

Redefining the status quo in healthcare

Whether it's building nanobots or protecting his family's future, Dean Ho is looking to make his mark on the world. BY FRANCIS KAN

When Dean Ho looks into the future, he sees a world where more people have access to higher quality healthcare at lower costs. Some may call him an optimist, but the research director is in a better position than most to believe in this somewhat utopian vision.

As director at a research institute that is personalising patient care and using digital medicine to usher in a new frontier of healthcare, Dr Ho is leading efforts to develop artificial intelligence (AI)-based solutions to design clinical trials for various purposes, including novel drug development and more recently, formulating optimal drug combinations to treat the Covid-19 virus.

Dr Ho, 41, who moved to Singapore with his family from the United States in 2018, says: "We are working hard to scale the validation, deployment, and implementation of our AI-based platforms."

"One of our major goals is to demonstrate that we can dramatically reduce the cost of optimal drug combination development, with orders of magnitude reduction in costs and bringing AI-optimised treatment outcomes to patients years faster, particularly in the area of oncology. We are excited about what's on the horizon."

His team has been using a platform called iDentif.AI to determine optimal combination therapies that can be clinically-administered to treat Covid-19 patients. "From our first studies, we were able to identify an extensive list of possible combinations, ranked based on their efficiency at countering infection from a patient-derived SARS-CoV-2 live virus."

This list enables clinicians to select potential combinations that may or may not contain certain drugs due to drug shortages or a patient's pre-existing conditions. "This allows for a substantial level of actionability and versatility for clinicians, as they have a broad spectrum of treatment options," he explains.

The response has been encouraging so far. Already, multiple clinical communities across the globe have reached out to his team for their results, which have provided helpful guidance.

The team ultimately aims to work with multiple partners to develop iDentif.AI-pinned combinations based on a large collection of potential therapies. They also plan to develop a public database of these combinations for the benefit of the community. "In the event we need additional combinations in the future, we will be ready," he says.

Curating precision treatments

Dr Ho's pandemic-related work is just part of his broader mission to leverage technologies such as AI and nanotechnology to create precision and

personalised medicine for the benefit of patients.

One of his more notable achievements is the creation of Curate.ai, an AI platform developed over about five years by a research team led by Dr Ho. As each individual's response to medication is unique and changing, Curate.ai uses a patient's data – such as how a tumour changes in size following a certain drug dosage – to generate a profile that is able to recommend the optimal drug dosage for this person at any point in time.

This method of dosing is designed to improve the efficacy and safety of treatments.

In 2018, Curate.ai's recommended drug dosage for a prostate cancer patient successfully reduced the size of his tumour. According to Dr Ho, his team's AI solutions are unique in that they use actual experimental data from studies to optimise the right drugs and doses. As a result, these platforms have already been taken to the clinic for multiple studies, he reveals.

"Importantly, by rapidly optimising how we develop these treatments or administer these treatments, we have an opportunity to markedly accelerate the delivery of these optimised therapies to patients, potentially reducing the cost of care while realising substantially improved treatment outcomes. Of note, our AI platforms can be broadly deployed against a broad spectrum of disease indications, so that we can continue to help as many patients as possible," he says.

Going big with nanotech

Dr Ho is also a pioneer in nanomedicine, with his team spearheading the use of nanoscopic "diamonds" that carry drugs to diseased cells in the body to treat cancer. Together with collaborators, they also developed a magnetic resonance imaging agent that dramatically improves imaging brightness, substantially reducing the amount of imaging agent required.

"Nanotechnology is exciting because the materials that we use are versatile and can be coated with a broad spectrum of therapies as well as imaging agents, and these nanomaterials can often markedly improve the efficiency and safety of drug treatment or imaging efficiency," explains Dr Ho.

For his AI-related work in personalised and precision medicine, as well as in the areas of nanomedicine, Dr Ho was the only Singapore-based academic inventor elected in 2018 as a fellow of the United States National Academy of Inventors, the highest professional accolade for academic inventors.

"I'm hoping that our aspirations of redefining the status quo in healthcare, and making practice-changing advances in medicine will have helped as many people as possible."



Family inspiration

One of Dr Ho's clinical trials was a collaborative project with his father focused on optimising drug therapy for liver transplant patients to prevent organ rejection.

"We were able to use AI to recommend appropriate dosages, but not only that, we could see an immediate and real benefit: patients could be discharged from intensive care up to a month earlier," he says.

"It was amazing to work with my dad to realise these outcomes for patients."

Indeed, the father of two aligns his work closely with how he views family. "We're often approached by families and communities who need help for a loved one."

"As a father, I want my children to know I'll always be there to help them when they need it. That's the same hope I have for the technologies we've developed."

Dr Ho was born and raised in Los

Angeles and attended the University of California, Los Angeles (UCLA), graduating with a PhD in biomedical engineering. Before relocating to Singapore in 2018, he spent six years as a professor at UCLA.

His parents had migrated to the United States to pursue their education, and he learnt from them the importance of using one's achievements to give back to society. His father was a career innovator in various fields, from biomedical to aerospace engineering, and treated his team as family, while his mother is a gifted artist and speaker.

"My parents were a huge inspiration for me growing up. Both of my parents inspired me to give back to the community, and being surrounded by their diverse strengths has been amazing," he says.

His experiences growing up also taught him the importance of fostering a close-knit team at work, and being a responsible and nurturing parent and husband. He describes his

son Ethan as an inquisitive child who adores sharks and all marine creatures, while his daughter is free-spirited and creative. He met his wife, Sarah Ahn, in college when both of them were pursuing biomedical doctorates, although she would later switch careers to study fashion design and establish her own label, NAMI.

It takes a village

Several months after the family moved to Singapore, Dr Ho's wife was diagnosed with a brain tumour. "After my wife's diagnosis, I was completely and utterly lost. I'm usually the one who knows what's next, because that's what I do. Now we were on the other side."

Thankfully, with the help of their community, Sarah was able to recover. "It takes a community to weather adversity. The minute we found out about Sarah's diagnosis, I was on the phone with so many



Above: Dean Ho moved to Singapore from the United States in 2018, with his wife Sarah and their two children.

Left: Dr Ho's experiences growing up also taught him the importance of fostering a close-knit team at work, and being a responsible and nurturing parent and husband.

PHOTOS: DEAN HO

people who went on to collectively play a role in saving her life and getting her back on her feet.

"We were away from our immediate family, but our community of supporters became a new family for us. We are so deeply grateful for that," he recalls.

Dr Ho believes that community will also be key in achieving his goal of advancing healthcare, as it will take a collective effort from different stakeholders in the sector's ecosystem. "Our team strongly believes that technology alone won't markedly advance healthcare. It takes the seamless integration of multiple disciplines and skill sets."

He notes that a key challenge in his work is to pair the AI platforms his team has developed with stakeholders that will play a vital role in ensuring that they can be integrated into healthcare workflows.

This includes doctor and nursing teams, healthcare economists, behavioural scientists, regulators, payer and reimbursement communities, as well as the patients and patient advocacy groups, among many others.

He cites these partners, as well as his own team members, as inspirations. "I consider this community my family, and collaborating with them has been an honour. Our work together is a mutual learning experience, and it has taken mutual inspiration to bring us to the point where we are now seeing the promise of clinical impact."

Leaving a legacy

While Dr Ho is well on his way to making a mark in the healthcare world, he is also focused on crafting a legacy that is far more personal in nature; and that is to ensure that his children have the means to achieve their own dreams.

He says: "To me, legacy planning means having the foresight to think ahead and provide peace of mind for our future generations so that they won't have to worry about not having the necessary means to support their aspirations. In the case of our children, we want to solidify their access to the financial means for limitless educational goals."

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Dr Dean Ho is one client who has experienced the exceptional support that Opus professionals can provide. "When my wife, Sarah, was diagnosed with a brain tumour, our family's shock was extraordinarily disorienting. Estella, our Opus Financial Consultant, was one of the very first people we spoke to," recalls Dr Ho. "Her being there for us in the very beginning was an amazing source of security for us. She helped us navigate the process of preparing our documents, but most of all, she became family during the process."

"She was always accessible, and would often check in with us to ask if there was any way

that she could help."

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