

# FROM BIODESIGN FELLOW TO COO A STARTUP JOURNEY



**SINGAPORE  
BIODESIGN**

**CASE STUDY SERIES**

## MAIN AUTHORS



Jing Ming Chew

3SSB Innovation Fellow

**JING MING** is an experienced Medtech professional with a proven track record in startup management and product development. Jingming's portfolio spanned across both the public and private sector and across different functional roles including investment management, incubation management, business development, corporate development, and sales and marketing. He was previously COO of a Series B Medtech startup where he grew the team to 20 headcounts, spearheaded market access into China, and led the fundraising efforts.

Jingming began his career in R&D where he started off as an Ultrasound Research Engineer whose key projects were in medical imaging and diagnostics. He was a recipient of the A\*STAR NSS(BS) Scholarship and was on the Chairman's Honour List. He has a B.Eng. in Biomedical Engineering (1st class honours) from Imperial College London, UK and an MBA (Healthcare Management specialization) from National University of Singapore. He was also a Singapore-Stanford Biodesign Fellow in 2013.

Jingming is currently CEO of Auristone Pte Ltd, an Asian Epigenomics company focused on Asian cohorts and Asian diseases and whose flagship product is a test that predicts patient response to immunotherapy. He is also a mentor with the Singapore Biodesign Program, A\*STAR Carrier Program, and Lean Launchpad Program in NUS/NTU. Jingming also believes in the importance of National Service. He serves as an Officer with the Singapore Navy and was awarded the Formation NSmen of the Year Award in 2021.



Ms Fiona Loke

Curriculum Head, Singapore Biodesign

**FIONA** is a Senior Manager with the Medical Technology Office (MTO) of SingHealth and concurrently consults as Curriculum Head for Singapore Biodesign. As Curriculum Head, Fiona works with the team to design materials for training innovators in the Biodesign approach and related topics via workshops, as well as in the Biodesign Fellowship. At MTO, Fiona and the team provide support to aspiring clinician innovators in unmet needs finding, solution generation, engineering management, quality management, regulatory guidance and commercialization planning, adapting the Biodesign methodology for medtech innovation in the local context.

Prior to this, Fiona worked in software engineering, leading a team developing healthcare applications combined with new media and providing training in healthcare interoperability standards. Fiona was part of the 2011 batch of Singapore Stanford Biodesign Fellows. She has also provided consultancy to A\*STAR, Covidien (now Medtronic) and the Singapore General Hospital on medtech innovation.

Fiona is a named inventor on 5 granted patents, 3 pending patent applications and 3 PCT applications. 3 inventions are out-licensed and commercially available. She is also a WSQ ACLP-certified trainer. Fiona obtained B.S. and M.S. degrees in Electrical Engineering from Stanford University, with a focus in medical imaging.

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After a year of intensive training in 2013 as a Singapore Biodesign Fellow, Jingming was presented with an attractive array of career choices. These included research, job opportunities in the private sector and entrepreneurship. Jingming opted to join a Singapore accelerator, which provided him with a good grounding in various key corporate functions. Rotating between roles in product development, business development, sales and marketing, and investments, the experience gained was useful in his subsequent career choice. He joined a medtech start-up in the gastrointestinal space, as a Chief Operating Officer (“COO”). Jingming soon discovered a start-up journey to be both an exciting and a fulfilling one.

## Human Capital

It was all hands on deck in the initial phase. In 2017, with a lean start-up team, everyone played multiple roles. The Chief Executive Officer (“CEO”) doubled up as a Chief Technical Officer. Jingming found himself double-hatting as the COO and a Programme Manager. His responsibilities were wide-ranging - business matters, quality assurance, regulatory affairs and clinical affairs. Never a dull moment, he was even involved in R&D as a Project Manager. The technical team comprised an optics engineer, a software developer and a systems integration engineer. “Essentially, everyone was involved on the technical front as that was the key activity,” shared Jingming.

Planning ahead for the start-up, Jingming assembled a clinical team a year in advance to prepare for anticipated clinical activities. The team consisted of talents from varied backgrounds. Members took on key roles in bridging the gap between the engineering team and hospital personnel, engaging with key opinion leaders, and overseeing the design, planning, and execution of clinical studies. Subsequently, the company took bold steps to expand overseas. To better understand the target market, the company strengthened its business development presence. Following that, the company established a quality and regulatory affairs team. This enabled the

company to implement a quality management system that met the ISO13485 standard and lay the groundwork for regulatory submissions. “The key is to bring in motivated people with a propensity to learn. After excelling in their core functions, they can then be cross-trained and cross-functionally deployed,” said Jingming. “Attitude is more important than aptitude. With a good team that is cohesive, supportive and in sync, a lot can be achieved.”

According to Jingming, a COO should complement a CEO, serving as a co-driver in stewardship of the company. “When the company first started, we had a proof-of-concept of a technology application in a particular clinical use-case, but that was all,” he explained. As COO, Jingming’s first challenge was to take care of business case development and technology development. Business case development entailed utilising Biodesign’s “DSTM” approach:

**D**isease state analysis to determine clinical utility.

**S**takeholder analysis to establish Unique Selling Points to buyers.

**T**reatment options and patient care cycle to determine optimal market positioning.

**M**arket sizing based on patient segmentation.

Jingming also held regular strategic and cross-functional discussions with his CEO to plan for the company. Discussing and sharing the plan regularly helped align the team's efforts and served as timely reminders to stay focused. "Our main challenge is to do more with less," he said. "We need to have clarity of thought, deploy resources thoughtfully, be willing to say no, and most importantly, build a cohesive culture in the company."

## Product Development

The start-up's flagship product was an endoscopic optical biopsy system. The system consists of a proprietary probe and a cart housing the main processing board. The probe provides molecular information on particular lesions, indicating whether they are likely to be cancerous, which in turn supports an endoscopist's decision-making process. The key features of the system include provision of real-time diagnostic support, objective analyses powered by artificial intelligence and an intuitive interface that is simple to use.

The company began by assembling a team and evaluating members' intrinsic competencies against required capabilities. The company also decided from the outset to hold key technology in-house. This would enable the company to maintain its competitive edge, by preserving deep knowledge of the platform

technology within the company. At the same time, this makes it harder for competitors to obtain the company's core domain information.

Next, the team worked in tandem on a few aspects of product development. While developing the probe and cart systems, they started looking at design for manufacturing and defining their supply chain. Ensuring stability of the supply chain was probably the most challenging, as its optical components were highly customised and sourced globally. As such, the risk of project slippages and logistical delays were high.

To source for supplier partners for critical components, the team visited vendors in China, Europe and the United States. Being on the ground enabled the team to better assess capabilities of potential supplier partners. During the selection process, the team evaluated candidates based on clearly-defined criteria, including manufacturing yield, process reliability and working relationships. Their rigour in shortlisting and selecting suppliers enabled the team to minimise risks and uncertainties in their supply chain.

The company imported parts, built, assembled and packaged the system in-house. Working with the same vendors (for design and development) at this stage, proved to be an advantage, as they were familiar with the company's processes

for critical components. Nonetheless, it was still essential for the company to take a proactive approach in drawing out the operational processes. For example, incoming quality checks at the company site and outgoing quality checks for the vendors were discussed and agreed upon to ensure smooth operations. Jingming also recommended that innovators engage critical suppliers who have their own ISO 13485 or FDA QSR certificate.

To accelerate the timeline, the company ran processes in parallel where they could. "Project management is critical and being able to think a few steps ahead to address potential critical pathways is important," advised Jingming.

As a young company, it also found several advantages in being part of an accelerator. Ancillary company functions could be outsourced and supported by the accelerator rather than handled in-house, saving time and money. Housing fellow entrepreneurs and experienced business owners under the same roof provided the company informal resources to refine and sharpen their thoughts, plans and ideas. They were also able to bring in talent through the accelerator.

In all, the team spent a year to progress from a concept to an engineering prototype, and another year to make a viable product based on the engineering prototype. The team spent a further six to nine months on validation and design tweaks. This was considered a very short development life cycle for a hugely complex product. "An innovator needs to have a well thought-out engineering plan and project-manage it relentlessly. Very often, as long as the product doesn't defy laws of physics and is not beyond state of the art processes, it can definitely be achieved. A well-conceived plan and good project management ensures that the company has the most effective and efficient way of solving problems," advised Jingming.

As a management-level executive, Jingming valued the ability to maintain a bird's eye view of the company's affairs, while addressing technical issues by applying his technical expertise. "A company's different functions are like levers of a machine. When an issue arises, one can determine which lever to pull to solve the problem effectively and efficiently", Jingming explained. When in the field, however, he has to be flexible to solve issues with whatever resources he has. "So far, we have not encountered any problems that we could not address."



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JING MING CHEW

### **Leading a Startup Team: Creating a Winning Team**

As the COO, Jingming built up the team over time according to the needs of the company. He shared, "We hire people with a good attitude and who are willing to learn and adapt. I would view favourably someone who has the drive because a start-up requires the team to wear multiple hats. Generalists suit a startup better in the early stages." Jingming would conduct face-to-

face interviews with potential hires to understand what made them tick, what their working styles were and whether they could work well in a team. "A potential candidate cannot have a fear of rank and must be willing to speak up," he said. Within the office, management sought to reduce hierarchical barriers and empower staff to voice their concerns and suggestions. Outside office hours, members also organised team building gatherings.

In the initial stages, the team held many cross-disciplinary meetings so that all team members understood how and where they fit in the big picture. As the team grew, it became increasingly challenging to have all members attend the meetings. In such situations, relationships built up over time enabled the members to trust one other to fulfil their roles independently. Thus, in building the team, Jingming always placed people first. "A good cohesive team can certainly achieve a lot!" he quipped.

The company expended considerable efforts to attract and retain a highly qualified and competent team. While employing staff who are already skilled in niche technical areas are expensive, Jingming pointed out that skilled staff were more likely to become productive within a shorter time frame. This hiring approach enabled it to achieve cost efficiencies. As a startup, the company offered exposure to a wide range of activities, which was a good motivator for retaining talent, especially the key team members. Hence, Jingming sought to understand his staff's motivation for joining the startup and their mid-term career goals. With these in mind, the company provided its staff with opportunities to acquire their desired skill sets. For example, the company provided its quality assurance staff with exposure to regulatory and clinical work, while

its clinical affairs staff were rotated into clinical marketing.

## Taking on the Overseas Market

During its research phase, the company worked with an overseas team based in the UK for about a year. However, as travel budget was limited, the team had to be judicious in deciding when and how frequently to fly its member(s) over.

"Ensuring that the entire team was aligned on the project status was key, regardless of geographical boundaries," noted Jingming. The project team thus held weekly update calls (with slide decks and questions circulated beforehand) to ensure that the whole team was aligned on the project status. Jingming also advised, "Always follow up with an email to close the loop after key discussions. Even though it is tedious, this is important."

To facilitate online communications, Jingming arranged for the project team to fly to the UK for a kickoff meeting. "When the working team can meet in person and engage in face-to-face conversations for the first meet-up, it adds a personal touch and the team is likely to bond better," he shared.

During his overseas trips, Jingming sought to build relationships with clinical collaborators and

potential commercial partners. He also leveraged on these trips to demonstrate the clinical and market value of the product. In its overseas endeavours, the company gained useful support from Enterprise Singapore (“**ESG**”). Jingming was intentional in attending ESG-organised trips to gain a basic introduction to healthcare ecosystems of various countries. ESG's officers on the ground provided useful referrals of companies that might be keen to collaborate. Jingming shared that through such referrals, companies keen to be on ESG's radar readily responded. In addition, ESG provided assistance to the company when it was incorporating its overseas arm.

Later on, when incorporating a subsidiary in China, Jingming reached out to various experts to affirm the company's hypothesis on the implementation procedure and workflow to gain local market access. It was important to discern between what could and could not work for the company. “When multiple people tell you the same thing, then you're probably on the right track,” he said.

## Immersion

To validate the unmet clinical need and the company's commercial strategy, Jingming engaged a sizeable number of people in conversations and visited more than 30 hospitals in the target market. Due to limited manpower, he personally

made these monthly overseas trips, for up to two weeks and covering two to three cities each time. Jingming shared that these face-to-face meetings were critical for building rapport with his contacts. “They want to know if you are serious. If you come once and leave, they won't believe you,” he said. Jingming has since handed over these relationships to local staff on the ground, after the company established its overseas subsidiary. Aside from investments, business development and other responsibilities, the local staff invested time and effort to continue cultivating these relationships. This was so even during the months of pandemic-related lockdown when they were unable to continue with the company's clinical work.

Jingming immersed himself on the clinical front prior to moving on to commercial validation. “Understanding the problem in theory and seeing it in practice make a lot of difference,” shared Jingming. During this clinical immersion, his Biodesign training guided him in performing due diligence on the clinical unmet need. Jingming advised, “Learn everything you can about the procedure first, so that you will understand what you are seeing because you may not have many opportunities to observe it. You need to know what you are looking for.” He often had only a day or two to observe procedures and speak to clinicians. At times,

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3SSB Innovation Fellow



the circumstances allowed him only a quick five-minute peek. To hone his clinical understanding, Jingming also participated in immersions in Singapore hospitals to understand the workflow and important highlights of the relevant procedures.

While overseas, mapping relationships between key clinicians, and discerning the true key opinion leaders from self-styled ones, were challenging but essential. Here is where psychology came into play for Jingming. During weekly clinical conferences that he attended, he would take note of clinicians whom the host greeted by name, and observe which clinicians deferred to their colleagues. This subtle human

behaviour provided him with some insight on possible power structures in the clinical community.

On the commercial side, Jingming studied the approval limits at various authorisation levels for hospital purchases. This provided him with an understanding on the quantum a hospital was able to pay for a medical device. By working with different distributors, he also gained a sense of profit margins that might be required at the distributor level.

“Always be close to the market,” says Jingming. “When you are on the ground, a lot of misconceptions get broken down almost immediately.” For example, from his immersions in

Singapore he had initially thought that space would be tight in any endoscopy room. However, in the company's overseas market, endoscopy rooms were spacious. Size of equipment was thus not critical. Assumptions on procedure time had to be validated as well – a 15-minute endoscopic procedure in Singapore was only five to eight minutes long in the company's overseas market. In addition, distributor margins were very different in Singapore and the overseas market, which had multiple levels of distributors.

### **Additional Pearls of Wisdom**

As the COO, Jingming spent most of his day building relationships with the team and helping them iron out issues. He saw himself as an umpire and a counsellor at times, encouraging the team to express their concerns and having a debrief to improve on lessons learnt.

To ensure consistency in fairness, Jingming worked closely with the CEO to set standards and expectations. The team could thus get up to speed quickly on how things worked within the company. This enabled them to resolve lower order issues independently, guided by the company's principles. In addition, Jingming shared his challenges so that his team could relate to and understand the company's

operations better. He had also taken his engineers on overseas trips for them to observe different working cultures and practices, and apply some of the best practices at home. These trips also improved cooperation between global offices. For instance, in a trip to an overseas office, the local team learned that round-the-clock responsiveness was necessary for operations and was also part of the working culture. Through interactions with colleagues in the overseas office, the local team was able to empathise with them and was therefore more willing to provide prompt responses to queries outside of office hours.

Jingming concluded, "It is all about people. Managing people at a small team level is about providing support, growth opportunities and open channels for communication," he said. "Everybody wants to grow and mature; the company ought to provide opportunities for the individual to take on more responsibilities, blossom and shine."

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# EMPOWERING ASIA'S HEALTHTECH INNOVATORS OF TOMORROW

Modelled after the established Biodesign Programme at Stanford University, Singapore Biodesign is a capability development initiative that aims to train and nurture the next generation of healthtech innovators for Asia.

We are a dedicated talent development and knowledge resource for health technology innovation, riding on the robust biodesign methodology and our wide-ranging regional network to provide an appreciation of healthcare needs through observations from stakeholder perspectives.

## MISSION

High-touch development of healthtech talent centered on needs-based approach and quality industry mentoring to accelerate health technology innovation and adoption for Asia's\* unmet healthcare needs.

## VISION

To be Asia's\* leading healthtech talent development and knowledge partner for accelerating health technologies innovation towards commercialization and adoption.

\*Asia refers to SG, China and ASEAN

# SINGAPORE BIODESIGN

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