Trailblazing the quantum cloud

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Meet Hoa Nguyen, a second-year Ph.D student at CLOUDS Lab at the University of Melbourne. We spoke to Hoa about his experience in Australia, what it's like studying at university, and how he is navigating his PhD.

Hoa's background

Originally from Ho Chi Minh City, Vietnam, Hoa was previously a teaching assistant and lec at the University of Information Technology. Before his PhD, Hoa had much academic expe and told Cybernews Academy of his fondness for academia. "I loved working in universities and

in research surrounding cutting-edge technologies. “That’s why I wanted to pursue my PhD studies,” Hoa added.

From Vietnam to Australia

There were a plethora of other reasons that inspired Hoa to move to Australia. “I love studying in a country where I can learn and improve my English skills, so I wanted to move to an English-speaking country. I had a few options: North America, a European country, or Australia. I applied to many universities, and all the offers I received were from Australia.” Seemingly fate, Hoa had to decide where he was going to study. Would it be the University of New South Wales, the University of Sydney, or the University of Melbourne?

Finding Professor Rajkumar Buyya

Hoa decided on the University of Melbourne mainly due to his Professor, Rajkumar Buyya. “I managed to contact a professor at the university who is “a top scientist in cloud computing within Australia,” and he told Hoa that he “had an opportunity to delve into a brand new topic: quantum cloud computing.” Furthermore, Hoa found this topic interesting and thought it would be an excellent opportunity to get out of his comfort zone and try something new. “It was a great chance to work with Professor Buyya, one of the leading scientists in cloud computing.” Eventually, the Vingroup Scholarship committee back home in Vietnam supported his studies at the University of Melbourne. Upon entering Melbourne, Hoa researched and found that Melbourne was one of the best cities in the world for studying – “It’s also one of the most liveable cities in the world, too.” The university was a top-ranked institution, which adds to the University of Melbourne's eclectic nature. “So, I’m finally here,” Hoa said triumphantly.

Changing paths

Hoa explained that he initially had a background in cybersecurity and computer networks. He had planned to go down this path; however, after meeting with his new professor, he became intensely interested in quantum computing. “I heard that quantum computing had a lot of potential, and Professor Buyya offered me a new topic to explore.” Hoa expressed that many people are already working in cybersecurity and artificial intelligence, so he decided to change paths and hopefully become a “pioneer in this developing field.”

Defining his Ph.D

is dedicated to engaging in innovative research projects and writing research papers under the guidance of his supervisors. Professor Rajkumar Buyya - Director of CLOUD Labs at the University of Melbourne, and Muhammad Usman - Leader of Quantum Systems at Data 61 CSIRO Australia, supervise Hoa while he completes his research. “Within our Ph.D. studies, we conduct extensive literature reviews, develop new software, and devise novel techniques to improve the efficiency of existing systems. This degree is predominantly a research-orientated program. Hoa’s degree requires much time and patience as he deals with many academic papers and research.

Research focus

We asked Hoa what the focus of his PhD research is, and he replied, “At the moment my focus is on Quantum Cloud Computing, particularly in developing system architecture and algorithms for optimizing the utilization and efficiency of quantum resources on the cloud.” Hoa explained that his research aims to simplify and streamline the quantum software engineering process. “My first research project, QFaaS, focused on applying a serverless computing model to ease the quantum software engineering process. During our conversation, Hoa elaborated on the intersection between quantum and cloud computing while clarifying the significance of this integration. “We don’t need to invest in a physical quantum device to access quantum computing resources. Instead, we can access these resources through cloud computing services, utilizing remote quantum data centers that provide necessary computing resources,” he explained. This approach significantly enhances efficiency, paving the way for research addressing some of the unmanageable problems classical computing faces. It took some time for Hoa to learn as he changed his focus and had to learn everything there was to know about quantum computing.

Adaptive-learning

One of the main things Hoa had to learn at university was learning how to re-learn efficiently. “I had to learn all these new things, manage the self-learning process, and conduct research appropriately.” Hoa had to address the big questions such as “What are the limitations of existing work, what problems can we solve, and how can we solve them efficiently?” This Ph.D. student emphasized the importance of formulating research problems, exploring different techniques, testing each method, and conducting thorough evaluations. If Hoa could go back to before his Ph.D., he told us that he would have focused on mastering mathematical concepts to deepen his understanding of quantum computing at the beginning of his studies.

In the future, Hoa is determined to complete his Ph.D. in quantum cloud computing and would

another country." Ultimately, Hoa would like to refine his research further before returning to Vietnam, where he intends to engage in academic pursuits and contribute to industry-focused projects.

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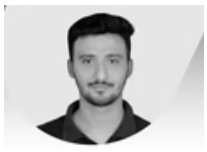

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