

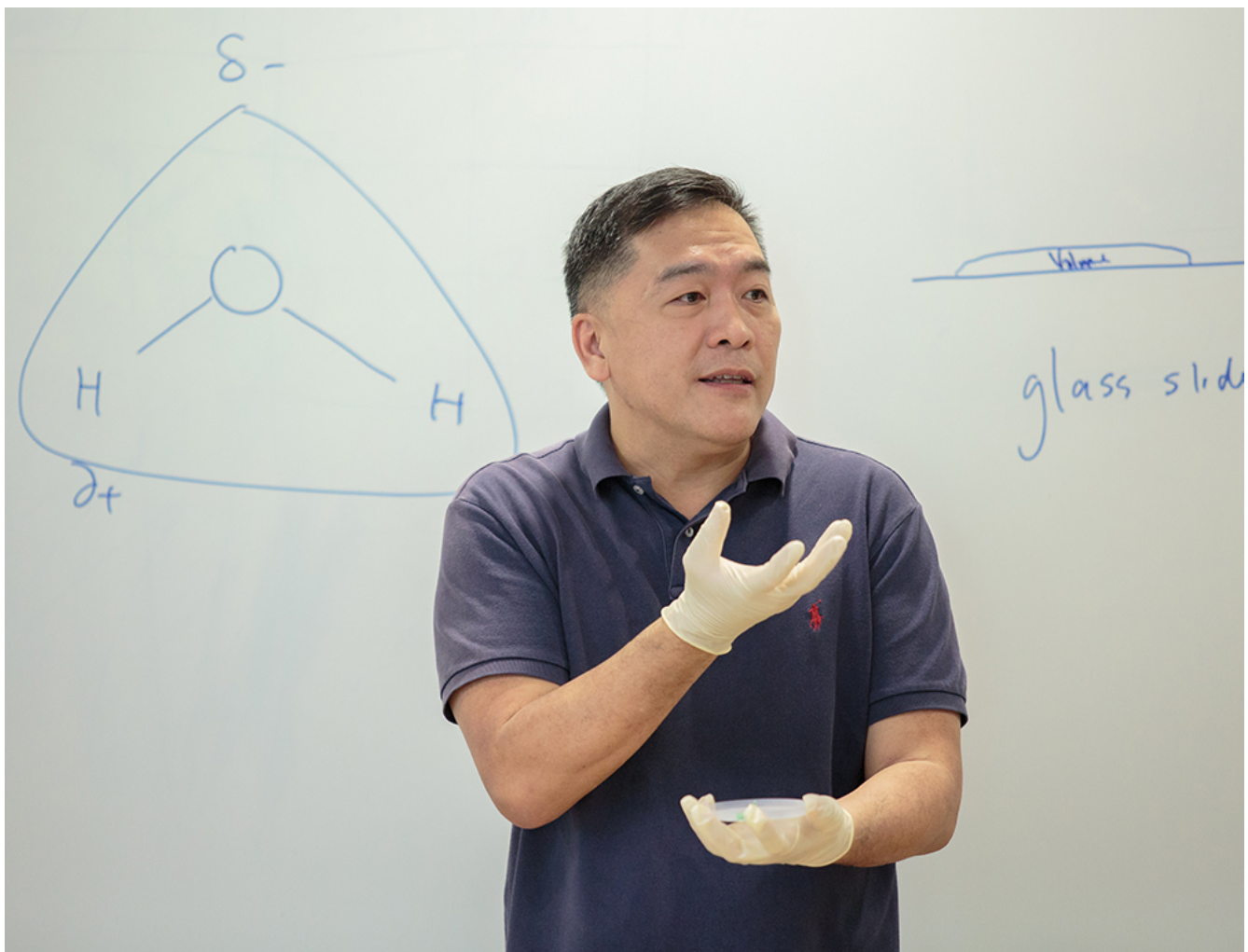


Hydrophobic Rose Petals and Green Tea Lattes: An Interview with Associate Professor Tok Eng Soon

By Stacy Ooi (USP + Sociology, Class of 2017)
Stacy is a student writer for USP Highlights.

Published: 01 March 2017

A/P Tok Eng Soon is an experimental physicist who teaches in USP and the NUS Physics Department. He teaches the USP module “[UPC2206 Nanoscale Science and Technology](#)”, for which he received the [USP Teaching Excellence Award](#) in 2015 and 2016. Currently, he does research in surface science. He studies how things come together to form structure at the nanoscale, and what kind of properties will exhibit themselves once these structures are formed. Stacy Ooi (USP + Sociology, Class of 2017) caught up with A/P Tok to find out more about this well-loved, quirky professor.



Prof Tok combines a sense of childlike wonder, with a rigorous adherence to academic standards, and a bottomless passion for teaching.

I met Prof Tok in late January, outside the USP general office. We headed towards the UTown Plaza, catching up with each other as we walked. It was great meeting my old professor again - I had fond memories of the class I took under him, and found him as humorous and caring as he was when I'd last seen him. We updated each other on the events of our lives, and he graciously bought me a green tea latte. We then sat down to chat further. I was a student in Prof Tok's class, "*Nanoscale Science and Technology*", in Semester 2 AY 2015/16. The class was full of laughter and there was a sense that we were in good hands. Prof clearly cared a lot about his students, and we all felt it. At the start of our interview, Prof Tok confirmed my sentiments by saying that he identified, first and foremost, as a teacher. "I research to teach," he said, with a forceful simplicity. For a moment, I was thrown off guard.

"Not the other way round?" I ask. Prof Tok is an accomplished researcher in his field, having published numerous peer-reviewed journal papers in areas related to surface and interface science of low dimensional materials.

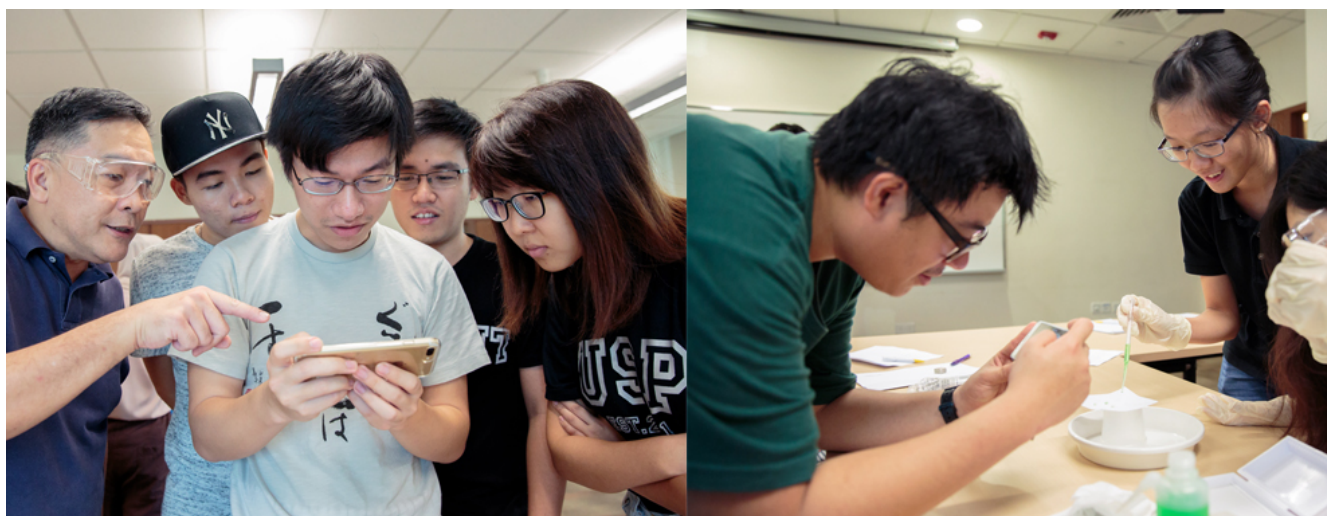
He shakes his head.

"One of the main reasons I do research is because I want to teach."

He elaborates further. Research is helpful for teaching because whenever a new discovery is made, he can bring it to class immediately. There is no need to wait for new discoveries to appear in textbooks, which frequently lag behind scientific and technological advances. Cutting-edge information can be given directly to the students as quickly as it surfaces, and Prof Tok sometimes connects students with companies who are working on real-life industry problems that require innovations in material science. It is important to Prof Tok that his students be equipped with the latest information, and the best skills. "Because I will be replaced, right? And who will replace me? Hopefully by students I have interacted with, I have taught, I have inspired."

To me, an arts student who stopped taking science subjects after the age of 16, seeing life from the perspective of a scientist is always interesting. Prof Tok is clearly passionate about science. Empirical observations are the foundation of his approach to science. "I like to be able to see and observe the theory in action in an experiment. I realise that I like that a lot more than just trying to sit down and write some equations. In the natural sciences, you are observing nature. For instance, you look at where the sun rises and its surroundings. You may ask why the daytime sky is blue - but perhaps a more interesting and probing question for us to examine would be why the colour shifts to red when there is a haze. Yes, it is a scattering phenomenon, but how is that related to the physical size and chemistry of the pollutants in the air? Can I demonstrate this effect in the classroom together with the underlying physics and chemistry? Questions like that have been what drives me."

What, then, does he do with his observations? As an experimental scientist, once he figures out how and why something happens, he tries to reproduce it in the laboratory and demonstrate it to his students. "I like to work with things using my hands. More importantly, I would like my students to be able to repeat the experiment and observe it together with me. Thus, my questions about research and teaching are centred around - oh, how can I do that experiment, how can I test that hypothesis and theory to help student better understand the subject. From empirical experiments, perhaps we can learn something more about what the theory has said."



Prof Tok's success in the world of academia obscures the obstacles he had to overcome to get here. He studied Physics and Chemistry in NUS, graduating in 1993 with First Class Honours. His parents were odd-job labourers who could not support his education. It was thanks to a Public Service Commission (PSC) Teaching Bursary that he was able to fund his undergraduate studies. Having done well in his undergraduate studies, he was very fortunate to receive a scholarship from NUS to do his PhD at Imperial College London, UK. "All these would not be possible without the support of the institution," he says.

A great deal of his life has been woven into NUS, and giving back to the university is a huge source of motivation for Prof Tok. "This place has supported me," he says. "I'm very thankful that they gave me a chance. Because people gave me a chance... that has always been on the back of my head, regarding how I can give back to the community."

The desire to help, the dedication that he puts into his classes, is definitely visible to all. Prof Tok goes the extra mile, for instance, to make his USP class accessible to all disciplines. "It's easier if you're discussing with Physics or Chemistry students who are in your own discipline [Science]," he says. "Certain technical terms and syntax... you just use it without having to think twice. Whereas when you teach in USP you have students from diverse backgrounds. You need to consider how the students will receive your information, and what their difficulties are in perceiving that information."

Perhaps this is what makes certain teachers so compelling - empathy. Prof Tok empathises with his students. He constantly goes back to the basics, to make the class accessible for those without the requisite background knowledge. He constantly introduces new gadgets to get us excited about science. During one of my classes with him, he brought rose petals and other hydrophobic materials for us to experiment with. Another day, he brought a laser pointer and a linear diffraction grating to class, showing us how to play with light and create interesting patterns on the wall. Prof Tok is constantly trying to get that childlike sense of wonder through to us.



Yet a teacher cannot just empathise, a teacher must also set standards. In that area, he is unapologetic. "Your content cannot be too simple. People with domain expertise will find it to be unsuitable. You cannot run away from the fact that you need to have some scientific rigour, some engineering, as well as some technological background for this module in USP. Make no apologies for the fact that after all, it's a Science and Technology module - you cannot run away from the math and the need to know some fundamentals."

Balancing the competing demands of students from diverse backgrounds is the greatest challenge. Prof Tok tries to make the module sufficiently tough, and at the same time "not necessarily biased to someone who has the domain expertise". To ensure that all his students truly understand the content, he creates several opportunities for small-group learning in the class. He meets with groups one-on-one to go through our papers and identify our strengths and weaknesses. Our consultations with Prof Tok often go beyond the assignment being discussed, and extend into broader territory where he goes over past material and clarifies larger concepts. When asked what he would improve about the USP experience, Prof Tok expressed a desire for a better teacher to student ratio. With about 20 students in his class, he feels it is still too large. "I wish I had a bit more time to work with my students and in a smaller group setting," he says. "I would like that."

As an undergraduate, Prof Tok did not have the opportunities that many of us do today. Going on exchange, or taking a semester off to do an internship, was unheard of in his time. Contact time with professors was much less. The emphasis on interdisciplinary learning was also not as pronounced. Outside of his home faculty, he took only two modules, "*Human Resource Management*" and "*Introduction to Computers*". Even to read Physics and Chemistry, as he did, was rare. Most of his batchmates majored in just one subject, and he was one out of only two students in the entire batch to combine both Physics and Chemistry.

Then he went overseas for postgraduate studies, and when he came back, universities had been completely restructured to ensure better opportunities for the next generation of students. "I went, and came back, and the undergraduate curriculum structure had changed. A change for the better, as students are increasingly exposed to an interdisciplinary curriculum and equipped with knowledge to solve existing and new problems."

Prof Tok combines a sense of childlike wonder, with a rigorous adherence to academic standards, and a bottomless passion for teaching. In the course of our conversation, his vocation of "teacher" showed through. "If there's anything that you feel is not clear, just ask," he says. "I'll try to express it in the best way to clarify things." I absolutely enjoyed our conversation and getting to know what motivates him to teach us. Prof Tok is an invaluable part of the USP community, and I hope he will continue to inspire the curious learners and thinkers in USP.

**Keen to know
our professors?**

Click Here!

[BACK](#)

[Homepage](#) / [Highlights](#) / Hydrophobic Rose Petals and Green Tea Lattes: An Interview with Associate Professor Tok Eng Soon

About

- [USP Overview](#)
- [USP Sharepoint](#)

Curriculum

- [Overview](#)
- [Academic Structure](#)
- [Academic Requirements](#)
- [Module Timetable](#)
- [Student Exchange Programme](#)
- [Special Programmes](#)
- [Forms](#)

NUS-Sciences Po Double Degree Programme

University Scholars Programme

- [📍 18 College Avenue East
Singapore 138593](#)
- [✉ nuscollege@nus.edu.sg](#)

© National University of Singapore. All Rights Reserved.
[Terms of use](#) • [Branding guidelines](#) • [Contact Us](#)