

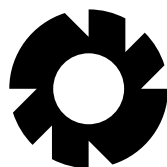
The Engine Repport

2021 & 2022



Built by MIT

Steel production is eight percent of global CO2 emissions. | **Green steel with zero**
gas emissions are from energy production. | **Safe, unlimited, carbon-free fusion**
ammonia synthesis for fertilizer. | Fossil fuel by-products burned into the air. |
| **Laboratory-derived wood products.** | A 100% renewable grid requires on-order
Electric vehicles limited by lack of lithium. | **Quick, efficient, and sustainable**
Novel materials to help decarbonize the most problematic industries. | Indus
sions. | **Membrane technology to retrofit existing infrastructure.** | Current te
wave drilling systems will unlock more geothermal energy. | Cement contribu
cement using renewable electricity. | Chemical manufacturing emits massive
of fossil-fuel-burning heat. | Current electricity infrastructure is insufficient for
more power with no new towers. | Industrial thermal separations account for
trial process. | Biologic therapies are hard to discover and make. | **Rapid disc**
rative diseases. | **Pacemakers for the brain.** | Unidentified public health probl
common diseases. | **Growing healthy human tissues.** | High rates of residual c
lity of food supply chains. | **Producing low-carb, protein-rich fungi flour.** | Si
Scalable process for precision genome editing. | Cellular therapies are time-
engineering. | Treatments for neurodegenerative diseases remain elusive. | I
third of global food produced is wasted. | **A natural coating to reduce spoilag**
harmful for the environment and our health. | **New multifunctional bio-inspired**
ment options. | **New drug delivery mechanisms.** | Vaccines are hard to tra
better delivery capability. | Unsolvable computational challenges. | **Scalable**
Miniaturized sensing solutions. | Artificial intelligence is limited by computing
ciency limits electronic capabilities. | **Advanced materials for 5G chips.** | Old
bling materials for the next generation of industrial innovation. | Poor connecti
centers are at their limit. | **Ultra-low-power high speed networks.** | Supply cha
rehouses and factories. | Charging cables are a drag on electrification. | **More**
chinery is difficult to electrify. | **Replace hydraulics with energy efficient subs**
guesswork to optimize infrastructure. | Every day globally there are over 4,0
sing in all weather conditions using new frequency ranges. | Inefficiency of p
to all. | The housing industry is in a general resource crisis. | **Change how we c**
be solved with classical computation. | **Quantum software and algorithms.** |



Founders solving
the world's biggest
problems through
the convergence of
breakthrough
science, engineering,
and remarkable
leadership.

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KATIE RAE
CEO & Managing Partner,
The Engine

EVERY TWO YEARS, it's my privilege to introduce The Engine Report: a public statement of work and one way in which we recommit to the common good. As an independent public benefit corporation, spun out of MIT, The Engine aligns our efforts towards material positive impact for the world, while maintaining our belief that long-term solutions for society's biggest challenges will also create economic benefit for those who bring them to market. This is our third report. Combined, these reports span a remarkable stretch of global events from 2016 through the present. Looking back, it's clear how interconnected our challenges are across the planet. Unraveling these connections helps create more sustainable and resilient approaches for every area of the economy. Today, the urgency and optimism of our mission feel more visceral than ever. This report captures the harmony and tension between those feelings. Yes, we have so much work to do. And also, yes, we have the technology and the people to do it.

The Engine's focus is Tough Tech: transformative technology that solves the world's most important challenges through the convergence of breakthrough science, engineering, and leadership. Tough

Tech addresses society's biggest challenges and opportunities: climate change and mitigation, human health and agriculture, advanced systems and infrastructure. We believe these areas are all interconnected — climate change solutions must go hand in hand with improving issues surrounding global supply chains and food systems, and vice versa.

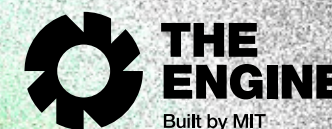
The Engine's unique relationship with MIT was put in place knowing it would require something new to see this mission through. It leverages the world class network and reach of MIT and spans across the research and talent, infrastructure, alumni network, experts, strategies, public affairs at the national and international level and so much more. Resources and connections that are critical for the acceleration and growth of the companies, such as the Industry Liaison Program, where industry strategics from around the world come and meet with our portfolio building lasting relationships that will be key for those companies as they scale.

The physical infrastructure surrounding our companies is critical for their early scaling. This September, thanks to MIT's ongoing commitment to investing in the evolving innovation ecosystem in Cambridge, we opened our new headquarters at 750 Main St between Kendall and Central Squares. With this new space, we now operate over 200,000 square feet of space for Tough Tech companies to begin work quickly and

then scale in place. Our infrastructure pillar creates a stepping stone for engineers and scientists right out of academia to scale their technologies to the world, while helping keep entrepreneurs in the Boston region and the incredible talent and resources at MIT and nearby universities.

While the milestones, fundraising, and new physical spaces are all important to recognize, the intangible successes are what bring the ecosystem to life. This report shares snapshots from founders' journeys to achieve bold objectives like growing healthy human tissue to treat disease; creating universal access to deep geothermal energy; and reinventing the foundations of industry —steel, concrete, electricity transmission— to support a decarbonized world. Our Tough Tech events like the Annual Tough Tech Summit, Blueprint program, and first-ever Talent Fair yield quotable experiences and emotional encounters that can only be told through photos. You'll find those human moments in this report, too.

The core functions of The Engine are designed to create a sustainable ecosystem with its own momentum. New opportunities come out of conversations and shared problem solving between companies and leaders. I hope you'll read through this report with an eye to how you might add your own unique expertise and energy to the Tough Tech ecosystem. Together, we can make a more optimistic future possible, faster.



Mission

Our mission at The Engine is to enable a more optimistic future, faster.

The Engine was launched by MIT in 2016 to enable a better future by focusing on Tough Tech to address the planet’s most challenging problems. The purpose of the public benefit corporation is to create a global positive material impact on society and the environment,

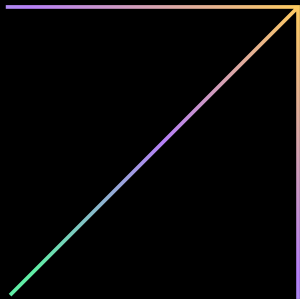
focusing on fostering entrepreneurship through the translation of science & technology, commercializing Tough Tech, and creating regional economic development through the process. We do this in collaboration with stakeholders across research, government, corporations and entrepreneurs, all working towards a common goal of a better future for all.

This report is organized by the pillars of that mission to show the progress being made in bridging the gap between discovery and commercialization for the most promising breakthrough inventions — so that we can create a healthier population, a more accessible and adaptive society, and a more resilient world.

Values

Ambitious Teams

We support ambitious teams solving global challenges with technology-driven innovation. We support them in their journey from lab to market, and we want to see them change the world. The Engine is also, itself, an ambitious team of hardworking and humble individuals who are driven to achieve our goals and see our portfolio companies succeed. We believe that by supporting ambitious teams and outcomes we can create enduring positive impact in the world.



Mission Focused

We are laser focused on ensuring bold ideas result in meaningful impact for humanity. Our mission is to support those who are just getting started in their journey to solve global challenges through innovation. We believe success in this mission is achieved through humility in the face of the unknown and dedication in championing the Tough Tech community.

Learning Together

We are a team of collaborative individuals committed to constant learning through experimentation and innovation. We do this by working together and lifting each other up to reach our goals. We are iterative, agile, and we lean into ambiguity. We share our wins and our learnings to accelerate the path of the Tough Tech community we support. We believe we can

achieve excellence by taking risks, leading in ambiguity, and sharing our knowledge.

Patiently Impatient

We believe both that important companies take time and that meaningful progress can be made in the near term. We relentlessly look for ways to push more aggressively towards progress, while respecting the milestones that require patience.

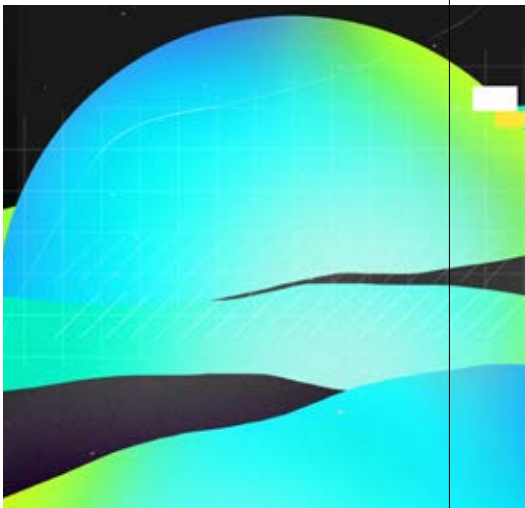
Inclusive Innovation

The ability to dream, to envision a better world for all, and to activate change is not specific to race, gender, or orientation. Anyone with the technical chops and ambition to drive change could be a tough tech founder or funder. We believe we must build an inclusive Tough Tech community to ensure that we collectively have the greatest impact.

Investment Areas

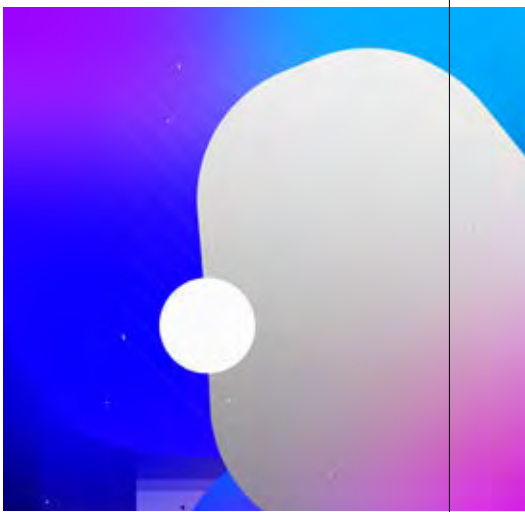
Climate Change

Meeting the challenges of a changing climate requires new materials and processes for how we produce, move, store, and use energy. These companies are working to mitigate the most severe consequences of climate change while building the foundation of our economy for decades to come.



Human Health

The Boston community has deep biotechnology knowledge and leadership. Our investments in human health build on this foundation and converge biology, materials, engineering, and AI to empower a healthy, vibrant world.

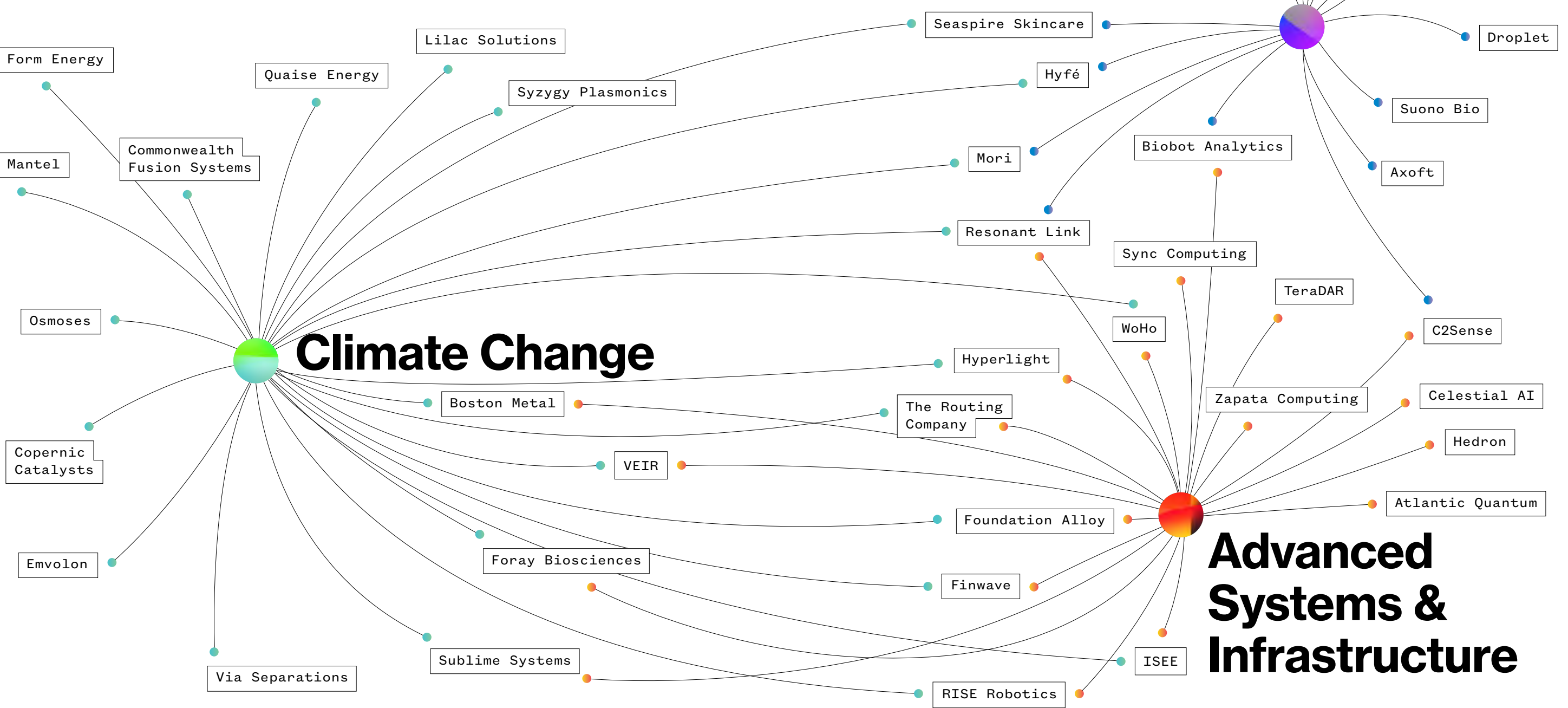


Advanced Systems & Infrastructure

Adapting and evolving to meet changing global economies requires new approaches for advanced computing, manufacturing and supply chains, the built environment, and space. These companies are building more effective, productive, and inclusive backbone technologies for industrial systems.



Transformative companies that solve the world's most important challenges.



Mapping The Engine portfolio across the United Nations Sustainable Development Goals



A sustainable framework for global impact

The United Nations Sustainable Development Goals (UNSDGs) are a set of 17 goals identified by the UN General Assembly global framework across environmental, social, and economic aspects of sustainable development. The goals are interconnected and cut across all aspects of society, with sustainability at the center. In adopting the UNSDG framework, The Engine embraces an integrated approach to solving a diverse set of issues.

We map the portfolio against the 17 UNSDGs to highlight which goals these companies are working towards and the need for an interdisciplinary approach to solving systemic problems. For example, companies with a core focus on human health may also have an impact on climate change if they can change the food choices available to communities. We further seek to invest in companies with a value set that prioritizes investment in cross-cutting goals such as gender equality, education, culture, and health.

8 Decent Work & Economic Growth

9 Industry, Innovation, & Infrastructure

10 Reduced Inequalities

11 Sustainable Cities & Communities

12 Responsible Consumption & Production

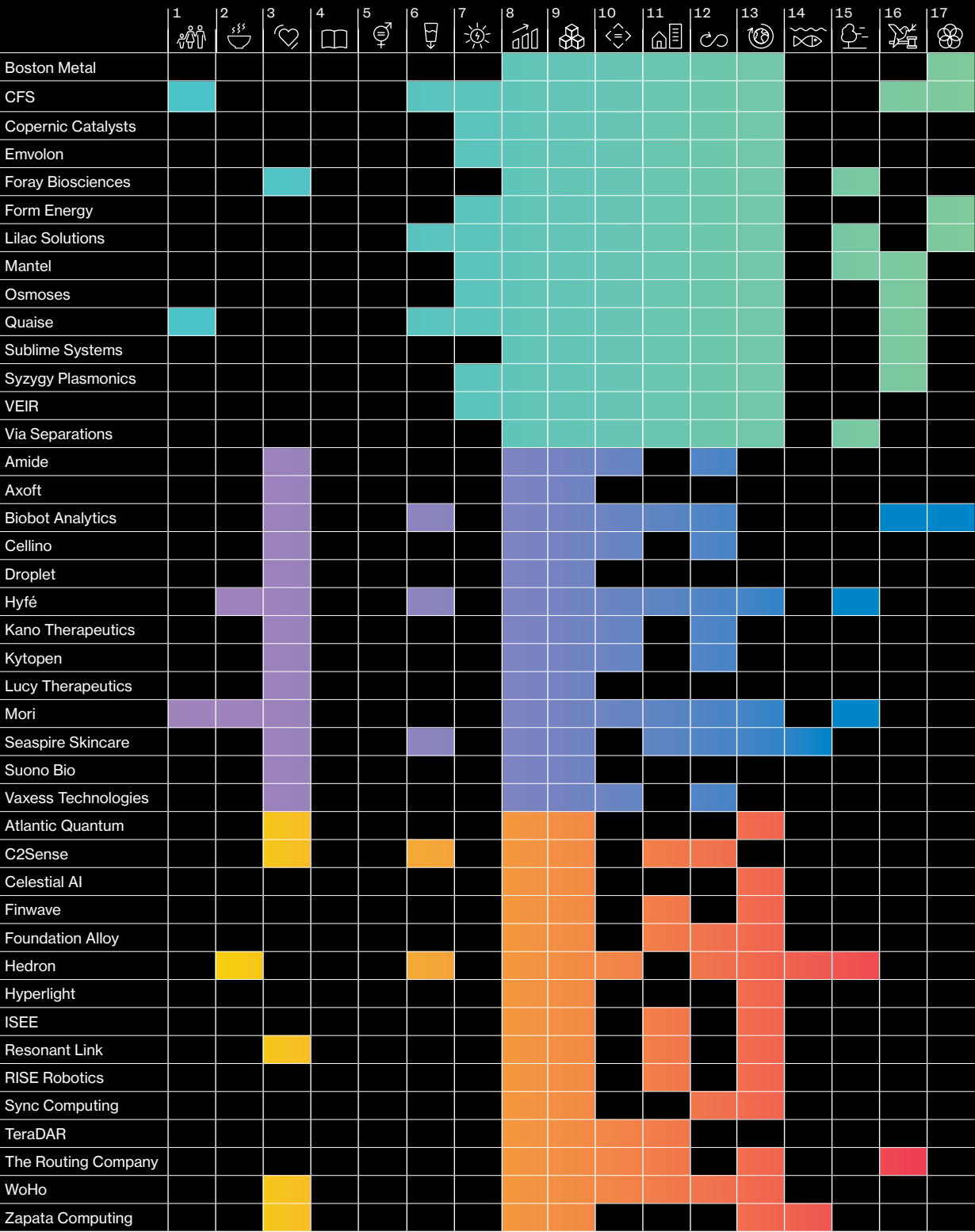
13 Climate Action

3 Good Health & Well-being

The very nature of Tough Tech is to leverage breakthrough innovations in science and engineering to build resilient infrastructure, grow the entrepreneurial talent pool, and promote inclusive, sustainable industrialization, and economic growth for all.

The Engine invests in companies taking urgent action to mitigate, adapt to, and ultimately reverse the universal crisis of climate change. These companies are on a mission to eliminate global energy inequalities, build the circular economies of the future, and make our communities inclusive, safe, resilient, and sustainable.

The Engine also invests in companies creating a more healthy, vibrant world. They build from deep biotechnology knowledge and leadership in the Boston community to create foundational companies rooted in biology, materials, engineering, and AI.



- 1 No Poverty
- 2 Zero Hunger
- 3 Good Health & Well-being
- 4 Quality Education
- 5 Gender Equality
- 6 Clean Water & Sanitation
- 7 Affordable & Clean Energy
- 8 Decent Work & Economic Growth
- 9 Industry, Innovation, & Infrastructure

- 10 Reduced Inequalities
- 11 Sustainable Cities & Communities
- 12 Responsible Consumption & Production
- 13 Climate Action
- 14 Life Below Water
- 15 Life On Land
- 16 Peace, Justice, & Strong Institutions
- 17 Partnerships for the Goals

- Climate Change
- Human Health
- Advanced Systems & Infrastructure

The Engine Portfolio

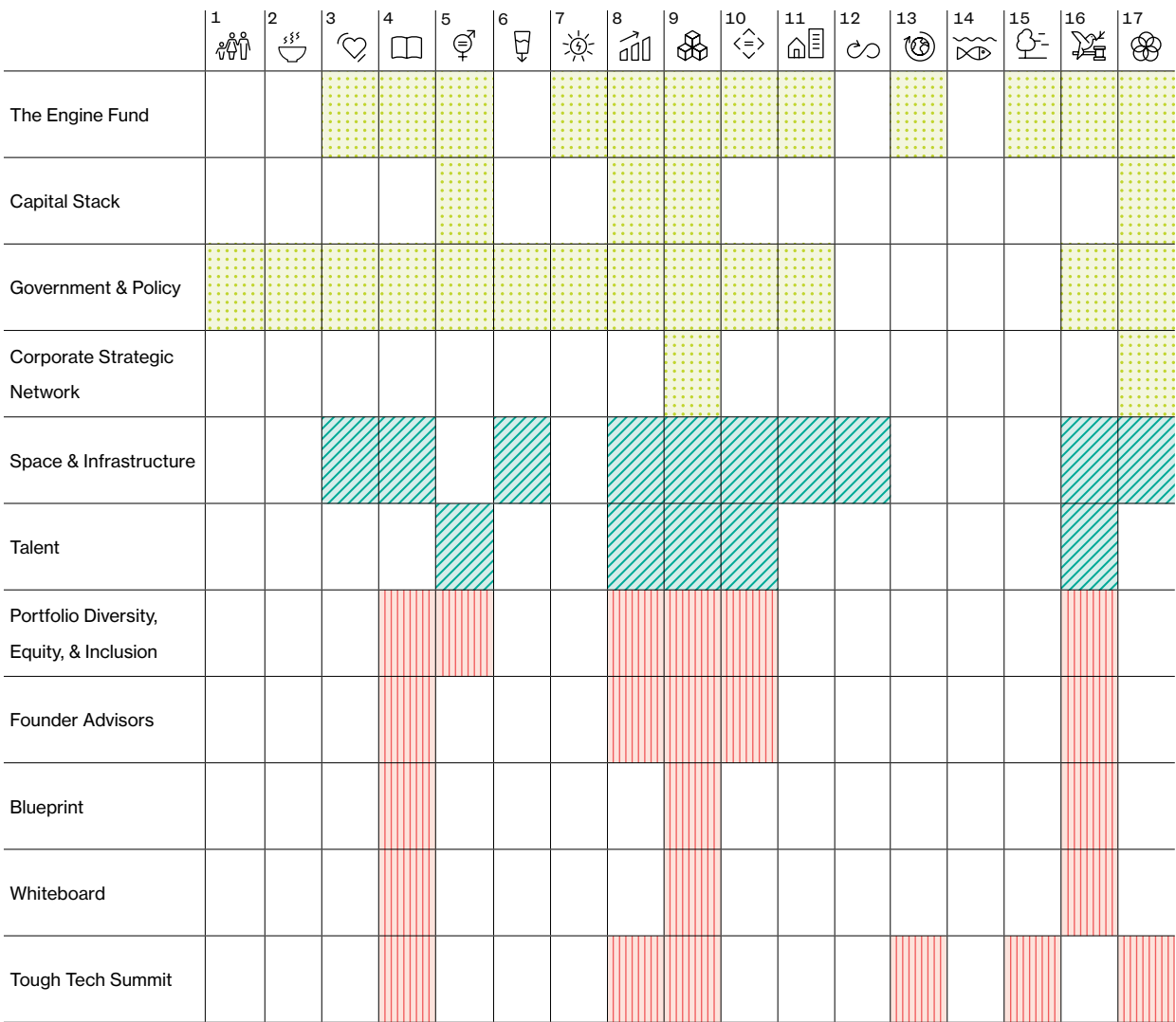
Mapping The Engine initiatives across the United Nations Sustainable Development Goals



Making a more optimistic future possible, faster

In addition to mapping our portfolio, we map The Engine's initiatives across the UNSDGs. Along with our values and mission, this effort helps us make decisions aligned with the material positive impact we seek to create in the world. We push Tough Tech as a sector to equitably encourage entrepreneurship, help regional economic development, and commercialize ideas that will create material positive change.

9 Industry, Innovation, & Infrastructure	The Engine was founded to support companies building resilient infrastructure, promote inclusive and sustainable industrialization, and foster entrepreneurship in science and technology.
8 Decent Work & Economic Growth	The successful commercialization of Tough Tech breakthroughs, from lab to market, is the key to achieving inclusive, sustainable economic growth, with productive employment and decent work for all.
4 Quality Education	The Engine fosters Tough Tech entrepreneurship by funding founders from all different backgrounds, as well as providing infrastructure and educational resources to the broader Tough Tech community.
16 Peace, Justice, & Strong Institutions	At all levels – from internal initiatives, to portfolio companies, to the wider ecosystem – The Engine seeks to build effective, accountable, and inclusive institutions that are necessary to support the growing Tough Tech movement.



1 No Poverty

2 Zero Hunger

3 Good Health & Well-being

4 Quality Education

5 Gender Equality

6 Clean Water & Sanitation

7 Affordable & Clean Energy

8 Decent Work & Economic Growth

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11 Sustainable Cities & Communities

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14 Life Below Water

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16 Peace, Justice, & Strong Institutions

17 Partnerships for the Goals

Commercializing Tough Tech

Supporting Regional Development

Fostering Entrepreneurship

The Engine Initiatives



THE ENGINE



“Tough Tech does not just require capital. To do what these companies

are doing they need labs, equipment, and advisors that are not always typical. There is a network of support and engagement needed from the earliest stages of venture building to the communities that these companies will grow in. The Engine aims to look at that full spectrum.”

FIONA MURRAY

Associate Dean of Innovation,
MIT Sloan School of Management

INITIATIVES

14

**Commercializing
Tough Tech**

26

**Supporting
Regional
Development**

40

**Fostering
Entrepreneurship**



“When I’m asked why my company will succeed, the answer is always quite simple. It’s because we have to. We must transition energy in one generation and it is finally the right time in human history where we have the right technologies to make it happen. Commercializing these technologies is non-negotiable.”

CARLOS ARAQUE
CEO & Co-Founder,
Quaise

COMMERCIALIZING TOUGH TECH

16
The Engine
Fund

17
Portfolio
Company
Programming

18
Capital
Stack

20
Government
& Policy

22
Strategic
Corporate
Network

Investing in the world's toughest problems

The Engine looks for three key ingredients when deciding whether to make an investment.

- + A founding team with the drive and passion to fulfill their mission.
- + A groundbreaking scientific discovery or technology solving a big global problem.
- + A massive opportunity to transform an industry.

Investing in solutions that increase the speed of innovation, are sustainable on a changing planet, and increase humanity's resilience in the face of crisis.

The Engine invests in Tough Tech companies, helping bridge the gap from discovery to commercialization. The companies we invest in have a clearly articulated scientific or engineering solution to a global problem. This often manifests as the convergence of multiple disciplines. As an early-stage investor, The Engine believes in supporting founding teams who are committed to societal positive impact. We look for leaders with an authentic connection to their company and an unstoppable drive to realize their vision.

The Engine Portfolio Investments

\$672M

The Engine's total assets under management

44

The Engine total Investments



Supporting founders with content and community

Dedicated programming for Tough Tech founders pioneering the scientific and technological breakthroughs that will change the future for the better.

Everything we do is in service of our founders. The Engine's portfolio company programming is the cornerstone of this mission. We bring best in class programming, people, and resources to our portfolio companies. Through offsites, workshops, and lunches, we unite our portfolio founders and leadership to learn from each other, share best practices, and solve common hurdles faced by rapidly growing companies. We leverage our team, network, and resources to create a community and support system for early stage Tough Tech founders.

The Engine provides portfolio companies with resources and opportunities to grow:

- + Annual CEO Offsite
- + Foundations Program
- + Targeted Content & Workshops
- + CEO/CTO/COO Lunches
- + Founder Community Social Programming
- + The Engine Access resource platform



↑ 2022 ANNUAL CEO OFFSITE. A two-day gathering for The Engine portfolio company CEOs to unplug, connect, and learn with each other, getting one-on-one time with The Engine Founder Advisors and The Engine team.

The Tough Tech capital stack is maturing

Getting the most audacious Tough Tech solutions to market requires founders to continuously evaluate the capital tools available. For many companies in the space, reaching commercialization will require not only a significant amount of capital, but also different types of capital for different stages of company development.

The Engine maintains a powerful network of capital providers and works closely with portfolio companies to develop and execute innovative financial roadmaps. Our strategies are based in a deep understanding of a company’s techno-economic model and the capital tools available.

Over the past two years, the quantity and diversity of options across the capital stack has continued to mature, offering founders the ability to find more efficient capital for certain activities, ranging from equipment and lease financing, to sale leasebacks for property, and other strategies. Our companies have also been successful in securing non-dilutive capital, including grants from government, foundations, corporations, and academia.

The Engine portfolio is attracting more Tough Tech investment

\$4.1B+

Total equity and convertible debt raised by The Engine portfolio companies

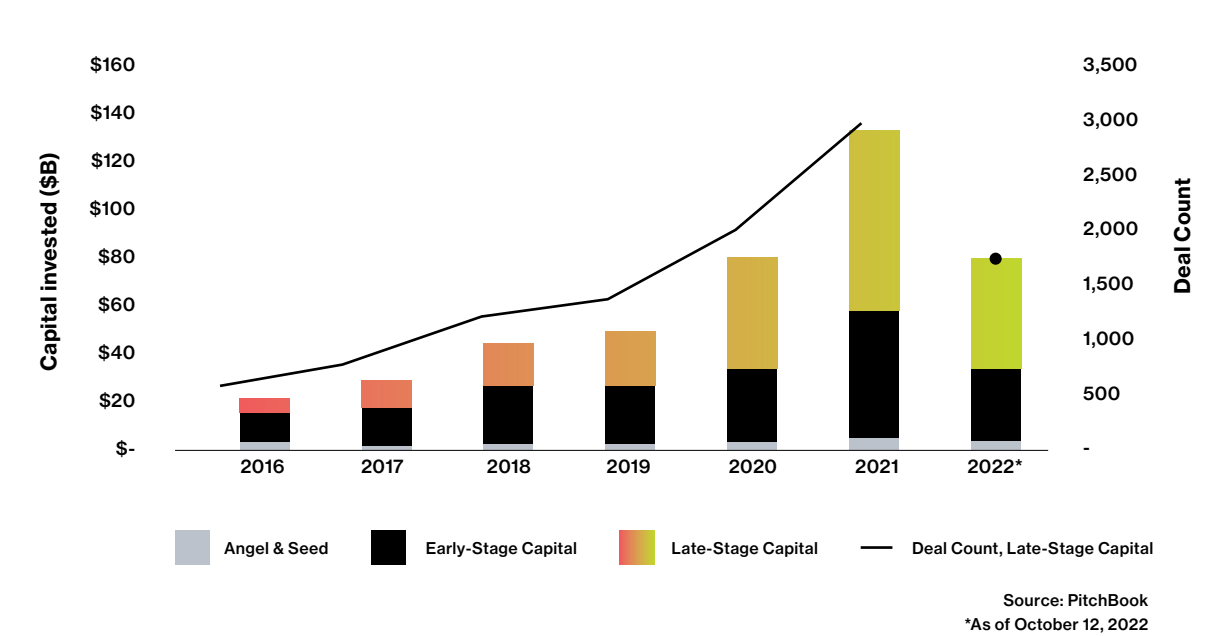
\$154M+ \$9.4B+

Total non-dilutive capital raised by The Engine portfolio companies Total valuation of all The Engine portfolio companies

14 : 1

For every \$1.00 The Engine invested, its portfolio companies raised another \$14 from other investors

Private capital invested into Tough Tech startups



The rate of technological development and the scale of global adoption are reaching levels that have never been seen before. Funding for Tough Tech broke new records in 2021, with more than \$130 billion in venture capital invested across 6,300 deals – a 50% year-over-year increase in investor dollars compared to 2020.

This record-setting venture environment has been made possible by breakthrough technical advances, growing adoption and expansion of business applications, as well as macroeconomic factors such as government policies and shifting regulations.

The impact of Tough Tech on our world is massive – and it can be even larger if we have the fortitude to start, stay the course, and scale globally.

To achieve these global scales, companies require capital and deep commercial partnerships. And there are many potential

partners that have the global networks, infrastructure, and workforce to help Tough Tech products and services reach all corners of the globe.

In recent years, we have seen the Tough Tech capital stack rise to meet this need, with much of the acceleration in Tough Tech investment driven by later-stage investors.

Corporate venture capital, hedge funds, private equity firms, and sovereign wealth funds accounted for 82% of total deal value in 2021. There are also emerging experiments to fill critical gaps, such as the U.S. Department of Energy Loan Programs Office.

Together, the increased support from later-stage investors reduces risk for early stage startups, extends the performance window for technology development and market entry, and increases the probability of success.



Data supported by the 2021 Tough Tech Landscape Report that The Engine published in collaboration with Pitchbook.

The report showcased that venture investment in Tough Tech has never been stronger.

Creating a shared vision of Tough Tech markets and economies of the future

Building transformative infrastructure is necessary to support breakthrough foundational technologies and create new jobs.

As a venture capital fund focused on bringing Tough Tech into the world, close alignment with the U.S. government is key to accomplishing our shared mission of serving the public good. That means driving regulatory innovation in sectors ready for transformation, thereby enabling Tough Tech companies to take root and grow into new industries. And it means driving stronger public-private partnerships, to strengthen the industrial base and enable the formation of new markets.

Government resources provide Tough Tech companies with many

different opportunities that help to derisk new technologies, such as pilot projects, testing facilities, and certifications. The Engine’s government practice builds relationships with the public sector to develop funding opportunities, understand critical public sector needs, and inform public policy.

Our portfolio companies are developing their technologies faster than regulations are evolving, and they require policy engagement to go-to-market or to create new addressable markets. For our earlier stage companies, we improve access to public sector funding, and develop government agencies as an addressable market. For later stage companies, we support portfolio growth through public-private partnerships, policy, and regulatory support.

Selection of The Engine’s public sector engagements



\$154M+

Total public sector funding raised by The Engine portfolio companies

1,654

Total number of jobs created by The Engine portfolio companies

Funding critical infrastructure of the future with ARPA-I

On July 26, 2022, an invited group of leaders from the U.S. Department of Transportation (DOT) and infrastructure stakeholders gathered to envision the future of our nation’s infrastructure. Our goal was to discuss how the Advanced Research Projects Agency for Infrastructure (ARPA-I) could most effectively help create a future infrastructure that is safe, resilient, equitable, and flexible. The discussion illustrated the overall need for an agency like ARPA-I to engage not just the innovation ecosystem of startups and academia, but the full range of stakeholders in US infrastructure development — including government agencies at the federal, state and local level, regulatory and standards bodies, corporations, and public-private capital providers – from early technical development to later-stage deployment.



↑ **IMAGINING ARPA-I.** An all-day gathering for government representatives hosted at The Engine in collaboration with MIT Mobility Initiative.

Guiding founders through new federal legislation

Understanding the complexity of founding one new agency is critical. It also informs our broader efforts to maximize government action to benefit our portfolio companies and their mission. In the past year, we saw the Bipartisan Infrastructure Act, the CHIPS and Science Act, and the Inflation Reduction Act all become law. In each case, we worked to inform companies of the changes and help them think through how those changes could affect them. Following a portfolio-wide, deep dive analysis of the Inflation Reduction

Act, as well as company specific findings, we held a workshop to discuss the implications of the bill at large. It revealed new opportunities for us to come together strategically - driving the kind of change that can only come through the power of collective engagement.

Helping portfolio companies secure nondilutive capital

Our portfolio companies are taking on some of the toughest science and engineering challenges out there, and we work with the public sector to help identify and de-risk these technologies at the earliest stage.

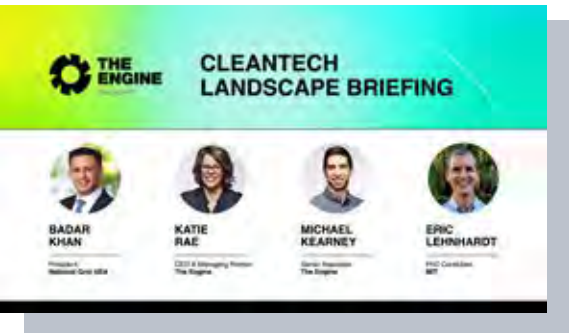
Government support provides our companies access to funding and technical resources that multiply the ability for our founders to make an impact on the world. In total, our companies have raised over \$154M+ in public sector funding alone. For every \$1.00 that The Engine has invested, our portfolio companies have raised an additional \$1.22 from the public sector, and have created over 1,654 new jobs.

The Tough Tech ecosystem brings it all together

Facilitating the creation of long-term mutually beneficial relationships between founders, startups, strategic corporate partners, policy makers, and investors.

We convene the investment, government, regulatory, and corporate communities to help accelerate the progress of those at the helm of early-stage Tough Tech companies. We create opportunities for our portfolio companies to learn from the lessons of existing large corporations and industry leaders. Simultaneously, industry and government have a chance to learn from The Engine's portfolio companies and collaborate on how to augment or build upon existing solutions. Where appropriate, portfolio companies can also tap into the work of these corporations through pilot projects and activities like prototype testing. Together, our network helps remove obstacles and clear a path to commercialization and success for our portfolio.

Tough Tech Talks



Semiconductor Landscape Briefing

86

Companies

112

Attendees

A circular portrait of Dr. John E. Kelly III, a man with glasses and a suit.

DR. JOHN E. KELLY III
Executive Vice President of IBM, Retired
Special Advisor to Chairman and CEO, IBM

Cleantech Landscape Briefing

47

Companies

85

Attendees

A circular portrait of Badar Khan, a man with glasses and a suit.

BADAR KHAN
President, National Grid

Network Partners

We facilitate the creation of long-term, mutually beneficial relationships between founders, startups, and strategic corporates through our partnership program. Our Network Members enable us to amplify groundbreaking Tough Tech innovation by expanding our resources, network, and community.

DIAMOND PARTNERS

Cambridge Consultants logo

Eppendorf logo

ThermoFisher Scientific logo

PLATINUM PARTNERS

U.S. Army logo

DEVCOM logo

GOLD PARTNERS

Mitsubishi Electric logo

Nanolive logo

SILVER PARTNERS

Five Years Out logo

Camber Road Partners logo

CSC logo

First Republic Bank logo

Hilti logo

GD logo

J.P. Morgan logo

Mintz logo

Silicon Valley Bank logo

TetraVrate logo

Business Development Day

Tough Tech Business Development Day enables highly curated one-on-one meetings between Tough Tech founders, members of government, and representatives from major corporations to forge meaningful and productive relationships.

16

Corporate strategics in attendance, 2021

50

1:1 meetings between startups and corporate strategics, 2021



“If you want to change the world, there are a lot of stakeholders. You have to think about what’s needed for a whole ecosystem so that Tough Tech can permeate things across finance, recruiting, and regulation. The systems and networks you have around you matter when you’re doing things like putting steel in the ground.”

BOB MUMGAARD
CEO & Co-Founder,
Commonwealth Fusion Systems



“The Engine is helping tackle society’s greatest challenges from right here in Massachusetts by providing emerging companies with the capital, space, and support they need to translate their innovative discoveries into commercial realities. In working with academic, corporate, and public partners to advance this mission, The Engine has developed an impressive cross-sector approach to advancing our innovation ecosystem for the benefit of the Commonwealth and the world.”

MIKE KENNEALY
Housing and Economic Development Secretary,
Commonwealth of Massachusetts

SUPPORTING REGIONAL DEVELOPMENT

28	30	32	36-37
Introduction to Infrastructure	Space & Infrastructure	750 Main St. Expansion	Talent Community

Supporting startup infrastructure needs

A home for the Tough Tech community

Providing access to the specialized labs, equipment, tools, and space necessary to build transformative technologies as economically and efficiently as possible.

The Engine has a sense of place. We are based in the Boston/Cambridge area and are committed to investing in the greater region so more jobs and foundational companies will be built in our community. Thanks to MIT’s ongoing commitment to investing in the evolving innovation ecosystem around Kendall Square, we have built out over 200,000 square feet of space for Tough Tech companies to begin work quickly and then scale in place. Readily available infrastructure can bypass months or even years of delays, moving Tough Tech to commercialization faster.

In our spaces, teams can move in and get to work without significant up-front investment for space or equipment. The labs and offices we provide are built out and move-in ready. Providing a flexible and agile solution for real estate lets our teams stay in the region longer and closer to the best resources and talent, their founding partners at local institutions, and investors.



“We have the chance to forge foundational infrastructure that can potentially change the geography of innovation. A thriving hub can propel the Greater Boston region into the future as a magnet for world-changing Tough Tech companies.”

EMILY KNIGHT,
Chief Operating Officer, The Engine

The Engine offers space to Tough Tech startups looking to

- + Grow and scale their companies.
- + Connect with like-minded entrepreneurs.
- + Expand their networks.

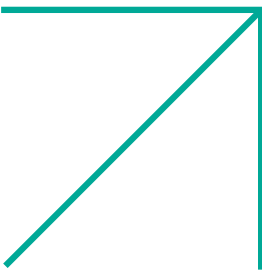


The Engine Infrastructure

For early-stage Tough Tech companies, we offer flexible use, ready-made facilities to help businesses on the path to global scale.

Selection of facilities that are part of The Engine Room:

- + Harvard Center for Nanoscale Systems
- + MIT Dept. of Chemistry Instrumentation Facilities
- + Harvard East Quad Nuclear Magnetic Resonance
- + Northeastern Kostas Center
- + Harvard Center for Biological Imaging
- + Materials Research Science & Engineering Centers
- + MIT Nano
- + The Koch Institute
- + UMass Core Facilities



The Engine Room

Online access to equipment and facilities throughout New England.

Early stage Tough Tech companies often require use of specialized and expensive equipment to run an experiment or build their product. The Engine Room exists to address this issue. Working with leading academic and research institutions across the state, The Engine

Room helps early stage companies gain access to specialized labs, equipment, tools, and space necessary to build transformative technologies as economically and efficiently as possible.



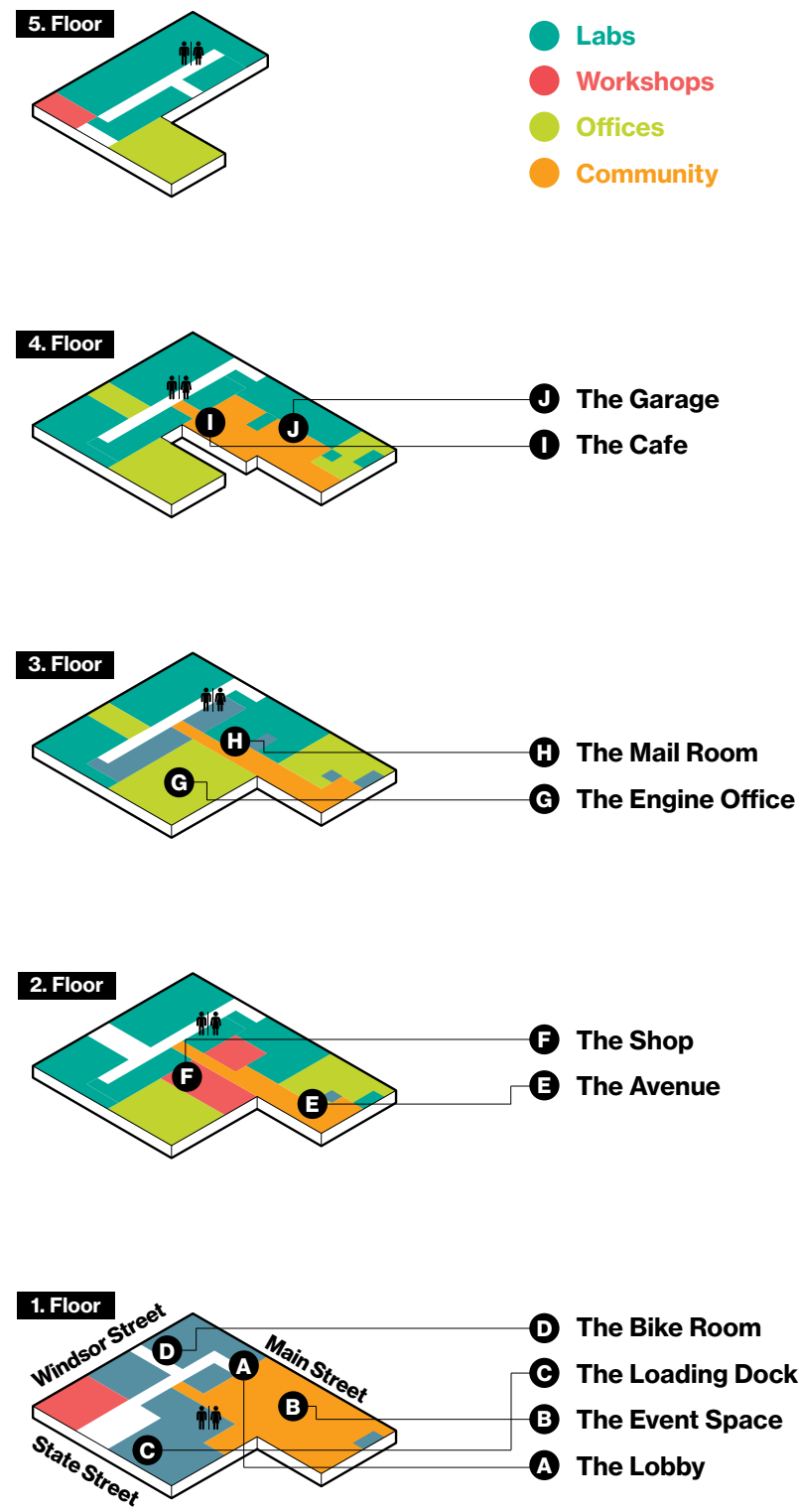
Location	Cambridge, MA	Cambridge, MA
Total space	155,000 sqft	30,000 sqft
Number of Tough Tech entrepreneurs	535 entrepreneurs	154 entrepreneurs
Number of Tough Tech companies	65 companies	5 companies
Average footprint per company	8 residents per company	17 residents per company
Biology & Chemistry Labs	●	●
Engineering Labs & Machine Shop	●	○
3D Printing, Laser Cutter, & Prototyping Labs	●	○
Open Industrial Space	●	●
Sensitive Compartmented Information Facility (SCIF)	●	○
Open Office Space & Office Suites	●	●
Public Event Space	●	●
Cafe & Collaborative Spaces	●	●

The Engine at 750 Main

Over 150,000 sq/ft of lab, office, and industrial space for Tough Tech companies.

Opened in September 2022 at 750 Main St in Cambridge, MA, The Engine’s new headquarters offer specialized equipment for lab work, fabrication, and engineering tailored to Tough Tech companies. With access to wet labs, fabrication space, and machine shops all under one roof, The Engine at 750 Main serves companies who sit at the convergence of breakthrough science, engineering, and leadership.

Building levels



The Engine at 750 Main



Biology & Chemistry Labs

Tough Tech teams often need quick access to sophisticated labs spaces, both bio labs and chem labs to do their work. The Engine at 750 Main meets a need for flexible-use science laboratory space that was previously not readily available outside of academia. These labs are move-in ready and provide terms for growth that match a Tough Tech company’s trajectory. Our facility provides the infrastructure needed to leave academic labs and quickly continue on with research, development, and experimentation processes.



Engineering Labs & Machine Shop

These spaces give teams the ability to create and build their technologies and rapidly prototype along the way. We provide a wide range of additive manufacturing and machining equipment for them to design and create products, as well as engineering support.

Open Industrial Space

Open fabrication space is a critical component for many Tough Tech companies to build prototypes, but is significantly limited in the Kendall Square area. The Engine at 750 Main provides companies an open space to set up their own ‘shop’ and build, test, and run larger systems in a flexible environment.



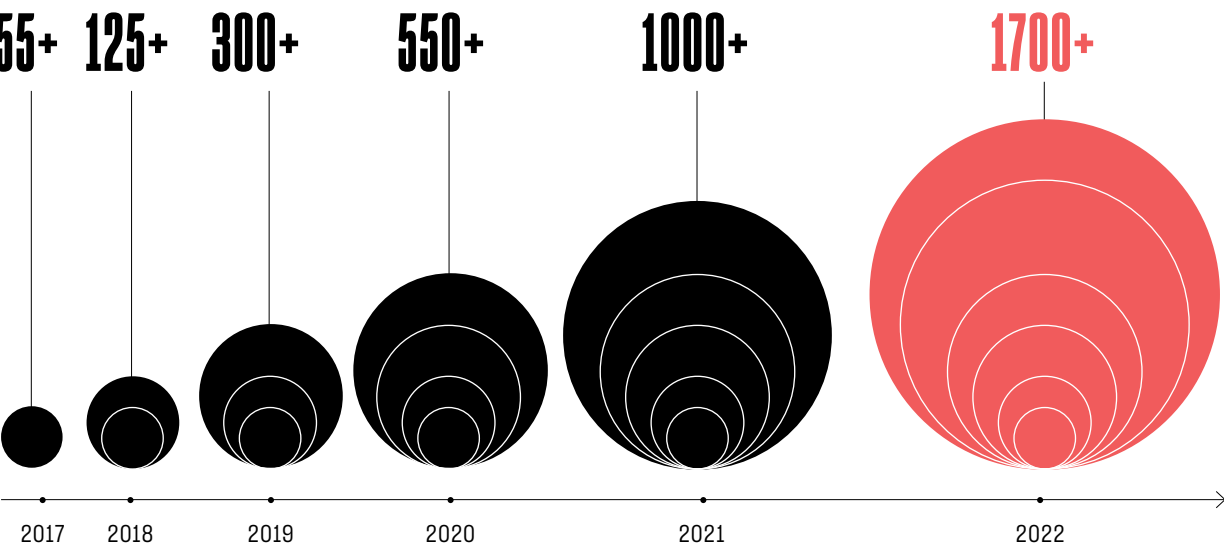
Public Event & Community Space

Building a community among our founders is a critical part of our ecosystem development. For founders, many who are starting a company for the first time, a network helps maintain momentum and provides a vital touchstone for personal development. The Engine at 750 Main provides a place to meet, convene, connect, and host stakeholders. The building includes spaces for everything from a small internal team meeting, to company offsites, board meetings, and large conferences for up to 350 people. The space is designed to be a gathering place both for the portfolio and the Tough Tech ecosystem.



Building Tough Tech teams

People employed by The Engine’s portfolio companies



The power of being located in Boston, concentrated by the mix of industries and the transient nature of the university student population, results in a rich pool of talent for our portfolio companies.

The Engine is helping founders tap into this talent pool with the following resources:

- + Talent fair
- + Job board
- + Compensation analysis
- + Machine shop co-op program

Tough Tech Talent Fair



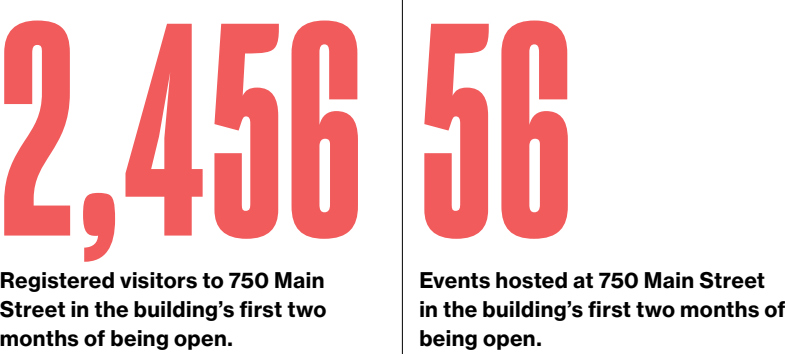
↑ 2022 TOUGH TECH TALENT FAIR. A half-day event to connect great talent across the Boston ecosystem with Tough Tech companies looking to grow.

Convening the Tough Tech ecosystem

In addition to lab and office space, The Engine residents gain access to many other resources:

- + The Engine Access resource platform
- + Discounted equipment and reagents
- + Membership to The Engine Room
- + Membership with MassBio
- + Office hours with The Engine’s government team
- + Consultations with The Engine’s Network Members
- + Community happy hours

Community



“The Engine infrastructure brings together groups of companies with knowledge about different spaces and pushes the boundaries of how they can work together while lowering the barriers for collaboration.”

PAULO GARCIA
CEO & Co-Founder, Kytopen



“The Engine has been pivotal because there's such a truly unique component of helping new founders, in a way that feels very safe and allows you to be open and honest to find the support you need, both with funding and other operational challenges.”

AMY RIPKA

CEO & Founder, Lucy Therapeutics



“The Engine provides inspiring support for companies working to tackle some of the greatest challenges of our time. It is a privilege and a pleasure to be able to join with so many brilliant and passionate entrepreneurs to help bring breakthrough ideas to the point of having real benefits for society by addressing these challenges.”

JIM GERAGHTY
Chairman of the Board,
Orchard Therapeutics & Pharmaceuticals

FOSTERING ENTREPRE- NEURSHIP

42
Diversity, Equity,
& Inclusion

44
Founder
Advisors

46
Blueprint

50
Tough Tech
Summit

Bold ideas come from diverse experiences

Technical founders often pull inspiration from their lived experiences. Massive opportunities can be found by intentionally creating pathways into Tough Tech for underrepresented communities. Further, we must invest in support systems to make sure any and every one can thrive in the ecosystem.

Our current portfolio represents an initial step towards a socially representative and diverse portfolio of founders. We continue to invest in improving these metrics, and in creating a ripple effect where more diverse founders are supported in hiring a more diverse set of employees, partnering with a more diverse set of advisors and, as a whole, bringing in new perspectives and approaches towards tackling society’s biggest problems.

The Engine provides portfolio companies with a multitude of resources

- + Diversity @ Workplace
- + Browning The Green Space
- + Diverse Hiring Office Hours



“I see the value of being in a community with not necessarily like-minded people, but people who are in a similar situation and have different perspectives and views. It’s diverse, and gives me ideas, experiences, and principles that I can keep in the back of my head.”

BHARATH KANNAN,
CEO & Co-Founder, Atlantic Quantum

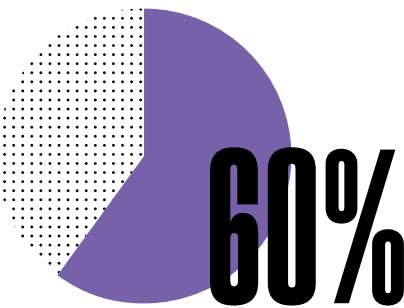


“You cannot solve the world’s biggest problems without recruiting people of all backgrounds to put their ideas into action. It is imperative that the founders we bet on, the investors we work with, and the teams we build continue to provide a model for diversity and inclusion for the rest of the industry and that we strive to be more inclusive each and every year.”

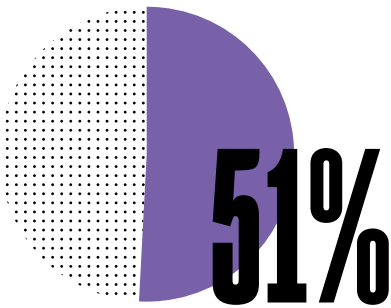
KATIE RAE
CEO & Managing Partner, The Engine

By the numbers

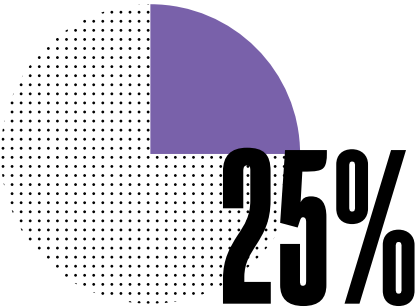
Underrepresented minority groups include Asians/Asian Americans, Black/African Americans, Latinos, American Indians, Native Pacific Islanders, and women.



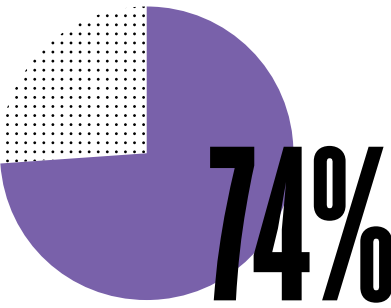
Percentage of portfolio companies with a CEO and/or Founder who is an immigrant to the U.S.



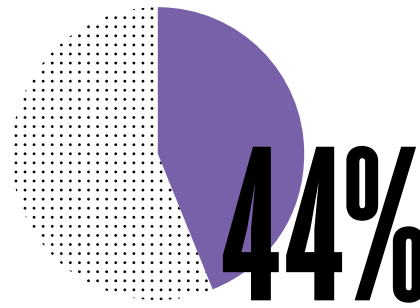
Percentage of portfolio companies with an underrepresented minority CEO



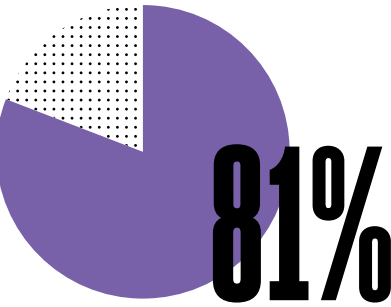
Percentage of portfolio companies with a woman CEO



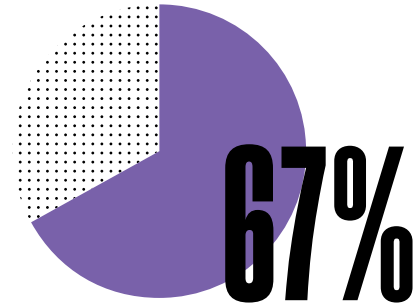
Percentage of portfolio companies with an underrepresented minority CEO and/or Founder



Percentage of portfolio companies with a woman CEO and/or Founder



Percentage of portfolio companies with an underrepresented minority board member



Percentage of portfolio companies with a woman board member

Advising the next generation of Tough Tech leaders

Prior experiences of founder advisors include:

- + Founders or early executives of a Tough Tech company.
- + Strategic decision-makers with a record of creating value.
- + Deep knowledge and expertise in key strategic areas.
- + Sourced significant levels of capital financing through multiple stages.
- + Successfully exited a Tough Tech company.
- + Built or enabled a diverse, high-performing organization.
- + Exemplify the highest levels of integrity.

Working with The Engine’s portfolio companies to accelerate their growth and path to commercialization.

The Engine’s Founder Advisors uniquely contribute to the success of building companies solving important world challenges. To accelerate company and CEO-founder development, Advisors engage with The Engine portfolio founders and CEOs on their company strategy, provide a counter-perspective relative to investor-think, share

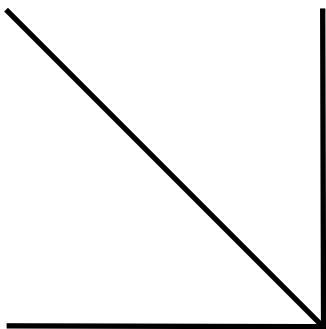
their experiences and knowledge, and open their network to the next generation of Tough Tech leaders.

Our advisors exemplify a few crucial characteristics: empathy for Tough Tech founders, based on experience; advice and counseling with the highest integrity; commitment and appreciation for building diverse organizations; and a deep desire, mindset, and willingness to give back to other founders. Their values resonate with ours.



“The Engine has taken a leadership role in addressing some of the biggest challenges we face worldwide by giving a generation of talented founders the resources to make the journey from bench to market successful. Through the Founder Advisor program, entrepreneurial founders have access to very successful business and science leaders. As an advisor, I am thankful for my contribution in making the next generation successful and engaged on issues that matter to mankind.”

MARTIN MADAUS,
Global Healthcare Executive



18

Founder Advisors supporting The Engine portfolio companies

12

Tough Tech companies started by Founder Advisors



ANDREW BOYD
Founder at Bramalea Partners, LLC



ANNE BANTA
Rent-A-Director, Corporate Marketing and Communications



COLLEEN CALHOUN
Vice President and General Manager, XL Grid at XL Fleet



DAVID BRADWELL
CTO & Co-Founder, Ambri



JENNIFER HOLMGREN
CEO, Lanzatech



JIM GERAGHTY
Chairman of the Board, Orchard Therapeutics & Pharmaceuticals



ADAM LONDON
CTO & Founder, Astra



JONATHAN MCINTYRE
Scientist & Entrepreneur



MARTIN MADAUS
Global Healthcare Executive



MICK MOUNTZ
CEO & Founder, Kiva Systems



COLIN RANEY
Designer & Entrepreneur



NIKHITA SINGH
Co-Founder & CPO, Artificial



PAUL SHENG
Senior Partner, McKinsey & Company



PHIL GIUDICE
Board Chair, FirstLight & US Secretary of Energy Advisory Board



DAX KEPSHIRE
Americas Regional VP of Engineering & Project Management, Fluence Energy



PRESCOTT LOGAN
Advisor



RAMYA SWAMINATHAN
Founder & CEO, Malta



STAN LAPIDUS
Inventor & Entrepreneur

Turning Tough Tech breakthroughs into Tough Tech startups

Blueprint is a nonresident program for graduate students, postdocs, research scientists, faculty members, and their teams, to explore the commercial opportunities of their breakthroughs and startup projects.

The program helps the next generation of Tough Tech leaders navigate the commercialization process through tailored programming concerning technology risk mitigation and experimentation planning, market discovery and selection, IP, team building, storytelling, and other topics.

Blueprint provides participants access to The Engine team, Tough Tech founders, investors, and representatives from major corporations.



“When I started my PhD, to me, the only option was to become a professor. And then, as work progressed, I realized that there were other options — I realized that I may want to go into the world of industry and entrepreneurship to translate my research or apply what I had learned during my PhD to real world situations. At Blueprint, I was able to see and to meet with other founders that have similar backgrounds. I got to see what a success story is made of. It was inspiring to see where the panelists were in their journeys and how they evaluated risk and fostered growth.”

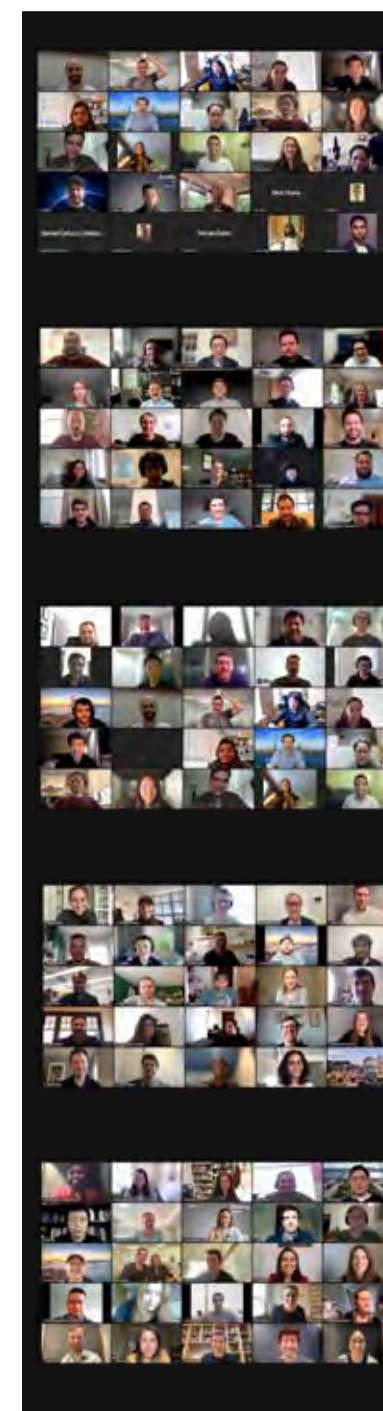
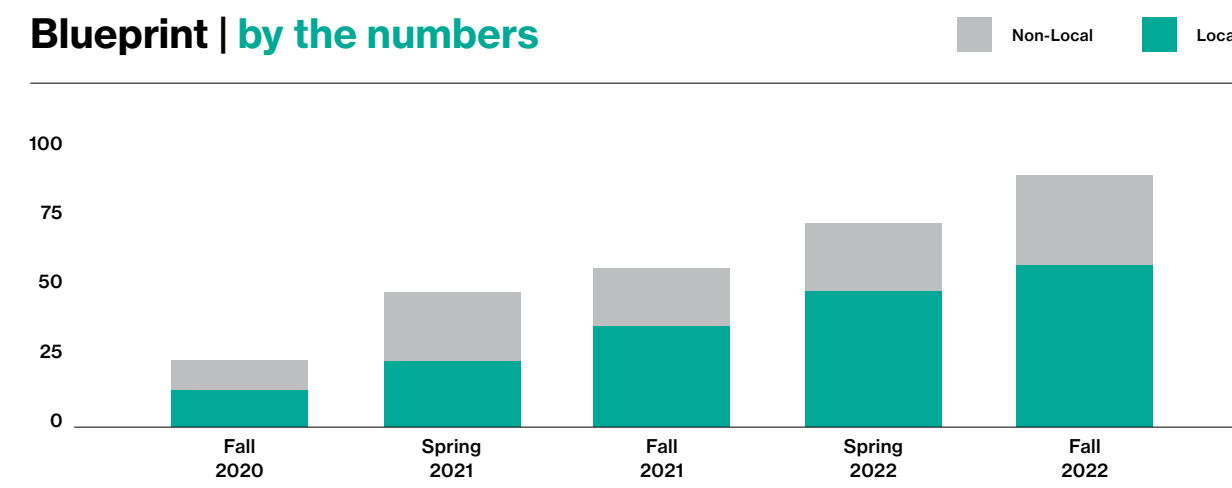
PAUL LE FLOCH,
CEO & Co-Founder, Axoft,
Harvard University



“Blueprint taught me that the journey of a Tough Tech founder is much more than, ‘I’m only in this to make money,’ or ‘I just want to call myself a CEO,’ or ‘I can’t get a faculty job so I’ll just start a company.’ You need to care about the problems you’re solving. The program also reassured me that the skills I’ve developed as a scientist translate into entrepreneurship. Blueprint helps consolidate lessons that I’ve heard in other programs, but in a way that truly connects with being a deep tech science founder. It is a translational layer between academia and building a company.”

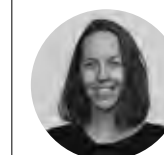
AARON HALL,
Founder, Intropic Materials,
University of California, Berkeley

Blueprint | by the numbers



Blueprint Program

- + Technology & Scaling
- + Fundraising Prep
- + Market & Regulatory Risk
- + Storytelling



“Blueprint enabled us to understand the unique needs of Tough Tech ventures. We make materials and hardware, and some of the challenges companies like ours face, such as scaling and supply chains, are nonexistent to software companies, for example. In addition, being part of the Tough Tech ecosystem has enabled Atacama to learn from other companies about techno-economic analyses, scaling strategies, and operations. Thanks to Blueprint and this network, Atacama has a clearly defined pathway forward to success.”

PALOMA GONZÁLEZ ROJAS,
CEO & Co-Founder, Atacama Biomaterials, MIT

518

Participants
2021-2022

184

Teams
2021-2022

61

Institutions
2021-2022



Catalyzing a Tough Tech movement

Tough Tech Summit® 2022

Invest 10.27 — Build 10.28

Solving the world's biggest problems with Tough Tech requires building a movement. We must unite those working towards change.

For Tough Tech to succeed, it's critical that discussions about the technologies at play, the stakeholders, the founders, and the ecosystems are dynamic, intersectional, and highly engaged. Tough Tech Summit is the opportunity to make those connections and elevate the ecosystem's work, as well as making the act of investing in, or working on, a Tough Tech startup more mainstream.

We've intentionally designed a two-day Summit united by this single agenda. During keynotes and panel discussions, attendees dive deep into prevailing themes within the Tough Tech community and strategic decision making. Meanwhile, case studies and founder stories provide an opportunity for founders to learn from one another, sharing successes, failures, and their collective experiences.

Many Tough Tech companies are still at the beginnings of their capital journeys. Some have proof of concept and are moving into pilot deployment, others are further along and are available in the market, while others are still deep in the research and development

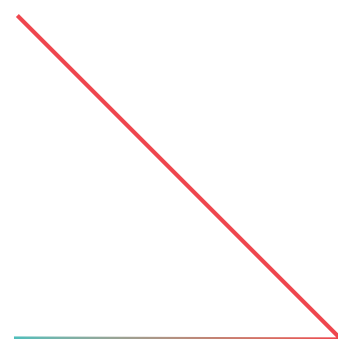
phase. The ingredients and founders to build successful companies are there but they need capital and partnerships to be able to scale and maintain their momentum. Tough Tech Summit has been, and will continue to be, a catalyzing event for the growing Tough Tech community.



“Networking and community building is a staple for innovation and climate tech conferences. The Engine takes the Tough Tech Summit to the next level. The mix of formats, topics, venues, and attendees ensures that everyone learns, shares, builds, and leaves with actions planned, human connections made, and, maybe most importantly, a deeper understanding of the context — progress, challenges, and possibilities — of the mission to bring Tough Tech to market to address big challenges and the multitudes that it will take to make that happen. Bravo to The Engine Team for the creation and execution of the Tough Tech Summit.”

BARBARA BURGER

Former VP of Innovation & President of Technology Ventures, Chevron



THE ENGINE INITIATIVES

FOSTERING ENTREPRENEURSHIP

→ TOUGH TECH SUMMIT

Invest Day | 875 unique attendees, 2021-2022

Stakeholders across the capital stack gather to hear firsthand from Tough Tech CEOs who are shaping the industries of tomorrow.

Key Speakers

MAKHTAR DIOP,
Managing Director, IFC

RICK NEEDHAM,
Energy Sector Lead,
TPG’s The Rise Fund

JIGAR SHAH,
Director of the Loan Programs Office, U.S. Department of Energy

CARMICHAEL ROBERTS,
Partner, Breakthrough Energy Ventures;
Co-Founder & Managing Partner, Material Impact

REGINE CLEMENT,
President & CEO, CREO

JESSE D. JENKINS,
Assistant Professor, Princeton University

JEFF JOHNSON,
Managing Director, Temasek

Selection of startups who pitched at the Tough Tech Summit

+ Atlantic Quantum

+ Axoft

+ Biobot Analytics

+ Cemvita Factory

+ ClearFlame Engine Technologies

+ Copernic Catalysts

+ Droplet

+ Emvolon

+ Foray Biosciences

+ Fortify

+ Foundation Alloy

+ GRO Biosciences

+ Hyfé Foods

+ ISEE

+ Kano Therapeutics

+ Kytopen

+ Lilac Solutions

+ Mantel

+ Osmoses

+ Quaise

+ Quidnet Energy

+ REGENT

+ Seaspire Skincare

+ Sublime Systems

+ Sync Computing

+ Syzygy Plasmonics

+ TeraDAR

+ Tynt Technologies

+ Vaxess

+ VEIR

+ Via Separations

+ Zapata Computing



Build Day | 723 unique attendees, 2021-2022

Engagement from stakeholders across academia, industry, government, and the founder ecosystem who are critical for the acceleration of Tough Tech globally.

Key Speakers

SANGEETA BHATIA,
John J. and Dorothy Wilson Professor, MIT

GINNI ROMETTY,
Former Chairman, President & CEO of IBM

GINA RAIMONDO,
U.S. Secretary of Commerce

EDWARD J. MARKEY,
Massachusetts Senator

GAURAB CHAKRABARTI,
Co-Founder & CEO, Solugen

GENE BERDICHEVSKY,
Co-Founder & CEO, Sila Nanotechnologies

BARBARA BURGER,
Former VP Innovation & President of Technology Ventures, Chevron

Topics Covered

+ From Pilot to Your First Commercial Deal

+ Defining Your Platform Strategy

+ Working with the U.S. Department of Defense

+ When to Build A Public Policy Function As Your Company Scales

+ Developing As A CEO & Leader

+ Underscoring Your Company’s Mission Through Decision Making

+ Growing Your Marketing Function

+ Board Development

+ Building an IP Strategy

+ Debt Instruments & Types of Financings

+ Growth Roadmap: Discovering Your Customer Pipeline

+ Managing Risks for Product Development and Project Deployment

+ Developing a Government Strategy From The Ground Up

+ How to Run Effective Collaborations with Large Strategics

+ Engaging Enterprise Customers

+ Developing Media Relationships



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THE ENGINE REPORT 2021-2022

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“Nobody gets great work done in a vacuum. At The Engine we are building an ecosystem to help founders learn from each other, recruit amazing talent, and build lasting relationships with corporate partners and investors. When everyone is on the mission together it creates compounding returns.”

REED STURTEVANT,
General Partner, The Engine



Lilac Solutions

Biobot Analytics

Mori

Sync Computing

Cellino Biotech

Resonant Link

Sublime Systems

Hyperlight

Axoft

ISEE

Form Energy

Quaise Energy

Vaxess Technologies

Kytopen

Atlantic Quantum

Commonwealth Fusion Systems

Finwave

TeraDAR

VEIR

Hyfé

C2Sense

Boston Metal

Syzygy Plasmonics

Lucy Tx

Suono Bio

Celestial AI

Via Separations

The Routing Company

Copernic Catalysts

Emvolon

Seaspire Skincare

Amide

Hedron

Zapata Computing

Foray Biosciences

Mantel

Osmoses

Droplet

RISE Robotics

WoHo

Kano Tx

Foundation Alloy

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Climate Change

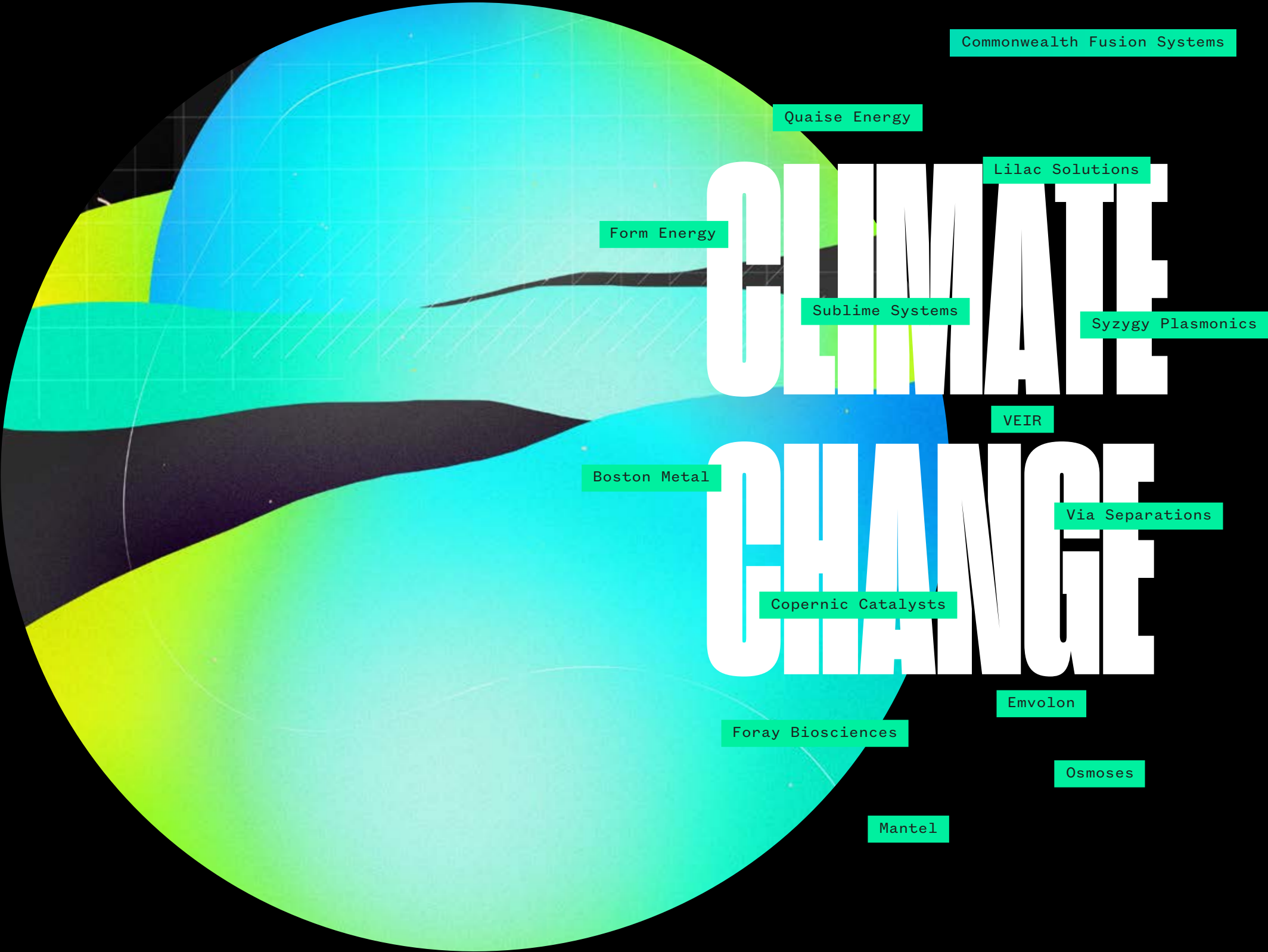
78

Human Health

98

Advanced Systems
& Infrastructure







Founders & Leadership	Bob Mumgaard, Brandon Sorbom, Dan Brunner, Dennis Whyte, Martin Greenwald, Zach Hartwig
Background	MIT Plasma Science & Fusion Center (PSFC)
Industries	Advanced Manufacturing, Energy

Safe, unlimited, carbon-free fusion power.



↑ SPARC Plant in Devens, MA. October 2022.



Arc



Sparc

2025

SPARC begins operations — a device that will demonstrate net fusion energy

20T

Demonstrated strongest high temperature superconducting magnet, a key technology for fusion energy

The Problem

today's challenges

The world's electricity demand is set to increase by more than 60% over the next two decades and today's needs are still largely met by fossil fuels, quickly exhausting our carbon budget. Currently, energy production is already responsible for 25% of global GHG emissions.

The Solution

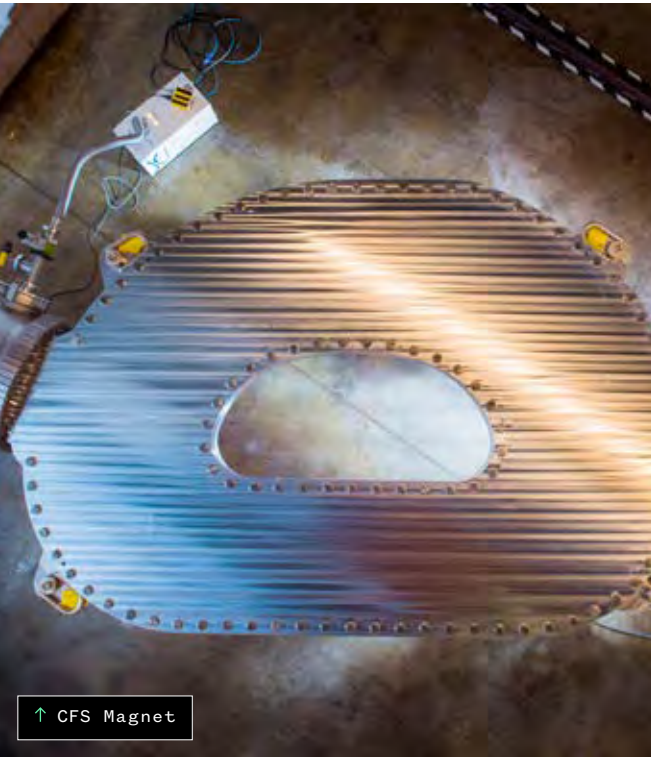
the Tough Tech breakthrough

Commonwealth Fusion systems (CFS) is on track to build and deploy the first commercial fusion power plants in the world. The team has developed high-field magnets using high-temperature superconductors that allow fusion machines to be 10 times smaller, economically feasible, and operational in the next 10–15 years. Fusion is a source of safe, clean energy: limitless, no greenhouse gases, no meltdown, and no proliferation; and has the potential to change the energy landscape.

The Opportunity

the world we want to build

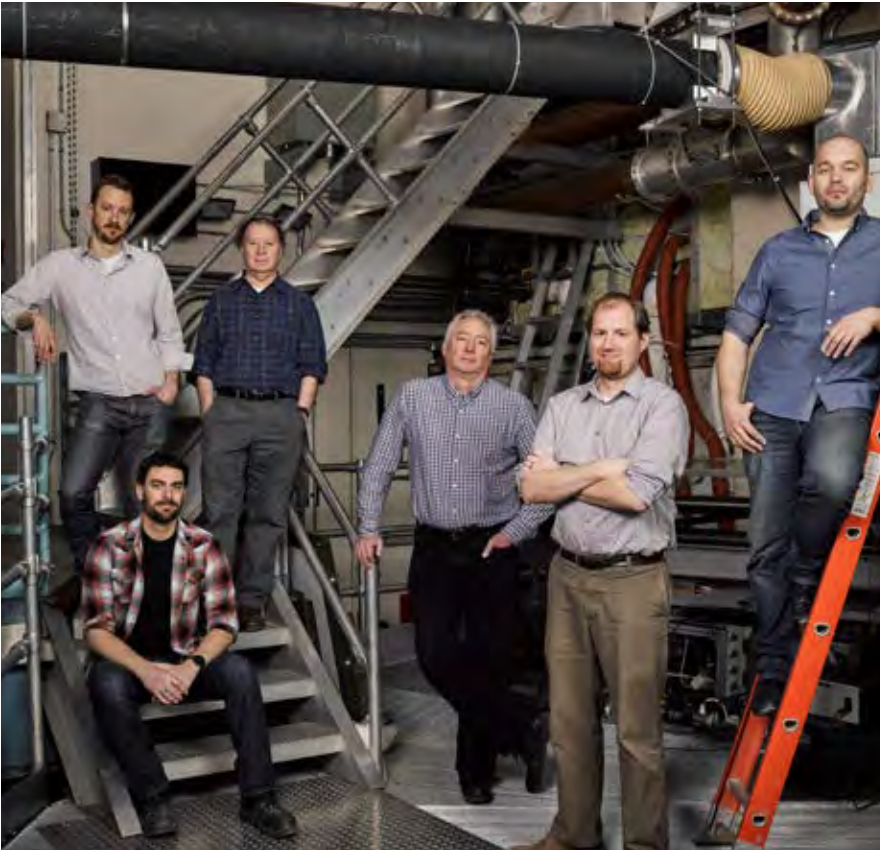
The CFS team has set a goal of deploying thousands of fusion power plants globally by 2050, providing a significant percentage of the world's total energy.



↑ CFS Magnet

“If you have fusion energy, then you have a huge solution for the energy crisis and climate change. Fusion is scalable, it can be deployed anywhere in the world, anytime you need, and is dispatchable, meaning you can turn it on and off. Fusion is, essentially, inexhaustible.”

BOB MUMGAARD
CEO & Co-Founder,
Commonwealth Fusion
Systems



>375

Total number of full time employees at CFS

50 TW

Electricity needed to power the world by 2050

\$10T+

Global electricity market opportunity



Founders & Leadership	Mateo Jaramillo, Yet-Ming Chiang, Ted Wiley, William Woodford, Marco Ferrara
Background	MIT Department of Material Science and Engineering, 24M Technologies, A123, Tesla Energy
Industries	Advanced Materials, Energy

Enabling a 100% renewable grid with multi-day energy storage systems.



↑ Render of a Form Energy's 56 MW Multi-Day Energy Storage System.

The Problem

today's challenges

The world needs 24/7 renewable energy to successfully combat climate change. But utility-scale energy storage can only deliver power for up to 4 hours, making it impossible to reliably provide renewable power—namely solar and wind.

The Solution

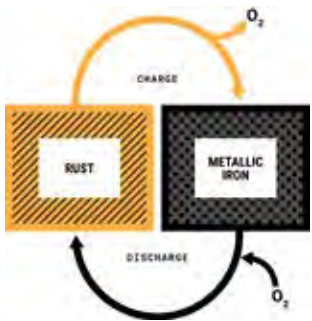
the Tough Tech breakthrough

Form Energy has created a large-scale, modular, multi-day energy storage system built with novel iron-air chemistry that uses low-cost, abundant materials available worldwide. Form Energy has the capability to reshape the electric system, making renewable energy available year-round and extending transmission capacity without building new wires.

The Opportunity

the world we want to build

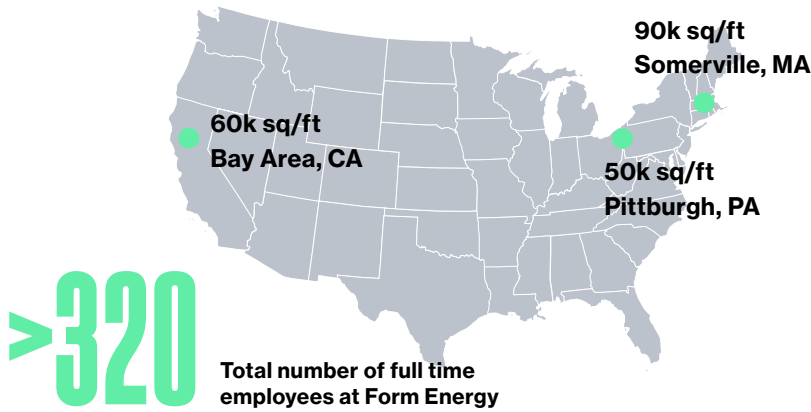
Eliminate 10 Gt of CO2 emissions caused by fossil fuels per year—or approximately 25% of all CO2 emissions worldwide.



↑ Iron pellets in Form Energy's Somerville lab



↑ Maria Ronchi, R&D Scientist at Form Energy in the wet lab.



“It’s key is that we see how we get to gigaton reduction emissions as we scale our technology. With our designs, the capital, the market buyers, we see a clear path to impact at a meaningful scale, and with this you can build a meaningful business.”

MATEO JARAMILLO
CEO & Co-Founder,
Form Energy



4.7_{TW}

Eliminating fossil power plants globally by firming renewable energy

50%

U.S. citizens live in a state that requires 100% clean energy

100+_{hour}

Duration required to make wind, water, and solar reliable year-round, anywhere in the world

<1.00 \$/kWh

The iron-air chemistry is the lowest cost rechargeable battery chemistry

2024

Form Energy's first pilot project comes online, with more in the pipeline



Founders & Leadership Dave Snyderaker, Nick Goldberg, Tom Wilson
Background Northwestern University
Industries Advanced Materials, Resource Extraction

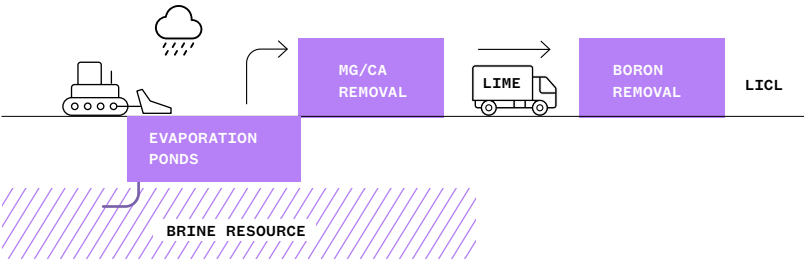
The fastest, most sustainable, and most efficient lithium extraction platform.

The Problem
today's challenges
The world currently cannot meet the predicted 30X increase in demand for lithium to electrify the transportation sector. The conventional process for extracting lithium from brines requires large evaporation ponds that are environmentally damaging, slow to start up, and vulnerable to weather.

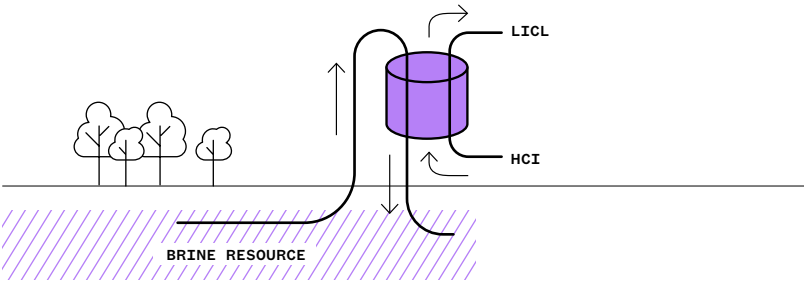
The Solution
the Tough Tech breakthrough
Lilac Solutions is sustainably developing previously inaccessible brine resources by commercializing a new ion exchange technology for lithium extraction. It is significantly faster, cheaper, and more sustainable than existing technology, enabling the massive increase in lithium supply needed for electric vehicles. Lilac's platform protects freshwater resources for local communities, reduces land use by 1,000X, and reduces GHG emissions by 80%.

The Opportunity
the world we want to build
Meet the growing demand for electric mobility solutions with a sustainable, long-term lithium supply.

Conventional Process: Evaporation Ponds



Lilac's Process: Proprietary Ion Exchange



10,000X

Faster brine processing using Lilac's technology compared to incumbents

1,000X

Smaller footprint using Lilac's technology compared to the incumbents

80-99%

Demonstrated lithium recovery from brine resources using Lilac's method

“There is currently no end in sight to growth in the EV market and that is creating a very intense demand for lithium supplies. With conventional technologies, it can take up to 10 years to get into production. We are shortening that to about 3. That speed to market is really important for the automakers who are already constructing electric vehicle plants and battery plants. No one can wait 10 years.”

DAVE SNYDACKER,
CEO & Co-Founder,
Lilac Solutions

Lilac Improves Environmental Performance



99.9%

Less Footprint



90%

Less Water Impact



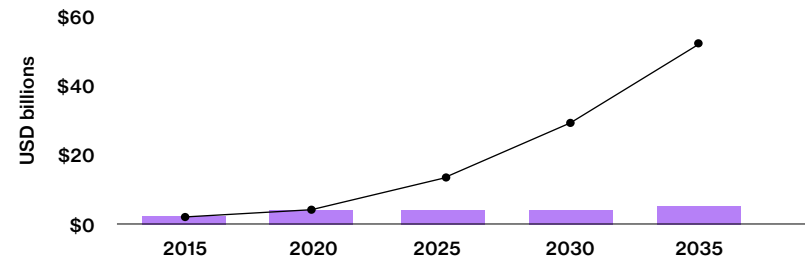
80-100%

Less Greenhouse Gases



	Ponds	Lilac
Accessible Resources	Rare: need >500 ppm Li, low impurities	Abundant: >500 ppm Li, high impurities
Permitting/ESG	Difficult or Impossible	Streamlined
Development Time	10 years	3 years
Lithium Recovery	30-40%	80-90%
Product Quality	Low Purity	Battery Grade

\$47 billion shortfall in lithium supply by 2035



\$52B

Global market opportunity for lithium by 2035

6,500 GWh

Global demand for lithium-ion batteries by 2040

QUAISE

Founders & Leadership	Carlos Araque, Matthew Houde, Henry Phan, Franck Monmont, Paul Woskov & Kevin Bonebrake
Background	Schlumberger, MIT, University of Cambridge, Stanford
Industries	Advanced Engineering, Advanced Materials, Energy

Universal access to geothermal energy through disruptive millimeter wave drilling technology.



The Problem

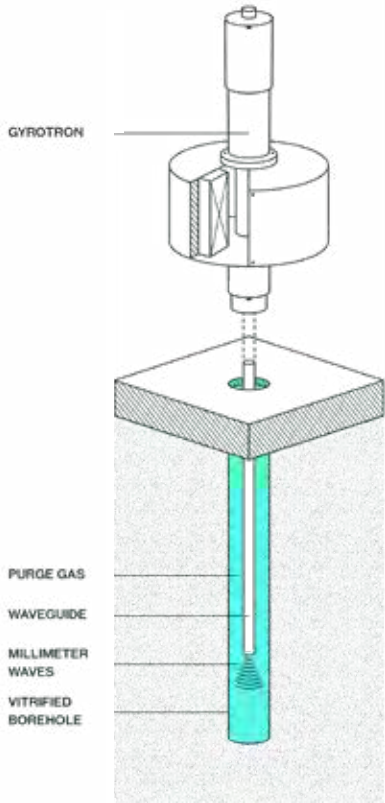
today's challenges
The world cannot transition away from fossil fuels with current technologies. Geothermal is the largest source of power-dense clean energy on Earth, but there is limited access today.

The Solution

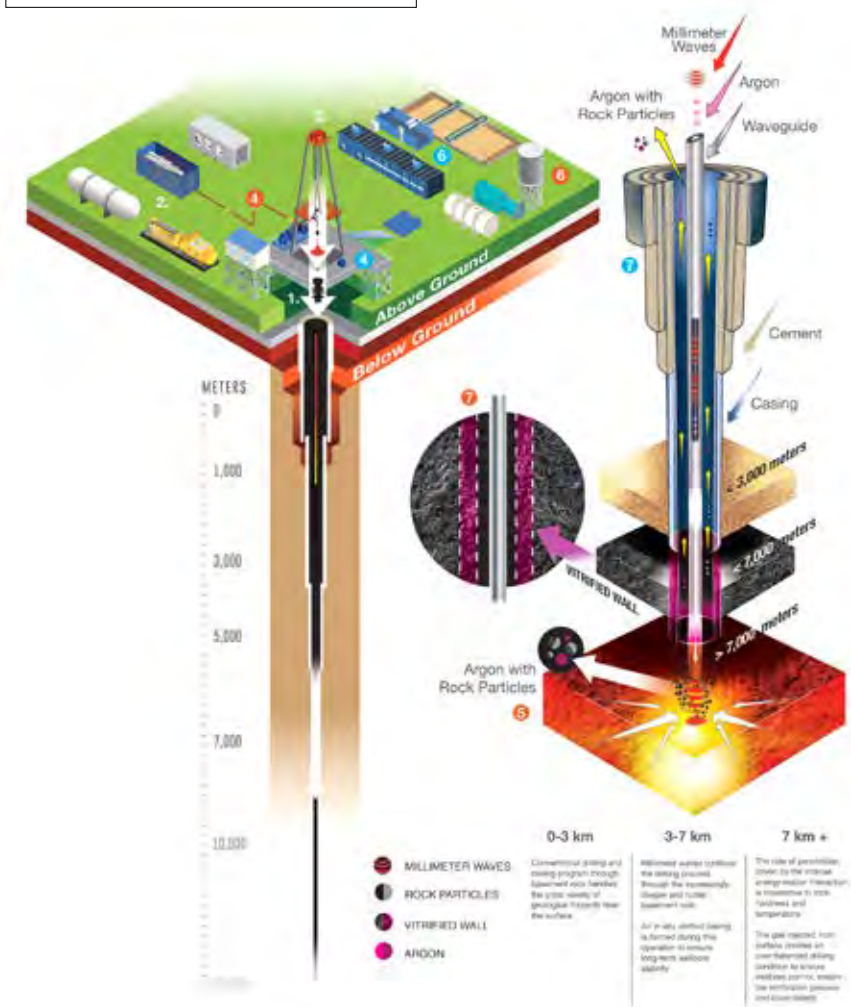
the Tough Tech breakthrough
Quaise is developing millimeter wave energy drilling systems to access greater depths (10-20 km) below the Earth's crust, where the temperatures are high enough to use supercritical steam to generate electricity. Quaise avoids the site restrictions of other geothermal approaches to make rapid deployment feasible at scale.

The Opportunity

the world we want to build
Unlock a clean energy source that can scale to address the climate crisis and strengthen energy security throughout the world.



↓ Millimeter Wave Drilling System



“I had this important realization that the energy transition needed to happen in the span of my career. That wasn't actually happening with existing technology. So I started looking for a way to do it.”

CARLOS ARAQUE
CEO & Co-Founder, Quaise



10-20 km

To make geothermal available to all nations

300-500°C

Temperatures to repower global fleet of existing fossil-fired power plants

100X

Greater scalability of geothermal at these depths and temperatures

50 TW

Total primary energy to supply the world by 2050

>\$10T

Global electricity market opportunity

10-30 \$/MWh

Quaise's expected levelized cost of energy



Founders & Leadership	Leah Ellis, Yet-Ming Chiang
Background	MIT, Dalhousie University
Industries	Advanced Manufacturing, Advanced Materials

Cost-effective, low-carbon cement produced via electrochemistry.



↑ Set time measurement: a needle probes fresh Sublime cement paste every 15 minutes to determine its set time.

The Problem

today's challenges

Cement production currently accounts for 8% of global CO2 emissions, and 75% of the industry's CO2 emissions come from lime production. Currently, 4 billion tons of cement are produced per year, and each kilogram of cement produces a kilogram of CO2.

The Solution

the Tough Tech breakthrough

Sublime Systems is producing low-cost, zero-carbon cement. Its electrochemical platform converts limestone to lime at room temperature, making the CO2 produced during the conversion process easier to capture, while reducing overall energy consumption. Sublime's initial tests show that its cement meets targets for strength, setting time, and increased flow – all at lower CO2 intensity compared to incumbents.



↑ Sublime's Cement

The Opportunity

the world we want to build

Deep decarbonization of the cement industry to meet emissions targets while supporting continued urban development around the world. Cement is the biggest industry by mass in the world, with an average of 4 billion tonnes produced per year. With an average cost of cement at \$130/ton, this is a massive market.

“Decarbonizing cement production is one of the biggest and least expensive levers for reducing global CO2 emissions.”

LEAH ELLIS
CEO & Co-Founder,
Sublime Systems



56 MPa
at 28 Days
Demonstrated compressive strength of Sublime Cement

800,000 tons / year
Sublime's target cement production scale in 2028

90%
CO2 reduction potential using Sublime's electrochemical cement production process

8%
Fraction of global GHG emissions from the cement industry

1:1
For every 1 ton of cement produced, 1 ton of CO2 is emitted into the atmosphere

\$450B
Projected global cement market size in 2026

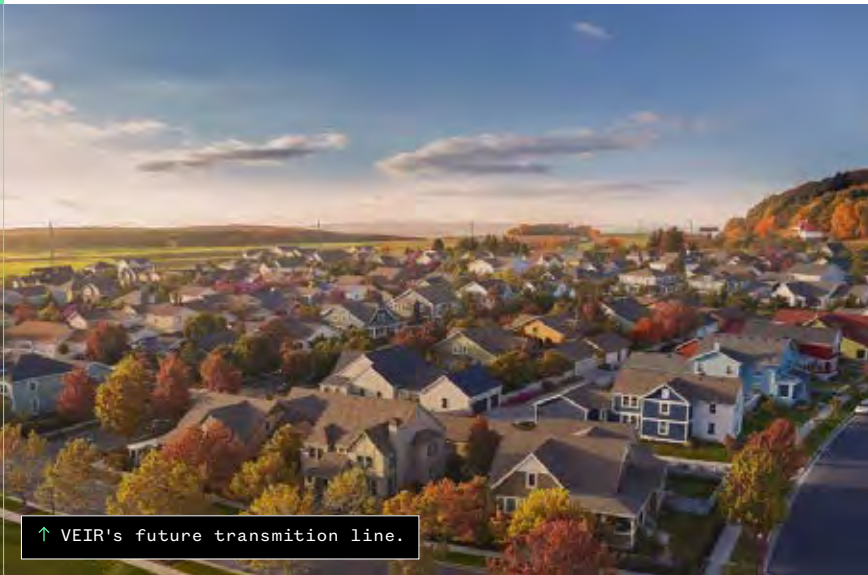


Founders & Leadership	Adam Wallen, Tim Heidel, Steve Ashworth, Franco Moriconi
Background	MIT, Los Alamos National Laboratories, ARPA-E, Breakthrough Energy Ventures
Industries	Energy

Reinventing the architecture of electricity transmission.



↑ Conventional 345kV transmission line.



↑ VEIR's future transmission line.

The Problem

today's challenges

The electrical grid is the backbone of the energy sector. As renewables deployments increase, electric vehicles and charging infrastructure become more widespread, and industrial processes are electrified, the grid is becoming more strained and operators are struggling to balance supply and demand.

The Solution

the Tough Tech breakthrough

VEIR's transmission lines use superconducting tape to enable existing electricity transmission infrastructure to transmit 5X more power, alleviating significant electric system pain points like congestion and renewable integration. VEIR's platform can reduce the uncertainty, time, and cost of siting and permitting new transmission corridors.

The Opportunity

the world we want to build

A robust electricity grid enables widespread electrification of power generation, mobility, and industrial processes—all key elements for meeting global decarbonization goals.

“Decarbonization of the global economy will require an unprecedented expansion of transmission networks, but new transmission is exceptionally difficult to build. VEIR unlocks the holy grail of transmission, using high temperature superconductors to allow far more power to be transmitted over long distances in smaller rights-of-way.”

TIM HEIDEL
CTO & Co-Founder, VEIR



↑ Heat exchange prototype device, part of VEIRs cooling architecture.



↑ VEIR team upon completion of the very first end-to-end demonstration of VEIRs cryogenic cooling solution.

1100 thousand GW-miles
In order to get to a net zero grid, the US transmission grid needs to grow to 1100 thousand GW miles from 200 thousand today

50%
% of north american transmission market with deployed cost > \$10,000/MW-mile

5-13Y
To build new extra High Voltage transmission lines.

100KM
Between liquid nitrogen delivery infrastructure, significantly higher than incumbent nitrogen cooled transmission lines

\$570B
2023 Market size for grid tie lines, constrained corridors, high capacity long-distance markets

\$1.8T
VEIR enables the market to grow to \$1.8T by 2040



Founders & Leadership	Tadeu Carneiro, Rich Bradshaw, Adam Rauwerdink, Donald R. Sadoway, Antoine Allanore, Jim Yurko
Background	MIT Department of Materials Science and Engineering
Industries	Advanced Manufacturing, Energy



Founders & Leadership	Jacob Grose, Aruna Ramkrishnan
Background	BASF, ExxonMobil
Industries	Advanced Manufacturing, Energy, Advanced Materials, Food & Ag

Enabling low-temperature chemical production using novel catalysts.

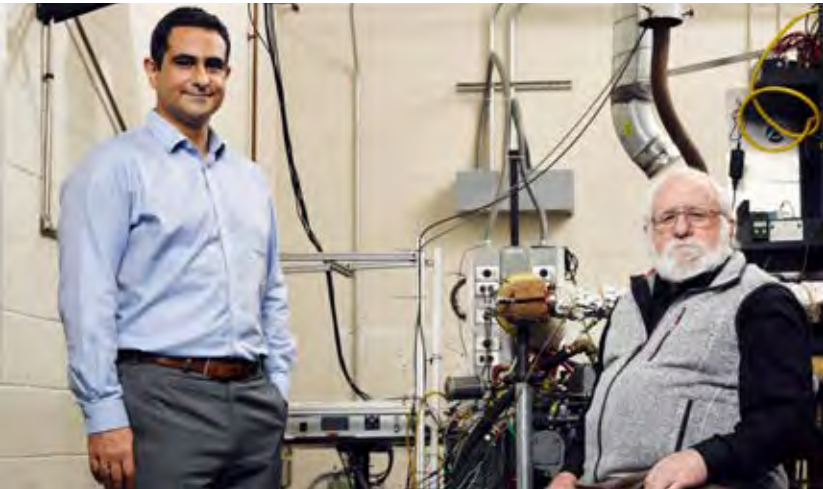
The Problem
today's challenges
Ammonia production uses the century-old Haber-Bosch process and is attributed to 1% of global carbon emissions. Catalysts capable of operating at low temperatures will directly reduce carbon emissions and enable fuel-switching to zero-carbon, electrified heating.

The Solution
the Tough Tech breakthrough
Copernic's innovation replaces Haber-Bosch's traditional iron ore catalyst with a next-generation catalyst that can drop into the world's existing ammonia manufacturing infrastructure. This drastically reduces the temperatures and pressures required to make ammonia—reducing energy usage, bringing down the cost of production, and opening the door to low-cost zero-carbon ammonia.

The Opportunity
the world we want to build
Reduce both capex and opex of ammonia production and enable the electrification of the thermal process, creating a pathway to carbon-free production. The utilization of this invention framework could lead to the development of a wide diversity of novel, low-temperature catalysts that can be deployed for the \$600+ billion chemicals market.



Founders & Leadership	Emmanuel Kasseris, Leslie Bromberg
Background	MIT Mechanical Engineering Department, MIT Plasma Science and Fusion Center, Chevron, ConocoPhillips
Industries	Energy



Decarbonizing chemicals synthesis using a low-cost distributed platform.

The Problem
today's challenges
Chemical synthesis today requires very high-temperature thermal process heat, primarily driven by fossil fuels, and takes place in billion-dollar, centralized chemical plants.

The Solution
the Tough Tech breakthrough
Emvolon's platform leverages the economies of scale associated with the mass production of engines, converting the engines into mini-chemical plants for distributed and decarbonized chemicals production. The process enables economically-attractive chemical production plants by exchanging economies of mass production for economies of scale.

The Opportunity
the world we want to build
Radically reduce supply chain transportation costs and dramatically cut the emissions from fuel and fertilizer production, as well as those associated with transportation.



Founders & Leadership	Ashley Beckwith
Background	MIT Department of Mechanical Engineering, Draper Labs, HBS
Industries	Advanced Manufacturing, Biotech & Life Sciences

Ending deforestation with lab-grown wood.

The Problem
today's challenges
In roughly the last thirty years, the planet has lost more than 500,000 square miles of natural forests, an area about two and a half times the size of France. An estimated 15.3 billion trees are net-lost each year—at this rate, the world's forests would disappear in a century.

The Solution
the Tough Tech breakthrough
Foray is developing a platform to bioengineer plant-based products that can be cultured and grown to order. The company is building a biological library—cataloging, collecting, and optimizing growth strategies for woody species. It is concurrently developing a toolkit of novel mechanisms for guiding cellular plant growth, using both external factors (like the cell culturing environment), and internal ones (like plant genetics).

The Opportunity
the world we want to build
Replicate the macro-structures of commercially useful woods in the lab and minimize wasteful, inefficient harvesting of forests.



Mantel

Founders & Leadership

Cameron Halliday, Danielle Colson, Sean Robertson, Alan Hatton, Takuya Harada

Background

MIT, Harvard

Industries

Energy



Reinventing carbon capture with novel materials.

The Problem
today's challenges
Carbon capture is an essential part of reaching net-zero global emissions. However, today's point-source carbon capture systems are highly inefficient.

The Solution
the Tough Tech breakthrough
Mantel is developing a point-source carbon capture platform that uses molten borate salts to selectively absorb CO₂ from gasses produced by any combustion process. By operating at around 600°C, the heat generated during capture is recovered as high-quality heat – reducing energy losses by more than 60%. Additionally, by leveraging liquid-phase chemistry Mantel can cycle between capture and release indefinitely without deterioration or decay.

The Opportunity
the world we want to build
The technology can be deployed to the hardest to decarbonize industrial sectors, which represent 40% of global CO₂ emissions.



OSMOSES

Founders & Leadership

Francesco Benedetti, Holden Lai, Katherine Mizrahi Rodriguez, Zachary Smith

Background

MIT, Stanford

Industries

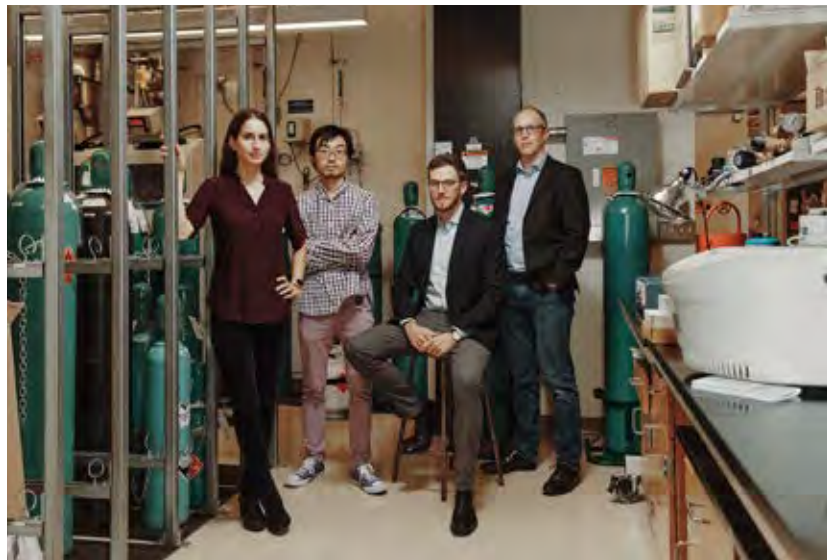
Advanced Materials, Energy

Decarbonizing gas separations to eliminate one gigaton of carbon emissions per year.

The Problem
today's challenges
The process of chemical separations — the act of transforming complex mixtures into pure components — is ubiquitous in nearly every major industry and constitutes nearly 16% of the world's carbon emissions.

The Solution
the Tough Tech breakthrough
Osmoses is developing a membrane platform technology to mitigate these emissions by passively unmixing heterogeneous gasses. Applications exist across energy transition pathways in carbon capture and removal, hydrogen production and distribution, and renewable natural gas.

The Opportunity
the world we want to build
Replace thermal gas separation processes—a \$100 billion opportunity that will prevent gigatons of carbon from entering the atmosphere.



SYZYGY PLASMONICS

Founders & Leadership

Trevor Best, Suman Khatiwada, Naomi Halas, Peter Nordlander

Background

Rice University, Baker Hughes

Industries

Advanced Manufacturing, Energy



Illuminating the future of chemical manufacturing.

The Problem
today's challenges
Historically, the chemical reactions required to produce the world's chemicals, such as hydrogen, ammonia, and methanol, have been powered by fossil fuel combustion.

The Solution
the Tough Tech breakthrough
Syzygy Plasmonics is developing a novel photocatalyst and reactor platform that can produce fuels, fertilizers, and other chemicals with far fewer greenhouse gas emissions compared to incumbents. The technology platform allows for chemicals to be produced on-site, in a modular, scalable, and cost-effective way, and can also be scaled up for mass chemical production.

The Opportunity
the world we want to build
Decarbonizing the trillion-dollar chemical manufacturing industry from hydrogen to sustainable aviation fuels.



VIA SEPARATIONS

Founders & Leadership

Shreya Dave, Brent Keller, Jeff Grossman

Background

MIT Department of Materials Science and Engineering

Industries

Advanced Manufacturing, Advanced Materials, Energy

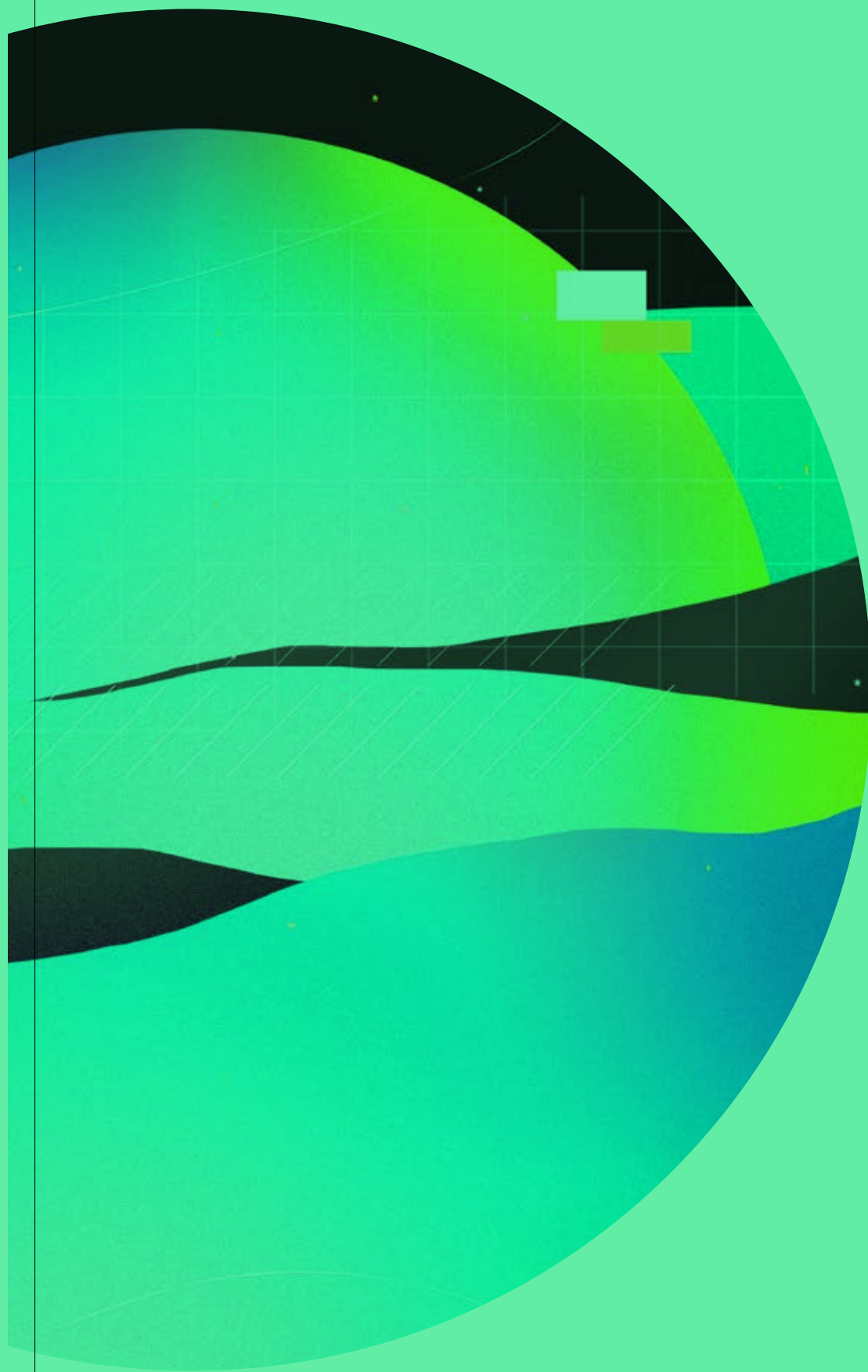
Decarbonizing liquid and solid separation—the core of every industrial process.

The Problem
today's challenges
Separation processes are the building blocks for materials, chemicals, and consumer goods. Currently, most separations are done with thermal processes such as evaporation and distillation, which are very energy intensive—12% of all U.S. energy consumption.

The Solution
the Tough Tech breakthrough
Via Separations is commercializing novel membrane materials and manufacturing processes to replace evaporation and distillation with filtration. The company's technology has the potential to replace thermal separation processes for liquids and solids, and is targeting the pulp & paper, chemical, and dairy industries.

The Opportunity
the world we want to build
By replacing all liquid and solid thermal separation processes with their membrane solution, Via is transforming the industrial landscape and making processes cleaner, cheaper, and more efficient.





“The energy transition is the largest economic opportunity since the industrial revolution. Deep decarbonization is not the changing or modification of a single industry, it is the complete transformation of the means of production across our economy. Producing everything from energy carriers and what we use to move and power the world, to materials and chemicals fundamental to daily life. The companies that win in these spaces will be foundational to the next 100 years.”

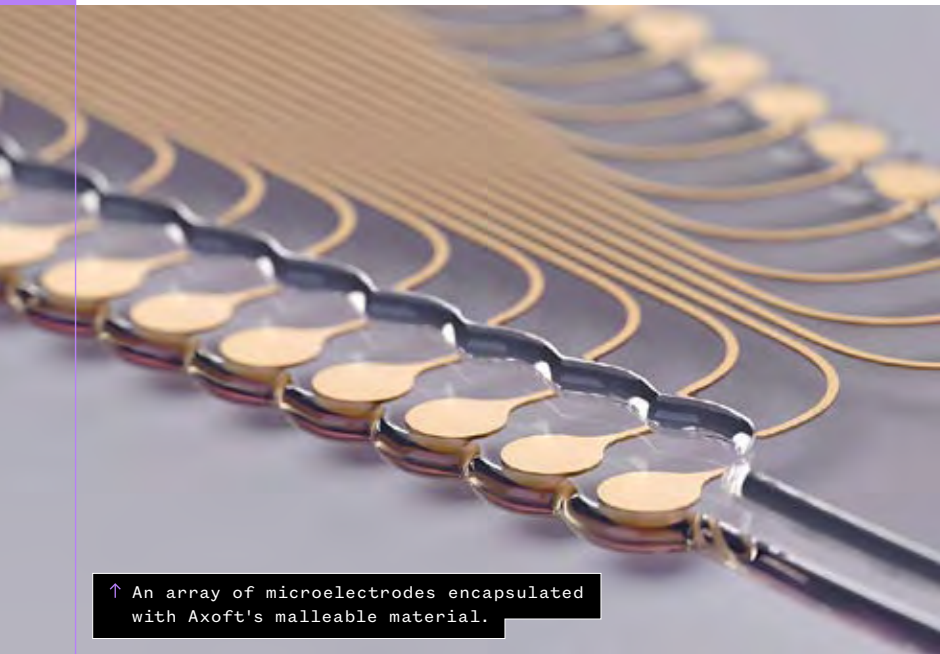
MICHAEL KEARNEY
Partner, The Engine



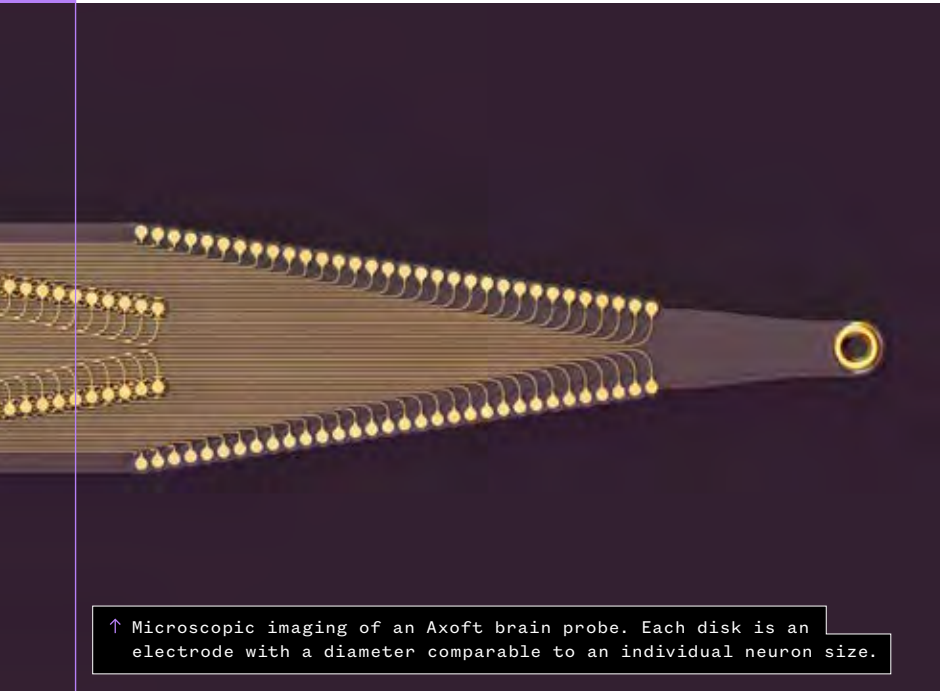
Axoft

Founders & Leadership	Paul Le Floch, Tianyang Ye, Jia Liu
Background	Harvard University
Industries	Advanced Materials, Advanced Systems & Infrastructure, Biotech & Life Sciences

Amplifying brain-machine communication with soft, implantable electronics.



↑ An array of microelectrodes encapsulated with Axoft's malleable material.



↑ Microscopic imaging of an Axoft brain probe. Each disk is an electrode with a diameter comparable to an individual neuron size.

The Problem

today's challenges

Brain-machine interfaces rely on electrodes implanted directly into brain tissue to selectively communicate with neurons. Yet current probes are too stiff and lack sufficient electrode density to match the brain and reach single neuron resolution.

The Solution

the Tough Tech breakthrough

Axoft is creating neural implants that are >10,000x softer than plastics and >100,000x softer than silicon used in current brain implants. These new soft electronic materials are fabricated at the nanoscale, and have similar properties to the brain tissue itself. Axoft's implants can also accommodate thousands of individual sensors, orders of magnitude more than currently possible.

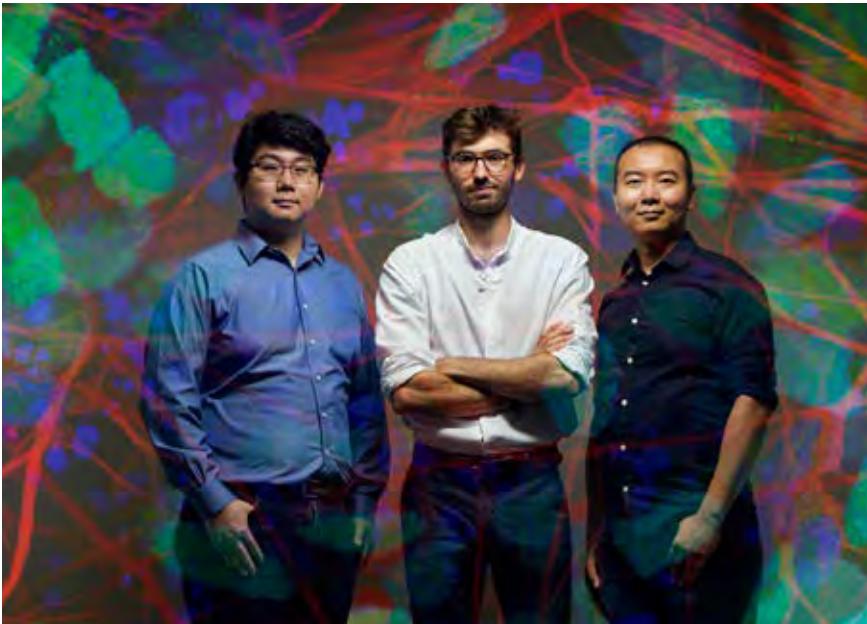
The Opportunity

the world we want to build

Mitigate a wide array of neurological disorders, such as paralysis, epilepsy, and even depression.

“We are making new materials to interface with the brain, which has not been done for decades, it will enable us to develop better therapies for patients with mobility disorders and improve their quality of life. These implants will be the brain pacemakers of the future.”

PAUL LE FLOCH
CEO & Co-Founder, Axoft



↑ Axoft's materials are soft and stretchable like neural tissues.



↑ Axoft probe version #1: 128 electrodes in a rubbery thread, thin as a single hair strand.



9 million

Deaths per year attributed to neurological disorders

\$1T

Market potential, including paralysis, epilepsy, movement disorders, depression, blindness, and aging

100,000X

Softer than silicon

2024

Large animal pilot is conducted



BIO
BOT

Founders & Leadership	Mariana Matus, Newsha Ghaeli
Background	MIT
Industries	AI & ML, Biotech & Life Sciences

Transforming wastewater infrastructure into public health observatories.

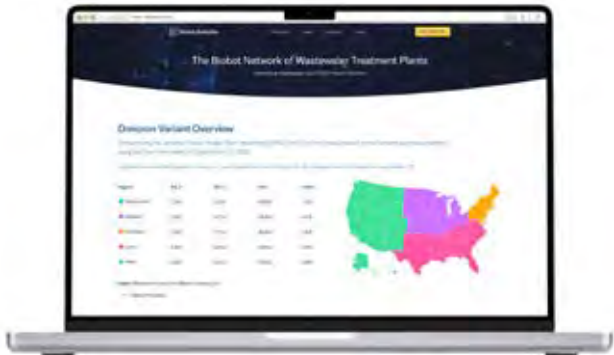


The Problem
today's challenges

Many public health problems, like COVID-19, monkeypox, and the opioid epidemic, are monitored by hospitalizations and diagnostic tests —lagging indicators of community spread. Earlier warning signals could inform proactive, timely decisions.

The Solution
the Tough Tech breakthrough
Biobot Analytics is a wastewater epidemiology company analyzing urine and stool samples to create a rapidly updated, population-level picture of community health. Biobot's proprietary predictive models provide insights for decision-makers to take more informed actions regarding ongoing threats.

The Opportunity
the world we want to build
Early identification of public health threats and more decisive action.



↑ Biobot dashboard



“With Biobot, public health officials can stay ahead of what’s coming and adjust their treatment strategies accordingly.”

MARIANA MATUS
Co-founder & CEO, Biobot Analytics



↑ Sample processing



↑ Wasterwater samples in hot bath

\$30M+

Projected ARR for the year 2022

4

Types of communities Biobot has identified defined by their illicit drug consumption based on waste water data

TIME 100 NEXT

The founders were recognized by Time Magazine for their leadership in wastewater intelligence

3-7 DAYS

Biobot's ability to detect spikes in Covid-19 viral concentrations preempts case testing data and gives governments and institutional clients time to make decisions and take action

SARS-COV-2

This virus is shed in the stool of infected individuals, making its way into the sewer system



Founders & Leadership	Nabiha Saklayen, Matthias Wagner, Marinna Madrid
Background	Harvard Physics Department, Harvard School of Engineering and Applied Sciences (SEAS), Harvard Medical School
Industries	Advanced Manufacturing, Biotech & Life Sciences

Curing the world’s toughest diseases by automating personalized medicine.



↑ Cellino's foundry vision



↑ Cellino's automated R&D production system

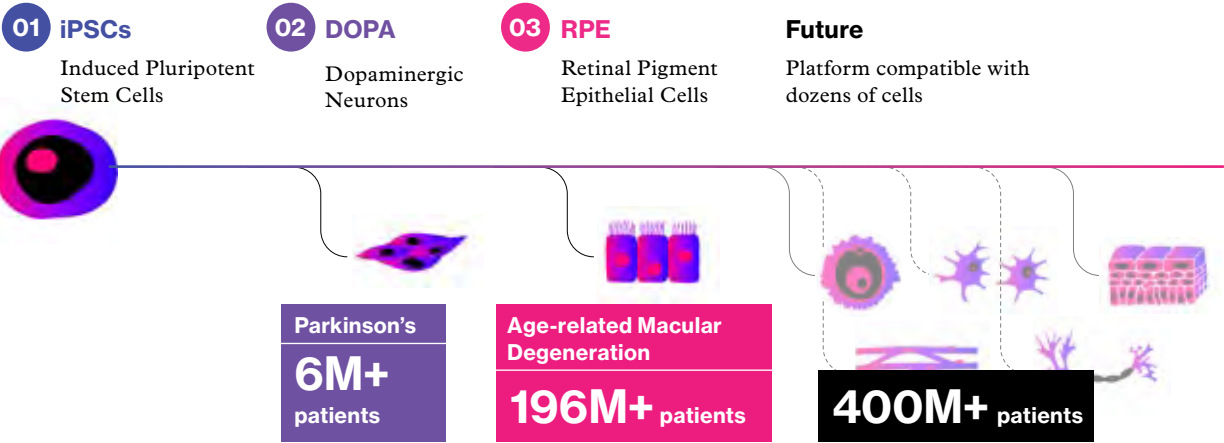
The Problem today's challenges

Illnesses like diabetes and heart disease claim nearly 750,000 lives per year in the U.S. alone. Research suggests these diseases can be cured using stem cell-based therapies to replace damaged cells, but current technologies lack the precision, scale, and affordability necessary to treat millions of patients.

The Solution the Tough Tech breakthrough

Inspired by the scale and precision of semiconductor manufacturing, Cellino is developing the first-ever stem cell foundry to manufacture regenerative medicines at scale. Cellino engineers use automated, software-driven, closed-system technology to personalize stem cells with laser-precision.

First Cell Types Are Most De-Risked: Exploring Next Cell Candidates

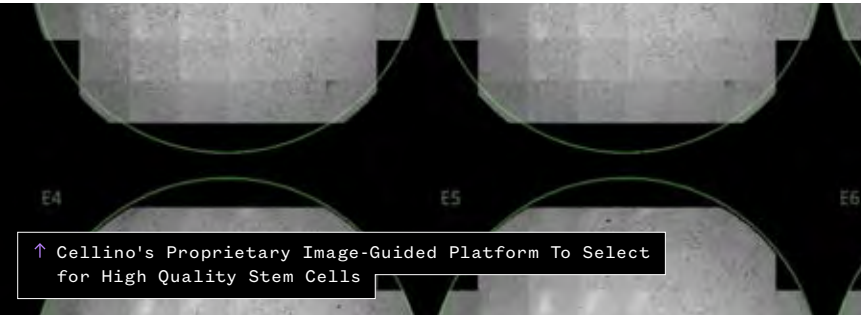


The Opportunity the world we want to build

Open up access to personalized cell- and tissue-based therapies for everyone. These living medicines have the potential to cure many diseases – from Alzheimer’s to agerelated.

“Cellino brings a truly unique approach, with a high level of complexity: hardware, AI/ML, bioengineering, cell based therapy, automation, and fluidics. It is supremely rewarding to see the convergence happening every day at Cellino. Our multidisciplinary team comes together actively, solving problems with creativity.”

NABIHA SAKLAYEN
CEO & Co-founder,
Cellino



↑ Cellino's Proprietary Image-Guided Platform To Select for High Quality Stem Cells



10X+

Target cost reductions enabled by Cellino's technology compared to incumbent methods

30+

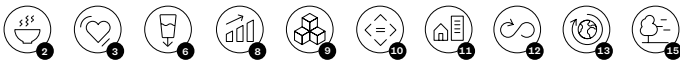
Patents portfolio

PHASE 2B+

Cellino is moving actively towards enabling scaled personalized iPSC trials at Phase 2b and beyond for the first time

600+ million

Patients who need access to regenerative medicine



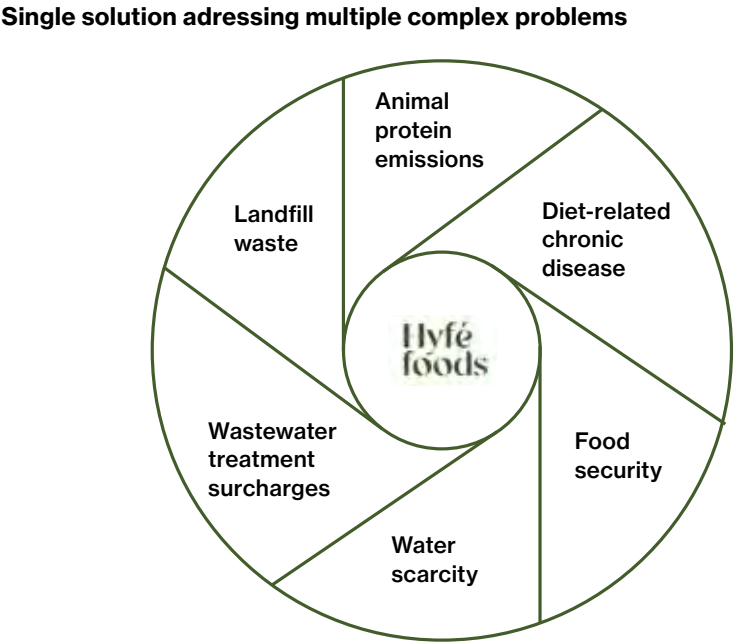
Founders & Leadership	Michelle Ruiz, Andrea Schoen
Background	LanzaTech, ExxonMobil, Carnegie Mellon, Northwestern
Industries	Advanced Manufacturing, Biotech & Life Sciences, Food & Ag

Producing low-carb, protein-rich fungi flour.

The Problem
today's challenges
Diet-related chronic illnesses, such as diabetes, are responsible for 60% of deaths per year. These diseases can be managed by replacing foods that cause inflammation with alternative flours and proteins, but these are unaffordable to most of the population.

The Solution
the Tough Tech breakthrough
Hyfé Foods is harnessing rich sugars from industrial food manufacturing waste streams to make protein from mycelium, the roots of mushrooms. The company has developed a platform that can produce fermentation feedstocks that are dramatically cheaper, climate positive, and noncompetitive with food.

The Opportunity
the world we want to build
To start, Hyfé is utilizing their platform to disrupt the \$26 billion alternative flours market, by leveraging the nutritional superiority of the mycelium protein to solve for health issues that are causing consumers to look for healthier and more sustainable alternatives to indulgent, everyday comfort foods.



30-50%
Hyfé projects its system will enable food manufacturers to achieve dramatic operating cost savings

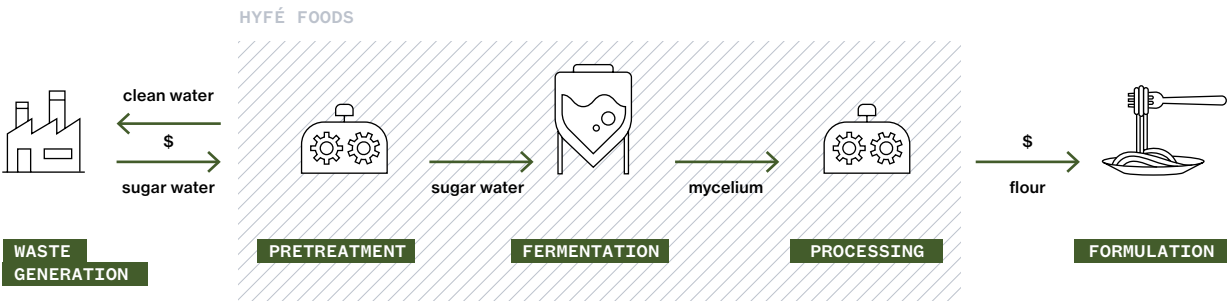
\$218B
Total addressable market for wastewater and water treatment

“The food manufacturing industry generates billions and billions of gallons of sugar-and-water byproduct each year, which goes to treatment plants and contributes to carbon emissions and pollution. Hyfé upcycles this waste through a sustainable fermentation process to turn it into useful products, starting with a low-cost, high-nutrient flour made from fungi.”

MICHELLE RUIZ,
CEO & Co-Founder, Hyfé Foods



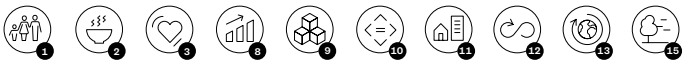
Fermentation platform monetizing both inputs and outputs



34%
Fraction of global GHG emissions from the food industry

\$214B
Global market for better-for-you foods, 2022

95 trillion gallons per year
Global wastewater production, 2020. Only 52% is collected and treated



mori

Founders & Leadership	Adam Behrens, Sezin Yigit, Livio Valenti, Benedetto Marelli, Fiorenzo Omenetto
Background	Tufts University SilkLab, MIT Laboratory for Advanced Biopolymers
Industries	Advanced Materials, Food & Agriculture

Keeping food fresher for longer and reducing packaging waste with a natural coating.



↑ Field Spinach

The Problem

today's challenges

About a third of all food produced globally is wasted and, together, food and packaging/containers account for almost 45% of the materials landfilled in the United States.

The Solution

the Tough Tech breakthrough

Mori takes advantage of silk's natural qualities by harnessing the protein in silk cocoons into a water-soluble powder designed to integrate seamlessly into existing harvesting, processing, and distribution workflows. Mori's all-natural protective layer slows down the spoiling processes across whole and cut produce, protein, and packaging, among others.

The Opportunity

the world we want to build

Mori will improve access to fresh food with less waste, increasing resiliency and sustainability in the global food supply chain. This will provide access to safe and healthy food that will remain fresher for longer—without the need for single-use plastic packaging.

UP TO 2X

Extension of shelf life of food

3

Elements in Mori's proprietary process: salt, water, and heat to extract natural silk protein

“Mori will become the material of choice for food, agriculture, and packaging. We will be in everyone's pantry.”

ADAM BEHRENS
CEO & Co-Founder, Mori



↑ Mori Headquarters



↑ Mori Silk coated greens



ACROSS

Whole & cut produce, protein, packaging, and others

30-40%

Food supply that is wasted

1.3 billion tons

Annual global food waste



Founders & Leadership	Michael Schrader, Kathryn Kosuda, Livio Valenti, David Kaplan, Fiorenzo Omenetto
Background	Harvard Business School, Tufts University SilkLab
Industries	Advanced Manufacturing, Advanced Materials, Biotech & Life Sciences

Transforming efficacy and access for vaccines and therapeutics.

The Problem
today's challenges

Easy access to vaccination and many therapeutics is critical to maintaining public health. To achieve this, the world requires medicines with long shelf-life, room-temperature shipping and handling, and a replacement for needle-based administration.

The Solution
the Tough Tech breakthrough

Vaxess is pioneering a smart release therapeutic patch that provides shelf-stable and easily administered vaccines and therapeutics. The solution stabilizes vaccines at room temperature, eventually removing the need for cold chain and enabling at-home delivery—critical for the COVID pandemic. The patch works with both traditional antigen vaccines as well as mRNA-based vaccines.

The Opportunity
the world we want to build

Accelerate vaccine access around the world through at-home delivery and administration.



↑ In 2021, Vaxess opened a brand new GMP manufacturing facility in Woburn, MA.

“As a team, Vaxess has gone from interesting science to real-world testing with humans. Our new manufacturing facility allows us to make patches, with a plan to scale up production, and our applicator has gone from a concept to a product.”

MICHAEL SCHRADER
CEO & Co-Founder, Vaxess



↓ Mimix patch system: Various renderings of the MIMIX™ product including the packaging, instructions and user-friendly applicator. The vaccine patch is visible from the underside of the applicator.



↑ Mimix Patch System

11
Patent families

2028
First program launches for the influenza vaccine using the MIMIX platform

PHASE 1
MIMIX-flu is currently in Phase 1 trials

50%
Only 50% of adults receive the influenza vaccine

AMIDE

Founders & Leadership	Brad Pentelute, Jeremy Wertheimer
Background	MIT
Industries	Advanced Manufacturing, Biotech & Life Sciences, Machine Learning



Changing the drug discovery paradigm.

The Problem
today's challenges

Biologic therapeutics are the fastest-growing category of drugs, but in order to accelerate drug discovery and manufacturing in this industry, scientists still need a way to quickly fabricate small- and medium-length proteins.

The Solution
the Tough Tech breakthrough

Amide is developing an automated platform for discovering and synthesizing biologic therapeutics. The company's automated tool is a robotic "printer" capable of synthesizing proteins and nanobodies with more amino acids, improved solubility, and at a faster rate compared to incumbent processes. It can also make non-natural, or mirror, amino acids, which exhibit unique therapeutic advantages.

The Opportunity
the world we want to build

Unlock the potential of biologic therapeutics, resulting in drugs that are safer, stronger, longer-lasting, and more stable.



Founders & Leadership	Theresa Tribble, Jose Zevallos, Aadel Chaudhuri, Stan Lapidus
Background	Washington University School of Medicine
Industries	Biotech & Life Sciences

Assessing cancer risk and informing treatment using post-surgical diagnostic tools.

The Problem
today's challenges

Physicians need appropriate and timely information in order to make decisions about patient care. Yet this type of data is currently unavailable, particularly in post-surgical oncology.

The Solution
the Tough Tech breakthrough

Droplet Biosciences is developing novel diagnostic tools to analyze post-surgical fluids and provide more nuanced, proximal diagnostics to oncologists and their patients. These tools can better assess cancer risk, identify residual disease, and inform post-surgical treatment.

The Opportunity
the world we want to build

Return patients to health faster and reduce unnecessary treatments, such as chemotherapy, with a more timely and accurate picture of post-operative health.



Founders & Leadership	Floris Engelhardt, John Vroom, Mark Bathe
Background	MIT BioNanoLab, Technical University of Munich, MIT Sloan
Industries	Biotech & Life Sciences



Enabling precision-genomic editing with single-stranded DNA technology.

The Problem
today's challenges

To realize the full potential of CRISPR technologies, therapeutic gene editing needs to become more targeted, efficient, and cheaper.

The Solution
the Tough Tech breakthrough

Kano is pioneering single-stranded DNA as a safe, efficient, and flexible biomaterial for gene insertions. The company's fermentation process enables the precision manufacturing of gene vectors in custom lengths and sequences. Its platform can supply single-stranded DNA molecules with specific properties for a broad range of needs— at manufacturing scale.

The Opportunity
the world we want to build

Expand our ability to use human genetic code to treat conditions like cancer and autoimmune diseases and potentially curing them.



KYTOPEN

Founders & Leadership	Paulo Garcia, Cullen Buie
Background	MIT Department of Mechanical Engineering
Industries	Advanced Manufacturing

Cellular engineering at unparalleled speeds, from discovery to the clinic, with no process re-optimization.

The Problem
today's challenges

Engineered cells hold the potential to save lives and cure the toughest diseases, but manufacturing them is currently a slow, laborious, and expensive process.

The Solution
the Tough Tech breakthrough

Kytopen has invented a new method of introducing genetic material into cells using continuous processing and electro-mechanical energy that is the same from discovery- to commercial-scale. This approach results in highly functional and healthy engineered cells in a fraction of the time and at a higher volume than other methods.

The Opportunity
the world we want to build

Accelerate time to clinic for groundbreaking new therapies and reduce the overall cost of development processes.





Founders & Leadership	Amy Ripka
Background	University of Wisconsin-Madison, The Scripps Research Institute Advanced
Industries	Biotech & Life Sciences



Breakthrough therapies for neurological diseases based on mitochondrial biology

The Problem
today's challenges
Treatments for our most insidious neurodegenerative diseases remain elusive, even after decades of research.

The Solution
the Tough Tech breakthrough
Lucy Therapeutics is targeting the mitochondria as a central player for many pathways known to be involved in neurological and other diseases. The insights will drive both more effective medicines as well as biomarker discovery to enable early, presymptomatic diagnosis of diseases.

The Opportunity
the world we want to build
Enabling doctors to diagnose and treat neurological diseases, such as Rett Syndrome, Alzheimer's, and Parkinson's, before patients develop debilitating symptoms like tremors, dementia, or seizures.



Founders & Leadership	Camille Martin, Leila Deravi
Background	Northeastern University
Industries	Advanced Materials, Biotech & Life Sciences

Sustainable, bio-inspired ingredients for skincare and consumer products.

The Problem
today's challenges
In suncare alone, more than 70% of products contain chemical UV-filters that have been reported to disrupt the endocrine system. Such UV-filters can also damage coral reefs, which are already critically endangered by climate change.

The Solution
the Tough Tech breakthrough
Seaspire is developing Xanthochrome, a proprietary organic natural biomolecule that functions as an SPF-booster, UV-filter stabilizer, and antioxidant. Xanthochrome outperforms current active ingredients found in over-the-counter products in safety, aesthetics, and function—without adversely affecting marine life.

The Opportunity
the world we want to build
Preventing skin damage and cancers caused by environmental pollutants, such as sunlight, smog, blue light, and oxidation, using a natural ingredient that is healthy for humans and the planet.



Founders & Leadership	Carl Schoellhammer, Robert Langer, Gio Traverso, Scott Kellogg
Background	MIT Department of Chemical Engineering
Industries	Biotech & Life Sciences



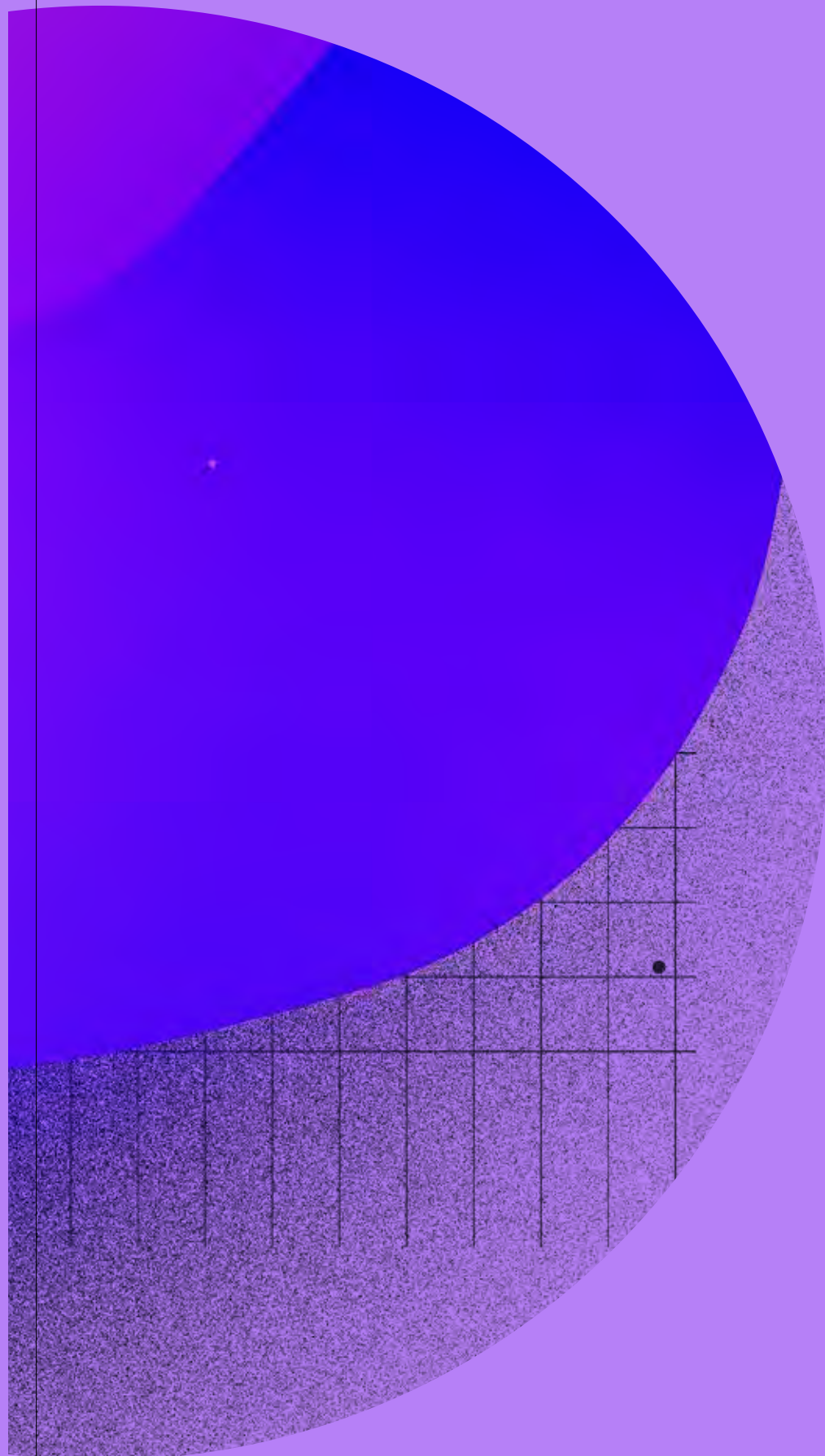
Increasing the efficacy of existing medicines and enabling new medicines.

The Problem
today's challenges
Ulcerative colitis impacts almost 1M patients in the U.S. alone. Poor treatment options lead to exorbitant medication spending in excess of \$10B annually.

The Solution
the Tough Tech breakthrough
Suono Bio is pioneering a platform technology for local, ultra-rapid administration of therapeutics in the GI tract that can deliver 10X the drug in only one minute. The company's drug delivery technology leverages low-frequency ultrasound in a process where drugs are gently "pushed" into the tissue, achieving ultra-rapid delivery of therapeutics. The platform can also deliver nucleic acids, like mRNA, which today can't be delivered to the GI tract.

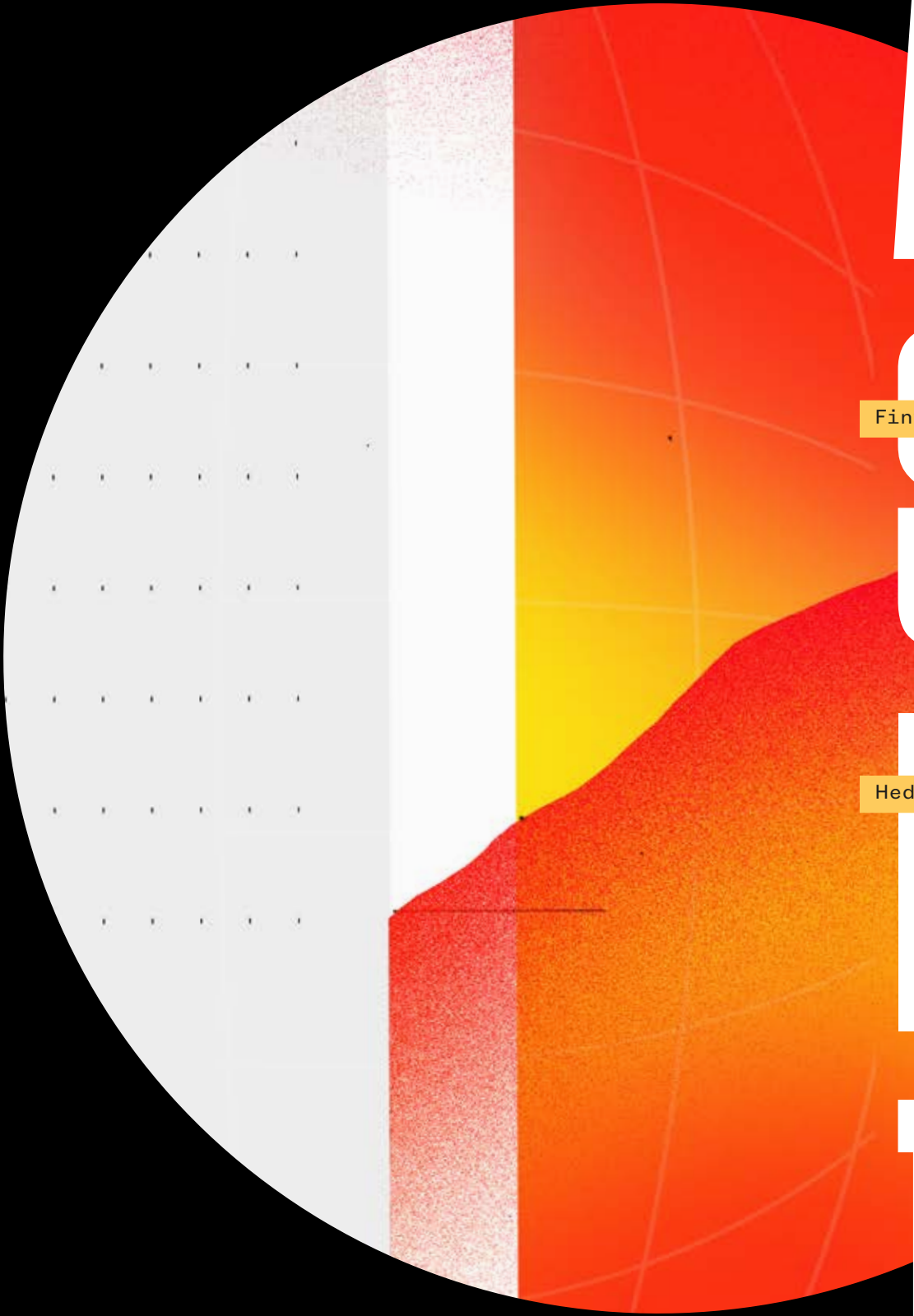
The Opportunity
the world we want to build
Address unmet medical needs in GI tract disease through more efficient and effective drug delivery.





“Opportunities to create a positive step change in the health of entire populations is possible by converging scientific and technology disciplines. Tough Tech seeks new manufacturing processes and products that do just that— from diagnosing or preventing disease and health threats, to treating both personally and broadly with medicines, and even to eating fresh, healthy food.”

ANN DEWITT
General Partner, The Engine



ADVANCED SYSTEMS & INFRA- STRUCTURE

Sync Computing

Hyperlight

Resonant Link

TeraDAR

ISEE

Finwave

Celestial AI

C2Sense

Hedron

Zapata Computing

RISE Robotics

Foundation Alloy

Atlantic Quantum

WoHo

The Routing Company



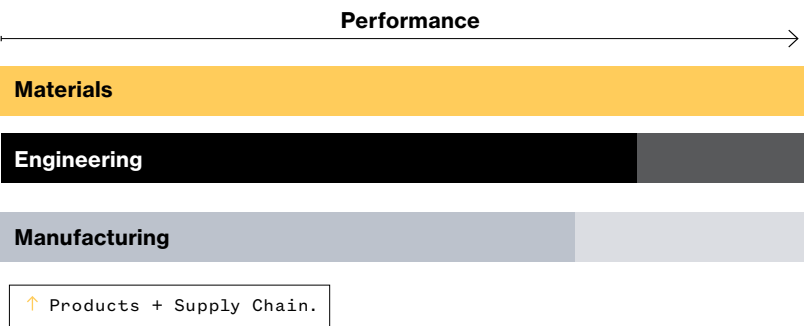
Founders & Leadership	Chris Schuh, Tim Rupert, Jake Guglin, Jasper Lienhard
Background	MIT Department of Materials Science and Engineering, UC Irvine
Industries	Advanced Manufacturing, Advanced Materials

Spring-loading the next generation of industrial innovation with novel metal alloys.

The Problem
today's challenges
The world needs a step change in materials productions and performance to meet manufacturing needs and fix current bottlenecks of global supply chains.

The Solution
the Tough Tech breakthrough
Foundation Alloy is reinventing the microstructure design of metals, from the atom up, to achieve stronger, lighter, less corrosive materials. Its high-performance metals have made-to-order structural qualities and derive from a more economical, 90% faster, and less energy-intensive manufacturing process.

The Opportunity
the world we want to build
Shift the \$867 billion global market for metal parts to high-performance metal components and broaden the horizon for new industrial design paradigms.



1200_{sqft}
Operational R&D space

4
Proprietary alloy families created to date

50%
Reduction in energy usage in part production

90%
Reduction in lead time

22%
Automotive industry's share of US GHG emissions

\$800B
Market size across copper alloy, nickel alloy, steel, titanium, and other alloy parts

“Engineering and manufacturing technologies have far outpaced the materials they rely on. Foundation Alloy modernizes metals, with control on an atomic level. This represents a seismic shift in the long history of metal design.”

JAKE GUGLIN
CEO & Co-Founder,
Foundation Alloy





Founders & Leadership	Mian Zhang, Marko Loncar, Christian Reimer, Kevin Luke
Background	Laboratory for Nanoscale Optics at Harvard University
Industries	Advanced Manufacturing, Advanced Materials, Semiconductors

De-bottlenecking data centers and telecom networks using ultra-efficient optical circuits.

The Problem
today's challenges
Data centers are quickly reaching limits of speed and energy consumption. Without significant innovation in material efficiency, the quantity of data and the transmission speed will reach a ceiling.

The Solution
the Tough Tech breakthrough
The connections between our most fundamental technologies rely on a device to convert signals between electricity and light waves at high speeds: the electro-optic modulator. HyperLight has developed Thin-Film Lithium Niobate (TFLN) photonic integrated circuits with innovative designs and scalable manufacturing processes that offer silicon-like reliable processing with the unique superior cost-efficiency and power performance. Integrated optical modulator devices made with HyperLight's low-loss chips will meet the growing market

demand for ultrahigh-performance, yet cost-effective optical solutions.

The Opportunity
the world we want to build
Reshape the world's relationship with optical data with faster and more capable connections between data centers, industries, offices, and homes, which can support modeling-heavy approaches to artificial intelligence and machine learning—a \$250 billion market by 2035.



↑ TFLN modulators.

100 GHz
Bandwidth of Hyperlight's integrated photonics devices

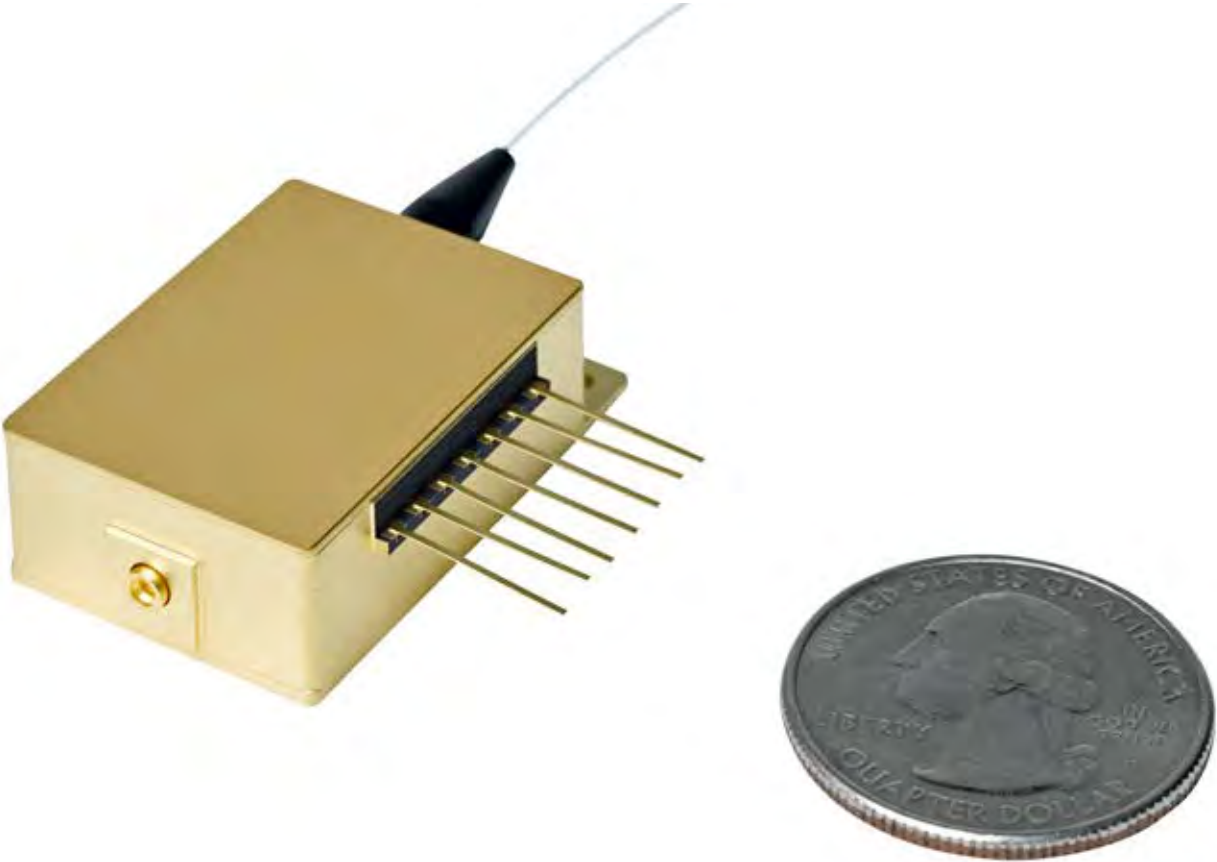
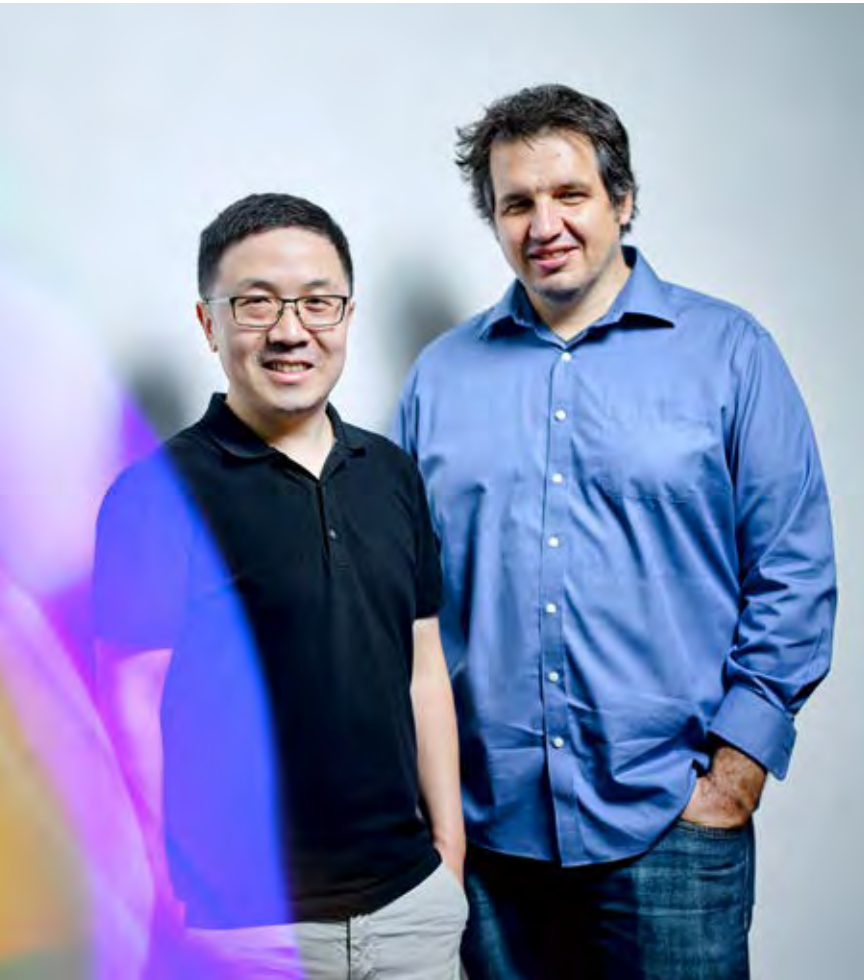
1 dB
on-chip loss

1 volt
Drive voltage

100X
Reduced the loss factor by 100x compared to existing optical fibers

“Our thin film lithium niobate photonic solutions combine the reliability and superior material properties of lithium niobate with its competitive cost efficiency and power performance.”

MIAN ZHANG
CEO & Co-Founder, HyperLight



↑ Packaged TFLN modulators.



Founders & Leadership	Yibiao Zhao, Debbie Yu, Chris Baker
Background	MIT Computational & Cognitive Science Group
Industries	AI & ML

Automating the logistics industry with a humanistic, AI-powered autonomous driving technology.

The Problem
today's challenges
Today's global supply chain is in dire need of modernization. Logistics companies face unpredictable labor capacity, variable costs, and increasing demands to improve safety.

The Solution
the Tough Tech breakthrough
With ISEE's AI-powered, self-driving yard trucks, logistics yard operators can improve yard safety, maximize yard efficiency, realize cost savings, and gain reliable driving capacity — all in the midst of a global supply chain crisis. The company plans to first automate logistics yards, reducing costs by 50% and increasing yard throughput by 30%.

The Opportunity
the world we want to build
A world where autonomous machines can thrive alongside people, freeing us to do what we do best.



\$100B

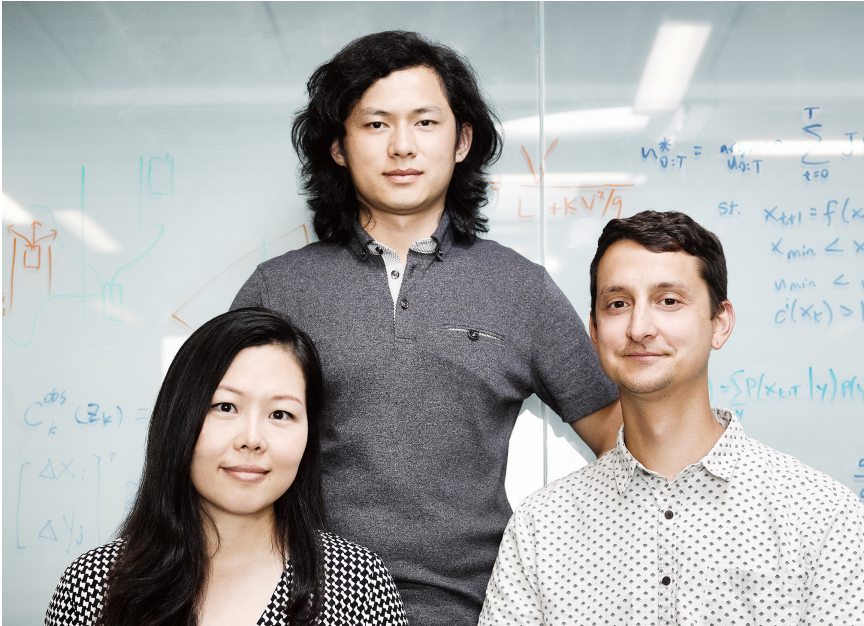
Global Market for logistics yards and driver labor

4 weeks

To seamlessly integrate hardware and software to ease customer adoption

“We have built a sophisticated tech stack, which is like ten technologies and innovations in one startup. This foundation gives us the ability to expand our AI-powered system to more general use cases.”

YIBIAO ZHAO
CEO & Co-Founder, ISEE



5-10X

Increase in container cost since March 2020

~100K

Shortage of qualified and experienced drivers for supply chains, forecasted by 2026

\$300K

Salary for 4 drivers and 24/7 operation



Founders & Leadership	Grayson Zulauf, Aaron Stein, Phyo Aung Kyaw
Background	Tesla, Apple, Motiv, Dynapower, Stanford, Dartmouth
Industries	Biotech & Life Sciences, Mobility

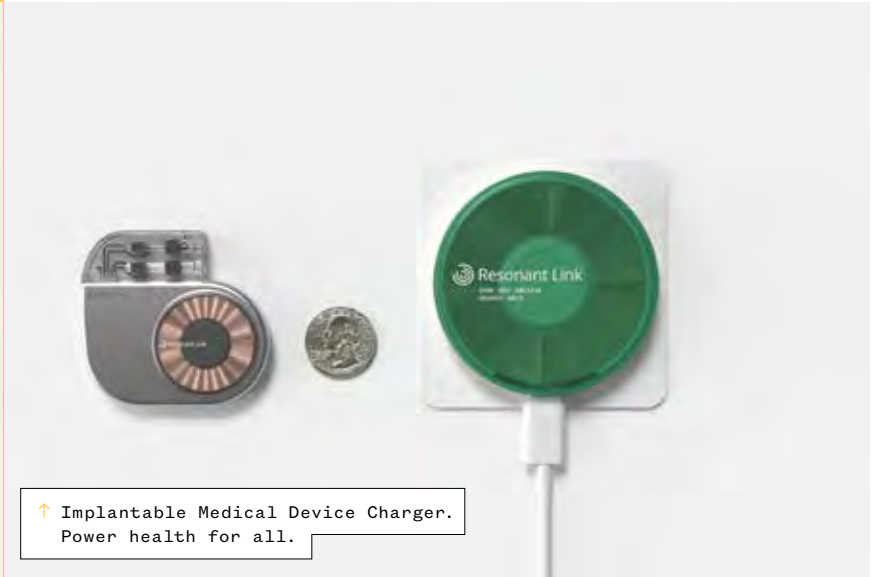
Untethering electric vehicles and medical devices with wireless charging.



The Problem
today's challenges
Electrification often comes with an unfortunate tangle: the charging cable. But today's wireless charging systems are slow, inefficient, unreliable, and expensive to manufacture.

The Solution
the Tough Tech breakthrough
Resonant Link is developing a novel wireless charging technology for systems as small as implantable medical devices and consumer electronics, to those as large as industrial applications and electric vehicles. Its platform can charge at greater distances, with a smaller footprint, and greater thermal efficiency than conventional systems.

The Opportunity
the world we want to build
Resonant Link's fast, safe, and reliable wireless charging seamlessly powers the vehicles and devices we depend on, without needing to plug in or swap out batteries. This has the potential to help people live safer, more productive lives — no more unnecessary surgeries, reduced logistics costs, and a way to support the grid through full electrification.



↑ Implantable Medical Device Charger. Power health for all.

5X
Higher performance than conventional wireless charging coils

5X
Cost improvement over current state-of-the-art wireless chargers



↑ Smartphone Charger. Charging made simple.



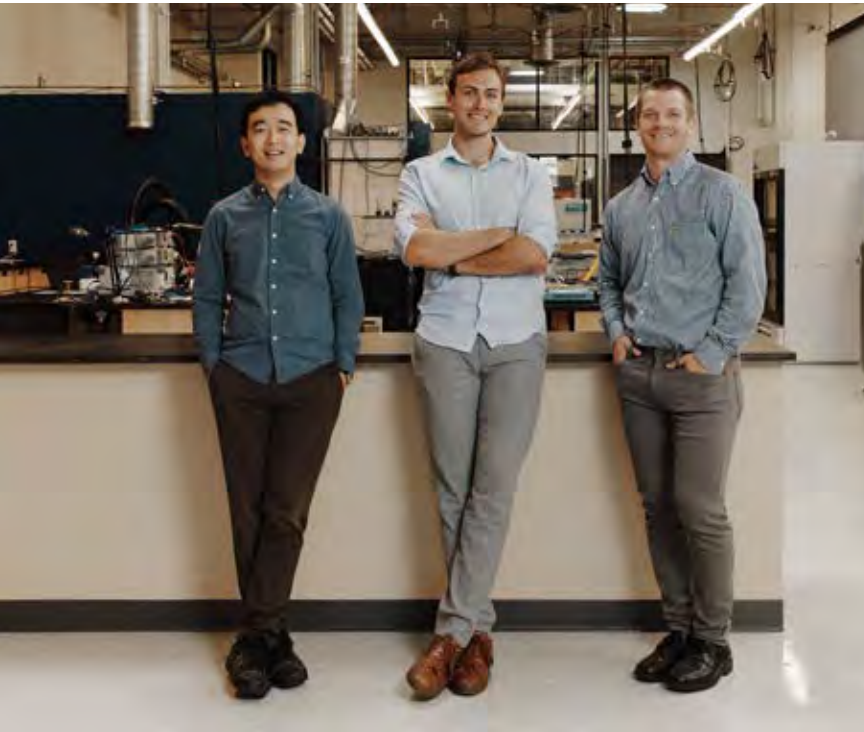
↑ Industrial and Material Handling Equipment Charger. Power fleets while they work.



↑ Electric Vehicle Charger. Charging that drives you forward.

“I've always been drawn to electric vehicles and the connection between electrification and health - reshaping the paradigm between energy and power to enable people to live safer, more fulfilling lives, and protect our planet at the same time.”

GRAYSON ZULAUF
CEO & Co-Founder,
Resonant Link





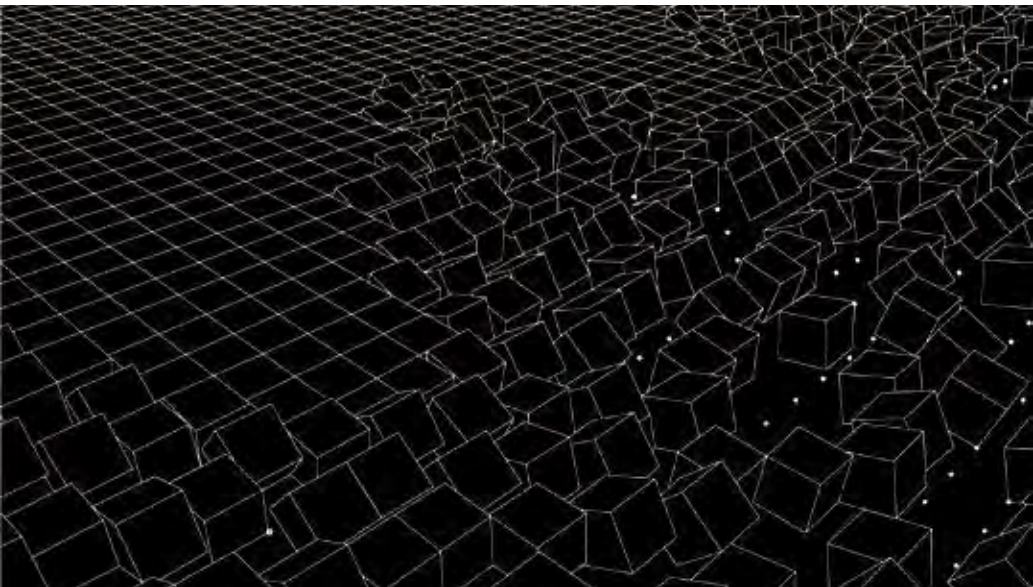
Founders & Leadership Jeff Chou, Suraj Bramhavar
Background MIT Lincoln Lab
Industries Advanced Computing

Transforming the way developers control cloud infrastructure for machine learning workloads.

The Problem
today's challenges
The \$300B global cloud computing industry is massively inefficient and complex, contributing to tens of billions of dollars of wasted time and electricity a year.

The Solution
the Tough Tech breakthrough
Sync Computing automatically reconfigures and reschedules big data and machine learning jobs to make the cloud easier, faster, and cheaper. Its technology can quickly optimize complex cloud infrastructure for cost and time with a single click.

The Opportunity
the world we want to build
By eliminating the guesswork, cloud applications such as big data analytics, machine learning, and scientific simulations can be instantly and optimally deployed to the cloud, saving companies billions of dollars.



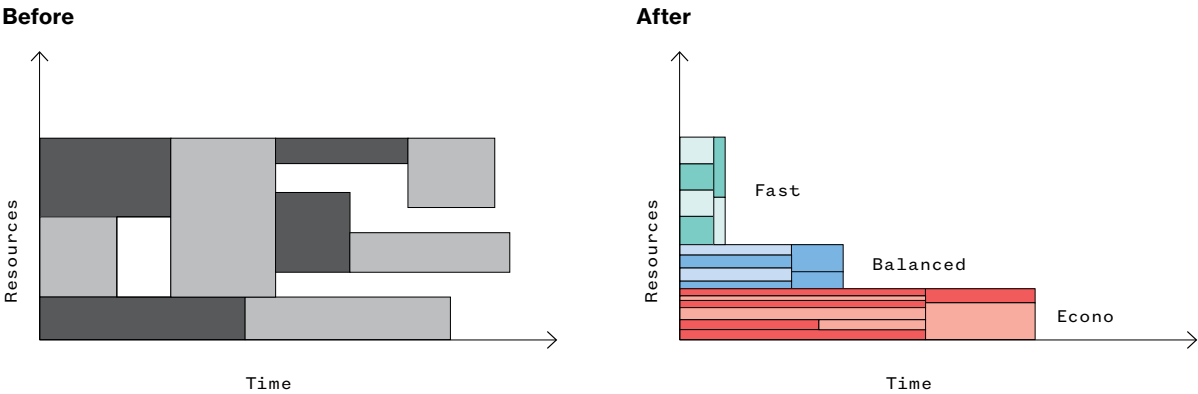
UP TO 80%
Faster than competitors

UP TO 31%
Cheaper than competitors

\$125B
Cloud infrastructure costs

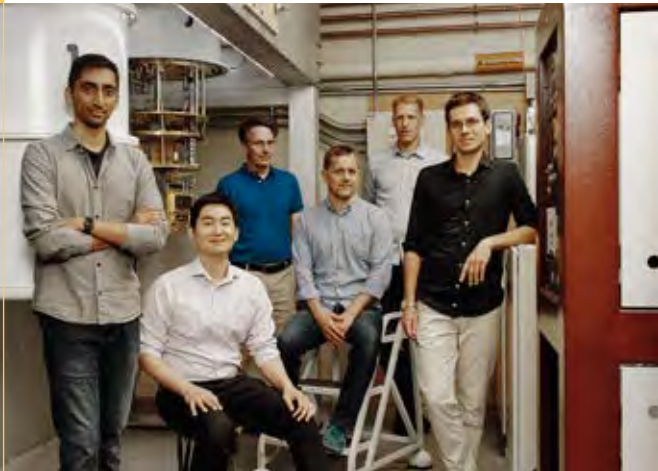
“The environmental impact of compute power is quite real. By optimizing systems we can drastically reduce companies annual spend but we are also really reducing a huge amount of waste. That is the Tough Tech challenge of computing that we are up against.”

JEFF CHOU
CEO & Co-Founder,
Sync Computing



Autotuner for Apache Spark					
Performance		Balanced		Economy	
Speed	Cost	Speed	Cost	Speed	Cost
73.9%	42.2%	45%	32%	38%	65.6%
Faster	More	Faster	More	Faster	More

	
Founders & Leadership	Bharath Kannan, Simon Gustavsson, Tim Menke, Youngkyu Sung, Shereen Shermak, Jonas Bylander, Will Oliver
Background	MIT Engineering Quantum Systems (EQus), Chalmers University of Technology
Industries	Advanced Computing, Quantum Computing



Tackling the world’s hardest computational challenges with scalable quantum computers.

The Problem
today’s challenges

Today’s quantum computers are physically complex and error-prone. Like the gargantuan early vacuum tube computers, these systems scale with a brute-force approach to engineering—requiring endless racks of equipment.

The Solution
the Tough Tech breakthrough

Atlantic Quantum is developing quantum computer hardware that achieves up to 100X improved performance compared to incumbents. This improved performance results in the ability to build scalable, fault-tolerant quantum computers.

The Opportunity
the world we want to build

A step change in computing will address the complexities of analyzing world challenges, and drastically reduce the power and space needed as both global compute needs and populations continue to scale.



	
Founders & Leadership	George Linscott, Tim Swager, Eric Keller, JT Mann
Background	MIT Department of Chemistry
Industries	Advanced Materials, Internet of Things

Enabling a healthier and safer world with miniaturized, mobile lab-grade sensing solutions.

The Problem
today’s challenges

Outdated sensing solutions and slow, costly, lab-based analyses limit access to invisible chemical signatures hidden all around us in air, food, medicines, and more. As a result, critical information on diseases, toxins, and product integrity remains under-reported and inaccessible.

The Solution
the Tough Tech breakthrough

C2Sense’s miniaturized sensing solutions are low-cost, portable, and laboratory grade, making the detection of invisible compounds and the power of rapid diagnosis readily available. The technology has a wide range of applications including diagnostic tools to bring lab accuracy into the home, counterfeit detection solutions for products across markets, and sensing platforms to monitor air, food, and water quality.

The Opportunity
the world we want to build

Make the world a healthier and safer place, particularly in two broad categories: 1) food safety and product integrity across the supply chain, and 2) health and environmental testing anywhere anytime.



	
Founders & Leadership	David Lazovsky, Preet Virk
Background	Intermolecular, POET Technologies, NVIDIA, Google, Groq, MACOM, Transmeta, Applied Materials
Industries	Advanced Materials, Semiconductors



Creating the most impactful AI computing solutions for the benefit of humanity.

The Problem
today’s challenges

The rise of artificial intelligence (AI) and machine learning (ML) is driving an explosion in compute demand. This acceleration in demand is coming at a time when transistor scaling has hit its limits and AI accelerator companies are struggling to keep pace with demands, particularly in “edge” applications, where energy use is of paramount concern.

The Solution
the Tough Tech breakthrough

Celestial AI is developing a silicon photonics system-in-package technology that includes a state-of-the-art AI accelerator chip. The system harnesses light rather than electrons to perform data-parallel calculations—a process that is many orders of magnitude faster, more power efficient, and more scalable than in traditional semiconductors.

The Opportunity
the world we want to build

Meet the needs of an AI compute market that is increasing by a factor of 128x every two years, and expected to grow to become a \$250 billion opportunity by 2030.



	
Founders & Leadership	Bin Lu, Tomás Palacios
Background	MIT Microsystems Technology Laboratories, MIT Department of Electrical Engineering and Computer Science
Industries	Advanced Materials, Semiconductors

Significantly more efficient electronics: from cell towers to data centers.

The Problem
today’s challenges

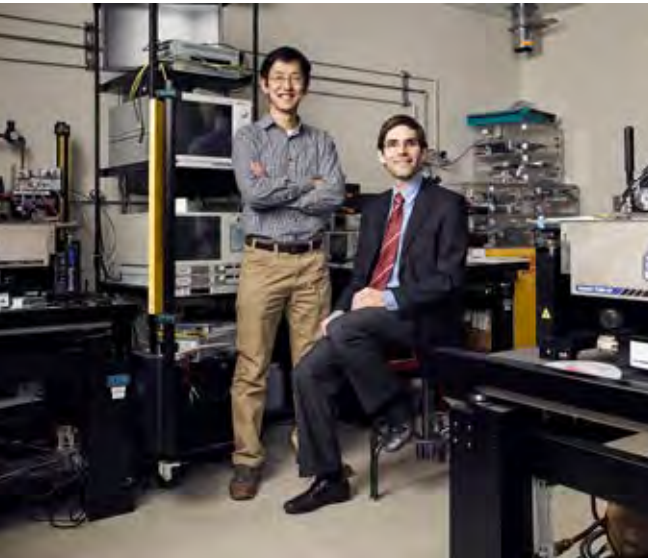
The poor energy efficiency of silicon semiconductor chips prevents wide adoption of 5G broadband services, constrains data center performance and efficiency, and limits the range of electric vehicles.

The Solution
the Tough Tech breakthrough

Finwave is overcoming the constraints of silicon chips with its new generation of semiconductor devices and chips based on a revolutionary gallium nitride (GaN) technology with a three- dimensional structure. The company’s chips can be made in standard fabs, with no special tools required, allowing Finwave to capitalize on the capabilities of modern foundries.

The Opportunity
the world we want to build

Create a usable 5G network—and even enable 6G services.



HEDRON

Founders & Leadership	Daniel Nevius, Baris I. Erkmen, Katherine Monson, Rhonda Landers
Background	MIT, NASA Jet Propulsion Laboratory, X the moonshot factory, Facebook
Industries	Internet of Things, Space



Real-time satellite network connecting space to Earth 24/7.

The Problem
today's challenges
Remote sensing satellites lack basic connectivity in orbit. We need real-time imagery from space to keep the planet safe and prosperous.

The Solution
the Tough Tech breakthrough
Hedron is building a network of in-orbit communication relay satellites that offers expanded connectivity for data transfer, without any change to existing hardware. Terabytes of data are liberated through faster data downloading, more access to download windows, lower latency, and improved cost structures while being compatible with heritage satellites and new satellites alike.

The Opportunity
the world we want to build
Provide abundant and timely information from space, to empower action in a quickly-changing world.



Founders & Leadership	Arron Acosta, Blake Sessions, Toomas Sepp, Kyle Dell'Aquila
Background	MIT
Industries	Robotics

Accelerating the electrification of heavy machinery with solid-state hydraulics.

The Problem
today's challenges
Heavy machinery consumes 14B gallons of diesel per year, resulting in 154M tons of annual CO2 emissions in the United States alone. Worldwide, this number is much larger – 570M tons of CO2 per year.

The Solution
the Tough Tech breakthrough
RISE Robotics has invented a replacement for hydraulic systems that will enable the next era of fully electrified heavy machinery, one that is at once sustainable, robust, and precise. The company's core technology is an electrically-powered mechanical linear actuator with all the abilities of a hydraulic cylinder but vastly improved efficiency and control.

The Opportunity
the world we want to build
Transforming the heavy industry sector through an all-electric, oil-free, zero-emission hydraulics replacement.



TERADAR

Founders & Leadership	Matt Carey, Greg Charvat, Nicholas Saiz
Background	Humatics, Lincoln Labs, Draper Laboratory, Butterfly Network, MIT
Industries	AI & ML, Transportation



Enabling the next level of perception and communication.

The Problem
today's challenges
Historically, there has been insufficient advancements in communication and sensing to enable a safe, connected world.

The Solution
the Tough Tech breakthrough
TeraDAR is developing a new category of sensors that will fundamentally transform the intelligent sensor landscape, enabling high-resolution sensing and high-speed communication. By moving into previously impossible electromagnetic frequency ranges, TeraDAR will be able to combine the benefits of multiple sensor systems into a single low-cost system.

The Opportunity
the world we want to build
Improve safety and add a critical, new component to smart city infrastructure.



Founders & Leadership	James Cox, Alex Wallar, Menno van der Zee, Daniela Rus, Javier Alonso-Mora, Bradford Church
Background	MIT, Uber, Canoo
Industries	AI & ML, Transportation

Democratizing public transit.

The Problem
today's challenges
Areas with public transit hubs are in high demand, pushing lower-income communities further away from the transportation options they need. This leads to more traffic congestion and higher transport costs for all.

The Solution
the Tough Tech breakthrough
Using optimization research pioneered at MIT's Computer Science and Artificial Intelligence Laboratory, The Routing Company is redefining public transit to make it the most reliable and accessible mobility option. Its platform gives communities of any size, in any place, with any resources, the ability to meet the transportation needs of its people, while reducing traffic congestion.

The Opportunity
the world we want to build
Reduce vehicle emissions and provide better access to economic opportunity.





Founders & Leadership	Antón García-Abril, Débora Mesa
Background	MIT, Ensemble Studio
Industries	Advanced Manufacturing, Advanced Materials

Changing how we design and construct our world.

The Problem today's challenges

The housing industry is in crisis with a scarcity of labor, higher prices, and fragmented supply chains. Additionally, as the world's population grows and becomes increasingly urban, housing density needs to keep pace.

The Solution the Tough Tech breakthrough

WoHo integrates architectural design, engineering, and construction into a single, streamlined platform to quickly build resilient, sustainable, high-rise buildings. The company will build lean, modular factories that balance automation and handwork close to construction hubs, simplifying the logistics, lowering the costs, and reducing the environmental footprint of its buildings.

The Opportunity the world we want to build

Housing the growing population by lowering construction costs, reducing project delivery time, minimizing environmental impact, and improving project predictability and construction quality.



Founders & Leadership	Christopher Savoie, Alán Aspuru-Guzik, Jonathan Olson, Peter Johnson, Yudong Cao, Jhonathan Romero Fontalvo
Background	Harvard Department of Chemistry, University of Toronto Department of Chemistry
Industries	Advanced Computing



Solving the world's most complex problems with quantum software.

The Problem today's challenges

Classical compute lacks the power to solve the most important problems in science and industry.

The Solution the Tough Tech breakthrough

Zapata Computing writes algorithms that harness the power of quantum computing to bridge the quantum and classical computing regimes and help predict and simulate some of the universe's most complex interactions, such as the behavior of molecules at an atomic level.

The Opportunity the world we want to build

Accelerate discoveries across the pharmaceutical, logistics, aerospace & automotive, finance, and materials industries, and much more.



“In order to spread prosperity across the planet’s global population, we need to use our natural resources 10x more efficiently. This means transforming industries that support our most basic life needs including food, housing, healthcare, transportation and much more.”

MILO WERNER
General Partner, The Engine





“The creation of The Engine has been instrumental in translating “Tough Tech” ideas from MIT. It has been inspiring to see our graduates create amazing companies that they might not have otherwise. Through the extensive mentorship, facilities, space, and funding, our students, postdocs and faculty have been able to envision and create a path for impact. The Engine has been critical in creating truly impressive leaders. It was a honor to serve on the inaugural Board of The Engine and see the growth of the entity from a concept to an expansive operation.”

ANANTHA P. CHANDRAKASAN

Dean of the School of Engineering, MIT
Board Emeritus, The Engine



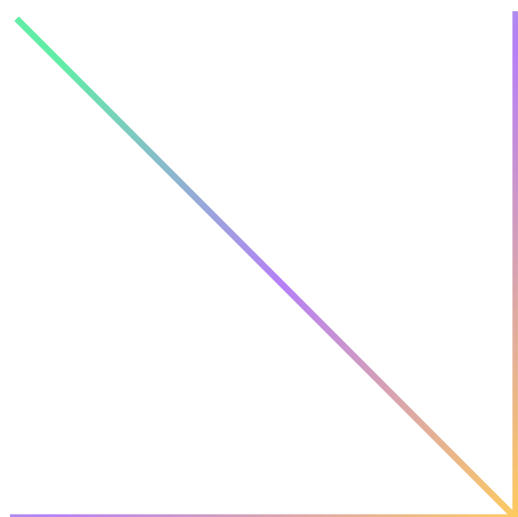
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**The most urgent problems hold
the biggest opportunities.
The Engine invests in
remarkable founders to create
positive global change.**

**WE HOPE
YOU CAN
JOIN US.**



The Engine Report
2021 & 2022

Creative Direction & Editing: *Chloe Holzinger, Fran Barros & Monique Guimond*

Designed by: *Draft Design* | www.draft.cl
Print by: *Puritan Capital* | www.puritanpress.com

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Published by The Engine Accelerator, Inc.
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en steel with zero greenhouse gas emissions. | One quarter of all greenhouse
bon-free fusion power. | Sustainable food for a growing population. | Efficient
d into the air. | Mini-plants make useful chemicals from waste. | Deforestation.
requires on-demand energy access. | Low-cost multi-day energy storage. |
d sustainable lithium extraction. | Carbon capture systems are inefficient. |
stries. | Industrial gas purification produces 16% of the world's carbon emis-
e. | Current technologies can't transition us fully from fossil fuels. | Millimeter
ement contributes 8% of global CO2 emissions. | Cost-effective, zero-carbon
emits massive amounts of CO2. | Catalyze reactions with electric light instead
s insufficient for a decarbonized world. | Superconducting cables transmit 5x
s account for 12% of all U.S. energy consumption. | Decarbonize every indus-
. | Rapid discovery and printing of new proteins. | Progressive neurodegene-
c health problems. | Sewage analysis for earlier detection. | Lack of cures for
es of residual cancer. | Nuanced, proximal post-surgical diagnostics. | Instabi-
ngi flour. | Single-stranded DNA is hard to produce, but medically powerful. |
opies are time-consuming and expensive to commercialize. | Automated cell
ain elusive. | Mitochondrial-based approach to treat diseases of the brain. | A
educe spoilage and packaging waste. | Topical products like sunscreens are
nal bio-inspired materials. | Common health conditions still have limited treat-
re hard to transport and not maximally effective. | A shelf-stable patch with
es. | Scalable quantum computing. | Molecular information is unreadable. |
by computing power. | Data moved by photons not electrons. | Silicon ineffi-
G chips. | Old materials don't work for new manufacturing techniques. | Ena-
Poor connectivity in orbit. | Relay satellites for 24/7 connection. | Global data
. | Supply chain gaps from a truck driver shortage. | Self-driving trucks at wa-
cation. | More efficient wireless charging, over longer distances. | Heavy ma-
efficient substitutes. | Cloud computing is massively inefficient. | Eliminate
e are over 4,000 deaths attributed to automobiles. | Better imaging and sen-
efficiency of public transportation. | AI-optimized routes bring transportation
ange how we design and construct our world. | Super complex problems can't
algorithms. | ...and more Tough Tech challenges that need solutions.



“The Engine is a champion for complexity, a cross-pollinator of knowledge, and a convener for the Tough Tech ecosystem. Together, we can make a more optimistic future possible, faster.”

KATIE RAE,
CEO & Managing Partner,
The Engine