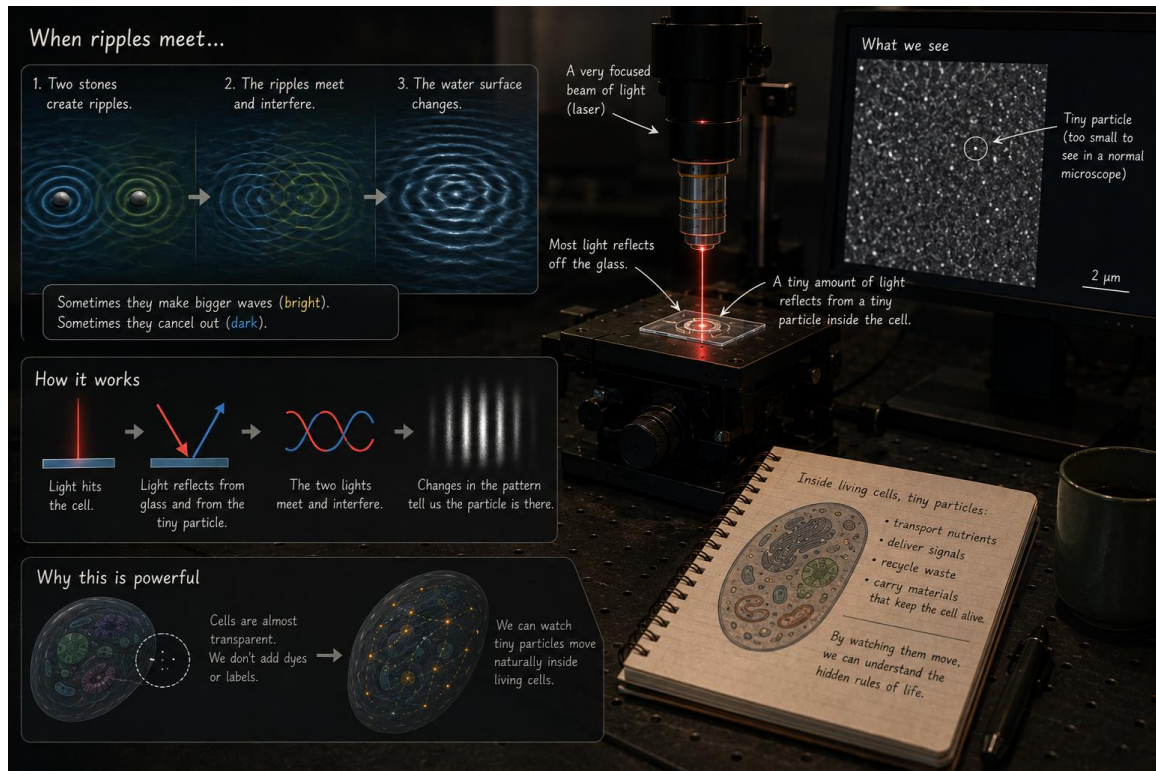
It was never losing the curiosity of a twelve-year-old.

Go, Physimo!

The stories are still there.

They have always been there.

You simply learned how to build a better lens to read them.



Announcement

The grammar and language of this article were refined with the assistance of ChatGPT. The illustration accompanying this work was also generated using ChatGPT based on my original ideas and story.