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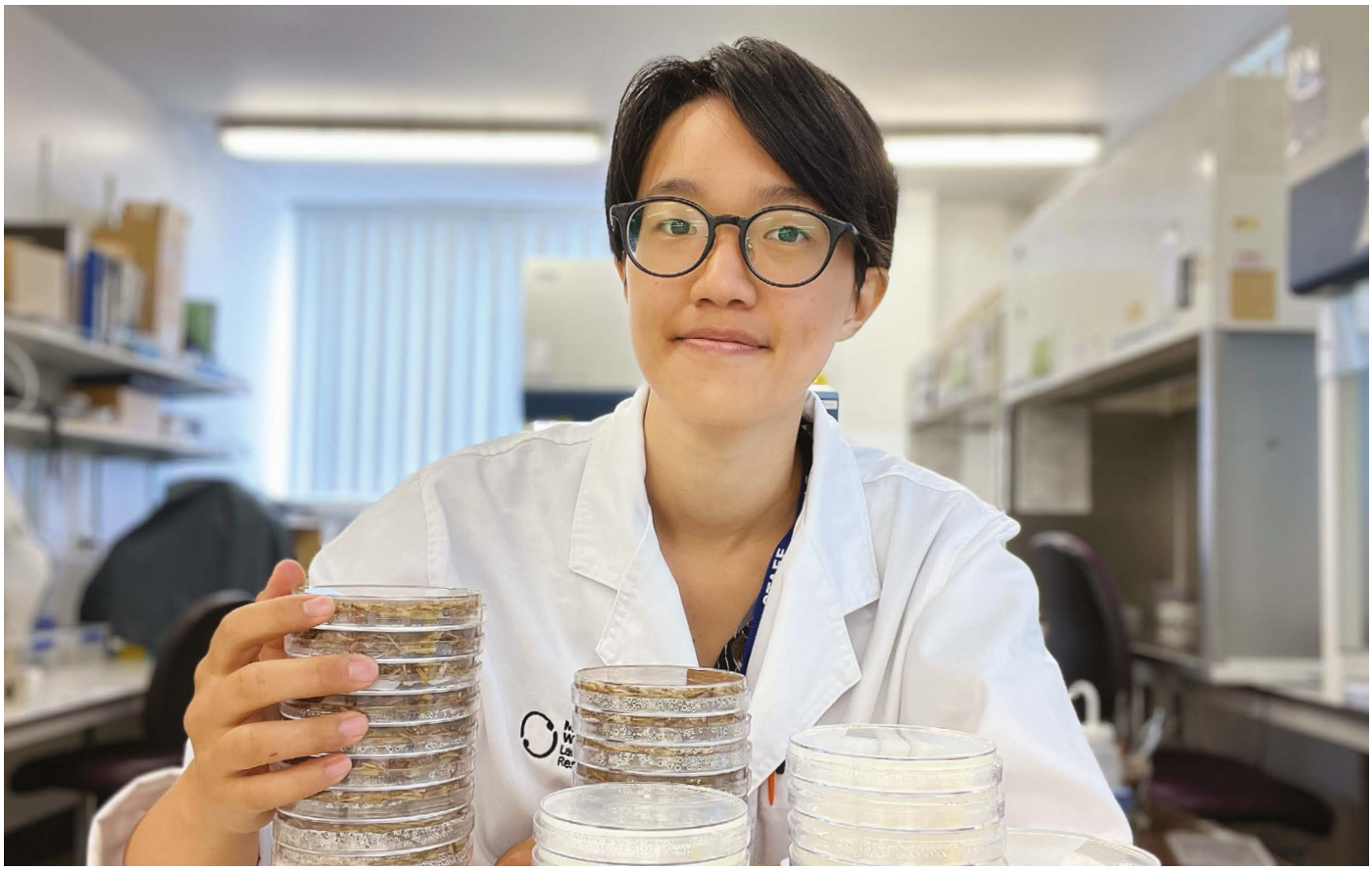

JESSICA CHIANG

Jessica Chiang is chief scientific officer at BioFab, a start-up company in Auckland, New Zealand.

START-UPS CREATE CAREER OPPORTUNITIES FOR SCIENTISTS

As companies compete for talent, a candidate's attitude can matter more than their credentials. **By Chris Woolston**

Chief science officers in industry used to fit a predictable profile: middle-aged, male and battle-hardened from many years at the bench. But the template is changing: scientific start-ups are now creating opportunities for a much wider range of researchers around the world.

Jessica Chiang, for example, was hired in 2020 as a chief scientific officer at BioFab, a start-up firm in Auckland, New Zealand, with a mission to develop biodegradable materials that could replace polystyrene. Chiang has a history of big ideas. She won a top prize at the 2017 GapSummit, a conference run by the non-profit organization Global Biotech Revolution in Washington DC, in which 100 of the world's most promising students and entrepreneurs take on some of the most pressing challenges in the biotechnology industry. But she doesn't have the standard credentials of a science officer.

As well as running research and development at BioFab, Chiang is working through the first year of her PhD programme in medical science at the University of Auckland. Through an arrangement with the university, her research at BioFab counts towards her PhD coursework, but she still has to find the time to balance life as a student and as a captain of industry. "I like to take on multiple projects and play around with different ideas," she says. "I get to work on the really science-y side of stuff, and I get to work on the commercial stuff."

Researchers looking to launch their careers have options beyond academia and big-name pharmaceutical and biotech companies. If they're willing to tolerate a bit of uncertainty and place their bets on an unproven concept, they can find a home at a newly founded company with a potentially bright future. But "a lot of scientists aren't aware of the opportunities that are out there", says Matt Krisiloff,

co-founder and chief executive of Conception, a start-up in San Francisco, California, that is attempting to produce viable human eggs from stem cells with the ultimate goal of treating infertility. In his view, researchers who don't tick the usual boxes for scientific achievement can still find a good fit at a start-up, but only if they have the right attitude. "Start-ups are often willing to take bets on people based on aptitude and enthusiasm rather than specific credentials," says Krisiloff, who also co-founded SciFounders, a venture-capital firm in San Francisco that provides start-ups showing particular potential with US$400,000 in exchange for a 10% equity in the firm.

Start-ups are inherently risky. An analysis of life-science companies spun off from US universities between 1980 and 2013 estimated that nearly half had failed or were on the brink of failure by 2017. Fewer than one in four were obvious successes and had been acquired by another company or were able to sell shares of stock through an initial public offering (IPO). The rest faced uncertain fates (P. Godfrey *et al. Nature Biotechnol.* **38**, 132–141; 2020).

Because of this, start-ups might not suit people who have a low tolerance to taking career risks. A 2021 analysis of the salaries of Danish employees going back to 1991 suggests that relatively mature companies have generally been a safer choice. Researchers estimated that employees in start-ups earned an average of 17% less over the following 10 years than did those who joined more-established companies, partly because they tend to have periods of unemployment if the company goes under (O. Sorenson *et al. Organ. Sci.* **32**, 587–604; 2021).

Desperately seeking scientists

But Krisiloff argues that joining a start-up isn't as risky as it might seem. "Companies are getting started on a weekly basis," he says. BDO, a global financial-services company, reports that 78 US biotech companies offered IPOs in 2020, an all-time high and a 77% increase from the previous year (see go.nature.com/3s8yu2q). "If the company you're at doesn't work out, you can move easily because of the shortage of good scientists," he adds. "It's the opposite of academia, where there are so many postdocs and so few professorships."

Just as labour shortages are plaguing workplaces such as restaurants, factories and farms in some parts of the world, many start-up companies are struggling to fill posts, Krisiloff says. "There's so much capital sloshing around in the world right now," he says. "Companies that are not that far along are raising hundreds of millions of dollars and have to figure out ways to justify that funding. They're desperately looking for people."

Companies are often willing to invest in talent. Salaries vary widely from company to company and from field to field, but Krisiloff says that typical starting salaries for PhDs in the life sciences in the United States is around $120,000 a year, including full benefits. In 2020, Labiotech.eu, a media site that covers the biotech industry in Europe, reported that senior scientists, which includes many new recruits at start-ups, can expect to earn up to €70,000 (US$78,000) a year.

IMPERIAL COLLEGE LONDON

Réka Trón is chief operating officer at London-based Multus.

Last year, Krisiloff started a Twitter thread to help connect short-staffed start-ups with scientists looking for work. He asked start-ups to explain their mission and the type of people they were looking to hire. The initial tweet generated responses from companies with a wide variety of products, including gene therapy, microscopy and laboratory-grown meat.

Mammoth Biosciences, a biotechnology company in Brisbane, California, posted to the thread that it had "many open positions". The company was founded in 2017 by two recent PhD graduates from Stanford University and two PhD students at the University of California, Berkeley. They were joined by biochemist and gene-editing pioneer Jennifer Doudna, who now chairs its scientific advisory board. The company, which uses CRISPR technology for applications in areas such as health care, biodefence and agriculture, now has 132 full-time employees (including 42 PhD researchers) and another 30 job openings for scientists and engineers, says chief operations officer Ted Tisch.

Open to suggestions

Réka Trón, co-founder of Multus, a London-based company that produces the media needed to grow meat in a lab, tweeted a link to current job openings, adding: "If you can't find one that suits you, e-mail us. We might hire you!" The Multus website says that "your motivation is more important to us than perfect grades, university degrees and a complete curriculum vitae".

Multus, incorporated in March 2020, now has 11 employees. Trón, who founded the company with two fellow students at Imperial College London and is now chief operating officer, says she is actively seeking someone who can serve as both a computational biologist and a software engineer. But she's open to hearing from someone who is willing and able to learn some skills on the job. She emphasizes that she would welcome an application from any qualified scientist who is excited about the company's mission and reducing the impact of livestock agriculture. "If someone brings a great idea or a great value to the team, we're open to the possibility," she says.

Multus is locked in competition for scientific talent with other firms, including the dozens working on lab-grown meat. Trón says the company still has to be discerning. In a smaller firm, there is less room for people who can't work as part of the team or get along well with others. "Attitude is an extremely important part of hiring," she says.

The company was formed during the pandemic, so Trón and her team have had to rely on Zoom interviews to gauge applicants' personalities. Candidates who live nearby are encouraged to come for a tour of the lab. She says that people tend to be more conversational and less stressed when they aren't talking to a screen.

A 'help wanted' sign is definitely up at Conception. "We're always looking for stem-cell scientists and organic biologists who are

interested in our mission," Krisiloff says. "We're not big on credentials. We're happy to consider someone who may not have a PhD."

Krisiloff says that scientists who apply to start-ups often have a deep supply of curiosity and a tolerance for uncertainty. For various reasons, they also tend to be eager to leave the conventional academic career path. Not only can they find more job openings in industry, but they can also have more time to focus on their work. "It can be a much more effective way of actually doing research," Krisiloff says. "Unlike in academia, you don't have everyone trying to carve out their own little niches that they have to publish around."

Big-company comparisons

In the right circumstances, a start-up can be a launching point for a stable career with ample room for promotion. Twelve years ago, immunologist Laurent Poirot left a postdoctoral position to join Cellectis, a biotech pharmaceutical firm in Paris. Poirot rose through the ranks and is now a senior vice-president of immunology in charge of a ten-person team. He enjoys mixing management responsibilities and business savvy with pure research. "The most rewarding and gratifying thing is having a [therapy] in my hands that I could see being injected into someone," Poirot says. "To be a part of that from inception to the bedside is exciting. That never happens in academia, unless you're in a lab that does its own clinical trials."

The firm, which was founded in 1999 and has about 280 employees, is now distant from its start-up roots, but Poirot says it still has plenty of untested ideas for new pharmaceutical products for anyone who wants to get in on the ground floor of something big.

Poirot says he's especially interested in hiring people who have shown when experiments or projects didn't go as planned. "Having been exposed to failure in science is something that I find tremendously valuable," he says. If an applicant says they have never faced real failure, Poirot will use the interview process to gauge their commitment to solving problems. "I like to challenge people when I talk to them. If the call turns into an ad-libbed discussion about science, that gets me excited."

It's much too early to predict the ultimate fate of BioFab, but Chiang says she plans to stay there at least until she finishes her PhD, which could take four years or so. By that time, she hopes the company will have a prototype that can generate sales. She also hopes that she's merely at the beginning of a long career in the start-up world. "I want to stay with this company and grow it, and maybe start other companies in the future," she says. "I'm an entrepreneur for life."

Chris Woolston is a freelance journalist in Billings, Montana.

Q&A

Fahd Albarraq
Yemeni museum manager

Geologist Fahd Albarraq manages the Yemen Geological Museum in Sana'a. In 2016, not long after civil war broke out, the country's economy collapsed and the museum lost its permanent financing from the government. Albarraq and three of his colleagues reopened it, without pay, in 2017.

Tell us about the museum and your exhibits.
It's a scientific museum that was founded in 1999 and obtained official recognition from the government in 2012, giving it national museum status. I've worked here for most of my professional life. Our main focus is on geology, thanks in part to our sponsors, the Yemen Geological Survey and Mineral Resources Board (YGSMRB). And, as well as our exhibits, we have a 140-seat lecture theatre, where we screen documentary films.

During the 2000s, we added more exhibits, such as snake fossils from the Jurassic period (201 million to 145 million years ago) and fish fossils from the Silurian period (443 million to 419 million years ago). There are also fossils of many types of mollusc and echinoderm, and of plants and trees from different geological periods. Almost all of the exhibits are from Yemen.

"Working at this museum makes me feel that I am doing something worthwhile."

We also show types of igneous, sedimentary and metamorphic rock, such as rhyolite, shale and gneiss.

Since 2019, the YGSMRB has given volunteers US$20 per month to cover our commuting costs. Visitors can also donate to the museum.

What are the difficulties you face?
The suspension of salaries — which happened in 2016 as a result of the war — is our biggest problem. There were 12 of us before the conflict started, and only 4 have been able to return to the museum to work on a voluntary basis.

In 2019 we also lost our government funding. This meant we couldn't pay for the museum's website, so we were unable to share any news. We now depend on our Facebook page, which is free to run. Despite the financial difficulties, admission to the museum is still free and will remain so. Before the civil war broke out, the museum averaged around 60 visitors a day. By 2021, that number had increased to more than 140 a day, thanks to a combination of social media promotion and our encouraging school trips. The war itself is also a factor: people are looking for escape and distraction in science and art.

How has the war affected you personally?
Before the war, I lived in comfort. As a geology student at Sana'a University between 1997 and 2001, I worked in a fast-food restaurant after classes. The wages were enough to live a good life because prices were low, and I could send money to my father, who lives in a Yemeni mountain village. In 2002, I got the job at the museum and was able to save money easily. I got married the following year, and a few years later bought a car.

Now, I borrow money from many people. I'm burdened by a monumental amount of debt. I have two daughters and two sons, aged from 6 to 16, and I have sold my car and my wife's jewellery to pay their school fees.

The war threatens our safety and our financial situation. Killing and destruction is everywhere. The most awful thing is the intense air raids on Sana'a, where we live. I worry that I can't do anything to make my family feel safe.

Why do you still volunteer at the museum?
This museum is an important part of my life. When a person works in a field they love, they sacrifice a lot to stay in that job. I wouldn't be comfortable with another job outside the field of earth sciences.

Working at this museum makes me feel that I am doing something worthwhile. After I finish my work at the museum, I go to my uncle's small mobile-phone shop. He gives me wages that help me meet some family expenses. It's hard to consider it a good opportunity, but it allows me to keep working at the museum.

Interview by Shihab Jamal.
This interview has been edited for length and clarity.