‘Entrepreneuring’ Physics

What started out as an enthusiasm to capture the night sky turns out to be a successful startup. *Physics Matters* catches up with Mr Grey Tan, CEO of TinyMOS, a company specialising in easy and affordable astrophotography.

⇧ The full moon and Milky Way taken with Tiny1

How did it all begin?

My interest in astronomy started when I took the module *Einstein and Quantum Weirdness* taught by A/Prof Phil Chan. His classes were very entertaining in the sense that I would always be learning something new and strange about the world we live in.

⇧ **Tiny1 – The world’s smallest and smartest social astronomy camera**

Once, I went on an astronomy learning trip to Punggai where seniors told us that they could see the Milky Way. I could not due to light pollution and I genuinely did not know what to look for. I brought my Nikon digital single-lens reflex (DSLR) camera for the trip but went home empty handed. The trip got me intrigued and I signed up for another stargazing trip to Mersing led by Mr Remus Chua. This time we saw the Milky Way, visible to the naked eye, spanning from horizon to horizon.

⇧ **Mr Grey Tan (second from right) with fellow founders of TinyMOS**

At first I could not capture the sight even though I was a professional photographer. I did not know the correct settings to use and also did not possess a lens wide enough. But with help from fellow astronomy enthusiasts, I did manage to capture the Milky Way. However, it took a lot of effort as the picture was a mosaic of six images using a 35-mm F1.4 lens and a DSLR costing about $1000 and over $4000 respectively. Further editing using Photoshop was also necessary.

If only there could be a camera designed to reduce the complexities of astrophotography through smart automation. So birthed my idea of Tiny1. The product features and ideas were bounced off from conversations I had with the local astronomy group and the lecturer and tutor of another module *Sky and Telescopes* I took, Dr Abel Yang and Mr Leong Qi Xiang. They highlighted a few challenges and I came out with some solutions which were cross verified with them.

What does TinyMOS do?

TinyMOS stands for “Tiny CMOS”. TinyMOS simplifies astrophotography. The camera Tiny1 helps with the planning, capturing, processing and sharing of celestial images on social media.

Using an augmented reality star map, Tiny1 guides users to the stars and astronomy features, helping users plan what they can capture for the night. The star map pairs with the automated pre-sets to give the best image settings, which are often complex and not available with conventional cameras. The camera does advanced noise reduction that preserves fidelity using a patent pending dark noise subtraction library. It saves time, reduces sensor heating and tailors the noise reduction to environmental factors more precisely than manually performed dark noise subtraction. Using a built-in WiFi, users can share their images at high speed in social media via their smart phone.

Share with us the ‘entrepreneuring’ process.

TinyMOS was launched in April 2014. I was joined by Mr Ashprit Singh Arora and Mr Chia Lih Wei who have engineering background. The TinyMOS team from investors to interns are all NUS students or alumni. It was not something we planned but we do get very strong support from like-minded people on campus.

We spent the first six months refining our business and product plans, speaking to user groups for feedback and investors for funds. Finally, after six months of drawing zero salary, Mercatus Capital invested in us followed by NUS alumnus Ms Lim Qing Ru (co-founder of Zopim).

Our development started earnestly with the funds in hand. We met with various suppliers and design teams from Singapore, India, San Francisco, San Diego and Taiwan. We tested the camera in Singapore, Malaysia, Japan, Australia and United States and also showcased our product in trade shows in Silicon Valley and Tokyo. Large corporations such as Land Rover and Young & Rubicam (watch https://www.youtube.com/watch?v=aWuvGHs3LLA) even became our partners.

Most recently we launched our crowdfunding campaign on Indiegogo and raised our target US$100,000 in just four hours! It was a most eye-opening experience which was impossible without all the people who believe in us. The support came especially from NUS Physics Department and NUS Business School.

Share with us your current and future plans.

We are doing our best to deliver the Tiny1 camera to backers on schedule. We are in negotiation with various manufacturing partners worldwide to ensure a smooth delivery. In order to make astrophotography more accessible, we are also working on various accessories to simplify cosmos imaging even further.

Our future plan is to put Tiny1 in the hands of every curious explorer for them to capture and share their astronomy experience with the world. We hope to gather interest in the astronomy space as we believe that space exploration will be a significant part of the future human civilisation.