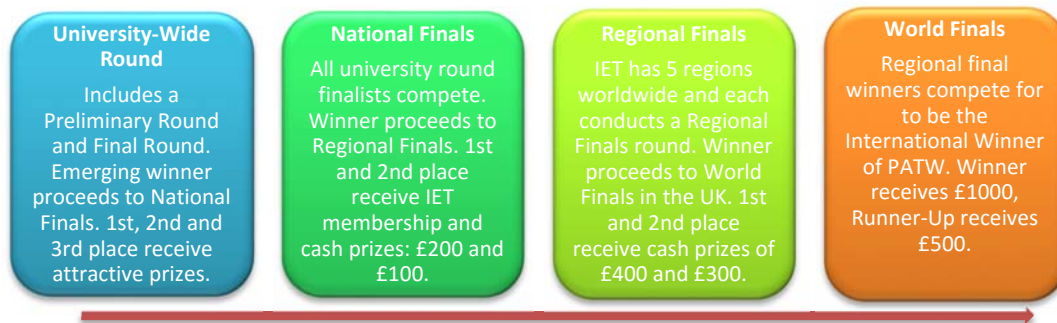


Scholars' experiences about CY1500 Introductory Research Methodology

Reported by Smrithi Keerthivarman (Year 2, Aerospace Engineering)

Organised by the Institution of Engineering and Technology (IET), Present around the World (PATW) is a well-established competition with several heats designed to encourage young engineers to develop their presentation skills. This annual competition takes place on an international level and requires participants to pick any engineering and technology related topic and present the subject matter in the most captivating, clear and visually appealing manner. Participants are graded on their presentation skills and how well they answer questions posed by the esteemed judge panel consisting of Professors and IET Leaders. The competition includes IET's 127 member countries and its structure is as follows:



I first came across the NTU Present around the World (PATW) announcement in an email sent to all NTU students in late February 2015. This was how the email started:

Aspire to improve your presentation skills?

Want to win an iPad mini (64G), Kindle and other attractive prizes?

Looking back, I find it interesting that I had only noticed and remembered the phrase **improve your presentation skills** and did not make a mental note of the attractive prizes. I would only realise about a month later that the winning prize in NTU's PATW was an iPad mini. Upon reflecting on this experience, I realized that the details that I paid most attention in the email were a sign of what I valued the most about this competition. PATW offered me a chance to test my presentation skills and technical knowledge at a higher level and gain more knowledge on engineering and technology in a non-classroom environment. I really liked the challenge involved and that was what drove me to sign up for PATW.

The role of CY1500:

It was around the time that I received the email that I also completed my CY1500 Introductory Research Methodology. The intent of CY1500 was to give CN Yang scholars an opportunity to dream big and understand the intricacies of a typical research process. During the course, we were required to pick any research area relating to Space Colonisation, write a formal research proposal and then present it to our PhD mentors and classmates. Since the research did not have to be carried out, we were allowed to hypothesise very large scale projects, while still preserving the spirit of scientific inquiry and basing our ideas on solid evidence. It was this freedom that encouraged many of us to dare to choose ground-breaking and revolutionary research problems relating to the exciting idea of space colonisation.

As for me, it was easy to find my calling since the topic related to my passion, space. Upon researching on the topic of Mars colonisation, I identified two problem areas that I wanted to focus on:

1. High fuel usage in the long journey to Mars

Setting up a space colony would involve the transportation of humans, raw materials, infrastructure, plant samples and machinery. Carrying all these over a distance of about 300 million km using conventional rocket fuel would be highly fuel intensive and slow (8 months on average). This is where I introduced the concept of a novel plasma ion thruster coupled with a nuclear reactor that promised to shorten the journey to Mars to an unprecedented 39 days. This would also minimise the use of conventional chemical fuel.

2. Lack of sustainable energy production on the Mars colony

Having identified that the usual fossil fuel burning method would be unsustainable on a foreign planet, I suggested the use of the carbon-negative system that works in low-oxygen environments to produce power from biomass.

The novel thruster and carbon negative technologies were not new ideas to me because I had previously read about them in my spare time and purely out of interest. Even so, I was thankful that this module encouraged me to hone my understanding of these ideas and explore further through detailed literature reviews and project time management using a Gantt chart.

Apart from the research proposal, there was also a 3 minute presentation with 1 static slide that gave me some practice with condensing complex ideas into a short time and creating a succinct yet captivating slide to aid me. Since the preliminary round of PATW required a 3 minute presentation, I was instantly drawn to it, given the experience and confidence gained through CY1500. I decided to continue to pursue my interest in plasma thrusters and chose my PATW topic: From Earth to Mars in 39 days.

NTU Preliminary Round – 16 March 2015

In this round, the main challenge was speaking within 3 minutes. Having chosen a topic on space propulsion, I initially found it tough to summarise all my ideas into such a short time. However, I decided to structure my presentation clearly and only express the most relevant points. I gave a short introduction by recalling Neil Armstrong's famous quote "That's one small step for man, one giant leap for mankind" and highlighted that it has been 46 years since that day, which makes us question how giant a leap we have actually taken in the field of space travel. Having given this context, I moved on to explain that one of the largest deterrents in manned missions to other planets is that long duration and high chemical fuel requirement. I also explained the dire need for a faster space travel technology in light of recent studies, which have shown that Mars One astronauts could die in about 68 days on Mars. If we could shorten the travel time to Mars, emergency rockets can be sent to Mars much faster and even save these human lives. It was at this juncture that I introduced revolutionary plasma thrusters that promise to take us to Mars in 39 days when coupled with a nuclear reactor. Following that I made a short comparison between this technology and conventional chemical rockets. I finally concluded saying that if we can develop, test and tap on this revolutionary technology, we will be able to take the "leap" towards a shared dream for mankind.

On the day of the competition, I executed my presentation comfortably and rather seamlessly and received several positive feedback from the judges and my fellow competitors. I was able to answer their questions satisfactorily because I was familiar with the subject matter as a result of my prior research. My fellow competitors also did a good job at delivering their content clearly. Eventually, 8 participants were chosen to move on to the NTU PATW finals.

Consultation Session – 18 March 2015

The finalists were invited to a consultation round with the judges where we watch our recorded presentation from the preliminary round and were given feedback in order to improve for the finals. The judges mentioned that I could explain more about the Mars One programme and the working principle behind Plasma propulsion. This was very much in line with what I had in mind for adding into the Finals presentation because we would be given 7 minutes to speak. A valuable piece of advice was that I could use a simplified analogy to illustrate more complex ideas. I incorporated this into my deck of slides for the finals as well. They complimented my clarity in speech and tonal modulation and added that I could cut down on the hand gestures a little so that I can preserve them for emphasising larger ideas rather than gesticulating for all ideas. I worked on this as well before the finals.

NTU Final Round – 26 March 2015

It was not easy preparing for this round because I had several other commitments like Hall Jamband, Hall Tennis and CN Yang Senior Exco responsibilities to handle, as well as academics and report submissions. However, I tried my best to set some time aside on a regular basis to work on my slides and script. The finals results were going to be based partially on audience poll and judges' scores. Hence, we were to invite our friends to support us. The presentation I made on the day of the finals was probably one of the most perfectly executed ones I have ever made, which really boosted my confidence. Once again, the judges' comments were favourable and the QnA went well too. Unfortunately I do not have a recording of this because the organisers lost the videos they took. I was contented that I had done my best and was not hoping for any particular result. I knew I would be happy to be amongst the top 3 because that way, I would be able to move on to the national finals. After collating the judges' scores and audience votes, I was announced as the NTU Winner of PATW 2015 and presented with an iPad mini. It was only then that that I realised that the top prize was an iPad mini. It was an amazing feeling no doubt, but I knew that this meant yet another gruelling round of presentation with tougher competition. Yet I was ready to take on the challenge because that was the very reason that I signed up in the first place.

National Finals – 16 May 2015

The national finals fell just a week after I had completed my semester's final exams, giving me limited time to prepare. In the fervour of preparing for my final exams, I had not kept in touch with my presentation. Nevertheless, I knew that I wanted to do my best and do NTU and CNYSP proud at the National Finals so I worked hard. A huge challenge in this round was the lack of information from the IET organisers. Despite several queries, we were not informed of the time limit for the presentation until 2 days before the Finals which made our preparation rather nerve-wrecking. Benjamin (an SBS student), Akshay (a year 1 CN Yang scholar) and I were the top 3 from NTU moving on to the National Finals and all of us had hopes of winning the first place and moving on to the Regional finals.

All finalists performed well on the day. The judges were extremely knowledgeable and experienced and one of them had even worked at NASA before. Hence their questions were very relevant and I answered them to the best of my knowledge and abilities. They also gave me some pointers on how I could make a clearer introduction by laying out the contents of my presentation to the audience right at the start. Their compliments that my presentation style is very effective, my slides are very appealing and I had a commanding presence were all heartening to hear. When they announced that I was the Winner of the Singapore round of PATW, I was extremely grateful that my efforts had paid off and that I was being awarded the honour of representing Singapore at the Regional Finals in Beijing. This was worth much more than the \$315 cash prize in my opinion. I was proud of both Akshay and Benjamin for giving NTU a great name with their performance at

the finals as well. I was especially happy for Akshay (who emerged Runner-Up) because he made time for this competition just a day before heading to CERN.

As for me, the journey thus far in PATW has not been easy, but it has been extremely rewarding. I started off purely with the passion to learn and I am thankful to have had so many opportunities to learn from my fellow competitors, the learned judges and my own ups and downs. It was also important to me that I was able to rise up to the challenge and do well not only in this competition, but all other commitments that I juggled this semester. Having come this far, I have a strong desire to do well at the regional finals and do Singapore and NTU proud.

Thank you CNYSP and Prof Tan for acknowledging my efforts in this competition and encouraging me to pursue my dreams!



Figure 1: Photo during the presentation



Figure 2: Photo during the presentation



Figure 3: Receiving my certificate and cash prize from Mike Henry, Honorary Secretary, Young Professional Section Chair



Figure 4: Singapore PATW Finalists and Judges