ENGINEERING CORNER

Engineering expert at USMC

> Students enjoy the best of two worlds

DR Low Siow Yong, assistant professor at the University of Southampton Malaysia Campus (USMC), held a variety of postdoctoral and research engineer posts prior to joining the university.

He currently teaches Electronic Systems, Electronic Circuits and Mathematics on the MEng Electrical and Electronic Engineering programme at USMC.

Here he shares his thoughts with *theSun* readers:

What is your academic and research background?

My PhD was in the area of speech processing and now my research is in the broad area of acoustics signal processing. In simple terms, my research involves the mathematical manipulation of acoustic signals to meet certain criteria. One example is speech enhancement, where noisy speech signals can be processed in such a way that the noise signal is reduced. The tricky bit about this is that both the speech and noise signals are overlapping, making the suppression of noise more complicated.

What inspired you to follow your area of expertise and what are the big challenges?

Alexander Graham Bell's work on telephony was greatly influenced by the fact that both his wife and his mother were deaf. I guess, to a certain extent, one's research direction is influenced by the problems or difficulties you see around yourself. After all, engineering research is all about making human lives better. For me, I used to live with my paternal grandma and I understood how difficult it was for her to communicate, with age-related hearing loss.

Speech and hearing are the two fundamental blocks in human verbal communication. It takes two to tango and if either one fails, verbal communication collapses. For instance, conversations will be difficult if there is background noise or there is some form of hearing loss from the persons involved.

For people with normal hearing capability, tackling the noise will not be a problem as our brains can filter out this noise to allow us to hear the speech clearly. But the big challenge here is when you have hearing impairment and environmental noise at the same time. We live in a noisy world, so my aim is to electronically reduce the environmental noise and simultaneously compensate or amplify the speech signals according to one's hearing profile.

What is the most challenging project you have been involved in?

I would say it was my first consultancy work with the Northam Police Department in Western Australia. The work involved forensic audio analyses of some emergency calls for a homicide investigation. The police wanted an enhanced version of the background noise as they believed there were some noisy yet faint background conversations in the recorded call, which could potentially reveal foul play.

The work was the complete opposite of what I was used to; the challenge was to suppress the speech (the caller and the operator) and enhance the background noise. An "inverse" algorithm was created to help the extraction process and the favourable results actually led to a similar consultancy work with the Organised Crime Squad in Perth, Western Australia.

What research projects are you currently working on?

My current research is applying new signal processing technologies to assistive listening devices and hearing aids. I am working on domains processing, where I have migrated from the usual time-frequency domain to a domain called modulation domain. In layman's terms, the potential here is that it is easier to distinguish speech components from noise in the modulation domain.

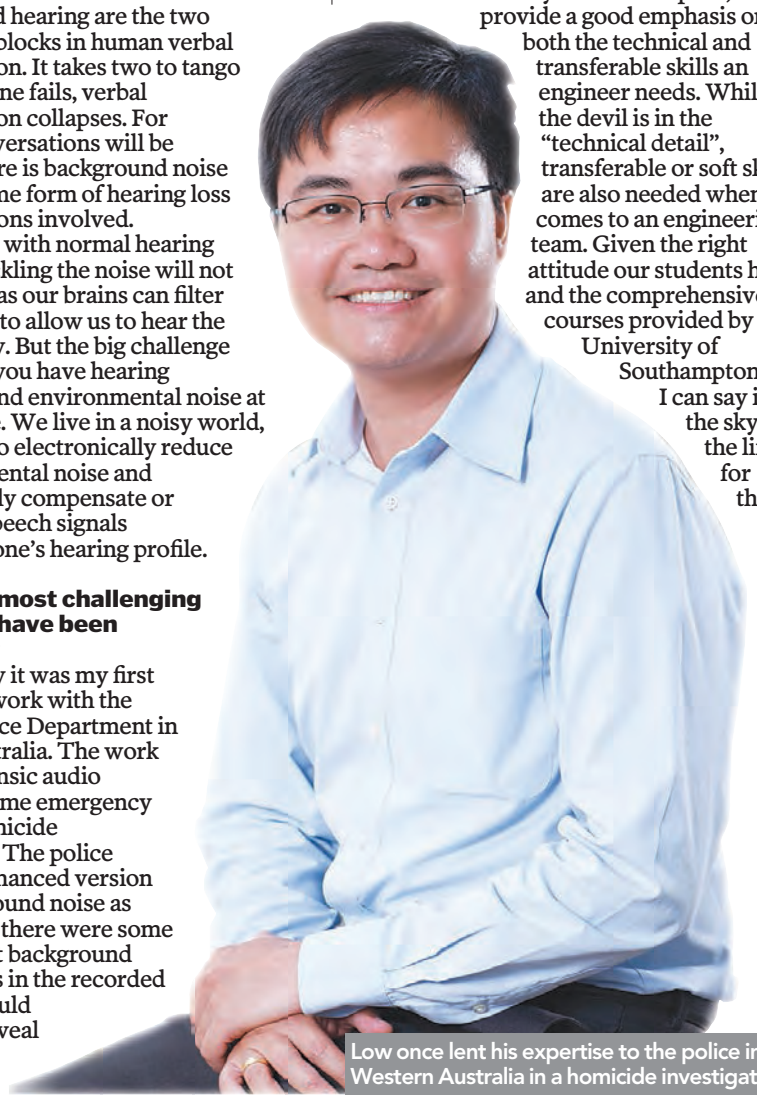
The work related to this area is still work in progress and I believe this domain could provide vital information which we have not seen in more traditional approaches. As well as my Southampton colleagues, I am also working with Hong Kong and Australian collaborators.

What advice do you have for students entering your field of study?

Studying at USMC is the best of both worlds. Students can build a solid foundation of engineering techniques at the Malaysian Campus, through smaller class sizes, excellent staff-to-student ratio and no acclimatisation issues. Then, in two years' time, students will be ready to embark on a new experience at the UK Campus, with excellent research facilities and a different culture and landscape altogether.

How do you see your students making an impact in their profession when they graduate?

At the University of Southampton, we provide a good emphasis on both the technical and transferable skills an engineer needs. Whilst the devil is in the "technical detail", transferable or soft skills are also needed when it comes to an engineering team. Given the right attitude our students have and the comprehensive courses provided by the University of Southampton, all I can say is the sky is the limit for them.



Low once lent his expertise to the police in Western Australia in a homicide investigation.