

ROLE & PROFILE

The Keystone Hire.

Director of Engineering Chemistry, Manufacturing & Controls (CMC)

We have written this the way we wish every role was written: openly and specifically — so the right person recognises it as theirs. If that person is you, you will know by the last page.

Most job specs are written for everyone. This one is written for someone.

A conventional spec smooths every edge until it could describe anyone, anywhere. We have done the opposite: been specific and open about what this role is and the kind of builder who thrives in it — so the person it was written for recognises themselves immediately.

WHAT WE WILL DO

Be clear and open

The scale of the ambition, the build-from-the-ground-up nature of the work, and what it truly takes to thrive here. A clear picture, on the record.

WHAT YOU WILL DO

Recognise yourself

If the mandate as described energises you, you are exactly who we are looking for. The clarity helps the right person lean in with confidence.

WHO WE ARE SEEKING

A builder

Someone who is energised by creating a function from a near-blank sheet, rather than maintaining a finished one. The canvas here is open.

WHY WE CAN BE THIS PRECISE

We are AI-native

A small, senior team with AI as genuine capacity. Because we are looking for one exceptional person, we can afford to describe them precisely.

HOW TO READ THIS

Read it as a mirror, not a brochure. By the final page, the right person feels a clear **“this was written for me.”** If that is you, we would love to hear from you.

WHO WE ARE

A precision-microbiome biotech, already in market.

ArrowBiome is a Singapore-headquartered biotechnology company. We make precision actives that remove a single target bacterium — the one driving acne or body odour — while leaving the rest of the skin microbiome intact. We are not a research project hoping for a first product. We have two products selling today and the platforms that make more.

2

PLATFORMS · ARCHER™ & FORGE™

2

PRODUCTS IN MARKET

Scale

LAB → VOLUME MANUFACTURING

The science, in one breath. ArcherZyme® uses engineered bacteriolytic enzymes — lysins, framed as cosmetic actives, not antibiotics — that pop a target bacterium like a balloon. SmartArrow® uses precision-engineered particles that mechanically strip biofilm without chemicals. Both are selective by design: they hit the troublemaker and spare the commensals.

Where this is going. Body odour and acne are the proven heroes. Behind them sits a broadening pipeline — oily/sebum, scalp, feminine intimate care, oral — delivered with brand-owner partners. The defining challenge of the next chapter is not the science. It is the ability to make these products dependably, at scale. That is your seat.

THE OPPORTUNITY, FRAMED SIMPLY

The discovery and formulation work is real and credible. This role adds the next piece: a **dedicated owner** of the path from bench to volume — the chemistry, the manufacturing, and the controls that turn a validated active into a reliable, scalable product. It is a clean mandate, and it is yours to build.

WHAT YOU WOULD MAKE

Two platforms. Two products. Two very different cost objects.

You would own the manufacturing reality of both. They are wonderfully different disciplines: one a fermentation-and-recovery craft, the other a polymer-synthesis-and-conjugation craft. The person we need has mastered at least one of these worlds — and is eager to make the other their own.

THE PORTFOLIO YOU WOULD INHERIT

ARCHER™ PLATFORM

ArcherZyme®

Engineered bacteriolytic enzymes (lysins) that pop a target bacterium like a balloon — sparing the commensal microbiome.

HOW IT IS MADE

Made by microbial fermentation and downstream recovery — a classic bioprocess to optimise.

In market

Body odour

FORGE™ PLATFORM

SmartArrow®

Precision-engineered ~200–250 nm particles that mechanically strip biofilm — no chemicals, above the EU nanomaterial threshold.

HOW IT IS MADE

Made by polymer synthesis, conjugation and spray-dry — a different, rewarding challenge.

In market

Acne & sebum

THE HEADLINE

Two craft challenges

Each product is made a different way, and each rewards a different kind of mastery. Making both reliable and efficient at scale is one of the most satisfying prizes of this role.

THE LEVER

Process intensification

Higher titre, better downstream recovery, fewer failed batches, and smarter host and process choices. Each is a meaningful lever on cost and reliability.

Note: lysins are described throughout as bacteriolytic enzymes and INCI cosmetic actives, never as antibiotics or drugs. SmartArrow® particles at ~200–250 nm sit above the EU 100 nm nanomaterial threshold and are not classified as a nanomaterial.



SECTION 01

01

How we work: AI-native, by design.

We did not add AI to a biotech. We are building the company around it — humans holding the judgment, AI amplifying the work. Before you read the role, understand the operating model you would be joining.

The team you would join is deliberately small.

“We did not add AI to a biotech. We are building the company around it, with humans holding the judgment and AI amplifying the work.” That is not a slogan — it is how the day actually runs. A small, senior team delivers the scope of a much larger one, with humans firmly in the loop on every decision that matters.

HUMAN-LED, AI-AMPLIFIED

The scope of a larger team, delivered by a small one — with humans holding every decision that matters.



Conventional peer
would carry ~33 people




ArrowBiome plan
18 humans + 8 AI teammates

THE THREE RULES

- 1 Humans hold the judgment**
Direction and accountability stay with humans, always.
- 2 AI amplifies the work**
It scans, drafts and synthesises at a scale a small team could not.
- 3 Every output crosses a human**
AI accelerates the first 80%; experts own the final word.

WHAT THIS MEANS FOR YOU

You will not be handed a department of junior engineers to direct. You will be handed **AI capacity to manage** — for literature synthesis, design exploration, documentation, and first-draft analysis — and the expectation that you own the judgement, the verification, and the final word. If you treat AI as a teammate rather than a threat, you will do the work of a much larger function. That is the deal, and we are being clear about it up front.



SECTION 02

02

The seat: why it exists, why now.

This role was named in our CTO's most recent R&D roadmap as one of the most consequential hires to make as we scale. Here is exactly why — with nothing hidden.

WHY THIS SEAT

The keystone in an org we are still building.

Our CTO rebuilt the R&D organisation from the mission outward: 25 roles the plan genuinely requires. Today, four are filled. Among them, one stands out as the keystone for the next chapter — the dedicated owner of how we make our products, at scale. That seat is this one.

ROLE-FIRST CAPABILITY MAP · 25 ROLES, 4 FILLED

The R&D organisation the mission requires
25 roles mapped from what it takes to win — not from who we have today

THE KEYSTONE SEAT
Director of Engineering
Chemistry, Manufacturing & Controls

Owns how we make our products, at scale

One of the most consequential hires for our next chapter

■ 4 seats filled today ■ The seat we are hiring ■ open / to come

THE DIAGNOSIS, IN HIS WORDS
The keystone for scaling
Turning proven science into dependable, scalable production is the defining challenge of this chapter. This is the seat that owns it.

WHAT THAT MEANS FOR YOU
Genuine ownership, day one
You are not joining a queue. You are the second senior technical owner in the company — building the function, not inheriting someone else's.

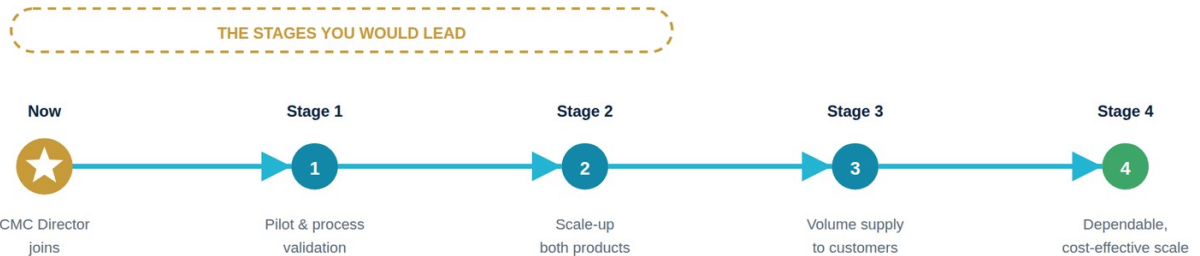
WHY NOW

This seat sits squarely on the critical path.

There is a clear sequence between today and dependable, at-scale production, and almost every link runs through manufacturing. We are not hiring ahead of a vague future need. We are hiring against a chain of events that has already started.

THE CHAIN YOU WOULD OWN

Why now — the seat sits on the critical path



WHY IT MATTERS

Almost every link in this chain runs through manufacturing — which is why this is one of the most consequential seats in the company.

THE MOMENTUM

You start with real pace

This is a role with genuine momentum behind it from day one — the work is live, not theoretical. How we set you up to hit the ground running is part of the very first conversation.

THE OPPORTUNITY INSIDE IT

Maximum leverage

Because so much depends on this work, everything you improve is felt immediately — in cost, in reliability, and in how fast we can scale to meet demand.

THE ROLE

What you would own.

The title is Director of Engineering. The substance is Chemistry, Manufacturing & Controls — end to end. You own the entire path from validated active to reliable, scalable, certifiable product, and you build that function from a near-blank sheet.

Domain	What it means here
Process & scale-up	Own the move from pilot through to volume manufacturing for both products, and the intensification programmes (titre, downstream recovery, batch reliability) that make production robust.
CDMO & tech transfer	Own the relationships, the tech-transfer packages, and the selection of a second manufacturing partner. Today this lives entirely with the CTO.
Cost & economics	Own the true, fully-loaded unit economics — and the levers to improve them. Be the person who understands every number and where it comes from.
Quality & controls	Stand up the controls and certifications the market gates on — EFfCI, ISO 9001, Halal — sequenced to unlock SEA, EU and Japan channels.
Process choices	Drive the key host and process decisions that shape cost, reliability and scalability — and own the rigour behind each call.
Building the function	Stand up the CMC function and become its first true owner — the dependable engine behind everything we make.

THE FIRST 90 DAYS — A REAL MANDATE, NOT AN ONBOARDING

You start by getting **hands-on with the real economics and process of how we make our products** — pressure-testing the numbers, finding the levers, and shaping the plan that turns proven science into dependable production. We want someone who reads that and feels excitement, not hesitation.



SECTION 03

03

The work, and the truth about it.

What the first eighteen months actually look like — and the things we refuse to pretend aren't true.

How we would know it's working.

We don't measure this seat by headcount or activity. We measure it by whether our products can be made dependably, at scale, and at a cost that lets us grow with confidence. Here is the scorecard.

- 1 The economics are understood, not guessed.** We know our true, fully-loaded unit costs and the levers that move them — with the rigour to back every number.
- 2 We are making at scale — for both products.** Body odour and acne are shipping dependably to our customers, with a process that is robust and repeatable.
- 3 The CMC function exists and runs.** Process, CDMO oversight, cost and certifications now live in a real function that you built and own.
- 4 The numbers stand up to scrutiny.** Our unit economics are reconciled on a fully-loaded basis you can explain and defend, line by line, to anyone who asks.
- 5 The certifications unlock revenue.** ISO 9001, Halal and EFfCI are sequenced and on track, opening the SEA, EU and Japan channels the commercial plan depends on.

“Success is when the hardest part of making our products has quietly become the most reliable part of the company.”

Why this role is special.

A few things make this mandate genuinely rare. We set them out clearly, because the right builder will read them and feel the pull immediately.

1 • Real pace and momentum.

This is a scaling company with genuine energy behind it. Priorities move quickly, the work is live, and your impact is visible fast — the environment a builder thrives in.

2 • A clean slate to shape.

Important questions are still open, and you would be the one to answer them — turning a near-blank sheet into a function the whole company relies on.

3 • Leverage beyond your headcount.

Your leverage is a small, senior team plus genuine AI capacity. You build the function first, and lead a larger one as we grow.

4 • Ownership that is truly yours.

What you own, you own end to end — the decisions, the craft and the credit. For the right person, that is the whole appeal.

5 • A world-class scientific partner.

Our CTO is a brilliant principal-researcher who built this platform. He owns the science; you own the making of it. Chemistry between you matters as much as competence.

THE FIT

What this role rewards, and asks.

Two columns: what the role rewards, and what it asks of you in return. Read them slowly. The right person sees both sides and feels, simply, “yes — that’s me.”

WHAT THIS ROLE REWARDS

- ✓ Experience taking a microbial or polymer process from bench to volume manufacturing.
- ✓ A builder who turns a hard cost-and-process question into an elegant, proven answer.
- ✓ Someone who creates the function and owns it, rather than inheriting a finished one.
- ✓ Fluency partnering with AI as a genuine part of the team.
- ✓ Energy for real ownership, an open canvas, and a world-class scientific partner.

WHAT IT ASKS OF YOU

- Comfort building from a near-blank sheet, before there is a large department.
- Confidence leading amid ambiguity and rapid change.
- Seniority measured by impact and craft, not headcount.
- The instinct to pressure-test ideas, including your own.
- A taste for pace, momentum and genuine accountability.

IF THAT FELT LIKE A DESCRIPTION OF YOU

Then the rest is straightforward. We don't need a perfect CV match — we value the temperament, the experience and the appetite to build. The next two pages describe the profile and how we would work together.

THE PROFILE

Who you are.

We care more about what you have done than where you did it. The essentials below are genuinely essential. Everything else we can build around the right person.

ESSENTIAL

The non-negotiables

Has taken a biological or polymer/particle process from bench through pilot to commercial scale — with the hard-earned experience that brings.

Deep, hands-on CMC fluency: process development, tech transfer, downstream processing, QC, and certification frameworks.

Can build and defend a rigorous, fully-loaded cost model — and knows the difference between a direct cost and the truth.

Has owned, not advised — carried real delivery accountability for a manufacturing milestone.

Treats AI as capacity to manage. Comfortable being the senior judgement on top of fast machine output.

BONUS

The things that would delight us

Microbial fermentation depth — titre, strain and production-host optimisation.

Polymer / nanoparticle conjugation and spray-dry experience.

Cosmetic-ingredient regulatory fluency (INCI, EFfCI, EU and APAC).

Has been an early operator in a venture-backed company and thrives in a lean, fast-moving environment.

Asia-Pacific manufacturing network and CDMO relationships.

THE DISPOSITION

Calm in ambiguity. Allergic to vanity metrics. Pressure-tests their own evidence before anyone else can. Wants to build the function, not inherit it.

The team, the reporting, the chemistry.

Capability gets you the conversation. Chemistry with this specific team gets you the role. We are small enough that one wrong personality costs more than one missing skill.

WHO YOU PARTNER WITH

The CTO & founder

You take CMC, manufacturing and cost ownership off his plate so he can return to platform science and innovation. This is a partnership of complementary strengths — he owns the science; you own the making of it.

WHO YOU WORK ALONGSIDE

A senior, lean team

A handful of strong scientists across research, lab operations, QC and formulation — plus AI capacity you direct. No layers, no bureaucracy — flat, fast, and full of room to build.

WHO YOU REPORT TO

CTO, with CEO access

You work into the CTO with direct, regular access to the CEO. On the questions that matter — margin, scale, capital — you will be in the room.

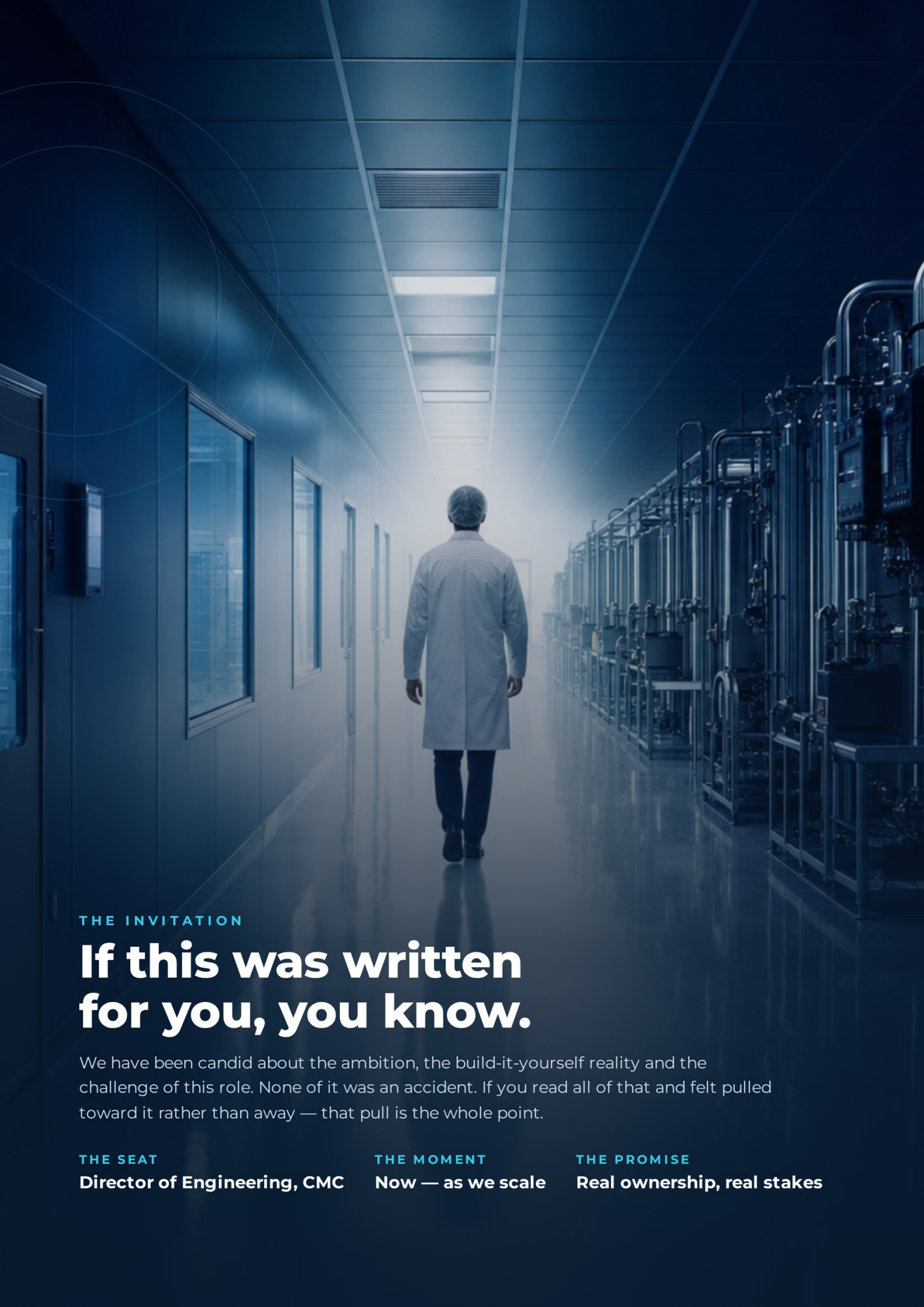
WHERE

Singapore HQ

Our primary R&D, CMC and commercial base. Expect to be close to the work, the team and the manufacturing partners.

THE CHEMISTRY THAT MATTERS

We are looking for someone who is direct and generous in equal measure, who builds trust by closing gaps rather than flagging them, and who treats “we don’t know yet” as a shared question to answer together. **If that is how you operate, you will love it here.**



THE INVITATION

If this was written for you, you know.

We have been candid about the ambition, the build-it-yourself reality and the challenge of this role. None of it was an accident. If you read all of that and felt pulled toward it rather than away — that pull is the whole point.

THE SEAT

Director of Engineering, CMC

THE MOMENT

Now — as we scale

THE PROMISE

Real ownership, real stakes

COLOPHON

The Keystone Hire

Director of Engineering · Chemistry, Manufacturing & Controls

A role-and-profile booklet prepared for ArrowBiome's search for its Director of Engineering (CMC). The role described — the CMC position — was defined in the CTO's R&D roadmap as one of the most consequential hires for the company's next chapter. The transparency in this document is deliberate: it is a filter designed to help the right person self-select.

SOURCES & BASIS

ArrowBiome CTO R&D / Innovation Roadmap (role-first capability map · 25 roles) · ArrowBiome AI-Native operating model, arrowbiome.com/ai. This booklet is written for prospective candidates; it describes the role, the profile and the nature of the challenge, and is candid about the ambition without disclosing confidential commercial detail.

● OPEN ROLE · DIRECTOR OF ENGINEERING

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