**2nd Prize The RDS McWilliams Young Science Writers Awards 2009**

The Taste of the Universe by Robert Flood (3rd Year)

Believe it or not, this story is from the future. The events that I will tell you have already happened in my time, but are yet to happen in yours. This is just a warning as you may notice throughout this story that a few minor things that would have been commonplace in your time have been changed; for instance, the absence of Jupiter and Mercury, due to their sudden and untimely destruction. Essentially, this story is about science. Science explains the phenomena that appear around us every day. Light, sound, humans themselves and why toast tends to fall butter-side down. You may notice objects or other things and wonder 'How does that work?' but your mind can't solve it. Don't worry; there are people who can do that for you. These people are known as scientists. This story is about a particular group and the work they've put into solving the universe.

So, now I'm going to ask you to think of the universe. Just for a while. After a few minutes you may notice that you have a headache. This is because the universe is immensely confusing. The shape alone has been such a mystery that there is a one million dollar reward for finding out what it is. But, and I'm sorry to disappoint you, there's already someone who is very close to finding out what shape it is. He thinks it's a 4 dimensional donut, if you are interested.

The group that this story is about are known as CERN. Now, you probably have heard of CERN. They were the people who built the Large Hadron Collider, or LHC. Since they first fired it up, around the time that you're reading this, their knowledge of the universe was quite basic compared to what we know today. It was a major success in most ways but the events that followed ruined its importance. They found out most of what they wanted to know –which was to simply recreate the Big Bang-, but, in a horribly sardonic twist, a German scientist theorised that every attribute of the Universe could be found out through an incredibly powerful particle accelerator. He presented this information to the scientific community with undeniable evidence and equations about a week after CERN's experiment, leaving the workers at CERN feeling quite depressed. This is because they're brilliant achievement had just been overshadowed. While the attributes of the Universe may not sound massive to you, if this powerful particle accelerator was built it would hold the key to everything about the Universe, ever; something that excited scientists around the world.

The thing about scientists is that they strive to know everything. And in this situation, they could develop the means to find out the answers to the biggest scientific and philosophical questions ever posed. The LHC just wasn't powerful or technologically advanced enough to prove this German's irrefutable theory. So they kept building. It became so big that it was moved to a hanger in America, and then, in what was perhaps the biggest site improvement ever, to Mars, the third of the six planets. Colonisation of Mars was achieved solely because of CERN. After settling in they weren't content with realising many schoolboys' dreams, so they continued building, in a typical, scientist manner.

And now the particle accelerator was nearing completion. It was magnificent. When compared to any other of man's accomplishments, made them all look like a six year olds' science project. The sheer complexity of the copper coils that stuck out from the top and side, gripping the sides of its mile and a half long container was enough to confuse most

people. The accelerator's diameter was over 50 metres. It absorbed more energy than the sun sends out every hour, which is a lot (this was to prevent the particles from going out of control).

The machine, despite its complexity, was a triumph in design. It snaked through the massive rooms, coated in a layer of wires and equipment. These, in turn, were enclosed in Vanadium, a bright metal, for protection. The sleek style of the modern device gave the illusion that it was a piece of art, not some thundering experiment. In a seemingly endless circle, it covered a huge distance, supporting the theory that bigger is better. Polished tiles were laid under the contraption, shining a bright reflection. The simplicity of this artwork contradicted how confusing it all was. No one scientist knew everything about the hadron collider.

The scientists, finally content, lowered a large glass ellipse engraved with the word CERN onto a spire outside the collider, a task which took two hours. It was over. They would test their calculations the next day before hitting a complex set of keys into a super computer and changing the way we see the universe.

The way we see the universe currently is skewed and rather shadowy, but it's certainly is interesting to find more out. For example, consider the theory of relativity. The theory of relativity states that time is relative to each person or object. The main thing which varies the rate that time works is speed. This means that if you're in a car and a person on the street beside you is standing still, you are in two different time zones, unique in themselves. They are very similar, but still different. The person in the car has managed to slow down time. This, of course, is a hard theory to prove but it can be done. Then it gets complicated. Say you're in the car, moving 50% of the speed of light and again you drive past this person. To you, since you're moving with the car and are therefore staying still –in relation to the car-, time behaves normally. If you were to look out the window, the person would be frozen because time is moving so slowly relative to you. And then the exact same thing is happening to him as time is behaving normally to him, so you're the one moving slowly in your car. Confusing? It should be.

Veronica, part of CERN's multinational team, strolled into the main laboratory, setting down her glasses on the desk. She slumped into the chair in front of her computer. It was an early morning. Of course it would be, it was going to be the day of the greatest achievement ever. She was reviewing the information and making sure everything was doing what it should be. She looked over the extensive and large piece of code. This code was like the creation of a computer program that ran and controlled the VLHC (Very Large Hadron Collider), the only difference was its length. Fifteen years of hard work from a team of programmers (which Veronica had been the head of for her four years on Mars) led to 783 pages of foreign language required to run the enormous machine. The last four months of her work was quite tedious and dreary as it was literally what she was doing now; examining, studying and fixing this code. A single semi-colon missing, could lead to the project failing, setting them back weeks. If she made a slightly bigger error, then part of the VLHC could be broken, destroying years of work. This meant she had huge responsibility.

She flicked her black hair out of her eyes. She had to concentrate. There were the last minute preparations before the final experiment. Can it even be called an experiment anymore? The scale of work she undertook was enormous, how can it be given the title of an 'experiment'? She wasn't the smartest person working there, in fact she was one of the least smart, but to most people she was a genius. She was by far the best coder there, but

she constantly asking questions as this was out of her field. She had a degree in Quantum physics, so she did know a little about what was happening, but that was never the focus of her career. It was always supposed to be about coding. She had to ask the scientists questions like 'When does the VLHC need to begin to collect data, before the particle has reached its full speed or after?' which was generally greeted with the smug reply of 'As soon as it reaches its top speed, of course! You really need to shape up! This isn't rocket science, it's real, hard work!'

She sat up properly, trying to rest her head on the top of the chair. Unfortunately, her height made this position rather uncomfortable and she soon slumped back down. Veronica's mind wandered and she looked out of the small glass window that sat opposite the desk. The desolate wasteland of Mars was hardly the cheeriest of sights. The Olympus Mons, which just looked like a sheer wall of rock, stood about a kilometre from her. Between her and the universe's largest volcano were just old dunes and craters, covered with iron oxide -or rust as it's more commonly known-. These scars on the land were scraped into the ground millions of years ago, a thought that makes you feel quite small. But she continued looking, her mind thinking about how all this was formed, how it rotates around the Sun and the mass of this floating red rock. Suddenly, it struck her. The VLHC would help explain all these things! All the attributes of the Universe include the attributes of the planets! It seemed so obvious why the project was so big now, because what it was solving was massive! And she was a part of it! The rush of excitement that only dawned on her now was unimaginable. This could mean fame for her; after all she was one of the heads of the many departments; and then, the work didn't seem so boring.

But what Veronica didn't realise is that attributes didn't just end at stars or planets. No. The Universe is filled with dark matter, an invisible mass with unknown composition. It comes in two flavours, MACHOs (Massive Compact Halo Objects)-which actually is a dark body similar to a planet- or WIMPs (Weakly Interfering Massive Particles)-these rarely come into contact with ordinary matter-. If you noticed something about the names, you'd realise that it's some scientist humour. But you may be thinking 'If they're invisible, then how do they know it's true?' Well, they don't know, but it is a strong theory. It can be backed up by the way galaxies move. They move quite quickly, far faster than how they should be moving with gravity, taking only visible matter into account; so, there must be further mass present. See where the scientists are coming from? This extra mass is dark matter.

The human race had evolved to a point where it was theorising and discovering things about something completely invisible and strange. Ideas that were unheard of 100 years ago were now coming up every year or so. The Dark Matter would be one of the many theories solved if the VLHC does its job.

It was eventually time for the VLHC to be fired. The way the previous particle accelerator worked was by sending either two proton or lead ions, which are called hadrons, flying around the accelerator's track. These eventually built up speed until they crashed into each other. This crash recreates what is thought to have happened at the big bang. But, with the VLHC there are three important changes: the first one revolves around the idea that the faster something goes the heavier it is. This is a problem when something, even if it's as weightless as an atom, is going at almost the speed of light. To fix this, CERN created a gravitational field inside to stop the atoms from falling and missing each other. When switched on, the field created an aura around the Hadron collider. This bright glow changed from blue, to green, to red in a continuous loop, adding to the VLHC's beauty.

Secondly, there is more than 258 times the recording equipment in the VLHC than there was in the LHC. This analyses every single last piece of information imaginable including weight, shape and heat of the particles. And thirdly, CERN built a glass cube, 50 metres in length, width and depth, where the particles should collide. This was so that the event, which would be the greatest of its kind, can be viewed by anyone.

Veronica stepped through the long passageway to the main hall. She was four hours early. It was expected that over 1200 people would travel from Earth to see this momentous occasion. Despite her early arrival, she was in the middle of the jungle of seats. She talked idly to her colleagues mainly to pass the time. But nobody here came to meet friends or have a chat. They came to see the collision. The one that CERN had been working on for forty years. With ten minutes left, a large television lowered in front of the by now-full crowd. The screen flickered and in large blue numbers in began a countdown; it also displayed facts and information scrolling along the bottom. Veronica was quite proud, that was one of the simpler things she coded.

**10:00**

She looked at the information whizzing past at the bottom of the countdown. 'Veronica Stuart, head of the team of programmers, is the newest edition to the CERN team after working on this project for only four years!' She stared behind her at the sea of people waving and cheering. 1200 seats were laid out and there was about 500 people standing at the back. She discovered that if this went wrong, so many people would be let down.

**5:00**

Her palms began to sweat and she felt faint. There were so many people relying on her work. What if she did something wrong? What if she had made that tiny mistake? Her heart pounded against her chest. Blood began to pulse in her ears. She was now sweating uncontrollably. 783 pages is a lot of room to leave out a semi-colon or sentence.

**3:00**

The nauseous feeling in the pit of her stomach grew to the point where it was unbearable. Everything from years of work all bubbled down to these few minutes. She bowed over and cupped her hand over her unfocused eyes. She didn't want to look at the clock, or anything else. The destruction of the marvellous VLHC could all be down to her simple mistake, wasting forty years and billions of Euros.

**1:00**

But, the clock kept rolling down and Veronica was still nervous. Actually, it was beyond nerves at this point. It was fear. The clock reached ten seconds and everyone began to chant. From the people standing in the back to the most esteemed members of staff at CERN. This was it.

**10!**

**9!**

**8!**

**7!**

**6!**

**5!**

**4!**

**3!**

**2!**

**1!**

**0!**

The clock's digits flashed red before the television retracted back into the ceiling. A thunderous noise was emitted from the large engines powering the beast. The sound swept over everyone, hushing them to silence. No one could see, but the particles were being wrapped around the entire circuit. So fast that within a few seconds they had gone through the large laps hundreds of times. They kept going. Slowly picking up pace and blasting towards each other until they met.

And then about five minutes later the Hadrons collided, the VLHC doing exactly what it said on the tin. Again, a massive din ran through everything. The cheering was phenomenal as everyone leapt up and shouted. The crowd kept wailing in triumph, as if their own blood, sweat and tears had gone into this machine. This made the noise of the collision seem microscopic in comparison.

The explosion that occurred was far superior to Veronica's first expectation. She thought it would be a small explosion no bigger than, say, a book. She was happy she was wrong. The explosion that was created lasted for a while. It was easily longer than a half minute. It started expanding slowly, the bright oranges, reds and yellows then began to throb outwards. It twisted towards the awe-struck crowd, combining the colours and grey smoke into a spiral. When the miniature big bang reached its peak it swirled towards its origin, before finally dissipating into nothing.

Finally, after forty years of human accomplishment, it was finished.

Well . . . no, it wasn't. Veronica's work was over, but it took six months for the quantum physicists to analyse every last piece of information. What they realised was overwhelming. The explosion showed that the universe is a giant 4-d donut, constantly pulsating and pausing, pulsating and pausing. This movement meant that time had no beginning nor ending. This fit nicely with the theory I mentioned earlier.

Not just that, but everything imaginable could be found out through this victorious battle. How quickly the universe beat, how old it was <u>exactly</u>-13.52155 billion years, eight months, six days and two minutes, what percentage of it supported life. The amount of theories put to rest moulded the way we see everything and anything around us. From then on, it was etched into the list of outstanding human achievements. Each of the heads of the departments at CERN suddenly found themselves quite wealthy, mainly from interviews and

awards. Scientists everywhere literally rejoiced with the wealth of knowledge CERN had dug up.

The only thing left up for debate is its taste. Using synthetic and natural foodstuffs, scientists could recreate what it would taste like if it wasn't a vacuum. This is the only argument that is still unresolved. While this is a matter of opinion, the general agreement is a mix of vanilla, with a hint of lemon. Despite this, there is a small, strong opposition claiming that this is nonsense; they say it tastes much more like pineapple.