

SCIENCE

By Michaela Ripper

My name is Avalon Paske. I'm a scientist. That means that I'm rational, and I don't trust something unless there's evidence.

That's why I don't expect you to believe my story.

The day was normal: a hugely disappointing day in the lab.

After a full twelve hours running numbers through the processors, I found an error in a datasheet which rendered my past month's work useless. I thought I was on the brink of stabilising the toroidal magnetic field in the fusion reactor. But, instead, I found a typo on page three.

I slouched home after work and tried to think about anything except nuclear fusion. It was surprisingly difficult. Images of a world with unlimited, clean energy played in my mind. It seemed so close, but so far away.

I curled under the covers and tried to quiet my restless mind. I must have fallen asleep eventually, because, suddenly, I was being jolted awake by harsh beeping noise and bright lights flashing before my eyes. I gasped in fright, sucking in a breath of cold, bitter air that tore at my lungs. My heart beat wildly as my eyes adjusted to the flashing brightness, and I saw that I wasn't in my bed any more. I wasn't even in my room.

I was lying inside a coffin-sized glass chamber filled with copper wires and flashing lights. The room beyond was hazy and foreign, miles and years away from the bed I had fallen asleep in.

I felt fearfully claustrophobic. I tried to move, but my body was all seized up. As I tried to shake feeling into my fingertips, agonising pins-and-needles rippled up my limbs. Finally, movement returned to my arms and I pushed against the glass. It wouldn't budge.

Then I noticed a small, red button to my right. I pushed it and, with a heaving groan, the glass cover of the chamber sprung open.

Desperate for fresh air, I lurched upward and scrabbled at the walls of the chamber. I was surprised when water splashed everywhere. Only then did I realise I was wearing a drenched hospital gown, and that I had been lying in a good fifteen centimetres of thick, blue-tinged water. I hauled myself out of the chamber and tumbled to the floor. My mind was whirling to try and find an explanation for the situation. I couldn't think of anything.

The bare room was empty and ugly, with grey walls covered in peeling paint and lifting tiles. I shivered with goosebumps. I tried to move towards the door, but was pulled back to the machine by metal cuffs locked to my wrists, with wires from them running to a huge silver machine below the glass chamber. It buzzed ominously.

I fumbled at the cuffs, but they were locked tight. I recognised them as the same locks as the ones we used at the labs: magnetic coded, very hard to break. To unlock them, you had to align the locks' teeth, the magnetic pins and the magnetic poles. But, as an undergrad, I had discovered that if you had a strong enough voltage, you could disrupt the magnetic field enough to weaken the lock.

I dropped to my knees and examined the machine below the bed. There was no power cord, so there must be a battery. I popped open the latch and fumbled through its internal parts: there were transformers, solenoids and tonnes of wires. I didn't have any luck finding the battery. Instead, all wires seemed to lead to some sort of capacitor. It looked like a *graphene supercapacitor*.

I frowned. That was impossible. Graphene supercapacitors were a hypothetical power source, able to store immense amounts of energy and deliver it very quickly. But no engineer had even developed a working prototype yet.

But, when I connected wires from the supercapacitor to the transformer, a painful kick of current jolted my body and sent me jerking backwards. I hadn't expected such a painful force, but it worked: when I pulled at the cuffs on my wrists and ankles, they just fell away.

Still shocked, I stood up and walked to the door. It groaned open when I gave a hefty shove, and I stepped out into a dark corridor which stretched into shadows in both directions.

Fluorescent lights stuttered to life along the corridor. There were no windows and no natural light. Along the corridor were lines of doors identical to the one I had just come through. It was eerily silent, with no other sign of life.

Deciding on a direction, I took off down the corridor. My pace quickened as the corridor twisted and turned with no sign of ending. Eventually, I turned a corner and froze. The end of the corridor was completely caved in, filled with huge grey rocks and white dirt. I bent down and picked up a stone at my feet. I recognised it as batholith, a volcanic stone that is only found deep underground. Was this place an underground bunker?

Suddenly, there was a noise behind me and I spun around. My heart leapt to my throat with terror.

Standing in the middle of the corridor stood a creature that seemed to be part human, part ape. It stared with deep-set eyes beneath a heavy brow. Sharp canines protruded from its wide-set mouth, and long arms hung from its sides. A ragged t-shirt covered its torso, oddly contrasted by the black hair that densely covered its entire body.

I started to stumble backwards when a croaky, mechanical voice emanated from a silver device strapped to the creature's throat.

"Avalon Paske. You must follow. You must not dispute this instruction."

I froze. What was going on?

When I didn't respond, the creature began to lunge towards me with heavy strides. I scrambled backwards until I was pressed against the caved-in wall. Out of frightened instinct, I hurled the batholith stone in my hand towards the creature's head. But with unnatural strength, the creature batted it out of the air with one deft swipe of its long arms.

I stumbled backwards, but the creature was upon me, and grabbed my left arm with an iron grip. I tried to escape, but the grip was too strong. The creature pulled me forward, and began to drag me down the corridor.

"You must follow," it repeated.

"Wh-where are you taking me?" I gasped.

"To the western wing of the central bunker." The creature replied, in the groaning mechanical tone.

"To the others. To Maria."

I closed my eyes. None of this made sense.

"What are you?" I asked, as the creature continued to drag me along.

"I am Lucy," it replied. "I am *Australopithecus afarensis*."

I shook my head. “That’s impossible.”

Australopithecus afarensis was a hominid that went extinct 3.2 million years ago. The first *Australopithecus* skeleton was found in Ethiopia in 1974. Its founders had nicknamed her “Lucy”. What was going on?

Lucy was silent as she continued to drag me down the corridor. *Australopithecus* didn’t have language, so how was she speaking? I looked across at the strange silver device strapped to her throat, like a silver voicebox. I realised, with a shock, that it was neuroprosthetic. Someone had attached a mechanical organ to her body that connected directly to her brain and conveyed her thoughts to voice.

But how? Like graphene supercapacitors, this level of neuroprosthesis was still hypothetical. They didn’t exist yet. They couldn’t. And yet... here was evidence to the contrary.

Lucy jerked me to the side, to avoid a huge puddle of water that had pooled in the centre of the corridor. Somewhere nearby, I heard the characteristic beeping of a Geiger counter.

Suddenly, Lucy turned sharply to the right and pushed through a door identical to the others. She shoved me inside, into a huge meeting room, filled with desks covered in broken computers.

In the centre of the room clustered a handful of people dressed, like myself, in hospital gowns. They all turned to look when I entered, their eyes wide with trepidation. My breath caught in my chest. Of all the things I had seen so far, this was by far the most unbelievable.

I knew these people. I had seen these faces countless times in the black-and-white images of my textbooks. They were the faces on the posters peeling from my laboratory walls. These were the people who had built the foundations of my career. Gathered together in one room, dressed in dank hospital gowns with hair ruffled from sleep, were some of the greatest physicists in history.

Maxwell. Pauli. Rutherford. Chadwick. Oliphant. Bethe. Fermi. Hahn. Sakharov. Teller.

Good god, even Einstein.

I gaped, dumbfounded, until Lucy pushed at my shoulders, forcing me further into the room. I stumbled towards the crowd.

“And who are you?” A voice piped up, and a wide-browed man with dark eyes stepped forward from the crowd. I recognised him as Enrico Fermi, the designer of the first nuclear reactor. “Another ghost from the past, or spectre from the future?”

As Lucy gave me one final push towards the group, I stumbled forward and stuttered. “M-my name is Avalon Paske. What’s going on?”

Fermi shrugged broadly. “I can only guess that this is some elaborate joke! Either that or madness.”

Albert Einstein stepped forward, shaking his head. “Again, you discount the obvious. We have been summoned to the future.”

My mind reeled. *The future?*

Edward Teller spoke up. “Why us though? I don’t see reason in this. Some of you are great scientists, but I have achieved nothing important.”

The room suddenly erupted into argumentative protests, with each scientist more desperate than the next to profess his own inadequacy.

“No, I’m just an amateur—”

“...you are one of the greatest of the century!”

“I am nothing—”

“...and the hydrogen bomb!”

“I don’t know why I’m here.” I said, adding to the chaos.

Soon, we all fell silent, quite confused.

Then, Hans Bethe spoke. “Why don’t we look at this logically?” He spoke in a steady, measured voice. “I recognise many faces here and I know that Maxwell is the first.” He pointed at a young man with a high brow and angled chin.

James Maxwell started at the attention. “I do not understand.” He said, in a thick Scottish accent. “I do not recognise anyone here.”

Bethe nodded. “Of course. That’s because your discovery is in 1873. You unify electricity and magnetism. Rutherford there is next,” he pointed at a round-faced man with a busy moustache, “with the theory of atomic disintegration in 1902. Then Einstein, with his mass-energy equivalency in 1905...”

“The what?” Einstein raised a single bushy eyebrow in question.

“ $E=mc^2$ —”

“Wait!” Mark Oliphant cried, stepping between them and raising both hands. “Won’t we mess with history if we all know what we’re going to discover?”

“Speak for yourself,” Otto Hahn said. “What is it that I do?”

“You discover fission in 1938,” Bethe replied. “It’s basically an extension of Fermi’s work.”

“And that is...?” Enrico Fermi asked.

“You create the first controlled nuclear reaction. 1942.”

Before anyone else could ask questions, there was a sudden noise. A door opened at the far end of the room, and a stunning young woman appeared. She seemed to be about my own age, with a delicate frame and a halo of cropped black hair. She had almost transparently white skin, deep brown eyes and ruby lips. In contrast with the rest of her appearance, she was dressed in ill-fitting cargo pants and a loose shirt.

She looked towards us and smiled, her body sagging slightly with relief.

“I am so glad to see you all.” She said, and looked towards me. “And Avalon too! Oh good, Lucy found you. I was worried I’d lost you when you hoodwinked the chromocuffs and dropped out of infrared range. If you’d found your way to the surface...” She shook her head balefully.

“Are you in charge here?” Fermi demanded, striding forward aggressively.

The woman smiled, nodding. “My name is Maria. I owe you all an explanation, this must seem so surreal. But you must understand I wouldn’t have brought you here if not for the most desperate of reasons.”

“Explain then!” Enrico Fermi said. “Explain this chaos, because my mind can find no rational argument.”

Maria nodded. “The year is 2097, and we are currently in an underground nuclear bunker located deep in the Simpson Desert. I have brought you all here from the past using quantum chromobiological transportation. You see, 99.7% of the world’s population is dead, the rest are dying and we need your help.”

There was silence for a moment, as if everyone was waiting for the punchline of the joke.

Finally, Einstein spoke. “What is chromobiological transportation?”

Maria smiled. “We use the temporal genomic fingerprint to quantum encode a physical organism and perform a quantum teleportation across the time dimension.”

“So, time travel?” Einstein clarified.

“Yes.” Maria nodded. “It’s a relatively recent technology, but also rather simple. I built the teleportation device myself and tested it.” She gestured to Lucy. “All I needed were fragments of your DNA, and that was relatively easy. The government has been cryogenically freezing the DNA of famous scientists for decades.”

“Wait!” Otto Hahn burst out, stepping forward from the group. “You say ‘famous scientists’. But many of us do not know why we’re here. I for one am certainly not famous, I have achieved nothing.”

“Perhaps not yet,” Teller said.

Maria smiled. “You – all of you – are the greatest nuclear physicists of the recent centuries. Together, you will lead to the development of modern atom models, nuclear reactors, transmutation, fission, nuclear weapons, medical isotopes and... fusion.”

My heart skipped a beat. In the room, everyone started speaking at once again. The scientists all shouted over each other, demanding to know what their famous discoveries would be.

I bit my lip. I recognised everyone in the room. This meant that I was the last of the scientists in line.

Maria frowned in frustration as the scientists shouted questions at her, gesticulating aggressively. She reached into the pocket of her pants and removed a small silver device. She pressed a button and, suddenly, everyone fell suddenly quiet. I tried to gasp, but it was as if I’d had my voicebox removed.

“I haven’t finished explaining why you’re here,” Maria stated, irritated. “You all ask what your famous discoveries are, but none of you ask about the consequences.”

She sighed, and lowered herself into a nearby chair. “We are at the very end of the worst war in human history, and soon, all life on Earth will be extinguished. Your minds led us to this war. This war was a battle for energy, and nuclear power has led to our destruction.”

I shook my head, unbidden. Fear was blossoming in my gut like a dark weed.

“Do you mean...” Sakharov spoke, indicating that the power which bound their voices had been lifted. “Does this have to do with...” He looked suggestively at Einstein and Fermi. I realised he was

asking whether Maria was talking about the nuclear bombs that ended World War Two with the destruction of Hiroshima and Nagasaki.

Maria shook her head. “This isn’t about fission,” she said. My stomach dropped and my mouth was suddenly bone-dry.

“Fission?” Maxwell asked.

“If you split large atoms like uranium, you get energy,” Bethe said. “But you can also get energy by fusing them together.”

Sakharov nodded. “Yes. Just like in the sun. But how?”

I started to reply. “ $E=mc^2$ —”

“Hush!” Oliphant snapped. “We shouldn’t know these things ahead of time!”

“Look, this is besides the point,” Fermi said, stepping out of the throng and taking three fierce strides towards Maria. “I don’t know who you are, and your story is ridiculous. I want to go home, so if this is a joke, end it now. Otherwise—”

His voice disappeared and Maria was on her feet again, her eyes flashing. “I have brought you all here for a reason, and I will send you all home soon. You will not be harmed. But only you can stop this war.”

“How?” I asked, my voice faint.

Maria looked at me for a moment with sadness in her eyes. “The war is almost over.” She said. “The Earth has been wiped empty of life. Humanity has been utterly extinguished, but for a very sparse few – those who have thus far defied chance and survived the radiation by hiding in these scattered bunkers deep underground. But there isn’t much time left, I am one of the last, and that’s why I’ve brought you here.”

She looked at them all. “I am going to send you all home, and I am going to give you a choice. But, before I do that, I will give you these.” She reached a delicate hand into the pockets of her cargo pants, removing a wad of envelopes addressed in cursive. “Inside these envelopes are the details of your greatest discoveries. They explain the great ways you will advance science, the feats you will become famous for, and the ways these discoveries will lead to this future.”

“You will return to the chromobiological machines that brought you here, and be transported home as simply and painlessly as you were brought here.”

“And what do we do once we’ve returned?” Enrico Fermi asked. “Are you asking us to quit our sciences? End our careers?”

There were gasps of protest.

“Yes,” Maria said, over the angry voices. “I am asking you to forget your science. Become musicians and poets and architects. But forget the physics and let history take a different path.”

“And if we choose not to do this?” Mark Oliphant asked, “What if we choose to remain on our fated paths? Won’t our very knowing of our futures alter them?”

This time, Maria smiled. “Not necessarily,” she said, and drew something else out of her pocket. It was a small glass vial, containing a bright green liquid. “Have you heard of the botulinum toxin? The neurotoxin found in the *Clostridium botulinum* bacterium? There is a similar neurotoxin that grows from a bacteria on irradiated fructose. It can permanently disrupt the synaptic pathways of the prefrontal cortex and parietal lobes. So, quite simply, it eradicates memories.”

She paused, and looked at the vial fondly. “The war has made it quite popular in recent years. The people call it ‘Scilence’. If you take this drug, you will not remember anything that has happened tonight. You will wake in the morning as if from a dreamless sleep. You will continue your lives as if nothing unusual has happened.”

“And it’s safe?” Enrico Fermi asked.

Maria nodded. “Completely. I have used it myself. I would have lost my mind a long time ago if not for Scilence.”

Suddenly, Lucy grunted from the other side of the room. Moments later, the beeping of a Geiger counter sounded, and something rumbled far overhead.

“I’m afraid we don’t have much time.” Maria said. “You must all be connected to your teleporting units again very soon.”

She rose to her feet and began distributing letters to the scientists. Each took the letter with trembling hands and tore it open immediately, eyes raking the page. When Maria handed me mine, her hand lingered on mine and she whispered, “I suggest you wait until you are alone to read this.”

Then, Maria and Lucy directed us back to our rooms, and one by one the scientists departed. I watched as Einstein and Fermi disappeared down the dank corridor, feeling my stomach twisting in confusion and anxiety. Was I really destined to be as famous a scientist as these great men? Would

my research really be successful? It didn't matter that I was in the company of my heroes; my whole life was written on the paper I held in my hands. My curiosity was a powerful physical pain in my chest.

When I returned to the small, dank room I had woken in, I opened the envelope with shaking hands and peered inside.

It was empty.

I froze. Was this a mistake? My breathing became shallow and my spirits plummeted.

At that moment, I heard Maria enter the room. "Hello Avalon," she said.

I held up the empty envelope. "Why am I here?"

Maria walked over and sat beside me on the bed. "I wanted to talk to you in person, Avalon. You're more important than anyone else here."

"Why? What is it that I do?"

"I think you can guess." Maria said. "In the future you're known as Solaris. You're the woman who gave us the power of the sun."

My heart leapt with joy. "Really? Cold fusion works? It's viable?"

Maria nodded. "Yes, it is your great achievement. Your fusion method is so elegant, so simple... You fuse elements together without mimicking the pressure of the sun's core, or raising plasma's temperature to millions of degrees... Your method is even more elegant than the sun's. You find a simple way to overcome the repulsion between hydrogen atoms and bind them together, harnessing their energy in a way that can be used by the whole world.

"Because of you, we finally have a way to bring electricity to every city and factory and tiny village on earth, using nothing more than the hydrogen in the sea. We can raise global living standards. We can reach equality. We can embrace our potential as humans."

I stared at Maria with dumbfounded delight. "But that's all good, right?"

Her shoulders slumped, and Maria shook her head. "I'm sorry Avalon. Your dream was beautiful but the utopia is broken. This is where fusion gets us. Not to global unity, but to a power war that ends with nothing. Instead of embracing our potential as a human race, everyone dies."

My heart sank. "So it all depends on me?"

Maria shook her head. "If all the others make the wrong decisions, then it will depend on you. It will only take one to change history."

"Why are you even giving us the decision? If everything you say is true, then why not just send us back without a choice in the matter? Why are you letting us decide?"

Maria smiled sadly. "Because I know what it is like to live with pain, and I find myself incapable of inflicting that upon anyone else. Perhaps that is my greatest weakness... But I am trying to be a good person."

"And what about you and Lucy?" I asked, after a moment. "What will you do?"

"I will send Lucy back home soon as well. And as for me..." Maria smiled sadly, and again I noticed the small bottle of Scilence in her hand. "At the right dosages, Scilence can eradicate the present as well as the past. This is the end of my road, and the end of all unless you change history."

Then she smiled again, and gestured at the silver machine. "I fixed up the wires you pulled. When you're ready, just reattach the cuffs and lie down. The entanglement will begin when your heartbeat is stable."

She turned to leave. "Oh!" she cried, and swung back around. "I almost forgot." She drew a small vial from her pocket and passed it to me.

"Scilence," she said. "Just in case you choose otherwise. Good luck."

Then she turned, walked through the doorway and closed the door behind her.

I was left in the small grey room with the Scilence.

I looked down at the vial. Inside was an iridescent green liquid, glistening in the light.

Solaris. I thought, testing the sound of the word in my mind. *The woman who gave us the energy of the sun.*

Maybe, if I returned, my life would be different anyway. Maybe one of the others had made the decision to change history. Maybe Einstein never wrote $E=mc^2$. Maybe Hahn never verified the fission chain reaction. Maybe Sakharov never proposed the idea of a tokamak controlled nuclear fusion reactor.

But there was a strong chance that, if I took the Scilence, I would return to a world where I would someday become the most famous nuclear physicist in history. I would be powerful. I would be rich. I would change the world. I would never remember this night, and my life would continue as it was

destined to. And it would be so easy. Just one sip from the little green vial, and I would wake to my normal life with no guilt, no memory, no pain. I couldn't regret a decision I couldn't remember making.

I reached out and let the vial of Scilence balance between my fingertips. Then I let it drop to the floor. The glass shattered on the tiles, and the green liquid spilled out into the cracks in the grout.

I lay back and closed my eyes. I breathed in and out, in and out.

Then suddenly I felt my surroundings change, and I opened my eyes to my familiar roof and my familiar room and my familiar bed and my familiar pajamas against my skin. I sat up. My whole body was shaking.

The first thing I did when the shaking steadied was to get up, cross the room to my bookcase and open an encyclopedia. I flicked it open to the relevant pages. Fermi. Teller. Oliphant. Thompson.

I let out a shaky breath. History was unchanged.

That meant that I was the only one who had chosen not to forget. Einstein, Bethe, Sakharov... Everyone else had taken the Scilence. They had chosen not to change history's terrible course. They had chosen to have their lives back instead.

And of course they'd made that decision, I thought. It could have been madness. It could have been a dream. There were no control variables. There was no way to check validity. There was no testable evidence.

How could I even be sure that it had been real?

I closed the encyclopedia and rubbed my eyes.

If it had been a dream then I could just continue my life as normal. I could continue with my research and achieve cold fusion. I could give the world the power of the sun.

But could I? Could I continue with my work, even with this heavy weight inside me? Could I continue my work knowing what it could lead to? Could I continue, knowing that the fate of the future was all up to me?

I'm a scientist. That means that I'm rational, and I don't trust something unless there's evidence.

The only evidence I have is a memory, a heaviness in my gut and an unsteadiness in my hands that makes my work more difficult with each passing day. But despite the lack of evidence, I know that my experience was real.

So I know that I should stop my research, but I tell myself that one more day won't hurt. There's no guarantee that I'll get there. I just want to know what comes next. And anyway, I can leave the project at any time. And maybe I can ignore the heavy weight of guilt. And maybe I can change the future and create fusion anyway. Maybe it won't lead to the apocalypse after all.

And Solaris rolls rather nicely off the tongue, don't you think?

The end.