

Braving the new world of artificial intelligence

Kee Yuan Ngiam is the group chief technology officer at National University Health System, Singapore, and assistant professor at the School of Medicine of the National University of Singapore. His research focuses on the effects of using artificial intelligence in healthcare. He is the 2018 recipient of Singapore's National Health IT Excellence Award, which recognizes individuals who advanced healthcare through innovation.

Kee Yuan Ngiam

Growing up in an engineering family, I was constantly exposed to the pragmatism and technical acumen of my father, who was a mechanical engineer. He would teach my brother and me to fix our own model cars using spare parts he brought back from his work at a factory that built fuel tanks and pipes for airports. This early exposure to science deeply influenced my approach to life. In the 1980s, I naturally gravitated toward the earliest computers, building my first PC during my high school years. I was particularly interested in gadgets that interacted with people, especially tools that helped improve human abilities.

Despite my family's engineering background—or perhaps because of it—I chose to pursue medicine, as I was eager to make a mark of my own in a new field. Fortunately, I had the support of my family to study medicine at the University College London Medical School in London. Observing luminary surgeons such as R. M. Kirk, a veteran general surgeon from World War II, I learned the values of surgical apprenticeship and medical scholarship.

After graduation, I went back to Singapore and delved into the world of molecular biology as a clinician-scientist, where I began to explore the maternal markers underlying fetal birth defects. I worked in the lab of gynecologist Mahesh Choolani.

It was also at this time that I was entering surgical residency. My research interests had shifted from gynecology to cancer by this time. Monoclonal antibody drugs were just beginning to make an impact on Hodgkin's lymphoma therapy and I wanted to investigate how these drugs had an effect of solid tumors. Rotations through hospitals meant a nomadic existence that could be incompatible with the lab-based research I was doing, research that often required me to be chained to a bench culturing Hodgkin's lymphoma cell lines. I am grateful for the tutelage of Herbert Schwarz at the National University of Singapore and the camaraderie of my labmates, who made it possible to live the double life of a clinician-scientist.



Credit: Kee Yuan Ngiam

My real calling to the implementation of technology in healthcare came around the time when I was a resident in the trenches of surgical training. I observed how data could be used to solve many clinical problems, such as tracking outcomes of surgical treatments and running epidemiological studies to gauge the prevalence of cancer. However, there wasn't a central data-sharing structure that allowed researchers to easily access data. This red tape was frustrating to me, especially when many deserving research questions could have been answered with available data.

Upon the completion of my surgery residency, I joined Singapore's National University Hospital (NUH) as a consulting thyroid and endocrine surgeon and initiated the process of building a data-aggregation platform to help break down the silos that existed in data access. Under the mentorship of Lee Chuen Neng and James Yip, I learned all about data analytics to help me build the platform.

Two years later, I was offered the position of deputy chief medical information officer to lead a research analytics team. The first thing I did in this position was to initiate an effort to extract large-scale longitudinal clinical data for research use. In 2014, when this large repository became available at NUH, artificial intelligence (AI) was becoming popular.

From my childhood days of tinkering with my first computer, I've now made it to where I regularly work with computer scientists and engineers on campus to develop next-generation AI technologies for healthcare. I was given the opportunity last year as group chief technology officer at National University Health System to oversee AI deployment on the Discovery AI platform, a platform that I designed to allow secure and equitable sharing of data, as well as to develop AI tools for clinical use. For example, there are now three different AI-based projects being tested in clinical trials, including a trial testing an AI tool capable of diagnosing appendicitis from physicians' notes within medical records.

There were many ups and downs in my journey as both a scientist and a clinician, from endless failed projects to days that seldom ended before midnight. If there's any advice to offer, it's to be honest with your abilities and seize opportunities that align with your long-term goals. There is currently plenty of opportunity within the AI field, for instance. In 2017, Singapore launched a new initiative called AI Singapore, to invest in AI-based projects, including in healthcare. I'm proud to now be a part of this new venture. After all, we all need to understand and embrace this brave new world, where healthcare is likely to be delivered at the speed of an algorithm. □

Kee Yuan Ngiam

Division of General Surgery (Thyroid and Endocrine Surgery), Department of Surgery, National University Hospital, Singapore, Singapore.

e-mail: kee_yuan_ngiam@nuhs.edu.sg

Published online: 7 January 2019
<https://doi.org/10.1038/s41591-018-0317-y>