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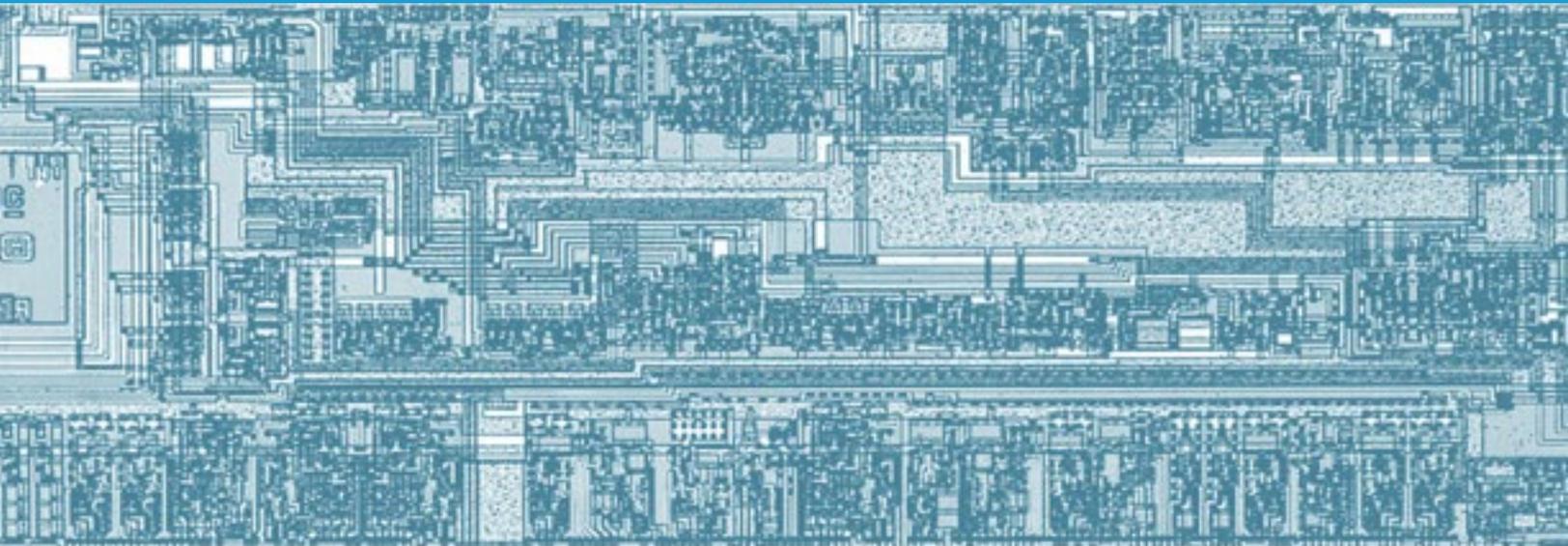
# SILICON STARTUP SOLUTIONS

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A SILICON CATALYST NEWSLETTER

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## IN THIS ISSUE



Lance Bell - Partner / Publisher



**Silicon Catalyst Board Member David French**  
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Minister Paul Scully with SiliconCatalyst.UK Managing Partner, Sean Redmond

Since our last newsletter, much has happened, not the least of which was the announcement that the UK government, for the benefit of The Department for Science Innovation and Technology (DSIT), has commissioned SiliconCatalyst.UK to run its \$1.58 million pilot semiconductor design incubator which has been named ChipStart UK. The two-year pilot business incubator will be focused on supporting early-stage UK companies involved in the design and creation of semiconductor solutions, and providing the technical and commercial support so that startups can successfully launch and thrive.

The lion's share of credit and many, many thanks go to the herculean efforts of our SiliconCatalyst.UK Managing Partner Sean Redmond. In an open tender by the UK government, it was Silicon Catalyst which was selected based on its unique model conceived by Co-Founder Rick Lazansky and supported by fellow co-founders Dan Armbrust and Mike Noonan. In a fierce competition for the government contract which included some of the UK's most iconic names in tech, SiliconCatalyst.UK won the contract. The government selection process for the contract used objective criteria. Sean communicated to me that their decision was based on our unique business model, our unparalleled ecosystem which gives UK semiconductor startups direct access to Silicon Valley, our extraordinary advisor network, our 8 plus year track record of having engaged with more than 1,000 semiconductor startups worldwide and their recognition of our brand as the gold standard when it comes to semiconductor startups.

I was involved with activities leading up to the October 12th event in London. The highlight of the event included orations by Minister Paul Scully, (Minister for Tech and the Digital Economy) and Arm's founding CTO Tudor Brown. What I found most interesting is the fact that our event had visibility all the way up to the Prime Minister's office and ultimately, all outward facing messaging needed the approval of the Number 10 Downing Street Comms team. The UK government clearly recognizes that Silicon Catalyst is truly about what's next.

As a teaser to our next edition of Silicon Startup Solutions, I could not help but include this image from our recent 6th Annual Semiconductor Industry Forum where a good time was had by all (see photo below). In the words of Silicon Catalyst Managing Partner and dear friend, Richard Curtin, the creator of the Forum says ... Stay tuned.



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## WELCOME



### CHAIRMAN'S CORNER RICK LAZANSKY

Chairman and Co-Founder, Silicon Catalyst  
Serial Entrepreneur and Incubator Fanatic

and the incredible things that our customers were able to build. That was followed by a wonderful 6 years of hopping around working mostly on early internet startups and fixing broken engineering teams. I thoroughly enjoyed those years asking dumb questions. I re-entered EDA in '02, working for of all people, Pete Rodriguez building an RFIC simulator at Xpedion. Pete had described the

talk some of them into doing that, with or without me. Pete was one of them. The mission would be to build an ecosystem with startups, lots of advisors, in-kind partnerships, many strategics, and an investor network, with close ties to universities. The intention was to incubate (not too) young entrepreneurs who actually wanted to build chips, IP, or better still to build more vertically, the bespoke

**“We don't invent the technology, nor do we manage the companies that do. We support the ones who want to be at the cutting edge of innovation, in an industry that eschews risk-taking.”**

## The Silicon Catalyst Backstory – “Maybe people are more intriguing than technology”

This may explain why I wanted to get Silicon Catalyst started - maybe people are more intriguing than technology. We built Silicon Catalyst to level the playing field for the many innovative folk that want to build hardware while software eats the world. An explanation is in order.

I'd gotten back into doing EDA startups after spending '82 to '96 developing and creating EDA software used to design and manufacture semiconductors. Looking back, the best moments of that came from managing teams of really sharp software engineers,

job as “come on over and it'll be just like finding a disassembled Ferrari in a barn, and putting it back together.” While that could not have been further from the truth, it was fun to be vicariously the accomplishments of our customers. Though the result was not in the least bit Ferrari-like, I'd learned a bit about myself, in the years anyway. I liked working with smart people, and I enjoyed not having to be one of the smart ones.

The industry had changed over those years. Building a chip became two orders of magnitude more expensive than it was in '82, while building software companies had become two or more orders of magnitude less expensive. VCs had abandoned hardware - any kind of software was a better bet, and that didn't require a lot with a lot of cash up front for tools, IP, and later on for fabrication.

In 2014, I started discussing with friends how to fix this and trying to

products that needed those particular chips. We'd copy everything else that worked for incubating software companies, finding or creating the hardware equivalent. That included “lots of free stuff” and incubators like the software ones had, but different where they needed to be different, deferring payments to in-kind partners until product release when free was impossible. The dream was to bring back a bit of the 80's and 90's, when the industry was more collaborative and competitors could nurture promising startups, share their knowledge, solve industry wide problems, and be members of a cool club. I was thinking that it might be similar to SEMATECH, which was formed and funded by the industry back in the late 80's, but solving a problem that had become worldwide.

Now all I had to do was convince other people to join, or better still, co-found. Smarter advisors, possibly retired or still working but maybe a bit frustrated



## THE TRAITOROUS EIGHT

executives. Much smarter than me. Smarter team members than me also. Basically everyone smarter than me. Turns out it's easy to find people smarter and more experienced. They just needed a nudge. I talked a lot about the vision in the early days, and finally met Mike Noonan, and Mike found Dan Armbrust, who had actually run SEMATECH.

We got a lot of stuff wrong in the beginning. I recall being particularly stubborn about wanting In-Kind partners to get equity in the startups. They wanted nothing to do with that, but I kept insisting. Eventually, I stopped pushing and we started listening, and onboard they came. Senior engineers and execs that I thought would only be interested in being Advisors instead wanted to join the team. We tried to raise money and found it quite difficult. In hindsight,

it's obvious. Nobody wants to invest in a company whose purpose was to create the very things they didn't want to invest in. We tried, rather timidly, to create a fund - the right idea or not, but definitely too early. Our goal was "lots of startups", early and high risk. The solution to funding lots of high risk startups is to have your own fund but that would be, at best, de minimis.

What didn't surprise us was the advisors. We'd worked with many of them in past jobs. This happened in the software incubation world as well. What did surprise us was how enthusiastic the industry partner would be. We also could point to any number of software incubators with startups that seem to just get better and better each year. The lesson there we all know - have grit: don't give up, listen, and improve. We were "go fast and break things" in an industry that

had for good reason grown more conservative. There's ample need for that carefulness in IC development, but less in the accelerators that support it.

Silicon Catalyst has been in many ways more successful than I'd imagined, and, of course, in some ways less, but that comes with any job. It's rewarding to share a vision and have those you share it with sharpen and amplify it. I'm proud that the team continues to put helping startups at the top of the list.

We don't invent the technology, nor do we manage the companies that do. We support the ones who want to be at the cutting edge of innovation, in an industry that eschews risk-taking. Those are the innovative ones, the intriguing ones who may not otherwise easily find support in a conservative industry.

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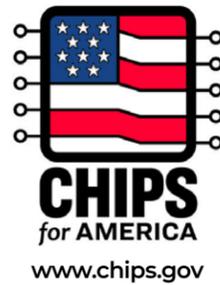
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## CHIPS FOR AMERICA FACT SHEET

### Selection Committee Announces Leaders to Operate the CHIPS for America National Semiconductor Technology Center



**October 11, 2023, WASHINGTON, D.C.** — Today, an independent selection committee announced the incoming board of trustees that is expected to oversee a nonprofit entity that will operate the National Semiconductor Technology Center (NSTC). The NSTC is the core research and development (R&D) component of the Department of Commerce's CHIPS for America program.

The NSTC will be a hub of collaboration for members of the entire semiconductor manufacturing and supplier ecosystem and will accelerate the pace of innovation and help lower the cost and time required to bring new technologies to market.

The newly selected board members will now begin the process of creating a nonprofit entity that is expected to run the NSTC and hire executive leadership. The Department of Commerce expects to enter into a funding agreement with the newly formed nonprofit so that it can begin to operate the NSTC.

**In a joint statement, selection committee members Janet Foutty, John Hennessy, Jason Matheny, Donald J. Rosenberg and Brenda Darden Wilkerson said,** "We are honored to have served in this capacity to help stand up the NSTC, which will be a truly transformational institution for the semiconductor industry. The incoming members of the board of trustees are distinguished in their expertise, experience and leadership abilities. We appreciate their generosity in giving back to the American microelectronics sector to make it the world's best."

"We are on a mission to bring semiconductor manufacturing back to America and secure our national and economic security, and to do that, we must continue to lead the world in semiconductor R&D. The NSTC is going to supercharge chip technology and innovation ecosystems across the country so that cutting-edge developments in semiconductor design and manufacturing happen here in the U.S.," said **Secretary of Commerce Gina Raimondo.** "I am grateful to this outstanding group of leaders for answering the call to serve our nation and advance America's technological leadership."

"The members of the board of trustees will help to establish an NSTC that is visionary, agile and responsive to the needs of the semiconductor ecosystem," said **Under Secretary of Commerce for Standards and Technology and National Institute of Standards and Technology (NIST) Director Laurie E. Locascio.** "The NSTC will provide our domestic manufacturing industry with technological advances that will keep American-made products competitive, and it will help train the next-generation workforce to make these products in the world's most advanced facilities."

"President Biden has secured historic legislation to revitalize America's leadership in semiconductors, and today's milestone is a critical step to support cutting-edge research and development in the next generation of chip technologies," said **Director of the National Economic Council Lael Brainard.**

In the Federal Register Notice calling for selection committee nominees, they were tasked with identifying "distinguished, purpose-driven, visionary leaders" for the NSTC. The initial members of the incoming board of trustees are:

- **Robin Abrams** has over four decades of experience in building and operating technology companies and startups. Prior leadership roles include service as interim chief executive officer (CEO) of ZILOG Inc., a provider of integrated microcontroller products; CEO of Firefly Communications Inc.; CEO of VeriFone, a world leader in payment and commerce solutions; and president of Apple Americas. Abrams earned her B.A. and J.D. from the University of Nebraska.



- **Craig R. Barrett** is the retired CEO and chairman of Intel Corporation, where he rose through the ranks to become chief operating officer in 1993, president in 1997, CEO in 1998 and served as chairman of the board of directors from 2005 to 2009. Today, he is an advocate for improving science, technology, engineering and mathematics education. Barrett earned his B.S., M.S. and Ph.D. from Stanford University.

- **L. Reginald (Reggie) Brothers** is a principal with MIT Lincoln Laboratory and an operating partner at AE Industrial. He served as CEO of BigBear.ai, chief technology officer of Peraton, and principal with The Chertoff Group. Prior to those roles, he served as Under Secretary, Science and Technology, U.S. Department of Homeland Security; Deputy Assistant Secretary, Research, U.S. Department of Defense; and held senior roles at the Defense Advanced Research Projects Agency, BAE Systems, Draper Laboratory, Envoy Networks and Lincoln Laboratory. Brothers earned his B.S.E.E. from Tufts University, M.S.E.E. from Southern Methodist University, and Ph.D. from Massachusetts Institute of Technology.

- **Nicholas (Nick) Donofrio** is a 44-year IBM veteran who led IBM's technology and innovation strategies from 1997 until his retirement in October 2008. He was also the vice chairman of the IBM International Foundation and the chairman of the board of governors for the IBM Academy of Technology. His most recent responsibilities included IBM research, governmental programs, technical support and quality, corporate community relations, and environmental health and product safety. He holds seven technology patents and is a member of numerous technical and science honor societies. Donofrio earned his B.S.E.E. from Rensselaer Polytechnic Institute and M.S.E.E. from Syracuse University.

- **Donna L. Dubinsky** is an entrepreneur best known as CEO of Palm Computing and Handspring, pioneers of the first successful hand-held computers and smartphones. She co-founded and served as chair/CEO of Numenta since 2005, where she continues to act as chair. Donna recently served as senior counselor to the U.S. Secretary of Commerce. She also served on the board of Yale University from 2006-2018, including two years as senior trustee; and was a director of Intuit from 1999-2006. Dubinsky earned a B.A. from Yale University and an M.B.A. from Harvard Business School.

- **Erica R.H. Fuchs** is a professor of engineering and public policy at Carnegie Mellon University, and, by courtesy, in the Department of Materials Science and Engineering and Heinz College of Information Systems and Public Policy. She is the founding director of the National Network for Critical Technology Assessment and was the founding director of Carnegie Mellon University's Manufacturing Futures Initiative, which today is an endowed institute. She serves on the Massachusetts Institute of Technology (MIT) Corporation Visiting Committee for the MIT Institute for Data, Systems and Society. Fuchs earned her Ph.D., S.M. and S.B. degrees from Massachusetts Institute of Technology.

- **James D. (Jim) Plummer** is the John M. Fluke Professor of Electrical Engineering at Stanford University. He was dean of the Stanford Engineering School from 1999-2014. His technical work is in the fields of semiconductor devices and technology with contributions to CMOS logic and high-voltage devices. His textbooks on chip technology are used worldwide. He has served on the board of directors of companies including Intel and Cadence. He earned his B.S. from UCLA and his M.S. and Ph.D. in electrical engineering from Stanford University. Plummer will serve as the inaugural chair.

To learn more about the NSTC structure, see **A Vision and Strategy for the National Semiconductor Technology Center**, published in April 2023.

The bipartisan CHIPS and Science Act established four research and development programs at the Department of Commerce that are being overseen by the CHIPS Research and Development Office within the National Institute of Standards and Technology (NIST): the National Semiconductor Technology Center, the National Advanced Packaging Manufacturing Program, up to three new Manufacturing USA institutes dedicated to semiconductors, and the CHIPS R&D Metrology Program.

### ABOUT CHIPS FOR AMERICA

CHIPS for America is part of President Biden's economic plan to invest in America, stimulate private sector investment, create good-paying jobs, and make the U.S. competitive in the 21st century. CHIPS for America includes the CHIPS Program Office, responsible for manufacturing incentives, and the CHIPS Research and Development Office, responsible for R&D programs. Both offices sit within the NIST at the Department of Commerce. NIST promotes U.S. innovation and industrial competitiveness by advancing measurement science, standards and technology in ways that enhance economic security and improve our quality of life.





### Helping Parkinsons Patients And Optimising AI – Meet The UK Chip Start-Ups Changing The Future

Twelve semiconductor design start-ups have joined government-backed incubator – ChipStart UK – launched through the National Semiconductor Strategy.

Two-year programme will give companies support to get innovative semiconductors to the global market.

The cohort are working to design chips that are better for brain implants, can improve online user security through transformative quantum computing, and that will reduce the computing resource and energy needed to train AI models.

British start-ups solving some of the world's most complex issues through the design of semiconductor chips have today (Thursday 12 October) been named as members of a new government-backed incubator that will provide support as they grow to become future global chip leaders.

Companies chosen for the pilot are already innovating in a range of exciting areas, including developing chips for brain implants that will address debilitating conditions such as parkinson's disease, groundbreaking chips that could boost the capability and efficiency of AI and new ways of reducing vast energy use in data centres across the world, helping to tackle climate change.

ChipStart UK is a two-year pilot programme backed by the Government that will provide early-stage companies involved in the design of semiconductors with the technical and commercial help they need to help bring new products to market.

The £1.3m programme will be delivered by SiliconCatalyst.UK, the world's most experienced start-up accelerator, which has engaged with hundreds of chip companies on scaling up and growing. It will give companies access to bespoke chip design tools, commercial expertise, specialised mentorship, and networking opportunities with prospective investors and partners.

#### MINISTER FOR TECHNOLOGY PAUL SCULLY SAID:

*"Semiconductors are the bedrock of our modern economy and an increasingly integral part of our lives. These firms are building on Britain's research leadership to open doors to innovation and growth, while designing chips that could truly change the way we live our lives."*

*"Whether they're innovating how we support patients with Parkinsons or are on the cusp of supercharging how AI is used, these firms are the brightest sparks in the UK's thriving semiconductor industry. This incubator will make sure they have the skills they need to revolutionise the lives of people not only in the UK, but across the world."*

Among the companies that have been announced as joining the pilot today are Mintneuro, which is pioneering the use of semiconductor technology to support patients with neurological conditions by developing physical neural implants that can reduce the need for surgery.

Mignon and Vaire Computing have also joined the pilot, both design hardware that is built to run large-scale AI models using more efficient chips – allowing AI models to use less energy and computer resource, leading to more efficient training and research.

#### SILICONCATALYST.UK CEO SEAN REDMOND SAID:

*"This is one of the most exciting times to start and grow a globally successful semiconductor company from the UK. The first group of 12 UK semiconductor startups to enter ChipStart UK incubator have been selected from 27 applications following two rounds of intensive panel interviews made up of semiconductor startup experts from the UK and Silicon Valley. Over the next 9 months we will shape and mould these outstanding new innovative companies into the next generation of semiconductor leaders."*

The UK's established, world-leading capability in semiconductor design is at the heart of the programme, with five of the firms initially founded as 'spinouts' from the UK's leading universities, and two more originating from research carried out at Oxford and Cambridge Universities.

The launch of the pilot delivers on a key commitment made in the National Semiconductor Strategy. On completion, the pilot will provide the UK's semiconductor industry with a pipeline of new startups that have an innovative product, route to market and are a foundation for their forward growth, including routes to future seed funding.

The pilot is a clear example of the government's commitment to working in partnership with the semiconductor industry to support the competitiveness of UK businesses, and to achieve the wider goals of the national semiconductor strategy by growing the UK sector through building on our strengths.

The programme will run two consecutive cohorts and end in March 2025. Start-ups that have been chosen will be provided with:

- Access to, and support for, commercial design capability. This includes the full Silicon Catalyst ecosystem, access to design tools, IP, and prototyping capability.
- Commercial expertise and bespoke mentorship. Startups will be mentored by experienced semiconductor industry executives and connected into Silicon Catalyst's global network.
- Exposure to private capital. Participant companies will also have access to the 270+ Silicon Catalyst advisors, strategic partners, and an extensive network of investment groups.



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"Arm's proven IP, tools and support have helped us manage risk and start on a solid foundation—which has been a bastion of confidence leading us to success."

Eray Erdogan, Co-Founder, HEX Microchip



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## Silicon Catalyst Launches £1.3M ChipStart U.K. Incubator

By Nitin Dahad | October 16, 2023 | EE Times



**PETE RODRIGUEZ (LEFT), SEAN REDMOND (MIDDLE) DISCUSS THE CHIPSTART PROGRAM WITH NITIN DAHAD (SOURCE: NITIN DAHAD)**

At the launch of Silicon Catalyst's ChipStart U.K. incubator program in London last week, 12 British chip design startups pitched their technologies and plans to the who's who of the U.K. semiconductor ecosystem.

The event had a huge air of excitement, with veteran semiconductor industry entrepreneurs and investors, government advisors, academia, and the emerging startups in attendance. The reason for the excitement? The spotlight was back on chip design expertise that some felt was almost forgotten over the last 20 years due to attention from investors and government entities being predominantly on the digital app economy. It's thought that there are some 200 chip design teams in the U.K.

The U.K. government's minister for technology, Paul Scully, made a brief appearance at the event, using phrases like, "We want to turbocharge the U.K.'s science and tech economy," indicating that semiconductor innovation underpins all elements of its semiconductor strategy. His attendance ultimately sent a signal that the government is taking the semiconductor industry seriously and is directing some resource towards it.

In his prepared statement for the event, Scully said, "Semiconductors are the bedrock of our modern economy

and an increasingly integral part of our lives." Referring to the 12 startups chosen for the first cohort of the ChipStart UK incubator, he added, "These firms are building on Britain's research leadership to open doors to innovation and growth, while designing chips that could truly change the way we live our lives. Whether they're innovating how we support patients with Parkinson's or are on the cusp of supercharging how AI is used, these firms are the brightest sparks in the U.K.'s thriving semiconductor industry. This incubator will make sure they have the skills they need to revolutionize the lives of people not only in the U.K., but across the world."

Highlighting the speed with which the ChipStart U.K. program was approved by the government, Silicon Catalyst CEO Pete Rodriguez quipped that while the U.S. CHIPS Act was announced first, the U.K. was quicker in implementing this aspect of it. You can hear what he and Silicon Catalyst U.K. CEO Sean Redmond had to say in EE Times' video interview.

ChipStart U.K. is a two-year pilot program backed by £1.3 million (about \$1.58 million) of British government funding



**THE U.K. MINISTER FOR TECHNOLOGY, PAUL SCULLY, SPEAKING AT THE LAUNCH OF SILICON CATALYST'S CHIPSTART U.K. INCUBATOR PROGRAM. (SOURCE: NITIN DAHAD)**

to provide early-stage companies involved in the design of semiconductors with the technical and commercial help they need to bring new products to market. Silicon Catalyst said it had 27 applications from which it selected 12 for the first cohort for the nine-month support program.

A second cohort will be selected the first round, with the two-year government pilot program supporting the incubator ending in March 2025. The aim of the pilot is to provide the U.K.'s semiconductor industry with a pipeline of new startups that have innovative products, route to market, a foundation for forward growth, and routes to future seed funding.

Companies chosen for the pilot are innovating in a range of areas, including developing chips for brain implants that will address debilitating conditions like Parkinson's disease; groundbreaking chips that could boost the capability and efficiency of AI; and new ways of reducing vast energy use in data centers across the world, helping to tackle climate change.

### TUDOR BROWN'S THREE TIPS FOR SUCCESS

A highlight of the day's event was the fireside chat with Tudor Brown, who was one of the founding members of Arm Holdings, who recounted the early days of Arm. He said that teamwork was a fundamental axis of the company's success and is demonstrated through how its vast partner network was established.

When asked about his advice to startups, he emphasized the significance of roadmaps. "What lots of startups don't get is



**TUDOR BROWN, LEFT, IN A FIRESIDE CHAT MODERATED BY SEAN REDMOND (RIGHT), CEO OF SILICON CATALYST U.K. (SOURCE: NITIN DAHAD)**

the importance of roadmaps," Brown said. "At the beginning, the roadmap is very tactical and accurate. But further out in the future, it can be vague, but that's OK. It may be wrong but that doesn't matter. What matters is to have a vision."

Brown offered his three tips for success for startups:

- Have belief in yourself.
- Be global and look after your customers. He said, "We spent a ridiculous amount of time on the road. But that's because we were always focused on what the customer wants."
- Hold on to your cash. He said, "Treat it like your own. There is a danger that you raise too much money and then get sloppy."



## Arm expands Flexible Access with new IP, subsystems and technologies

By Gabriella Giuffrida, Senior Business Manager, Arm Flexible Access

Since Arm launched Flexible Access in 2019, we have continued to add new IP and solutions to the program. This gives our partners low cost, or for startups zero cost, access to a wide choice of technologies when they are designing their system-on-chips (SoCs).



Alongside over 200 established companies currently signed up to Flexible Access, in 2020 we extended the program to early-stage silicon startups through **Arm Flexible for Startups**. Over 70 startups are signed up to the program at present, with each one getting zero cost access to a broad range of Arm technologies – over 80 Arm IP in total which accounts for 70 percent of our most used portfolio!

### A GROWING LIST OF IP, TECHNOLOGIES AND SOLUTIONS

This list of Arm products available to members of the program continues to grow. At Arm, we want to help companies that are designing the next big SoC innovations to thrive, which is why we continue to add new IP and solutions to Arm Flexible Access.

In May 2023, we added **Arm Cortex-A55 CPU**, one of Arm's most popular IP designs to the broad portfolio of Arm IP and tools available through Flexible Access. Now we are delighted to add a range of new IP, subsystems, and technologies to the program. Silicon startups will have access to these newly added Arm products for zero cost initially. This gives companies the perfect foundation to start developing their silicon prototypes with the lowest risk path for the broadest range of applications and markets.

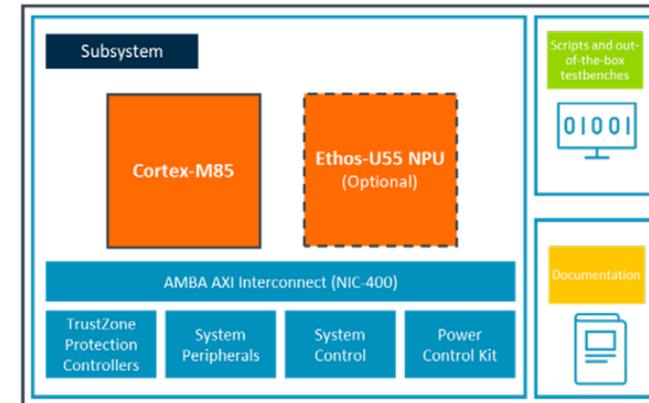
### The new technology additions to Flexible Access include the following:

- **Arm Cortex-M85**, which integrates **Arm Helium Technology**, is the highest performing Cortex-M processor and natural choice for IoT applications that require AI and machine learning (ML) capabilities, high performance and advanced security.

As part of the Cortex-M85 IP offering for Flexible Access, we also provide a **functional safety package** of tools and technologies and **Arm's processor implementation kit**, a leading implementation solution for Arm microprocessor technology that delivers the fastest path to take Arm IP to silicon. The aim of this new package of support is to provide the highest levels of performance, security, and safety, alongside the quickest time-to-market for Arm Flexible Access partners.

- **Corstone-310** is Arm's high-performance solution for voice recognition applications, but also provides the perfect starting point for AI-capable SoCs across IoT markets. Through Flexible Access, Corstone-310 includes an example subsystem based on the Cortex-M85 CPU and **Ethos-U55 NPU**, which is already available through Flexible Access but through this package also offers accelerated machine learning (ML) support. Alongside the AI, performance and security capabilities from being Arm's most advanced microcontroller subsystem, Corstone-310 makes it easier than ever for Flexible Access partners to build SoC design for a broad range of IoT applications and use cases.

### Corstone-310



- **Mali-G310** brings a broad range of graphics performance benefits to low-cost consumer tech devices, from TVs and set-top boxes to low-cost augmented reality (AR) and virtual reality (VR) devices. The GPU integrates **Arm Frame Buffer Compressions (AFBC)** and **Arm Fixed-Rate Compression (AFRC)** image compression technologies that save system bandwidth and power. The AFBC and AFRC technologies are also both available separately as part of Arm Flexible Access.

- **Mali-C55** is a versatile image signal processor (ISP) for a wide range of IoT, embedded and ML applications, including smart cameras, hobby drones and robots.

The decision to expand the IP, tools and support comes following feedback from our Flexible Access customers that are always looking for more technologies to support the development of their SoCs. From our Cortex and Mali Multimedia processors to system IP and Corstone subsystems, Flexible Access offers something for any company looking to get started on their silicon journey.

### STARTUP SUCCESS WITH THE ARM FLEXIBLE ACCESS TECHNOLOGY PORTFOLIO

For the startups that have already signed up to Flexible Access, the results from the program have been impressive. Many have been able to accelerate their own product development process and can now tapeout their SoC designs.

Eray Erdogan, Co-Founder of HEX Microchip, says: "Arm's proven IP, tools and support have helped us manage risk and start on a solid foundation, which has been a bastion of confidence leading us to success." The startup will begin the tapeout of its product in early 2024.

Another startup that is looking to tapeout in 2024 is weeteq, which is developing cutting-edge AI technology for industrial IoT applications. Its founder and CEO, Dr. Taner Dosluoglu, says: "Arm Flexible Access for Startups provides access to state-of-the-art technology and global ecosystem partners, at no cost. It is already hard for startups to develop circuit-level AI solutions, but impossible without this program."

**WandowPower**, which subscribed to Arm Flexible Access for Startups due to the zero-cost access to a broad portfolio of Arm IP, tools and support, tells a similar story. Khash Dolatshahi, Head of Digital Design, says: "We can rely on the performance of the IP, the design kit, blocks and scripts available to us, and focus our efforts on the rest of the design and peripherals that we're adding. That gives us a great jump start."

### A COMMITMENT TO THE FLEXIBLE ACCESS COMMUNITY

The fact that so many Flexible Access customers have been able to move quickly to tapeout highlights the strength of the technology offering and the program. Regularly adding more IP, subsystems, tools and support demonstrates our commitment to Flexible Access customers as they look to target a growing range of applications across a broad spectrum of markets.

We are committed to ensuring that Flexible Access customers and the startup community can build their innovative products and solutions as effectively and efficiently as possible on Arm.

If you're a silicon startup, then find out more about how to get started with Arm Flexible Access today: [www.arm.com/startups-innovation](http://www.arm.com/startups-innovation)



## STRATEGIC PARTNER



### Silicon Catalyst Announces Winners of the Semiconductor Startups Contest in partnership with Arm

## A Look at the Winners of the Silicon Catalyst/Arm Silicon Startups Contest

by Mike Gianfagna, SemiWiki, July 28, 2023

Silicon Catalyst is the world's only incubator focused exclusively on semiconductor solutions. This unique position puts the organization in the center of many new technology innovations. Recently, a Semiconductor Startups Contest was announced in collaboration with Arm. You can learn more about the details of the contest here. Entrants to the contest represented the most interesting emerging applications using Arm technologies, including quantum computing, consumer products, massively parallel AI, cryptography and wireless communications. Silicon Catalyst recently announced the winners of the contest. The winning companies are located in Ireland, Germany and Scotland, emphasizing the global footprint of Silicon Catalyst. Let's take a look at the winners of the Silicon Catalyst/Arm Silicon Startups Contest.

#### THE CONTEST

Arm is both a Silicon Catalyst Strategic Partner and an In-Kind Partner, so the company was a natural fit for this contest. Winners receive valuable commercial, technical and marketing support from Arm and Silicon Catalyst.

The overall top winner receives Arm credit worth \$150,000. In addition, all winners receive:

- Access to the full Arm Flexible Access for Startups program, which includes:
- No cost, easy access to an extensive SoC design portfolio including a wide range of Cortex processors, Mali graphics, Corstone reference systems, CoreLink and CoreSight system IP
- Free tools, training, and support
- \$0 license fee to produce prototypes
- Cost-free Arm Design Check-in Review with Arm's experienced support team
- Entry to the invitation-only Arm ecosystem event and be featured, along with the networking and connecting with Arm's broad portfolio of silicon, OEM and software partners
- Investor pitch review and preparation support by Silicon Catalyst, and an opportunity to present to the Silicon Catalyst Angels group and their investment syndication network

Quite a list of very useful swag. And the winners are...

#### TOP WINNER - EQUAL1

Based in Ireland, Equal1 is a pioneering silicon quantum computing company dedicated to making the technology affordable and accessible. Equal1's pioneering Quantum System-on-a-Chip (QSoC) processors, now in their third generation, integrate entire quantum computing systems onto a single chip, merging millions of qubits, control systems, and real-time error correction capabilities. The company is one of the top patent holders in quantum silicon and is indeed opening a path to the future of quantum computing.



TO LEARN MORE ABOUT EQUAL1 YOU CAN VIEW A SHORT VIDEO FROM THE CEO AND CTO HERE: [HTTPS://SILICONCATALYST.COM/SILICON-CATALYST-ANNOUNCES-WINNERS-OF-THE-SEMICONDUCTOR-STARTUPS-CONTEST-IN-PARTNERSHIP-WITH-ARM](https://siliconcatalyst.com/silicon-catalyst-announces-winners-of-the-semiconductor-startups-contest-in-partnership-with-arm)



#### RUNNER UP - SPINNCLOUD

Based in Germany, SpiNNcloud delivers a unique solution combining deep learning, symbolic AI, and neuromorphic computing. The company's platform delivers a real-time, low-latency, and energy-efficient cognitive AI capability that leverages cutting-edge research from the Human Brain Project. By combining statistical AI and neuromorphic computing in a massively-parallel scale with world-class energy efficiency and real-time response, brain-like capabilities can be enabled. The company aims to deliver Large-Scale AI in Real-time.



SpiNNcloud's system is the only real-time AI cloud with brain inspiration, powering instantaneous robotics control, sensing, prediction and insights, resulting in enabling the most intelligent and capable robots, and the most effective cognitive services.

#### RUNNER-UP - WEETEQ

Based in Scotland, weeteq is pioneering a new approach to circuit design that defines a new technology category of 'circuit-level machine learning'. Called Ultra Edge®, it enables circuit-level, sensor-independent, predictive performance planning and unsupervised performance improvement for every closed-loop control system.



The company is developing embedded software, silicon, modules and enterprise software, allowing other technology manufacturers to seamlessly integrate Ultra Edge® into their solutions. weeteq holds four patents to protect the technology.

#### TO LEARN MORE

You can learn more about the contest and the winners here. And that's a look at the winners of the Silicon Catalyst/Arm Silicon Startups Contest. <https://siliconcatalyst.com/silicon-catalyst-announces-winners-of-the-semiconductor-startups-contest-in-partnership-with-arm>



## IN-KIND PARTNER TEL AVIV UNIVERSITY



### Silicon Catalyst Incorporates Tel Aviv University's Centre for Nanoscience and Nanotechnology into its Ecosystem

by BNN Correspondents

The Centre for Nanoscience and Nanotechnology at Tel Aviv University (TAU) has recently joined the Silicon Catalyst's In-Kind Partner (IKP) ecosystem. This new partnership will provide companies in the Silicon Catalyst Incubator access to the Centre's high-grade nanoscale process development, fabrication services, testing, and analysis services.

Research and development staff from the incubator's companies will be able to utilize the Centre's advanced machinery and professional staff to manufacture and optimize prototypes of their inventions. The TAU Centre offers hands-on equipment use and provides guidance and training for working with various semiconductor equipment and materials. It also provides advanced analytical and imaging capabilities.



(LEFT TO RIGHT) DANNY BIRAN, PETE RODRIGUEZ, ALICE POLACSI-SEGEV, MOSHE ZALCBERG

would grant start-ups from Israel and across Europe access to top-notch nanofabrication and characterization facilities. These facilities are crucial in the development of advanced semiconductor devices. Biran also highlighted that this partnership strengthens Silicon Catalyst's ties with the Israeli innovation ecosystem.

#### EXPANDING INFLUENCE IN THE SEMICONDUCTOR INDUSTRY

With more than 20 years of experience in the semiconductor and design automation industries, Moshe Zalcberg is currently the CEO of Veriest Solutions, a leading design engineering services company. He has previously served as General Manager Israel and world-wide VP of Business Development with Presto Engineering. Moshe also spent over 12 years at Cadence Design Systems, in roles that included General Manager, Israel, and Head of European Professional Services.

Pete Rodriguez, CEO of Silicon Catalyst, stated, "We believe that the value Silicon Catalyst and its partners offer to startups, along with the local support by Danny and Moshe, will help more entrepreneurs overcome the challenges of getting early funding for semiconductor companies."

Dov Moran, Manager Partner at Grove Ventures, also expressed his support for Silicon Catalyst's expansion to Israel, stating, "As Israel excels in semiconductors, I am happy to see Silicon Catalyst's activities expanding to Israel, helping startups reach the prototype stage earlier. Partnerships with foundries and design tool vendors are crucial to such startups, and any activity that enables better access to these elements is blessed."

#### ACCESS TO ADVANCED NANOFABRICATION AND CHARACTERIZATION EQUIPMENT

Alice Polacsi-Segev, the Managing Director of the TAU Centre, expressed her excitement about the partnership. She stated that it would allow innovative start-ups to access a wide range of advanced nanofabrication and characterization equipment and services. Polacsi-Segev believes that this partnership will help Silicon Catalyst's companies to quickly and successfully create and test prototypes of their products.

#### STRENGTHENING TIES WITH THE ISRAELI INNOVATION ECOSYSTEM

Danny Biran, Managing Partner at Silicon Catalyst, also emphasized the significance of the collaboration. He noted that adding the TAU Centre to the roster of In-Kind Partners

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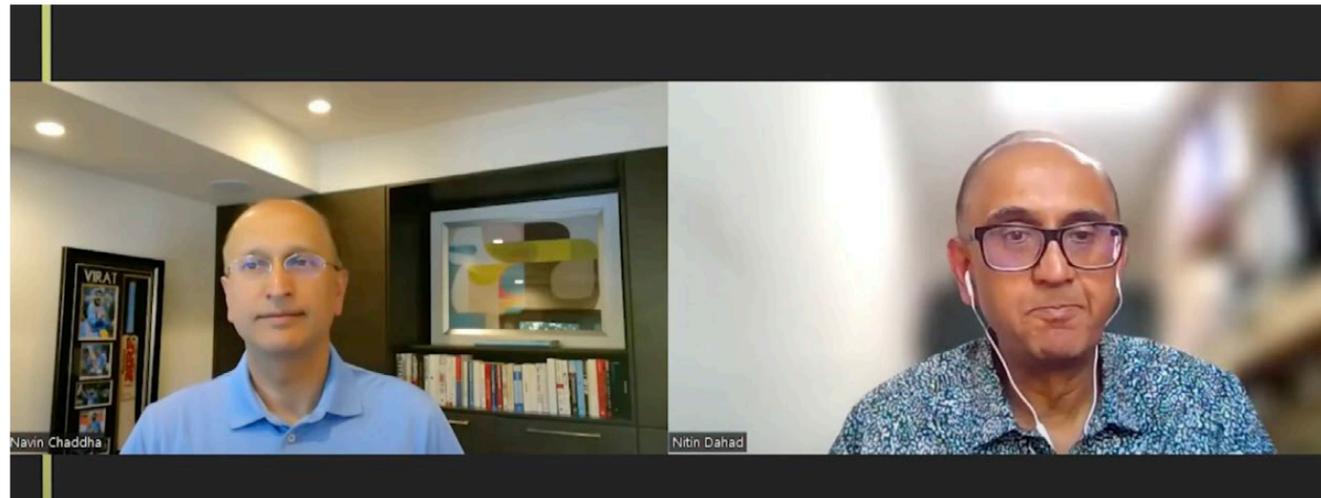
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**STRATEGIC INVESTMENT PARTNER** *Mayfield*  
**MAYFIELD**

**Navin Chaddha: Helping Entrepreneurs Achieve Their Dreams**

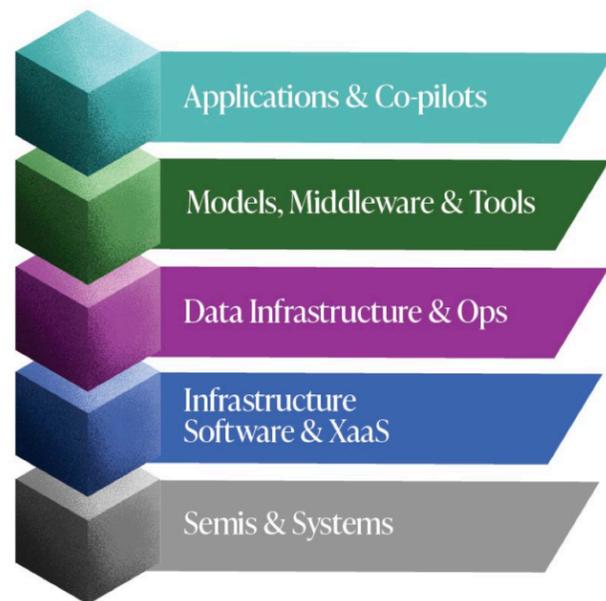
by Nitin Dahad | September 21, 2023 | EE Times



**MAYFIELD MANAGING PARTNER NAVIN CHADDHA (LEFT) DURING INTERVIEW BY EE TIMES JOURNALIST NITIN DAHAD ON THE SILICON GRAPEVINE PODCAST**

Mayfield Managing Partner Navin Chaddha recently joined EE Times journalist Nitin Dahad on the Silicon Grapevine podcast. In this interview Navin shares his motivation for becoming a venture capitalist after three back-to-back successful startups; his journey from his beginnings studying at IIT in Delhi, and Stanford in California, to becoming an accidental entrepreneur to a successful VC; his POV on the semiconductor industry; and more. **Key takeaways include:**

1. Invest in relationships, not transactions - Mayfield's people-first philosophy guides our investment decisions.
2. The VC industry experienced a massive increase in capital investment in startups, reaching a 10x increase from 2012-2021. However, most of this funding went to mid and later-stage companies via follow-on rounds, creating a supply-demand imbalance. It's important for the industry to remember its roots in inception and early-stage investing, and to right-size the amount of money going into startups.



“Take it easy, enjoy the journey and look at what’s around you - don’t be so focused on your goal that you miss out.”

NAVIN CHADDHA, MANAGING PARTNER

3. For a while, the VC industry at large did not invest in semis for a variety of reasons - Moore’s Law, the capital intensity of these ventures, long product development, even longer sales cycles, and public markets valuing software and consumer companies highly, to name a few. But today, silicon investing is back with the Renaissance of Semiconductors, and Navin actively invests in this space, with investments including Nuvia (acquired by Qualcomm), Alif, Auradine, and Frore Systems.

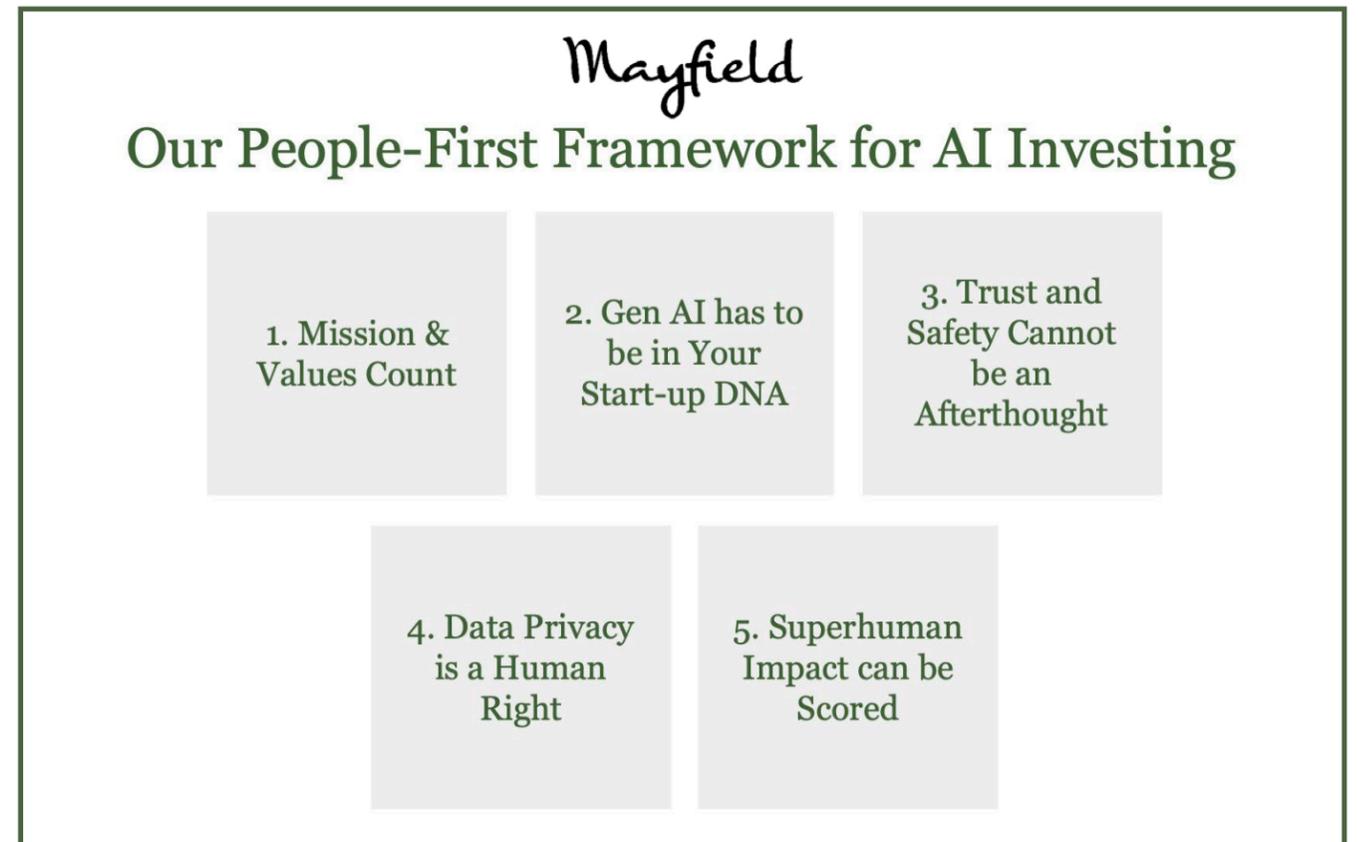
4. Navin urges entrepreneurs that they should have a 30-second elevator pitch, starting with vision, mission & values; articulating the customer problem; explaining how big the market is; and sharing the team’s background and founder-market fit. Once you have a VC’s attention you can

dive deeper into the technology behind the company.

5. Some investment themes Navin and Mayfield are investing in include AI, the renaissance of silicon, the rise of the individual, cybersecurity, and human and planetary health.

6. One piece of advice he would give his younger self: take it easy, enjoy the journey and look at what’s around you - don’t be so focused on your goal that you miss out.

Mayfield brings a People-first view to AI and invests across the five layers of the technology stack. The firm also recently announced the first dedicated seed fund in the firm’s history, the \$250M AI Start. Learn more about the firm’s AI focus here.





## STRATEGIC PARTNER INVESTMENT GROUP M VENTURES



### Overview

by Owen Lozman Managing Director

#### INTRO

The semiconductor industry presents an interesting paradox, superposing a high degree of product innovation with an extremely conservative manufacturing paradigm and a constant pressure on yield improvement and cost reduction. Being successful in such an industry requires a combination of scientific and engineering excellence and an obsession with quality and process control, at the same time as being sufficiently informed and being entrepreneurial and agile enough to respond to technology and market forces. M Ventures is proud to work along with EMD Electronics and Silicon Catalyst to support emerging technologies and companies within the semiconductor ecosystem and to provide early-stage financing for world class entrepreneurs with a potential strategic overlap with the future business of EMD Electronics.

#### WHAT GETS US EXCITED IN THE SEMICONDUCTOR SPACE

M Ventures, as a financially driven, strategic corporate investor, looks for emerging themes that drive the future growth of the industry and for partners that complement EMD Electronics' customer offerings. As an innovative materials supplier it is important for EMD Electronics to keep abreast of developments in both core and adjacent markets to support existing business as well as create new options. Working with our industry partners, such as Si Catalyst, as well as other strategic and institutional investors, portfolio companies and academic advisors we continuously evaluate both market and



STARTUPS FOR SEMICONDUCTOR SUSTAINABILITY PANEL MODERATED BY TOBIAS EGLE OF M VENTURES, WITH PARTICIPANTS FROM LAM RESEARCH CAPITAL, TEL VENTURE CAPITAL, SK HYNIX VENTURES, AND INTEL CAPITAL.

technology drivers to highlight areas of high strategic interest.

Within the technology investment area, we target companies developing applications and solutions for the future of computing, data storage, display and device miniaturization as well as pursuing interdisciplinary approaches that have a strong element of semiconductor technology convergence with healthcare and life sciences. We further focus on novel technologies, services and business models that can positively impact the sustainability of both EMD Electronics and our customers, be that via novel production of materials or through innovations in the application of digital technologies.

**Advanced Nodes:** Novel technologies, materials and processes driving further miniaturization of front-end transistor architectures. Including areas such as: EUV, transistor materials, novel photoresist, metrology, advanced process control.

Example: Tignis combines the precise insights of physics with the most advanced AI and ML data science to give semiconductor equipment manufacturers, wafer fabs, and components and materials suppliers unprecedented automation and process control. Tignis provides the ability to know what your equipment will do, select the best states of operation, and continually (co) optimize processes.

**Architectural innovation:** Novel approaches to improved data flow architectures, including chiplets and interconnect technologies and ASICs for acceleration of specific workloads. Alternative compute approaches, including quantum, neuromorphic, and photonic architectures.

Example: MemryX uses a proprietary, configurable native dataflow architecture, along with at-memory computing. This system architecture fundamentally eliminates the data movement bottleneck for edge AI

<sup>1</sup> M Ventures is the corporate venture arm of Merck, KGaA, Darmstadt Germany. The Electronic business of Merck, KGaA, Darmstadt Germany operates in the US as EMD Electronics.



processing, while supporting a broad set of AI models. Based on a proprietary compiler, a fully automated process allows one-click compilation and performance optimization of trained AI models without and reduction in accuracy or any hand-tuning and model retraining.

**Advanced Photonics:** Technologies which enable the next generation of optical components and systems for display and telecommunications applications, including sensing, holography and optical interconnects and photonic compute.

Example: Celestial AI has built a photonic fabric-based architecture, which scales across multiple-chip systems. Based on optical interconnect technology for compute-to-compute, compute-to-memory and on-chip data transmission, Celestial AI reduces the power required for data movement, allowing a chip to increase its compute power and separate the memory and logic components for high-performance compute applications.

**Semiconductor manufacturing in new markets:** Design companies that leverage traditional semiconductor manufacturing supply chains, to establish entirely new markets outside the areas currently served by the industry.

Example: Metalenz is a fabless design company that designs metasurface optics to enable the next generation of sensing. Rather than building optical lenses out of plastics or glass, Metalenz uses standard semiconductor foundry processes to build optical systems with unparalleled control, performance, and the ability to process previously inaccessible information, such as the polarization components of light.

**Sustainability:** Technologies driving sustainable manufacturing in semiconductor and other industries. Application of Biotechnology to produce sustainable materials, replacement, or abatement of PFAS and other process chemicals, efficient

use of energy, materials and water in the semiconductor industry.

**Security and collaboration:** The security and confidentiality of the data being shared between multiple parties is critical to enable the value creation promised by the latest generation of machine learning models.

#### COLLABORATION WITH EMD ELECTRONICS

Along these main investment themes, we are constantly looking to support companies where there is mutual benefit to having M Ventures as an investor and the heavy weight support of EMD Electronics in the background.

Collaboration with EMD Electronics can come in various forms. For example, together with our portfolio company Seeqc, EMD Electronics is building an enterprise-level quantum enhanced computer for pharmaceutical R&D applications. EMD Electronics is providing global market access as a supplier for ElectronInks metal complex inks in wafer level packaging and module shielding applications. In other cases, EMD Electronics has provided manufacturing services, engaged in joint development agreements, or simply provided detailed markets insights. Importantly, any engagement with EMD Electronics is independent of an investment from M Ventures and no formal collaboration is needed prior to an investment. We strive to provide portfolio companies with access to key decision makers and other talents at EMD Electronics and use strategic engagements as a measure of success of our investment thesis over the long term.

#### CURRENT PORTFOLIO HIGHLIGHTS



#### INDUSTRY COLLABORATION IS KEY: STARTUPS FOR SEMICONDUCTOR SUSTAINABILITY

M Ventures is a strong supporter and one of the founding members of the Startups for Semiconductor Sustainability Initiative, a mentorship program and pitch event for innovators with sustainable technologies that can help drive impact in the semiconductor industry in the areas of emissions, energy, and circularity. The event was inspired by our friends at Micron Ventures, and is organized by corporate VCs of major players in the semiconductor ecosystem, including Applied Ventures, ASML, Intel Capital, LAM Research Capital, Samsung Ventures, SK Hynix Ventures, and TEL Venture Capital.

We strongly believe that to address the major challenges towards establishing a fully sustainable semiconductor supply chain, a concerted effort between fabs, tool makers, and materials suppliers is required and are therefore proud supporters of this initiative, uniting leading semiconductor corporate VCs. As part of our commitment to this effort, we have invested in Tignis who emerged as a semi-finalist in the first iteration of the initiative in 2022.

#### ABOUT M VENTURES

M Ventures is the strategic corporate venture capital arm of the Germany-based Science and Technology firm Merck KGaA, Darmstadt, Germany. The Electronics business of Merck, KGaA, Darmstadt, Germany operates as EMD Electronics in the United States and Canada.

Our team has been involved in the creation and progress of more than 90 businesses since it was set up in 2009. M Ventures has two dedicated areas of strategic investment: Biotechnology (covering healthcare, life sciences) and Technology (covering electronics and frontier tech and sustainability).

Please visit us at [www.m-ventures.com](http://www.m-ventures.com)

# Startups Shaping the Future for Sustainable Semiconductors

## Annual Pitch Event & Mentorship Program

By: Jennifer Ard, Managing Director, Head of Investment Operations at Intel Capital  
Alexandra Farmer Venture Capital Associate at Intel Capital

### Calling all Entrepreneurs, Innovators, and Industry Leaders:

We're inviting you to join us for the third year of the Startup for Sustainable Semiconductors (S3) initiative organized by Corporate Venture Capitalists (CVCs) of the major industry players in the semiconductor ecosystem.

#### HOW DID THE S3 PROGRAM START?

Two years ago, Andy Byrnes, a member of the Micron Ventures team recognized that various semiconductor companies were seeking similar solutions to address the challenges of meeting their net zero goals. In light of this insight, he initiated discussions with Intel Capital and Applied Ventures. Remarkably, both Intel Capital and Applied Ventures were also on a mission to explore novel technologies specifically aimed at sustainable semiconductor manufacturing. From these conversations, the idea of the S3 initiative was born. 2021 was the first year of the program and undeniably served as a learning experience. During this period, several additional venture funds became part of the initiative, contributing a more holistic perspective around the program's model. Additionally, we quickly saw the value of getting SEMI [https://semi.org/] involved in the program as a way to amplify the

program participants with additional PR opportunities, including an opportunity for finalists to present on stage at Semicon West. For the past two years, the program was a huge success with multiple proof of concepts, pilots, and even venture funding.

#### FOSTERING INNOVATION

The program offers startups the unique opportunity to collaborate with industry experts and investors. During the duration of the program, start-ups will have two-way dialogues with technical experts that will enable them to better understand how they can engage with the ever-complex semiconductor ecosystem. *Often, the semiconductor space can be intimidating to start-ups, and this program aims to demystify and provide custom advice on how to tailor their products to best meet the needs of the industry.* In addition, the S3 initiative opens doors for potential proof of concept and pilot partnerships. Additionally, with the CVCs closely engaged, companies can provide feedback on how to improve their pitch to investors and get coaching on how to approach fundraising.

#### THE PROCESS

The S3 initiative is designed to propel the semiconductor industry's sustainability journey forward by partnering with the startup ecosystem. Start-ups apply to the program early in the year. After the submissions are completed, the program sponsors will review all of the submissions by taking into account several factors that include technology, market potential, and the team. Program sponsors also hand-pick mentors for each company to maximize the value of the program to the start-up companies. Those companies then meet with the assigned sponsors to discuss the goals of the start-up companies, including coaching on a specific technical element of their solution, guidance on how to insert themselves in the semiconductor ecosystem, or how to hone in their funding pitch. At that point, there are approximately 6 weeks allotted for the participants to get mentoring. At the conclusion of the mentoring, participants participate in a virtual pitch event with all of the sponsors and other sustainability-minded venture funds. From there, the finalists



#### S3 Program Sponsors



are chosen and invited to share their story and mingle with industry experts at Semicon West in San Francisco.

#### THE 2024 PITCH EVENT

Over the last two years, we have had over 50 companies who have made it to the semi-final round to receive mentoring. For this coming year, we hope to be able to expand our numbers even further. We have expanded the technology focus areas, as described below. Additionally, we are working with international incubation programs to continue to expand applicants across the world. This program signifies a thrilling new chapter in the pursuit of semiconductor sustainability - we encourage startups of any stage and geography to apply.

For more information about the program, please visit the website at <https://www.semi.org/en/industry-groups/startups>. Applications open on January 1st!

#### The technology focus areas for the 2024 program include:

##### Water

- Liquid waste stream abatement, desalination, brine treatment, metals extraction, and energy reduction processes that reach toward 100% water reuse
- PFAS collection, removal, and destruction
- Water measurement, planning, and maintenance software

##### Materials

- Example materials of interest: hydrogen, helium, rare earth elements, copper, ammonia, cobalt, metals, organics/inorganics
- Sourcing, mining, and refinement of materials used in semi manufacturing

- Sustainable processing, storing, or shipping of materials, and on site production
- Recycling and reuse methodologies
- Green hydrogen production and recycling
- Software / AI for sustainable chemicals and materials development

##### Energy

- New process designs for decreased energy intensity
- Improved thermal mgmt, including data center cooling
- Alternative energy sources
- Energy tracking and mgmt software

##### Emissions

- Direct air capture and treatment, including GHG's
- Emissions detection, reduction, and measurement SW/HW tools

#### 2023 Finalists

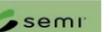
##### Circularity



##### Emissions



##### Energy



#### BIOS:

**Tobias Egle** is an Analyst with M Ventures with a background in Chemical Engineering and a Ph.D. in Physical Chemistry and Materials Science from Harvard University. Located in M Ventures' Boston offices, Tobias focuses on investments in evolving sectors in semiconductors and sustainability. M Ventures is the CVC of Merck KGaA, Darmstadt, Germany whose Electronics business operates as EMD Electronics in Canada and the US. He led S3 in their 2022-2023 efforts.



**Alexandra Farmer** is a Venture Capital Associate at Intel Capital where she focuses on Seed - Series B investments within cloud-native infrastructure & tooling, and sustainability. Based out of Austin Texas, Alexandra joined Intel Capital in 2020 after graduating from the University of Michigan with a Bachelor in Economics. She will lead S3's 2024 efforts alongside Jennifer Ard.



**Jennifer Ard** is a Managing Director at Intel Capital and Head of Investment Operations. She has been with Intel Capital for over 12 years and focuses on investing in the Silicon domain, which includes the fund's sustainability investments. She graduated with a BS and MBA from Brigham Young University. She will lead S3's 2024 efforts alongside Ally Farmer.



IN-KIND PARTNER  
HRFM

## Artificial Intelligence Patent Drafting Strategies for Avoiding or Overcoming Non-Patentable Subject Matter Rejections

by Stephen P. Scuderi | www.hrfmlaw.com

The World Intellectual Property Organization's publication title: "WIPO Technology Trends 2019-Artificial Intelligence" defines artificial intelligence ("AI") systems primarily as:

"learning systems; that is machines that can become better at a task typically performed by humans with limited or no human intervention."

Inadvertently though, the ability of AI systems to perform human tasks better and faster than humans has clashed with recently evolving legal standards on what inventions may qualify under the law as patent eligible subject matter.

In the United States, which arguably imposes the most difficult legal hurdles of any country with regard to patent eligibility, patent eligible subject matter is defined in 35 United States Code section 101 ("section 101") to be:

"any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."

Moreover, U.S. courts have long held that abstract ideas, laws of nature, and natural phenomena are not eligible for patent protection under section 101. The reasoning behind these judicially created exceptions is that they are considered to be the basic tools of scientific and technological work. Therefore, the courts are concerned that granting patents on them would inhibit, rather than encourage, future innovations.

The standard for patent subject matter eligibility became more stringent with the U.S. Supreme Court's 2014 decision in *Alice Corp Pty. Ltd v. CLS Bank International*, 134 S. Ct. 2347 ("Alice"). The Alice decision defined a two step test of: (1) determining whether the claim of an invention is directed to a patent-ineligible concept (such as an abstract idea); and if so, (2) determining if there are additional elements in the claim that contain an "inventive concept" sufficient to transform the abstract idea into a "patent eligible application".

Unfortunately, the courts, as well as the United States Patent and Trademark Office (USPTO), have struggled to apply the Alice test with a reasonably degree of consistency.

Accordingly, litigation over what constitutes patent eligible subject matter has increased markedly since the Alice decision, especially in the area of abstract ideas. This is due, in no small part, to the fact that the Supreme Court has not established a definitive rule to determine what constitutes an abstract idea. Rather, the Supreme Court, and lower courts, have found it sufficient to compare claims at issue to those claims already found to be directed to an abstract idea in previous cases." *Enfish, LLC v Microsoft Corp.*, 822 F.3d 1327, 1334 (2016).

The problem of eligibility is especially acute for AI inventions, which are often rejected by the USPTO as being directed to an abstract idea. This is because an abstract idea may be loosely defined as any concept that can theoretically be performed in the human mind or with pencil and paper, which closely parallels the definition of AI as:

"The capability of a machine to imitate intelligent human behavior (such as reasoning, learning, or the understanding of speech)." (Merriam Webster – Unabridged, <https://unabridged.merriam-webster.com/>)

In an effort to provide more clarity to the analysis of patent subject matter eligibility and particularly to the analysis of abstract ideas, the USPTO published its "2019 Revised Patent Subject Matter Eligibility Guidance" ("2019 PEG"). The 2019 PEG categorizes abstract ideas into the three main groupings of: Mathematical Concepts, Mental Processes (concepts performed in the human mind) and Certain Methods of Organizing Human Activity.

AI Inventions frequently receive 101 rejections (i.e., rejections for non-patentable subject matter) from the USPTO for falling into the grouping of Mental Processes/Abstract Ideas under the 2019 PEG. With that in mind, there are certain precautionary measures one can take in drafting a patent application for an AI invention, that would greatly increase ones chances of overcoming a potential 101 rejection by the USPTO.

First, and probably foremost, the 2019 PEG (as well as a

growing body of court decisions) states that: "an improvement in the functioning of a computer or other technology or technical field may render a claim patent eligible at step one of the Alice/Mayo test even if it recites an abstract idea, law of nature or natural phenomenon." So it is important that the patent application include a detailed explanation of how the AI invention effects a specific technical improvement in either the functioning of the computer system in which it is implemented or the technology field in which it is utilized.

Second, the state of the prior art should be detailed, to the best of the inventor's ability, in the application. This is because in order to describe a technology improvement in any detail, one must have a prior art baseline to compare the improvement to. Indeed, if no state of the prior art is mentioned in the application, there can arguably be no measurable way to claim an improvement. It is important to note, that for a section 101 eligibility determination, the state of the prior art is what the application asserts it to be. It is not necessarily what the actual prior art turns out to be after a search has been conducted by an Examiner at the USPTO to determine patentability. This is because eligibility under section 101 is a threshold determination that must be assessed first, before an Examiner addresses the question of patentability. *Ultramercial, Inc. Hulu, LLC*, 772 F.3d 709 (2014). An Examiner must make a determination of patent eligible subject matter (for a potential 101 rejection) prior to

doing any patentability searches (for potential novelty (102) or obviousness (103) rejections). Therefore, for a determination of patent eligibility under section 101, an Examiner must look to the contents of the application itself to determine the prior art and the improvement over that prior art.

Finally, the stated improvement should be integrated into the language of the claims if possible. General statements of improvement, such as increases in efficiency or speed, of a system will not be enough and will not carry any patentable weight. Rather application should state precisely what the detailed mechanisms or methods are that make the improvements possible, and that language should be inserted into the claims.

In conclusion a patent application for a computer implemented AI invention, should be written anticipating a patent eligibility challenge from the USPTO in the form of a section 101 rejection. One of the most recognized and consistent ways to avoid or overcome such a challenge is to:

- detail a specific technical improvement the AI invention effects in the AI computer system or related technology field;
- baseline the state of the prior art over which the improvement is made; and
- include the structural details of the improvement in the language of the claims.

## STEPHEN P. SCUDERI – ATTORNEY AT LAW

stephen.scuderi@hrfmlaw.com

Stephen P. Scuderi was a professional design engineer for more than 20 years prior to entering private practice as a patent attorney in 1998 and is an inventor on several issued patents. As a patent attorney, he has had substantial experience in both corporate and law firm settings. His practice involves all phases of intellectual property law, including the drafting of hundreds of patents in the electrical and mechanical arts. This includes a diverse array of experience in such technical areas as cell matching for lithium secondary batteries, microfluidic devices for gene sequencing, orthopedic implant systems and other biomedical devices, resistive random access memory devices that emulate the synapses of the human brain, internal combustion engine design, jet engine cooling devices, power generators, refrigerant recovery machines, safety mechanisms for firearms, ink jet printers, computer memory arrays and more. His experience also includes a particular emphasis on state of the art semiconductor and microelectronic technology, including such technical subjects as vertical SRAM semiconductor structures, electrostatic discharge latching technology, wafer boat design, tunneling field effect transistors, complex self-aligned multiple patterning techniques and more. Mr. Scuderi has advised national and international clients on such issues as patent and trademark prosecution strategies, infringement and patentability opinions, licensing and litigation. Stephen also has substantial experience in negotiating, drafting and administering agreements related to corporate and IP matters.

Stephen has earned a Bachelor of Science in Mechanical Engineering from the University of Massachusetts, a Bachelor of Science in Electrical Engineering from Western New England University, a Juris Doctor from Western New England University School of Law, and a Master of Intellectual Property from the University of New Hampshire. Stephen is a registered patent attorney with the United States Patent and Trademark Office and is admitted to practice law in New York, Massachusetts and Connecticut.





## PORTFOLIO COMPANY NEWS SIGMA SENSE COMPANY



### SigmaSense Appoints Semiconductor Industry Veteran David French as CEO

by Shannon Davis | Semiconductor Digest

SigmaSense, an emerging leader in DSP-based sensing systems, announced today that it has recruited veteran semiconductor industry executive David French as Chief Executive Officer to drive the next phase of growth for SigmaSense's digital sensing products for real-world AI. The announcement comes on the heels of NXP Semiconductor's \$35m investment earlier in the year which includes both licensing and co-development of SigmaSense's proprietary technologies.



DAVID FRENCH

David French takes the helm just as SigmaSense's unique approach to sensing is being recognized as transformative for sensing in vehicles, touch screens, and now batteries.

Mr. French, a SigmaSense board member since 2020, brings strong leadership and management experience from his various CEO and executive positions.

• These include: EVP at NXP Semiconductors N.V., CEO of Cirrus Logic, and VP/GM at Analog Devices. French is widely credited for the early productization and broad adoption of DSPs while at Texas Instruments and Analog Devices.

• Most recently, he has been focused on building a portfolio of semiconductor companies as an investor in and advisor to Silicon Catalyst, the world's only incubator focused exclusively on semiconductor solutions.

"It has become clear to me that the Company's technology and extensive IP portfolio affords the unique ability to

capitalize on high growth opportunities across a range of sensing applications," said French. "SigmaSense has invented a foundational technology that transforms the interactions between digital systems and the physical world, which will usher in a new era of radically enhanced DSP-based sensing. These are truly exciting times which the industry has come to recognize. I look forward to helping this talented team build further innovation while ramping sales."

Co-founder Rick Seger, will continue serving as Chairman of the Board to support Mr. French to drive new partnerships and production scaling:

"David French's visionary leadership drove the advancement of DSPs and sigma-delta based semiconductors to grow multiple businesses generating billions in sales," stated Rick Seger, Chairman of the Board. "Today, AI is shifting the demands for reconfigurable mixed signal processing just as SigmaSense is preparing to ramp. SigmaSense is poised to emerge

as a leader in the transition to advanced DSP-based sensing under Dave's leadership," added Seger.

The company also announced the appointment of semiconductor veteran John Teegen to its Board of Directors. Mr. Teegen has held various leadership roles at Dialog Semiconductor, which he joined after Dialog's acquisition of Silego Technology, where he was President and CEO.

"John brings a wealth of experience as a technologist, business leader and senior executive in the semiconductor sector," said Aurelio Fernandez, SigmaSense Board Member and former VP Worldwide Sales for Broadcom. "His industry knowledge and understanding of how sensed data drives product performance makes him an ideal, valuable addition to our board."

**TO LISTEN TO DAVE'S PODCAST INTERVIEW WITH SEMI WIKI VISIT:**  
<https://semiwiki.com/podcast/podcast-ep192-the-impact-of-sigmasense-on-ai-and-beyond-with-david-french/>

#### SHANNON DAVIS

Shannon, writes, edits and produces Semiconductor Digest's news articles, email newsletters, blogs, webcasts, and social media posts. She holds a bachelor's degree in journalism from Huntington University in Huntington, IN. In addition to her years of freelance business reporting, Shannon has also worked in marketing and public relations in the renewable energy and healthcare industries.

"Using their deep knowledge and vast network to put forward superb candidates, we have recruited world-class talent. Strategic, agile and responsive, we are partnering with Errigo for our executive-level searches."

Debo Olaosebikan  
CEO, Kepler Computing

"Errigo recruited our three top C-level executives and all are best-in-class."

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Managing Director, Tugboat Ventures

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## Governor Hochul Announces Round Six Winners of Luminate NY Accelerator Competition

by New York State ?????????????? | September 27, 2023



**\$1 MILLION INVESTMENT RECIPIENT CHARBEL RIZK, CEO OF OCULI**

### Oculi Receives \$1 Million in Investment; Five Additional Companies Secure Follow-on Investments

### Applications Now Being Accepted for Round 7 of the Optics, Photonics, and Imaging Competition until January 8, 2024

### NYS Investment Complements "Finger Lakes Forward" – the Region's Comprehensive Strategy to Revitalize Communities and Grow the Economy

Governor Kathy Hochul today announced Oculi as the winner of Round Six of the Luminate NY optics, photonics, and imaging startup accelerator competition. Baltimore, Maryland-based Oculi received the "Company of the Year" Award at Luminate Finals 2023, which was held live at Innovation Square in downtown Rochester, and online. The company will receive \$1 million in investment from New York State through the Finger Lakes Forward Upstate Revitalization Initiative. Oculi will use the follow-on funding to move its headquarters to Rochester, and to scale operations for mass production, expanding sales, and for developing advanced versions of its products. Luminate NY, which is administered by NextCorps, is the world's largest business accelerator for emerging companies that have technologies enabled by optics, photonics, and imaging. The Finals event

marks the completion of the sixth year of the cohort-based program, which now has over 50 companies in its portfolio. As required by the award, all winners of the competition will commit to establishing operations in the region for at least the next 18 months.

"Thanks to Luminate NY, our state will continue to lead the nation on cutting-edge technological research," Governor Hochul said. "The winners of the competition's sixth round represent some of world's most innovative businesses that are bringing transformative products in optics, photonics and the imaging supply chain to market. I congratulate this year's winners, and remain committed to supporting the fast-growing, high-tech businesses and industries that will move New York forward."

Oculi is redefining computer and machine vision with the world's first smart programmable vision sensor, the Oculi SPU™ (Sensing and Processing Unit). It combines the efficiency of biology—more specifically the human eye—and the speed of machines to make computer vision faster and more efficient. By embedding intelligence in the sensor at the pixel level, the innovative chip has the power to transform smart devices across homes, offices, and vehicles. Oculi's SPU is ideal for visual intelligence at the edge, such as gesture tracking, facial recognition, and low latency eye tracking.



## Semiconductor Industry Veteran Kevin Conley Joins Applied Brain Research as CEO to Drive Next Phase of Innovation

PR Newswire | September 11, 2023

A trailblazing leader in the development of AI solutions, is proud to announce the appointment of, an accomplished semiconductor industry veteran, as its new Chief Executive Officer. With a proven track record of steering industry-leading businesses to new heights, Kevin brings unparalleled expertise and vision to ABR as it enters a transformative phase of growth and innovation.

"I am thrilled to join ABR as CEO and embark on this exciting journey," said Kevin. "In an era of rapid technological evolution, ABR stands at the cutting edge of AI solution innovation, and I am committed to bringing its game changing technology to the Artificial Intelligence of Things (AIoT) chip market. With our leadership in , we are uniquely positioned to redefine industry standards and elevate ABR to new heights of excellence."

"In an era of rapid technological evolution, ABR stands at the cutting edge of AI solution innovation."



KEVIN CONLEY

ABR's co-founder and interim CEO has moved to the CTO role. Chris added "ABR's commitment to delivering breakthrough solutions aligns seamlessly with Kevin's proven ability to drive product development and market expansion. Under his leadership, the company will continue to forge new paths in AI acceleration, enabling groundbreaking applications across industries."

Having held executive leadership positions at global semiconductor leaders, including SanDisk, Corsair Components and Everspin Technologies, Kevin has consistently driven innovation, propelled technology advancements, and delivered exceptional value to customers. His deep insights into the AI chip landscape, semiconductor and product development experience, combined with his strategic acumen, make Kevin the perfect choice to lead ABR's journey into the future.

When asked about the future of the company with this change, Chris said "ABR has consistently challenged industry norms and set new benchmarks in AI. As Kevin assumes the role of CEO, ABR is poised to reinforce its competitive advantage and foster an era of unparalleled innovation bringing its technology to the broad opportunity in the AIoT."

### ABOUT APPLIED BRAIN RESEARCH

(ABR) is a pioneer in Artificial Intelligence technology founded by alumni of the Computational Neuroscience Research Group at the University of Waterloo. ABR is leading a new wave of product development targeting ultra-low power Edge AI, enabling a new level of capability in low-power critical applications. ABR's revolutionary time-series AI processor uses 100x less-power than other high-functionality edge AI hardware, and supports AI models up to 10-100x larger than other low-power edge AI hardware. Device makers can benefit by giving their products cloud-sized AI capabilities, such as full natural language , for less power, latency, and cost, all running locally offline.

ABR, headquartered in Waterloo Ontario, is a Silicon Catalyst Portfolio Company. <https://appliedbrainresearch.com/>



PORTFOLIO COMPANY NEWS  
QPT

## QPT drives Cambridge-Ottawa electric vehicle power play

by Tony Qusted | July 18, 2023 | [www.businessweekly.co.uk/news/cleantech](http://www.businessweekly.co.uk/news/cleantech)

The driving range of electric vehicles is set to be significantly boosted through a transatlantic alliance between Cambridge UK-based power electronics company QPT and GaN Systems Inc in Ottawa.

QPT recently announced that it had created the drive, control, and sense technologies to maximise GaN (Gallium Nitride) transistor performance and overcome design challenges in the 100 kHz to 20 MHz frequency range for high-power and high-voltage applications that use hard switching.

This technology now unleashes the power performance in GaN-based designs – most dominantly in the automotive industry.

The QPT solution requires high-speed GaN transistors to deliver the promised power efficiencies. Now the company has signed an MOU with GaN Systems Inc., who are a world leader in GaN power transistors, to investigate the possibilities of developing these technologies resulting in increased performance and further improvements that will boost the driving range of EVs.

Rob Gwynne, QPT's founder, and CEO, says: "GaN Systems produces the highest performing 650V power GaN devices and this allows us to achieve the highest efficiency when combined with our technology. The better the efficiency of power usage, the greater the range of the EV."

Jim Witham, CEO of the Canadian partner said GaN Systems Inc. was impressed with the technologies that QPT has developed.

"They have unlocked functional improvement in performance, resulting in a highly optimised GaN solution for the EV market," he says. "In partnership, GaN Systems' transistors and QPT



technology could dramatically change the GaN market."

The most significant boost to the EV range comes from QPT's ability to drive GaN much more efficiently. GaN transistors are regarded as the future of power electronics due to their ability to operate at higher frequencies for switching on and off.

A slow switching transition wastes energy because during the switching time, when the transistor is neither on nor off, it dissipates huge amounts of power – resulting in energy losses and overheating issues.

The higher the switching speed, the less time is spent in transition and the less energy is lost. GaN transistors can quickly transition from on to off at 1-2ns instead of 20-50ns for Si and SiC transistors. However, achieving maximum performance is challenging in some high-voltage, high-power applications.

QPT says its solution enables the GaN transistors to be run at their full potential of up to 20 MHz with nanosecond switching to deliver better operational precision without RF interference issues or overheating.

It says its technology enables motors to be driven at up to 99.7 per cent efficiency at peak load with hardly any decrease in efficiency at lower loads. This is a challenge for conventional designs

today, where the efficiency can drop off rapidly at lower loads.

An additional boost comes from integrating and shrinking the Variable Frequency Drive (VFD) that controls the motor speed. Current VFDs are bulky, which means that it is invariably located away from the motor itself and then connected by copper cables that are big and heavy to cope with the hundreds of amps or so going through them.

QPT's next-generation GaN technology shrinks the size of a VFD to around a twentieth of the size, reducing weight and, more importantly, the size reduction means that it can be co-located beside the motor.

This integrated motor solution eliminates the need for long heavy copper cables, which can total up to a significant weight and cost reduction at around half a meter each.

Additionally, the copper cables have resistance marking less power loss and reducing the overall system efficiency. All these factors mean that QPT's solution without copper cables can increase the range of the car.

Rob Gwynne added: "Our calculations show that our VFD solution can reduce power usage by around 10 per cent and even more when the motor operates at low speeds.

"Together with the benefits of no long cables, that can significantly increase the range of an EV or a smaller battery for the same range. Our technology is encapsulated into modules to form a plug-and-play solution that can be dropped in to replace an existing VFD with the rest of the existing system, such as the microprocessor and software stack, staying the same."

QPT Limited was established in Cambridge in 2020 as an independent power electronics company.

PORTFOLIO COMPANY NEWS  
LEMURIAN

## NVIDIA, Intel and Google Alums Launch Lemurian Labs and Secure \$9M in Funding to Solve AI's Compute Capacity Limitations

HPC Wire | October 5, 2023

**TORONTO, Oct. 5, 2023** — Lemurian Labs announced it has secured \$9 million in seed funding to develop an accelerated computing platform specifically tailored for AI applications. The round was led by Oval Park Capital, with participation from Good Growth Capital, Raptor Group and Alumni Ventures among others.

Composed of a core team with experience at Google, Microsoft, NVIDIA, AMD and Intel, Lemurian Labs was founded with the mission to democratize AI, and through the development and deployment of novel mathematical formulas, address several of the key challenges currently facing the industry.

**OUTSIZED DEMAND, PROHIBITIVE COST**

Artificial intelligence is advancing with unprecedented speed, but the computing power needed to develop accurate models is outpacing current hardware capabilities. To keep up with increasingly demanding applications, GPUs are burning an exorbitant amount of power, making AI development extremely costly and environmentally unsustainable. For example, deploying GPT3 at the scale of Google search would consume 400 megawatts, enough electricity to power up to ~360K conventionally-powered homes for an entire year, with costs exceeding \$100B. In addition, the demand has created chip shortages, further halting development, resulting in only a select handful of massively capitalized companies that can even afford to run high-end AI models.

"AI models have grown in complexity and adoption at a rate so rapid that it is now stressing our current hardware infrastructure to the point of fracture," said Jay Dawani, CEO and co-founder of Lemurian Labs. "Models will continue to grow so we need fundamental changes in hardware in order to keep pace. We reimagined accelerated computing around the needs of AI models and its developers to bring down the cost and power consumption by 10X. This way we can fundamentally change the economics of AI such that any company can train and deploy LLMs, not just the fortunate few."

**UNLOCKING GREATER PERFORMANCE THROUGH NEW ARITHMETIC**

Lemurian Labs is addressing these challenges by developing an accelerated computing platform that leverages a novel number system, referred to as PAL (parallel adaptive logarithm), to expedite AI workloads by up to 20x greater throughput at a 1/10th of the total cost of legacy GPUs. This combination of a new number system and co-designed hardware and software in their compute platform unleashes performance gains without scaling up power, allowing users to deploy more within the same power envelope. With faster AI workload deployments at a lower cost, Lemurian Labs is accelerating developer productivity while making these solutions accessible to a wider range of businesses and organizations.

"Lemurian Labs is a venture that epitomizes our mission to invest in

exceptional founders developing and commercializing disruptive technologies aimed at solving mission-critical global challenges," said Justin Wright-Eakes, Managing Partner at Oval Park Capital. "Unlike many of its hardware-first competitors, Lemurian leverages its proprietary parallel adaptive logarithm (PAL) numbering system and takes a software-centric approach to generate improvements in both realizable performance and energy efficiency, positioning Lemurian to redefine the AI processor landscape while enabling scalable, precise and energy-efficient AI solutions for nearly any use case."

For more information about Lemurian Labs and its technology, please visit <https://www.lemurianlabs.com>.

Additional investments came from Untapped Ventures, Plug and Play Ventures, Silicon Catalyst Angels, Blue Lake Capital, Futureland Ventures, AI Operators Fund and Tola Capital.

**ABOUT LEMURIAN LABS**

Founded by accomplished experts in the domains of AI, technology and business at leading companies and organizations like NVIDIA, Intel, and Microsoft, Lemurian Labs is committed to solving AI's compute capacity limitations. The company is pioneering computing solutions of remarkable performance that redefine the boundaries of processing power, democratizing AI for broader accessibility.

Source: Lemurian Labs

## PORTFOLIO COMPANY NEWS

### SALIENCE LABS



## SaliENCE Labs pushing AI forward with new chip design

CEO Magazine | April 26, 2023

Vaysh Kewada, CEO and Co-Founder of SaliENCE Labs, is solving the biggest problem facing AI development today – limited processing power – with a revolutionary new chip design.

Developments in AI have advanced rapidly in the last few years. For the lightning-speed growth needed for the future, however, a revolution in chip technology must occur. And Vaysh Kewada, CEO and Co-Founder of United Kingdom-based SaliENCE Labs, is working on a match to start that fire: a chip with the potential to continually increase in performance and expand AI capabilities.



VAYSH KEWADA

access to the new technology is expanding rapidly.

“Silicon photonics has come a long way on the manufacturing side in the last five to seven years. Now you can fabricate these chips on production-level foundry processes.”

#### LAUNCHING IN A CRISIS

The company was spun out of Oxford and Münster universities in 2021, with leading names in the semiconductor industry, including former CEO of Dialog Semiconductor Jalal Bagherli,

backing the business.

“If we look at how much AI computer models have been increasing, they’re roughly doubling every three and a half months, which is a crazy rate of increase in demand,” Kewada explains. “Our processors historically double in speed every two years, so this is already a problem. We are not keeping up with the demand.”

As standard semiconductor technologies begin to fail, she says the solution lies in photonic tech. The hybrid photonic chips combine the traditional silicone chip with a photonic layer, meaning they are compatible with current systems but also poised for the needs of the future.

“What we have developed is not just an incremental improvement, but a step change in the way we think about computer architecture,” Kewada tells The CEO Magazine.

“It’s a processor that uses photonics, or light on a chip, and that enables the magnitude step change of performance which will enable a whole host of new AI capabilities.”

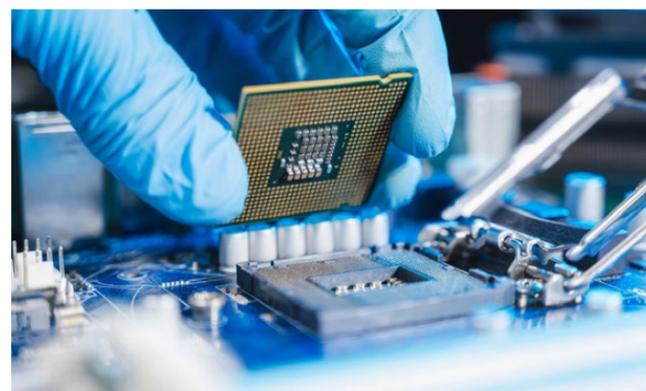
Computing on different wavelengths of light is impossible on a standard electronic chip.

“Our chip creates levels in which you can scale computing capability that isn’t possible with just electronics,” she explains, and now with advancements in technology,

But along with the traditionally higher costs of starting a hardware company, launching a new tech company with chips at its center during the international semiconductor crisis of 2021 was not ideal timing.

“I think it was one of the most interesting times to found a chip start-up,” she says with a laugh.

“When it came to the semiconductor shortage, that just put even more pressure on the importance of being able to build close relationships with the foundry – helping them understand why they should invest their time and resources in our prototyping. That was an important lesson to learn.”



During this uncertain period, Kewada was able to lean on some experienced mentors who helped to guide and reassure her.

“I’ve got a strong band of mentors, industry titans who have gone through this process, and I can call them up when I don’t know how to tackle something,” she says. “I think that has been particularly important.”

With an undergraduate and master’s degree in physics from Imperial College London, where her thesis focused on genetic algorithms, there is no doubt this is an area of specific interest for Kewada.

After a meeting of minds with Johannes Feldmann, the newly formed SaliENCE Labs raised US\$13.5 million in seed funding. And as technical as the company’s focus is, the human touch of in-person conversations led to its birth and has secured its future.

“At the end of the day, we’re very much an engineering company. We absolutely love the engineering aspect, but I think human relationships are really critical. It’s got to be both, being able to attract top talent alongside having good technology, that is what’s really key,” she says.

#### DESIGNING FOR THE FUTURE

Moving forward, Kewada admits planning is strange in an area of business where the sky – and beyond – is the limit.

“We’re designing the process today for a market in two years’ time and it’s a market that’s changing really rapidly,” she explains.

“We can’t design for today. We’ve got to design for the future. If we had to imagine all the ways in which we’d be able to use AI now five years ago, that would have been really hard to picture.

“But that really motivates me because I think we can’t even begin to imagine the capabilities we could create in another five years by providing this level of horsepower to AI models. A very wide host of capabilities will be enabled.”

One of the major issues SaliENCE Labs chip solves is that of low latency, the time it takes for a data packet to travel

from one designated point to another.

“Latency is a critical but sometimes overlooked performance aspect of chips which is increasingly a problem,” Kewada says.

“Model sizes are going in one direction, they’re only increasing. There’ll become a point at which that latency makes them unusable and the only way that we’d be able to overcome that is to have faster hardware. Speed is most definitely important.”



Combining the ultra-fast speed of photonics, the flexibility of electronics and the manufacturability of complementary metal-

oxide semiconductors will allow a new era of processing, a weight that Kewada acknowledges.

Building a game-changing company hasn’t been without its challenges, but the lessons learned from all the obstacles she’s had to overcome has had a formative effect on her business acumen.

“Starting a company, you face a lot of obstacles and it’s important to persevere through them and overcome them,” Kewada says.

“I think when you’re a bit different to the norm, whether that’s gender, age, or whatever difference you have, in those scenarios, I think it’s fair to say you receive slightly less benefit of the doubt. And that’s true, regardless of the way in which you’re different.

“But on the other hand, I have found that has taught me to be very disciplined. It’s taught me to always bring my A-game and so I think it’s been a good learning ground.”

And her overall takeaway from the process of forming SaliENCE Labs and working on such a revolutionary product is one of inspiration.

“Being able to attract the caliber of talent we have and bring people along on the journey you want to go on has been the thing I am most grateful for,” she says.

Learn more at [www.saliencelabs.ai](http://www.saliencelabs.ai)



## PORTFOLIO COMPANY NEWS SPARK MICRO



### Sonus faber Chooses SPARK Microsystems' UWB Wireless Tech for Low Latency Home Audio Speakers

SPARK's UWB technology provides high-quality uncompressed audio delivery for Sonus faber Duetto Stereo wireless speaker system

**Montreal, Canada, October 5, 2023** – SPARK Microsystems, a Canadian fabless semiconductor company specializing in next-generation short-range wireless communications, today announced Italian speaker manufacturer Sonus faber has chosen SPARK's UWB technology for its Duetto wireless speaker system. SPARK's UWB technology enables low latency data transmission from wired to wireless speakers, allowing Sonus faber to deliver a high-quality, uncompressed audio performance that can't be achieved with Bluetooth or Wi-Fi.

Sonus faber's new Duetto speaker system enables customers to enjoy their Duetto streaming home audio system with the satellite speaker of the stereo pair being connected to the main unit using the SPARK UWB-based solution. The system supports a range up to 8 meters for unfettered placement/positioning flexibility with no compromises in audio performance. The system, certified by ETSI and the Federal Communications Commission, enables customers to enjoy high precision wireless connectivity between speakers, maximizing placement options whilst enjoying market leading functionality and integration of music services and connectivity.

"Sonus faber's Duetto speaker system demonstrates the market's evolutionary shift to true wireless audio that delivers premium sound without the wires," said Julie Delamarre, SPARK Microsystems, Vice President of EMEA Sales. "The Duetto speaker system is based on SPARK's UWB technology that enables low latency, deterministic, low power, and high-speed data transport, allowing Sonus faber to deliver uncompressed audio across wirelessly-linked speakers – an industry first achievement."

The ultra-low power, low latency and high-throughput SPARK UWB wireless transceiver enables a new class of short-range wireless connectivity for premium audio applications. Offering higher data rates and better robustness than other short-range wireless solutions – with extreme low latency that can't be matched with Bluetooth or WiFi – SPARK UWB enables high fidelity uncompressed audio for a richer, more immersive audio experience.



"SPARK's UWB technology was chosen for the Duetto speaker system because of its capabilities to deliver uncompressed audio wirelessly with no latency, variability or bandwidth concerns," said Livio Cucuzza, Chief Design Officer, Sonus faber. "These capabilities will give our customers a superior experience because they can enjoy audio as it was originally intended by the artists themselves, with the flexibility of wireless pairing between speakers."

#### ABOUT SONUS FABER

Sonus faber is a designer and manufacturer of high-end audio technology, founded in 1983 in Italy's Veneto region, world-renowned for luxury goods manufacturing. Latin for "Artisan of Sound", Sonus faber expertly informs their state-of-the-art audio engineering with the traditions of Italian design expertise, hand-producing speakers with design cues inspired by centuries of musical instruments, crafted from organic materials such as wood and leather to reproduce sound as the artist intended. Marrying the artisanal beauty of the past with the technology of the future, Sonus faber audio systems deliver natural, immersive, three-dimensional sound from beautiful, hand-designed speakers built to last for decades. For more information, please visit [www.sonusfaber.com](http://www.sonusfaber.com).

#### ABOUT SPARK MICROSYSTEMS

SPARK Microsystems is building next generation short-range wireless communication devices. SPARK UWB provides high data rate and very low latency wireless communication links at an ultra-low power profile, making it ideal for personal area networks (PANs) used in mobile, consumer and IoT-connected products. Leveraging patented technologies, SPARK Microsystems strives to minimize and ultimately eliminate wires and batteries from a wide range of applications. For more information, please visit [www.sparkmicro.com](http://www.sparkmicro.com).



## PORTFOLIO COMPANY NEWS QUADRIC



### Quadric Joins the Silicon Catalyst In-Kind Partner Ecosystem

Chimera™ GPNPU IP now available to power efficient AI/ML inference for the next generation of silicon startups

Press Release | June 28, 2023

**Silicon Valley, CA, June 28, 2023** - Silicon Catalyst, an incubator exclusively focused on accelerating semiconductor solutions, announced that Quadric® has joined as a new member of its In-Kind Partner (IKP) ecosystem. The Silicon Catalyst IKPs provide technical and business support to the Portfolio Companies in the incubator, enabling them to tap into the products and services available to enhance the growth of their companies.

Quadric's Chimera family of GPNPUs is a semiconductor intellectual property (IP) offering that blends the ML performance characteristics of a neural processing accelerator with the full C++ programmability of a modern DSP. Chimera GPNPUs provide one unified architecture for ML inference plus pre-and-post processing, greatly simplifying both system-on-chip (SoC) hardware design by the semiconductor developer today and subsequent software programming months and years later by application developers.

Chimera GPNPUs are now added to the roster of silicon IP building blocks available to Silicon Catalyst member companies, enabling those innovative startups to focus on value-add algorithm solutions that deliver differentiated value.

"Silicon Catalyst is instrumental in bootstrapping new and innovative silicon companies" said Veerbhan Kheterpal, CEO and co-founder of Quadric. "Quadric itself was a part of the Silicon Catalyst program back in 2018, and now we have a chance to pay that back to the next cohort of incubating companies."

#### HIGH EFFICIENCY + FLEXIBILITY: FIRST TO SUPPORT VISION TRANSFORMERS

The Chimera GPNPU architecture excels at convolution layers, the heart of convolutional neural networks (CNNs). Quadric's Chimera cores deliver ML inference performance similar to the efficiency of dedicated CNN offload engines but with full programmability. Unlike conventional accelerators that can only run a handful of

predetermined ML operators, Chimera GPNPUs can run any ML operator. Custom operators can be added by the software developer simply by writing a C++ kernel utilizing the Chimera CCL application programming interface then compiling that kernel using the Chimera SDK.

Quadric's support of the latest innovation in machine learning – the Transformer class of models – is evidence of the architecture's flexibility. The invention of the Vision Transformer (ViT) class of models has rendered many traditional edge and device NPU accelerators obsolete because they cannot support ViT class models. But Quadric's Chimera GPNPU does support performant implementations of ViT graphs. Interested users can see and evaluate ViT on the Chimera platform in the Quadric DevStudio, found at [studio.quadric.io](http://studio.quadric.io).

"Silicon Catalyst has built an ecosystem to support semiconductor hardware companies that includes over 60 In-Kind Partners, and we are thrilled to have Quadric become our first Portfolio-Company-turned-INKP," said Nick Kepler, COO of Silicon Catalyst, "As they build a successful market presence, it is gratifying to see Quadric evolve from building their first chip with the help of our In-Kind Partners to providing that same support to our current and future Portfolio Companies."

#### QUADRIC AT DAC60 IN SAN FRANCISCO

Quadric's Chief Marketing Officer, Steve Roddy, will be participating in a panel session, "AI on the Edge! Challenges and solutions for Edge AI products", Monday July 10, 2023, 3:30 to 5pm, Room 2008, level 2. The session details can be found here in the areas of communications, energy, IoT and embedded systems."

#### ABOUT QUADRIC

Quadric Inc. is the leading licensor of general-purpose neural processor IP (GPNPU) that runs both machine learning inference workloads and classic DSP and control algorithms. Quadric's unified hardware and software architecture is optimized for on-device ML inference. Learn more at [www.quadric.io](http://www.quadric.io).

**PORTFOLIO COMPANY NEWS**  
**RAAAM MEMORY TECHNOLOGIES**



**RAAAM Memory Technologies Ltd. Strengthens its Corporate Structure**

Seed funding round accomplished. Two industry veterans, Thomas Seiler and Danny Biran elected to its Board of Directors

Press Release | May 7, 2023

**Tel Aviv, Israel / Lausanne, Switzerland – 5 July 2023**

- RAAAM Memory Technologies Ltd., a provider of the highest-density on-chip embedded memories in standard CMOS technologies, has elected two industry veterans, Thomas Seiler and Danny Biran, to its Board of Directors following its successful seed funding round.

Thomas Seiler's career spans decades in the semiconductor and electronics industry. He has been a member of the Board of Directors of u-blox Holding AG and served as its CEO from 2002 to 2022. From 2002 until 2019, he also held the role of Head of Marketing and Sales. Before, from 1999 to 2001, he served as CEO of Kistler Holding AG, Switzerland, and from 1991 through 1998 he led Melcher Holding AG, Switzerland as CEO.



**(L-R) THOMAS SEILER AND DANNY BIRAN**

Danny Biran is a managing partner at Silicon Catalyst. He had a long career in the semiconductor industry, most recently as Senior Vice President of Marketing and Strategy at Altera Corporation until its acquisition by Intel. He also served as a member of the Board of Directors of the Global Semiconductor Alliance (GSA). He is also a senior policy fellow at Israel's Start-up Nation Policy Institute (SNPI).

RAAAM's innovative GCRAM technology is based on many years of research and development by Israeli-based Bar Ilan University (BIU) and Swiss-based École Polytechnique Fédérale de Lausanne (EPFL). It provides much higher density and lower power consumption than traditional SRAMs, thus allowing embedding more memory on chip or reducing die size and cost, depending on the application needs. The technology is fully compatible with standard CMOS processes and requires no additional process steps or cost. It has been validated on silicon covering a wide range of CMOS technologies in several foundries.

"We are extremely excited and honored to have Thomas Seiler and Danny Biran join RAAAM's Board of Directors", said Robert Giterman, RAAAM's CEO. "Thomas and Danny's combined experience in the semiconductor industry will

drive RAAAM forward to build up and grow the company, to secure its future financing and to reach qualification of our memory technology in more process nodes."

"As traditional SRAM scaling is effectively coming to a halt in very advanced nodes, the industry is looking for new technologies to support the increasing demand for embedded memories", said Thomas Seiler. "RAAAM solves this problem with leading edge technology."

**ABOUT RAAAM**

RAAAM Memory Technologies Ltd. is an innovative embedded memory solutions provider, delivering the highest-density on-chip memory technology in the semiconductor industry. RAAAM's patented GCRAM technology allows semiconductor companies to significantly reduce fabrication costs through die size reduction or enable a dramatic reduction in the off-chip data movement by increasing the on-chip memory capacity, enabling industry growth for emerging applications such as AR/VR, Machine Learning (ML), Internet-of-Things (IoT) and Automotive. Find us on [www.raaam-tech.com](http://www.raaam-tech.com) LinkedIn

**Si SILICON CATALYST** **Strategic Ecosystem Partners**



**Si SILICON CATALYST** **In-Kind Ecosystem Partners**



**PRESS RELEASE**  
**INNOVATION SPACE**



**Innovation Space and Silicon Catalyst Establish Collaboration for Joint Incubation to Fuel Growth of Semiconductor Industry Startups**

News Release | October 3, 2023

**Wilmington, DE and Silicon Valley, CA, October 3, 2023 -**

The Innovation Space™ a not-for-profit innovation ecosystem - and one of the nation's largest for science entrepreneurs - and Silicon Catalyst, the world's only incubator + accelerator focused on semiconductor solutions, have established a collaboration to co-incubate early-stage science-based enterprises focused on advanced materials and other enabling technologies critical for the semiconductor industry.

Startups and early-stage entrepreneurial teams will have access to the best-in-class science labs, mentorship, and customized programming available from The Innovation Space alongside Silicon Catalyst's startup development expertise and its comprehensive ecosystem of Strategic Partners, Advisors and In-Kind Partners, providing a unique opportunity to drive business growth.

"The partnership between The Innovation Space and Silicon Catalyst was inspired and catalyzed by the pending transformative changes on the horizon for the semiconductor industry as a result of the bipartisan CHIPS & Science Act that was championed by President Biden," said Bill Provine, founder, President and CEO of The Innovation Space. "Our new partnership will provide startups with critical resources and support that will build and grow a more vibrant domestic semiconductor innovation ecosystem."

Silicon Catalyst Co-founder and former CEO Dan Armbrust is one of the original 24 members appointed to the Industrial Advisory Committee (IAC), an advisory body that is providing guidance to Commerce Secretary Gina Raimondo on a range of issues related to domestic semiconductor research and development in support of the CHIPS & Science Act. In addition, CEO Pete Rodriguez served on the semiconductor working group of the President's Council of Advisors in Science and Technology (PCAST).

Collectively, this new partnership will present opportunities



to startups that leverage the industry-specific expertise of Silicon Catalyst and its powerful semiconductor ecosystem coupled with the state-of-the-art laboratories and scientific infrastructure and the hands-on, mentorship and coaching prowess of The Innovation Space. Startups can now be considered for lab space at The Innovation Space in Wilmington, Delaware and/or with virtual support provided by both entities for startups from anywhere in the world.

"We are very pleased to announce our collaboration with The Innovation Space. Our joint efforts to assist science-based entrepreneurs develop and deliver new technologies for semiconductor materials offers a unique opportunity for our industry," stated Dr. Atiye Bayman, Silicon Catalyst Partner.

The Innovation Space is a not-for-profit organization and is a virtual and physical innovation ecosystem located in Wilmington, Delaware on the historic grounds of the DuPont Experimental Station campus. It is built from the foundational partnership between the State of Delaware, DuPont, and the University of Delaware and its mission is to catalyze the scientific innovation of entrepreneurs working in the fields of advanced materials, innovative ingredients, agriculture, healthcare, renewables, and



Silicon Catalyst has developed an unparalleled support ecosystem for its semiconductor start-ups, providing a strong network of financiers, business advisors, and industry professionals who help companies to launch and scale in the market. In addition, the incubator provides privileged access to services, expertise, and intellectual property that can empower their companies' technological innovation.

**ABOUT THE INNOVATION SPACE**

The Innovation Space™ - "The home for science entrepreneurs"™

The Innovation Space™ is a not-for-profit innovation ecosystem and is a virtual and physical home for leading science entrepreneurs. The Innovation Space works to "transform science and technology startups into industry leading companies." Located on the historic Experimental Station campus in Wilmington, Delaware, The Innovation Space is comprised of 130,000 ft2 of state-of-the-art lab and office space with access to cutting edge equipment alongside a suite of entrepreneurship programs and opportunities supporting startup growth. Register for more information and updates to learn more about all The Innovation Space programs and funding opportunities. [www.innovationspace.org](http://www.innovationspace.org)

advanced manufacturing. Innovation Space has supported more than 100 companies on their trajectory toward commercialization and those companies have raised \$1 billion in funding since the founding of Innovation Space in 2017.

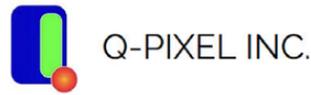
Silicon Catalyst is the world's only incubator + accelerator focused on semiconductor solutions, (including Photonics, MEMS, sensors, IP, materials & Life Sciences) to accelerate startups from idea through prototype, and onto a path to volume production.





# Portfolio Companies

## CURRENT



# COVALENT METROLOGY

# Analytical Services and Solutions to Accelerate Your R&D

Data & insight fuel smarter decision-making. Covalent provides advanced materials characterization services that empower researchers and engineers to keep innovating.

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Root-cause Failure Analysis  
Competitor Benchmarking  
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ICPMS | ICPOES | Raman  
SIMS | Solid/Liquid NMR

### Electron Microscopy

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BIB | Lamella Prep  
EDS/EDX | EELS | EBSD

### Material Property Testing

DSC | TGA | TMA/DMA  
Rheology | Gas Adsorption/BET  
Porometry | Pycnometry  
Zeta Potential

### Optical Imaging & Inspection

Ellipsometry | Interferometry  
LSCM | CDP/FRT  
VKX | VHX | VR

### Particle Analysis

Laser Diffraction PSA  
DLS/ELS  
Streaming Zeta Potential

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**ADVISOR EVENT  
MCKINSEY & COMPANY**

McKinsey  
& Company

McKinsey & Company Shines a Light on Domain Specific Architectures

by Mike Gianfagna | October 6, 2023 | SemiWiki



When we hear McKinsey & Company, we may think of one of the “Big Three” management consultancies. While that’s true, this firm has a reach and impact that goes far beyond management consulting. According to its website, the firm accelerates sustainable and inclusive growth. While this is an inspirational statement, the purpose of the company really gets my attention – to help create positive, enduring change in the world. Silicon Catalyst felt the same way recently when they invited one of the partners from McKinsey to discuss the future of software and semiconductors. The comments made illustrate a solid understanding of the trends around us and a tendency to revolutionize results. Read on to see how McKinsey & Company shines a light on domain specific architectures.

**THE EVENT AND THE SPEAKER**

Silicon Catalyst hosted a networking event recently that focused on the future of compute. Presenting was Rutger Vrijen, Ph.D, a partner in McKinsey’s global Semiconductor and Advanced Electronics practice.

He serves semiconductor and other advanced-electronics clients on a range of topics, including growth strategy and transformation, cross-border M&A, pricing excellence, supply-chain performance diagnostics and transformation, as well as effective, efficient product development. With two patents and over 30 articles in globally leading scientific journals, Rutger had some insightful comments to share with the group.

**THE DISCUSSION**  
Rutger Vrijen, Ph.D

Rutger began his talk with an overview of the forces that got us to domain specific architectures. Essentially, the slowing of transistor density scaling (Moore’s Law) and the acceleration of the energy cost (Dennard scaling).

While Moore’s Law is still quite important, process innovation is no longer enough to address the innovation requirements of advanced products. We must turn to architectural innovation and here is where domain specific architectures (DSAs) become relevant.

Rutger focused on the impact of DSAs across four main markets – HPC & AI, IoT, blockchain, and automotive. The impact is broader than this, but these markets exhibit some high-impact results from a workload-specific approach. Rutger reports that across these four domains, DSAs have an estimated 2026 market share of \$89B, with HPC & AI leading the pack at \$46B.

According to Rutger, the DSA movement has attracted around \$18B in venture funding since 2012 and there are about 150 DSA startups today. The movement is real. Critical enablers for DSA innovators are becoming increasingly available, which will further accelerate changes. These enablers include:

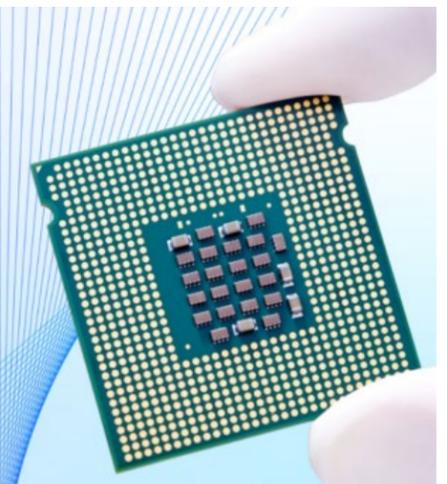


RUTGER VRIJEN, PH.D

McKinsey  
& Company

**Future of Compute:  
Exploring the future of Domain  
Specific Architectures (DSA)  
and disruptions of the value chain**

Silicon Catalyst / Silicon Angels Networking Event  
Rutger Vrijen, Ph.D. – Partner  
September 2023



- Increasing manufacturing leadership of foundries, providing universal access to leading manufacturing capabilities

- A mature cloud market, delivering fast routes to customers and applications for chip startups that are integrated in cloud infrastructures

- Increasing maturity of licensed and open-source hardware and software IP to democratize chip design and software stacks

- Advanced semiconductor packaging and heterogeneous integration to interconnect DSAs with low latency and high bandwidth

- Material innovations including paradigms beyond CMOS (e.g., photonic, neuromorphic)

Rutger went on to discuss the incredible impact DSAs and AI in general will have on design and manufacturing. The discussion was quite exciting. I’ll be sharing a link where you can get a lot of this detail in a moment. But first I want to convey one interesting use of AI that McKinsey was behind – the design of racing sailboats.

It turns out this sport has some real challenges. The design of the boat is done over many months, with the need for a lot of simulation time. This requires actual humans to spend time in the simulator to debug the design. These are the same humans who are conducting press interviews and promotion for the event – a difficult balance. Something else I didn’t know – the actual race boat with final hydrofoil designs is physically available only a few weeks before the race. Talk about pressure.

McKinsey had a different idea. In 2021, they partnered with the New Zealand team to build a reinforcement learning approach to sailboat design. The software was able to adjust 14 different boat controls simultaneously, a task that typically takes three Olympic medalist sailors. This approach

to extreme and continuous optimization paid off – New Zealand won the Americas Cup that year. This is another example of how McKinsey is quietly changing the world.

**TO LEARN MORE**

You can read the entire story about domain-specific architectures and the future of compute in the [McKinsey Insight piece here](#). McKinsey is also collaborating with the SEMI organization for an event dedicated to DSAs and the future of compute. There is a who’s who lineup for this event. It will take place at SEMI headquarters in Milpitas, CA. Here are some of the presenters:

**STARTUPS**

- Cerebras – Dhiraj Mallick
- SiMa – Gopal Hegde
- Recogni – Marc Bolitho
- Tenstorrent – Keith Witek, Aniket Saha
- ai – Gavin Uberty

**INVESTORS**

- Silicon Catalyst – Pete Rodriguez
- Cambium Capital – Bill Leszinski
- ModularAI – Chris Lattner
- Simon Segars

**ECOSYSTEM**

- Synopsys – Antonio Varas
- Rescale – Joris Poort, Edward Hsu
- GlobalFoundries – Jamie Schaeffer
- TSMC – Paul Rousseau
- LAM – David Fried
- Advantest – Ira Leventhal
- ASE – Calvin Cheung
- Intel – Satish Surana

You can register for this event here. And that’s how McKinsey & Company shines a light on domain specific architectures.

## SILICON CATALYST ADVISOR PROFILE

### LYNN FORESTER

Silicon Catalyst Managing Partner Atiye Bayman had an opportunity to speak with Dr. Lynn Forester, one of our Advisors, based in Silicon Valley. Dr. Forester is an entrepreneurial engineer with a strong business background, excellent management skills, and an outstanding technical background.

Dr. Forester is a co-founder and Chief Executive Officer of Quantum Semiconductor, focused on the development and commercialization of a new technology platform combining Group IV alloys and superlattices with CMOS. She is responsible for technical oversight and strategic direction, as well as legal, financial, and business aspects of the company. Dr. Forester has over 30 years' experience in the semiconductor industry. Before co-founding Quantum Semiconductor, she was in the senior management team at Honeywell Advanced Microelectronic Materials, in Sunnyvale, California, where she built a team of over 40 engineers and was responsible for application engineering, international account and business development, strategic planning and global marketing. After graduate school at Caltech, Dr. Forester joined Advanced Micro Devices as a senior development engineer, first in California and then on assignment in Texas. She was recruited overseas by Philips Semiconductor in Eindhoven, the Netherlands to join the Mega Project (a joint venture of the Dutch and German governments, Siemens and Philips), where she worked on CMOS process development and integration. After Philips, she spent 3 years at IMEC in Leuven, Belgium



**DR. LYNN FORESTER, CHIEF EXECUTIVE OFFICER OF QUANTUM SEMICONDUCTOR**

in advanced CMOS research and development.

Lynn holds M.S. and Ph.D. degrees in Chemical Engineering from the California Institute of Technology in Pasadena, California and a B.A. in Chemistry from the University of California at Santa Cruz. She received her M.B.A. from Santa Clara University where her specializations included finance and entrepreneurship. She is the author or co-author of over 40 talks and technical papers and 8 patents.

**AB: PLEASE TELL US ABOUT YOUR BACKGROUND AND EXPERIENCE IN THE SEMICONDUCTOR INDUSTRY, PRIOR TO FOUNDING QUANTUM SEMI.**

**LF:** I started my college education at UC Santa Cruz, where I studied chemistry. I was very interested in physics, I had had a research fellowship as an undergraduate, where I figured out that I really wasn't comfortable working on animals. And so it had to be materials after that, or physics or something like that. I went to graduate school at Caltech, where I worked on a very little-known technique called inelastic electron tunneling spectroscopy, associated with surface science. I studied how you take a known homogeneous catalyst and put it on the surface to see if it's still active. And from there, well, a lot of the graduate students from that group, if they didn't go into academics, they went into the petroleum industry. And faced with the petroleum industry, or semiconductors, semiconductors seemed way more exciting, and I decided to join Advanced Micro Devices. I was a process engineer, working in photo lithography. After AMD, I joined Philips Semiconductors and moved to the Netherlands to work on the Mega project. The Mega project was a joint development between the Dutch and German governments and Philips and Siemens, to compete with



the Japanese, in SRAMs and DRAMs. My next stop was at IMEC in Belgium. I was involved with semiconductor process integration, and not really process development anymore, primarily for back-end technology. At IMEC I worked for Luc Van den hove, who's now the President and CEO of IMEC. But back then, he was the manager of the micro-patterning group.

**AB: WHAT LED YOU TO BECOMING AN ENTREPRENEUR AND LAUNCHING QUANTUM SEMI?**

**LF:** I ended up starting the company with my co-founder, a colleague from IMEC. I decided to make the leap and looking back on the decision, I had no idea that it would be such a long leap. It has been quite a journey, challenging and fun, and at times, difficult. In the early days, we had a lot of good things going on with Jazz, which is now Tower Semiconductor. Their CTO liked our technology, and we had several free shuttle runs to develop our photodiodes using standard materials for sensing based on their BiCMOS process. We also spent a lot of time trying to get the attention of various people doing infrared imaging at DARPA. And finally, one of them agreed to give us a contract. Quantum Semi is focused on advancing what silicon can do handling light through the addition of special type of superlattices - atomistically engineered Group-IV

materials to bring new capabilities for how it can sense and emit efficiently in the infrared. Silicon doesn't emit efficiently or absorb in the infrared. If you talk to Group III-V material people, they really don't know why you would want to do that. They think III-V materials are really pretty good the way they are, so why would you want to even bother. Our view is that if you could bring these capabilities to silicon, then it opens amazing possibilities for the types of devices, the functionality that you have, the ability to also engineer lasers in silicon next to photodiodes that can absorb. I'm pleased to say that Quantum Semi has been granted 28 US patents.

**AB: WHAT ADVICE WOULD YOU GIVE CEOs THAT ARE STARTING A COMPANY IN THE SEMICONDUCTOR INDUSTRY?**

**LF:** Simply stated, be organized and persevere. Make sure you have a good patent attorney. And if you don't then learn how to write provisional filings that you can turn into something later. I believe that you need to be prepared to learn other things than what your core expertise might be going into your company. For our company, I didn't anticipate learning nearly as much as I have about government funding, and all the ins and outs and requirements of that. It's been challenging and interesting. You pretty much need to be kind of a jack of all

trades at a small company. You need to figure out your own personal taste for how much "pain" you can endure and the financial burden that you're willing to take on. I think that's important to figure out in advance what your limits are and have those discussions with your co-founders so that you're all on the same page. And hopefully, you choose co-founders that you're going to get along with well enough to advance your business.

**AB: WITH YOUR KNOWLEDGE AND EXPERIENCE IN THE SEMICONDUCTOR MATERIALS SPACE, WHAT BREAKTHROUGH TECHNOLOGIES DO YOU SEE IN THE NEXT THREE TO FIVE YEARS?**

**LF:** I think one of the big new areas coming up is metamaterials and their impact for photonics. For optics, there will be metalenses and metamaterials that can bend light and do things that you couldn't do before, that you can't do with silicon. It's similar to what we're working on, these engineered atomistic materials. If you look at the advances that are going on in quantum computing, nobody really wants to have a network of cryogenically cooled devices. Our belief is that quantum silicon photonics is going to be the way to go. And a lot of new materials will have properties that hopefully will not need cryogenic cooling as they get more advanced and more controlled. Even traditional electronics and microelectronics are going that way - if you look at what's going on now, for some of the advanced nodes, with FinFETs, that certainly helped us because 10 years ago the types of tools that we need in terms of epitaxy, and growing layer by layer materials really didn't exist, or it was not nearly as well understood as it is now. Being able to do that with standard tools in the industry is a complete game changer to explore a realm of new materials and figure out how to make them silicon compatible and take advantage of the supply chain for CMOS.

## SILICON CATALYST ADVISOR PROFILE

### STEVE TURLEY, PH.D.

Silicon Catalyst UK Managing Partner Sean Redmond had an opportunity to speak with Steve Turley, one of our Advisors, based in the UK. Steve is an accomplished entrepreneur, with strong technical and business expertise in the area of photonics.

Steve Turley, Ph.D., is Chairman of the Supervisory Board of Effect Photonics, a fabless Photonic Integrated Circuit company headquartered in the Netherlands, with additional engineering and DSP design capabilities in the US. Steve's current focus is to guide early-stage technology companies through their lifecycle from fundraising and strategic assessment to global scale up and exit. Steve is an Advisor to the Chip Start UK program, the collaboration between Silicon Catalyst UK and the UK government's National Semiconductor Strategy. Until recently Steve was CEO of Perpetuum, a venture capital backed spin out from Southampton University based on energy harvesting technology. He pivoted the capability to include AI/IOT capabilities to deliver condition monitoring information to the rail industry. He sold the company to Hitachi Rail in 2021 and left in 2023 after completing the integration and working on Hitachi's digital strategy for Rail. Prior to this he was CCO of Bookham (now Lumentum) with responsibility for Sales, Marketing, Product Management and M&A. Earlier he was VP Strategic Alliances, Director of Sales and Marketing for Nortel Networks Optical Components. His career started in R&D on semiconductor lasers with STC/ITT, which he transferred into manufacturing and became responsible for Manufacturing Operations including wafer fab and



**STEVE TURLEY, PH.D. CHAIRMAN OF THE SUPERVISORY BOARD OF EFFECT PHOTONICS**

package assembly. Steve has a degree in Physics from Oxford University and a Ph.D. in Semiconductor Laser Physics from Sheffield University and is based in the UK.

**SR: WHAT ATTRACTED YOU TO THE SEMICONDUCTOR INDUSTRY, PLEASE GIVE US A SENSE OF YOUR BACKGROUND**

**ST:** After completing a physics degree, I decided to work in the field of industrial R&D for semiconductors. The first job choice was working with gallium arsenide and indium phosphide compound semiconductor materials. Looking back, it turned out to be a really good choice. I've been involved in photonics pretty much all my career. I think it's a fascinating area to work in, because you can see the output of what you're doing. For example, one of the projects

was to design a semiconductor laser for the first generation of undersea communications between UK and Belgium and you think, Wow, you know, this really makes a difference. Very quickly, you get hooked into the subject and it's difficult to leave after that.

**SR: NOW THAT YOU'VE BEEN INVOLVED WITH SILICON CATALYST UK, WHAT DO YOU SEE AS THE BENEFITS?**

**ST:** It's great to see so many startups so you get to connect with innovative deep tech companies run by very, very smart people. What they need is the commercial experience and expertise to drive them forward. With any startup, there's so many bear pits around that you can fall down and every new technology has got its new ones. So why would you fall down the ones that everyone else knows about? I think that's really the magic of bringing our skills and experience so people can focus on avoiding the new traps that technology and their target markets have created. The other thing that's important to me is that you actually learn a heck of a lot from listening to the other advisors as well. There's so much skill and experience there that when you're just listening to other people, you're just absorbing that and really broadens your horizon and broadens your experience.

**SR: CAN YOU ELABORATE ABOUT YOUR REFERENCE TO "BEAR TRAPS" AND HOW IT RELATES TO OUR STARTUPS?**

**ST:** I think it's mostly the entrepreneur's commercial inexperience as they are much earlier in their careers. They tend to be really smart people, so they've gone through their education, and they've been right at the top of the pack. Of course, if you go into the commercial environment, then it's much more about your experience rather than a logic that says okay, I can work out where this bear trap is, and I can do some equations and plot exactly where it is. It just doesn't work like that. The education system delivers an academic output in general. And I think there would be significant benefits from more commercial expertise to enable their business growth.

**SR: LOOKING BACK OVER THE COURSE OF YOUR CAREER, WHAT ADVICE WOULD YOU GIVE YOUR YOUNGER SELF?**

**ST:** I probably stayed too long in R&D but I think that's part of a general comment. I think that in any new role you're going into, you go through a learning curve, and then that starts to saturate. In my view once that learning is starting to level off then that's a sign to move on and do something else, as it's better for your career to do that. That way you keep learning at a fast rate. It's also better for your own motivation. I mean, who wants to carry on doing the same stuff when you're just not learning anything? I think those are the key things, and probably related to each other. When I moved into manufacturing from my R&D position, I remember my manager at the time thought I was mental. He nearly had me certified there and then. You know, why are you leaving R&D and going into, of all the things, the production environment. But I suddenly found, well, this is fantastic. There are so many more dimensions, and there's much quicker feedback in terms of when you do something, and you get the results on it. I thought it was a much more stimulating environment and in retrospect, I wish I'd made that move much, much earlier.

**SR: TELL US ABOUT YOUR CURRENT ACTIVITIES WITH CREATIVE DESTRUCTION LABS AND EFFECT PHOTONICS.**

**ST:** Creative Destruction Labs started out of the business school in Toronto and has spread globally. One of those is now hosted by the Saïd Business School of the University of Oxford. It takes very early-stage companies and provides a group of mentors who provide them advice and guidance. In some ways it's very similar to Silicon Catalyst in that you get smart people with really good ideas, but they just don't have that commercial experience. I'm a mentor on the AI stream and also the climate stream.

Effect Photonics is a spin out from the Technical University of Eindhoven, focusing on monolithically integrated indium phosphide. Their business is to put all the optical functionality into one chip. It's essentially a "PIC", a photonic integrated circuit. What that does is because you've got all the components on one chip, it essentially gives you lower losses, you get better power efficiencies, you deliver better functionality, and do it with lower power and lower cost. It also fits into a smaller space, and so delivers what the customers in the telecom and datacom need. If you're going into a data center, it's about those parameters that people are important in. The initial part of the business was in Eindhoven and now we've got a DSP design capability that we acquired in Cleveland, Ohio, and an engineering group that's working in Boston. It's really become a global organization.

**SR: WHAT ADVICE WOULD YOU GIVE TO EARLY-STAGE SEMICONDUCTOR STARTUPS AND TEAMS, ESPECIALLY THOSE THAT WILL BE ACCEPTED INTO THE CHIP START UK PROGRAM?**

**ST:** It comes down to what is important for a deep tech company. Technology is obviously essential. That's the core of the business. But what's also critical is being able to distill the technical

innovation down into a narrative that will then allow you to engage with the customers in the market. The startup needs to take all the complexity of the technology and deliver it in a very clear message because then you get the customers excited and engaged. But also, it's the same thing with investors, you'll need to go out and get money. Unless you can distill that message down into something that captures the vision and does it very, very quickly, then you're not going to have customers, and you're not going to have investors. Then ultimately, you've got to pull that back to the third leg of the triangle, which is the company's financial performance. The technology could be great, customers that love you, but if you're losing your shirt, it is going to be a pretty short-lived enterprise. I think those three factors are so important i.e. the technology, how you articulate that for the market and the customers, and how you get that right financially. You've really got to understand all three, because they will determine your strategy going forward.

The other key element is obviously the startup's people. You're going to be competing with the whole planet. It's not going to be in your local area, it's going to be the best people in the world you are going to be competing with, because any technology business must be on a global scale. So that means you must hire the best people you can find. And even if you're paying more, it's worth it because they will really make a difference. I think the other advice is to be aware that in a startup, the progress is never linear. There's going to be ups and downs, so don't get dispirited, don't lose faith even when you're going through a bad patch, because it will get better. But it never is linear, it's about handling surprises and coping with it, and taking it on the chin and picking yourself up, dusting yourself down, and moving on to the next stage.



## SILICON CATALYST ADVISOR PROFILE CARLO GUARESCHI

Silicon Catalyst UK Managing Partner Sean Redmond had an opportunity to speak with Carlo Guareschi, one of our Advisors, based in Geneva Switzerland. Carlo has had extensive semiconductor experience, on a global level, during his 28 year tenure at ST Microelectronics.



CARLO GUARESCHI

Carlo's experience spans Business Unit Management to Strategic Partnerships and Sales. He has initiated and developed success stories based on disruptive technologies, such as low-cost computing,

silicon photonics and printed electronics. He worked for 28 years at STMicroelectronics in various countries, and then for 2 years at a start-up in France. The last 6 years Carlo continued his work with early-stage entrepreneurial teams as a self-employed consultant, supporting international customers, mainly start-ups and early-stage companies, in projects of strategy and business development.

Carlo joined Silicon Catalyst UK in 2021 as an Advisor and is also a mentor for Polihub at Politecnico di Milano and an angel investor through his participation with Business Angel Switzerland. Born in Milano, Italy, Carlo holds a master's degree in physics from the University of Pavia and an MBA from SDA Bocconi in Milano.

### SR: PLEASE TELL US ABOUT YOUR EARLY CAREER IN THE SEMICONDUCTOR INDUSTRY:

CG: Looking at the semiconductor industry in Italy, there was and there still is one big company – originally it was SGS at the time I joined, before SGS merged with Thomson; now in the market as ST Microelectronics. My initial involvement at SGS was on process simulation: I was working in the CAD team on a software modeling program

called Supreme, that was simulating how transistor devices behave, if you change semiconductor process parameters. I eventually transitioned to their manufacturing activity and then to business functions.

### SR: HOW DID YOU GET INVOLVED WITH SILICON CATALYST?

CG: I initially found out about the incubator through my participation with a startup in Switzerland that informed me about the organization. I started my own investigation and then I decided that I wanted to apply as an advisor / mentor. I am also part of an incubator at the Polytechnic of Milano, which is the largest engineering university in Italy. I've been very impressed with the quality of the companies that Silicon Catalyst is screening. And the kinds of questions, comments, suggestions from the other Advisors are useful for the applicant companies and are useful for me as well, because I learn every time that I participate in the screening meetings. I am really pleased that I have the chance to be part of the Silicon Catalyst Advisor network.

### SR: WHEN YOU ARE INTRODUCED TO EARLY-STAGE STARTUPS, WHAT ASPECTS OF THEIR BUSINESS ARE MOST IMPORTANT FOR YOU TO REVIEW?

CG: Being able to identify the best team and the best CEO has been always my guiding principle I try to look at three things: first the quality of the team; second, having really breakthrough innovation, and third having a company that is clear on and focused on one thing. When I see a company that is trying to do many things in parallel, I am getting scared, especially when the business model is not clear. I think it should have a very clear business

model and be very focused, otherwise, in my experience the chances of success are much reduced. But before creating a startup, you have to be sure that you have an advantage. I can quote Pasquale Pistorio, CEO of the SGS Group, and then of ST Micro, "if you don't have a competitive advantage, do not compete."

### SR: WHAT APPLICATION AREAS AND TECHNOLOGIES DO YOU SEE THAT WILL DRIVE THE NEXT BUSINESS EXPANSION CYCLE FOR OUR INDUSTRY?

CG: I think that 80% of the people will answer AI. I would say for sure AI is a big potential but I will say something where I always have been very intrigued and I think the potential is big: personalized medicine. So whatever is the connection between semiconductors and medicine. This is, I think, still a very fascinating, big market that can not only be very rewarding for the startup company and people who invested there, but also can be good for humanity because you can help people to live longer lives and so on. I always have an extremely interesting exchange with my daughters. The youngest is a medical doctor, and they say "you are leaving to us a world that is not as good as the one we are living in. We have problems with global warming." Typical kind of complaints. I say yes true, but you will probably be living 100 plus years, you will be living in a world without cancer. And this is all because of the research in medicine, but also in what electronics and semiconductors can contribute to health care. This is what I say to them. And this for me, it's really the most fascinating and potentially largest important development for the semiconductor industry.



## PORTFOLIO COMPANY NEWS SILICON CATALYST



## Silicon Catalyst Announces Four Newly Admitted Companies to Semiconductor Incubator

**Silicon Valley, California, and London, England - June 7, 2023** - Silicon Catalyst, the world's only incubator focused exclusively on accelerating semiconductor solutions, announces the admission of four companies into the semiconductor industry's highly acclaimed program.

### THE NEWLY ADMITTED COMPANIES INCLUDE: CAMBRIDGE TERAHERTZ • LIITTO • VEEVX • WEETEQ

Silicon Catalyst has developed an unparalleled support ecosystem for its semiconductor start-ups, providing a strong network of Strategic Partners, technical & business advisors, and industry professionals who help companies to launch and scale in the market. In addition, the incubator's In-Kind Partners provide privileged access to services, expertise, and intellectual property that can help commercialize their companies' technological innovation.

"Our most recent applicant screening cycle was truly spectacular, with a record number of entrepreneurial teams from 14 countries looking to participate in our 24-month incubation program," stated Paul Pickering, Managing Partner at Silicon Catalyst. "These four companies exemplify our mission to assist in building out the next generation of semiconductor-based solutions to address the significant market challenges and opportunities in the areas of communications, energy, IoT and embedded systems."

### Cambridge, Massachusetts

**Dr. Nathan Monroe, CEO**

**Dr. Refael Whyte, CPO**

[www.thzcorp.com](http://www.thzcorp.com)

**Utilizing the Terahertz spectrum to save and improve lives on a global scale**



Cambridge Terahertz was spun out of MIT in 2021 with the mission to bring Terahertz technology to the world. Our Terahertz CMOS phased array technology is setting orders-of-magnitude performance records, enabling low-cost and widely deployed Terahertz wireless systems, unlocking the benefits of this untapped frequency range. The list of impactful/lucrative markets for such a tech is extremely long but we are beginning with imaging, starting with the physical security and loss prevention markets. We're building a future where detection of weapons and contraband is ubiquitous and blends into the background.

### New York, NY

**William Layden, Co-founder & CEO**

[www.liitto.tech](http://www.liitto.tech)

**Computing Solutions for the Clean Energy Era**



Liitto builds hardware that transforms low-priced and wasted clean energy into a valuable computational resource. Our unique solution helps solar and wind power plants address the \$11 billion annual problem of value deflation and curtailment. Simultaneously, we provide a path to decarbonize the fast-growing, energy-intensive fields of computation, ranging from Bitcoin Mining to AI Training.

### Mesa, Arizona

**Douglas Smith, Founder & President**

[www.veevx.com](http://www.veevx.com)

**Intelligent Memory Chiplets**



Veevx Intelligent Memory (iRAM) Chiplets combine high performance, high density, and ultra-low power enabling the next generation in memory technology to service the demands from a wide variety of markets. iRAM performance and non-volatility enables replacement of large block SRAM with 100X reduction in deep sleep power and 2X improvement in density. The Veevx Intelligent Memory product family spans memory densities from 2MB to 128MB and supports 3D and 2.5D packaging options with a configurable Chiplets interface.

### Glasgow, Scotland

**Dr. Taner Dosluoglu, Founder & CEO**

[www.weeteq.com](http://www.weeteq.com)

**The 'tiny' embedded technology company**



Weeteq is pioneering a new approach to circuit design for industrial applications, optimizing operational performance and unsupervised machine learning, for every closed-loop control system, changing the way industries approach digital transformation. Ultra Edge@ technology introduces circuit-level artificial intelligence, which solves real-world industrial-scale challenges, reducing cost and energy expenditure, whilst increasing productivity and uptime of assets. Our goal is for our 'tiny', embedded technology to become a ubiquitous presence within the circuits and components of Industry 4.0 solutions.

**UNIVERSITY NEWS**  
**SILICON CATALYST UNIVERSITY PROGRAM**



The Silicon Catalyst University Program provides exciting Collaborations Between Universities, Strategic Partners, and our Incubator Ecosystem

The Silicon Catalyst University program is designed to cultivate valuable connections and collaborative initiatives between our incubator ecosystem and renowned universities. While the challenges posed by the COVID-19 pandemic briefly disrupted our ongoing projects, we are now actively reestablishing these vital relationships and forging new connections with academic institutions.

**BUILDING BRIDGES WITH UNIVERSITIES**

Our mission is to bridge the gap between universities and our ecosystem, and we've enlisted the expertise of our esteemed advisors to help us achieve this. Together, we are committed to understanding the unique needs of each university and crafting bespoke solutions to empower their students.

**SHOWCASING OUR COLLABORATIONS**

We take pride in the valuable collaborations we have initiated with several universities, further strengthening our commitment to higher education and innovation.

**Here's a glimpse of some of our past projects:**

**Stanford University:** Pete Rodriguez, Raul Camposano and Mark Ross presented a class for their renowned EE380 Seminar. Our advisors shared their insights on "How to Build an IC Company," providing students with invaluable knowledge and mentorship. Additionally, Atiye Bayman and Laura Swan engaged with budding entrepreneurs and faculty members during the eWEAR Entrepreneur Pitch Event.



**Cornell University:** Richard Curtin organized a panel discussion, "Where's the Edge? Opportunities in the Future of Computing from the Core to the Moon and Beyond", including Rick Bahr, Veerban Kheterpal and Doug Kirkpatrick



as panel members. Our many advisors on the call also shared their expertise with attending Praxis Center incubator companies who presented a pitch of their budding companies. Geegah joined our ecosystem as a result of this collaboration. We also completed an IP technology review with their Center for Technology Licensing, opening up new avenues for intellectual property partnerships. Cornell has also been a valuable source of interns for our portfolio companies.

**University of California Berkeley-** UC Berkeley /CITRIS (The Center for Information Technology Research in the Interest of Society) joined forces in an exciting collaboration that brings together student interns with the most innovative minds in the industry. CITRIS provided six students to our portfolio companies in the summer of 2023. We are looking forward to continuing our collaboration so please reach out if you would like to work with interns from the UC System.



**EXPLORING CUTTING-EDGE RESEARCH**

We are constantly striving to remain at the forefront of emerging technologies. Our commitment to working closely with our partners helps us identify universities at the cutting edge of research in their respective fields. This, in turn, enables us to establish vital connections with pioneering research teams, driving innovation and growth.

**GET INVOLVED**

If you are as enthusiastic about collaborating with universities as we are, we invite you to contact us. Whether you have a specific university in mind or you're simply interested in exploring potential partnerships, we are eager to hear from you. (email [laura@sicatalyst.com](mailto:laura@sicatalyst.com))

Together, we can unlock endless possibilities and make a significant impact on the academic and entrepreneurial landscape.

**SILICON CATALYST ANGELS**  
**ANGEL CAPITAL ASSOCIATION**



Early Stage Investing Critical To Long-Term Growth in US Economy

We all collectively dodged a bullet after the collapse of Silicon Valley Bank which threatened to destroy a whole generation of startups. Had the US Treasury and Federal Reserve Bank not intervened quickly, many companies would have lost their hard-won deposits and the market collapse would have made it extremely difficult for them to access new financing. Many more companies in and outside the tech sector would have struggled as their products and services stopped working because of reliance on these newly defunct

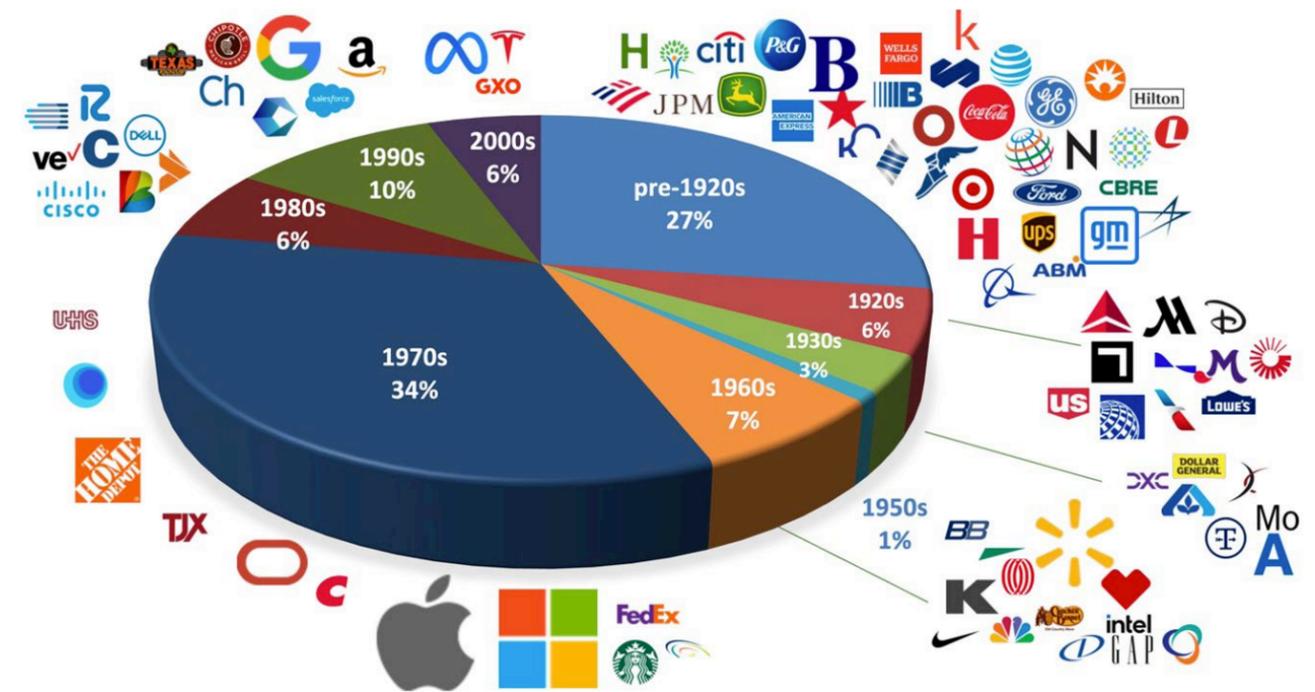


tech companies' products. While the short-term impact would have been dramatic for our entire economy, the long-term impact would have been far greater because it would have likely resulted in an unparalleled mass extinction event covering a whole generation of companies.

To understand the importance of that dynamic, this article explores the 100 largest employers in the US today and breaks them into decades since their founding to reveal insights on the long-term impact of losing a generation of startups.

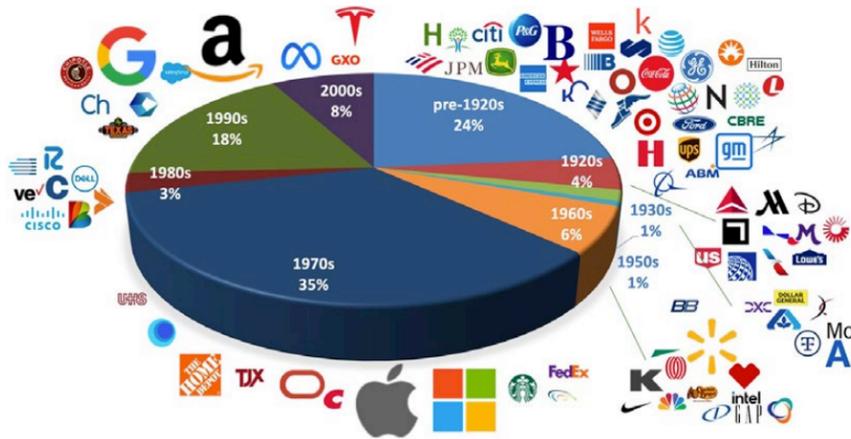
In terms of profit generation, 56% of profits in the top 100 companies today were from companies founded after the dawn of the era of venture capital and angel investing in the 1970s, and losing companies from any one decade would have wiped

**FIGURE 1: NET INCOME FOR TOP 100 EMPLOYERS BY DECADE FOUNDED**



Source: Yahoo Finance for 2022 net income from continuing operations; Google search for year founded.

**FIGURE 2: MARKET CAP FOR TOP 100 EMPLOYERS BY DECADE FOUNDED**



Source: Yahoo Finance for market cap as of 6/6/23; Google search for year founded.

out between 6% and 34% of profit in the economy. That would have been hugely detrimental to the Government's corporate tax base.

In terms of market cap, 64% of market cap of the top 100 companies were companies founded since 1970. That has generated enormous wealth and taxes through capital gains.

Finally, in terms of employment, early-stage investing is the engine of growth in national employment. A full 34% of employment at the top 100 companies comes from companies founded since 1970. Without them our economy would be a third smaller.

The impact of this startup ecosystem goes well beyond the jobs created at

each company. For instance, Apple now has 164,000 employees but the total number of jobs created in the U.S. throughout its supply chain is well over 2 million including 450,000 jobs through U.S. based suppliers and 1,530,000 jobs attributed to the Apple App Store. And beyond Apple's \$385 billion in annual revenue, the Apple App Store ecosystem facilitated \$1.1 trillion in developer billings and sales in 2022, comprised of \$910 billion in total billings and sales from the sale of physical goods and services, \$109 billion from in-app advertising, and \$104 billion for digital goods and services. Additionally, new analysis from the Progressive Policy Institute found the iOS app economy now supports more than 4.8 million jobs across the U.S. and Europe, with approximately 2.4 million in each region.<sup>1</sup>

Comparing the top 100 companies on the 1960 Fortune 500 list to the list in 2020, only 17 made both lists. Change and churn is constant in our economy, and new companies are the lifeblood of the renewal process. Our investments are the catalyst and essential for bright future.

**KEY TAKEAWAY:**

Beyond their contributions to societal improvements through innovation, the investments we are making today in early-stage companies will drive both near-term and long-term growth in employment, profits, and stock market gains for our economy, and tax revenue for the Government. Our economy would truly stagnate, and even decline, without that engine for growth.

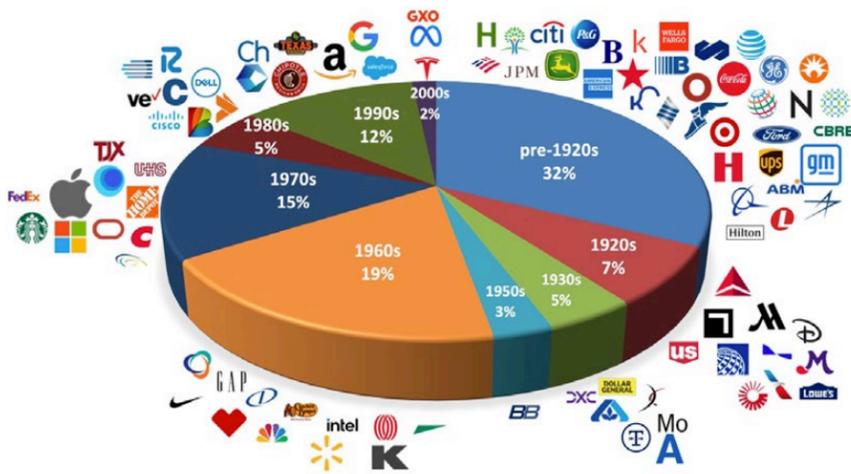
**AUTHOR:**

John Harbison, Chairman Emeritus of Tech Coast Angels and ACA Board Member.



<sup>1</sup> Per Apple Press release May 31, 2023

**FIGURE 3: EMPLOYEES FOR TOP 100 EMPLOYERS BY DECADE FOUNDED**



Source: <https://companiesmarketcap.com/usa/largest-american-companies-by-number-of-employees/>; Google search for year founded.

**SILICON CATALYST ANGELS INVESTING IN THE INNOVATION**



**Funding and Fostering the Innovations, Technologies, and Companies that will Improve our Lives**

We are inviting potential investors to take a dive into a world where groundbreaking technologies are nurtured, innovations are ignited, and the future is transformed. The Silicon Catalyst Angels group is an investment offshoot of Silicon Catalyst, the singular incubator devoted solely to propelling advancements in semiconductor solutions.

What sets Silicon Catalyst Angels apart is not just our unparalleled access to an exclusive stream of cutting-edge opportunities, but the extraordinary composition of our membership—a league of seasoned semiconductor veterans, armed not only with their investment prowess but also with deep industry knowledge and expertise.

The angels' members possess a deep understanding of the hardware

landscape, cultivated through decades of experience in the semiconductor industry. The true magic lies in the fusion of our members' unparalleled experience, and vast network of connections with the exceptional companies that have been meticulously vetted and welcomed into the Silicon Catalyst family.

After launching our group in July 2019, we're pleased to announce that our members have invested over \$ 3.25 Million in 19 companies.

Interested in joining?  
Interested in pitching?

Please contact Laura Swan, VP of Operations  
laura@siliconcatalystangels.com  
Visit our website:  
Siliconcatalystangels.com



Amos Ben Meir  
Board President



Michael Joehren  
Director



Raul Camposano  
Director



Laura Swan  
VP of Business Operations



# Startups start here.

it's about what's next.®



it starts with startups.®



## APPLICATIONS NOW BEING ACCEPTED

### Silicon Catalyst's Incubator Application Deadline - January 12, 2024

Silicon Catalyst is the world's only incubator + accelerator focused on semiconductor solutions, including Photonics, MEMS, sensors, IP, materials and Life Science. We accelerate startups from idea through prototype, and onto a path to volume production.

Selected early-stage companies may be eligible to receive **initial seed funding from Silicon Catalyst Angels and other partners.**

In addition, companies that are accepted to participate in Luminare and Silicon Catalyst accelerator programs concurrently will receive **\$100,000 in funding** at the start of programming and a chance to compete for:

### UP TO \$2M IN FOLLOW-ON FUNDING.

- In-Kind Partners (TSMC, Synopsys, Arm, ST, MathWorks and over 50 more) – provide each startup several millions of dollars' worth of goods and services including EDA tools, IP, PDKs, prototypes, design and test services, packaging and business solutions. Our companies have received over \$150M in in-kind goods and services.
- Strategic Partners (including TI, ON Semi, Soitec, Bosch, Cirrus Logic, Arm, ST Micro, Sony, EMD Electronics, NXP, Mayfield and DuPont) – participate in the selection process and actively look for opportunities to partner with our startups.
- Investors – Our partnership with Mayfield and a large group of over 300 VCs, Angels, Angel groups, Corporate VCs, and Family Offices fund each journey. Silicon Catalyst Angels, created from our ecosystem, also funds our companies. Our companies have received over \$600M in venture investments.
- Advisors – A valuable network of over 300 industry experts that we match to the specific needs of each startup.
- Universities, Industry Organizations, Accelerators and Government Agencies – We nurture over 400 partner relationships for the benefit of our portfolio companies. Our companies have received over \$100M in grants.

Silicon Catalyst's mission is to help semiconductor startups succeed.

Join us in driving innovation!

Apply now.

[www.siliconcatalyst.com](http://www.siliconcatalyst.com)



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for sensors,  
MEMS, and  
microtechnology  
companies



## MICROTECH VENTURES

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# SILICON STARTUP SOLUTIONS

## About Us

Silicon Catalyst is the world's only incubator + accelerator focused on semiconductor solutions, including Photonics, MEMS, sensors, IP, materials and Life Science. We accelerate startups from idea through prototype, and onto a path to volume production.

We have engaged with more than 1,000 semiconductor startups worldwide and have admitted over 100 exciting companies. In addition, our UK government funded early-stage incubator launched its first cohort of 12 startups on October 1, 2023.

Our companies participate in a 24-month customized incubation program. Each is guided closely by a Silicon Catalyst partner. This includes a semiconductor focused curriculum and over 40 events worldwide each year.

Silicon Catalyst's ecosystem provides everything our startups need to design, fabricate, and market semiconductor solutions:

- **In-Kind Partners** (TSMC, Synopsys, Arm, ST, MathWorks and over 50 more) – provide each startup several millions of dollars' worth of goods and services including EDA tools, IP, PDKs, prototypes, design and test services, packaging and business solutions. Our companies have received over \$150M in in-kind goods and services.
- **Strategic Partners** (including TI, ON Semi, Soitec, Bosch, Cirrus Logic, Arm, ST Micro, Sony, EMD Electronics, NXP, Mayfield and DuPont) – participate in the selection process and actively look for opportunities to partner with our startups.
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Silicon Catalyst's mission is to help semiconductor startups succeed. Join us in driving innovation!

A VALUABLE RESOURCE FOR THE SEMICONDUCTOR STARTUP COMMUNITY



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