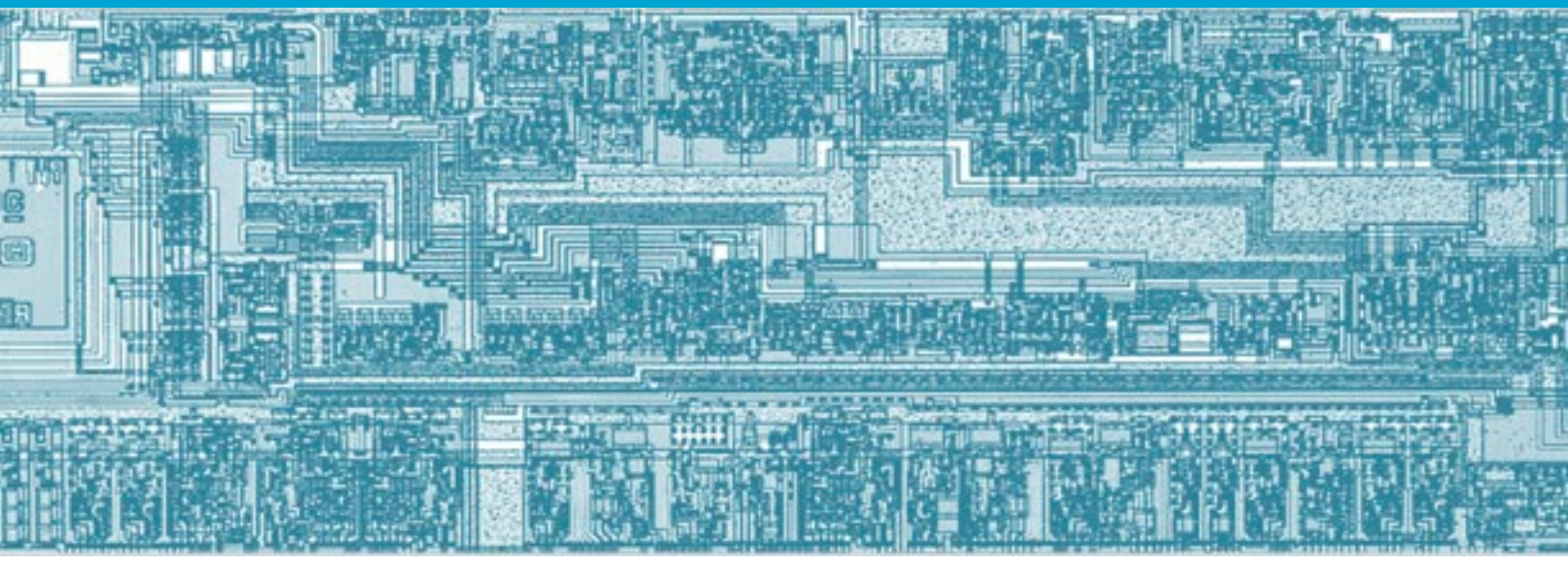
VOLUME 10 - SUMMER 2020

SILICON STARTUP SOLUTIONS

it's about what's next.®

A SILICON CATALYST NEWSLETTER

A VALUABLE RESOURCE FOR THE SEMICONDUCTOR STARTUP COMMUNITY



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Portfolio Companies

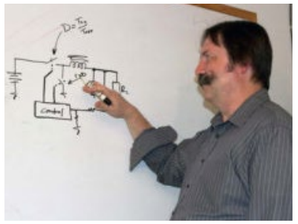
CURRENT

Teramics – Leading mmwave Solutions
MultiFractal Semiconductors
5D Sensing
MEMTECH
DiGiTAL Light
SigmaSense
beam
OWL Autonomous Imaging
DOVER Microsystems
quadric
trameto
SPARK Microsystems
ERIDAN
MENTIUM Technologies
Zeno Semiconductor
ESPRE TECHNOLOGIES
Seamless Microsystems – Digitizing Your World Seamlessly
Power Down Semiconductor

ALUMNI

PROBIUS
EcoCircuits
Xceler Systems
One Silicon Chip Photonics
ADAPDIX
REX Computing
GmK – With a soulful touch
Active Layer Parametrics
CLOPTech – Connecting the Lives of People
AEPONYX
Ayar Labs

SILICON STARTUP SOLUTIONS



WELCOME

CHAIRMAN'S CORNER
RICK LAZANSKY

Co-Founder - Silicon Catalyst
serial entrepreneur
and incubator fanatic

GRATITUDE AND SADNESS

We lost a brilliant mind, a courageous entrepreneur, a joyful person, and a beloved colleague and educator in our industry in May. Earl McCune passed away unexpectedly. I was going to write about genius and the renaissances over geographies and periods in time. I find myself wanting to write about one genius in particular, who was here among us in Silicon Valley. I met Earl seven years ago when I was researching starting Silicon Catalyst. He was introduced to me by a mutual friend, and just like the other legendary figures in analog and RF he had an amazing lab.

I was just reading a wonderful essayist, Packy McCormick when I received the news Packy makes a case that ancient Greece, the I Renaissance in Florence, the Scottish Enlightenment, another half dozen or so places, eventually Bell Labs and now Silicon Valley were the scenes in which geniuses congregated and generously shared. Earl was exemplary proof of this.

THE END OF EVERYTHING OLD.

I have never wanted to take a vacation as much as I do at this very moment. My takeaway for 2020 is that "forced digitalization" is the great experience those living now will share, with the realization that the experience could be either great wonderful or tragic, and the choice is ours.

I apologize in advance for writing about Covid-19, but no matter what happens with the progression of the disease and its resolution or our adjustment to the absence of a resolution, the world has irrevocably changed. There is no going back. What my futuristic engineering friends had worked for decades to change, with decades perhaps still remaining, SARS-CoV-2 has changed in six months. The world is going digital. The economy is going digital. Our lives are now, irrevocably, digital for the foreseeable future. I know this, even when there is not foreseeing the future. Technology will win. What choice we have is who, if any, will pay the price. Will we take full opportunity to bridge the digital divide? To have equal opportunity in practice more than in theory?

The question in front of us as a world, a nation, down to each individual person is "what are we going to do about it?" It can be, I believe, a much better world, a time of reflection and adjusting our values, of righting our wrongs – a fresh start. Its going to take persistence to make the world better, a grittiness drawn deep from within each individual – because, even with Zoom, we are now more individuals than before. I've written about our exceeding our Dunbar limit - that's the cognitive limit to the number of people with whom one can maintain stable social relationships. There apparently is a corollary to the concept – the minimum number of relationships one must maintain. We seem to be testing that minimum. Apparently that isn't 0, (or 1, for I fear I may start talking to myself). I want a vacation, and on on it I want to meet new people, make a few new friends, and visit with my old ones.

So what actually changes? Our global supply chain which has proven too fragile to rely on as a species. It need be far more robust, and it will be. Its not just moving. It's being completely digitalized now, in all aspects – planning, logistics, transportation, labor. Game on – for every one of those components. And each stage of manufacturing will eventually appear in ever-growing yet darkened factories, because people won't be needed – too expensive, too distractable, and perhaps not adaptable enough.

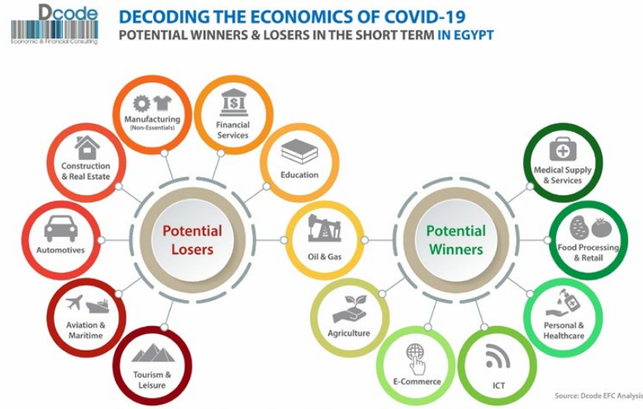
Let's not forget about sustainability and reuse – the other side of the supply chain. Robots will recycle far better than we ever would, so that will happen. No, that's wrong – is happening. It's persistence that will win that battle – we now have time, having ignored the problem so far, but no more.

Banking and all manners of commerce will be done at distance. The next generation born may never see cash, a credit card, or the inside of a bank. Say goodbye to your doctor, even to your mental health professionals – AI/ML does that better today, but the driving force to adoption is the distance we now demand from our caregivers.

Take a look at the figure below – I believe it captures who wins, who loses. Perhaps use it to discuss with your children, when you talk about their future.

It will take grit, more courage, more optimism, more dedication to the course - certainly for those who must bring it to bear to change the world. More so for those who must adapt to the newness of it all, so quickly.

I want to take the opportunity to ask you for something. Decide what will make the world around you better for others around you, Go make that happen. Stick with it. Don't give up – we're in the time when that is truly possible. And try to either stay out of the way, or to help others, make theirs happen too.



VOLUME 10

IN THIS ISSUE

Lance Bell - Partner / Publisher

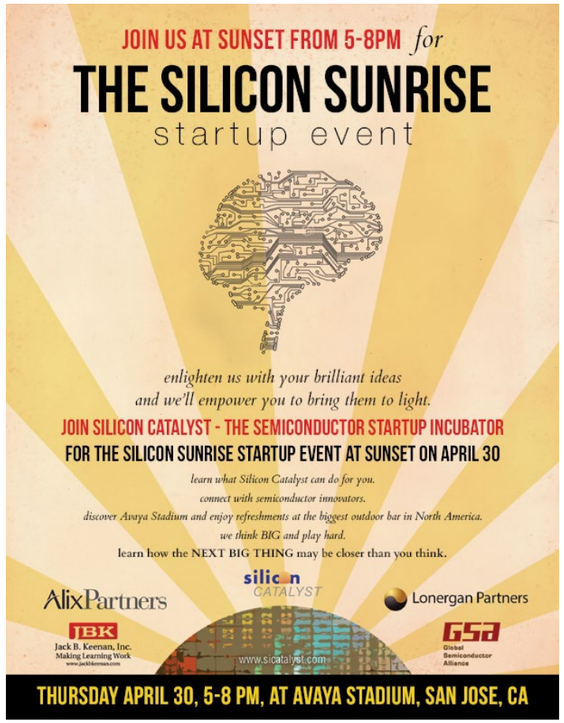
Building an Ecosystem

"*Enlighten us with your brilliant ideas and we'll empower you to bring them to light*", so read the invitation to Silicon Catalyst's launch event at the Avaya soccer stadium on April 30, 2015. Dubbed 'The Silicon Sunrise' it both pronounced and portended the dawn of a new era and appetite for silicon startups. Predicated on the concept that Silicon Catalyst is "Switzerland for Startups" we have worked to build a vital and vibrant ecosystem to provide startups every necessary ingredient to succeed. The announcement of both Arm and ST joining as both Strategic and In-Kind Partners is a testament to where we've come these past 5 years. With over 300 applications reviewed, we are up to 31 Portfolio Companies, ranging from an energy harvesting startup in Wales to a biotech spinoff from Stanford.

As lofty as it sounds, Silicon Catalyst is becoming a global epicenter for hardware startup innovation, with 50 percent of our companies headquartered outside the US.

Though I can chronicle myriad milestones in our evolution, I'd like to share that as of press time, I'm happy to report that Silicon Catalyst just hosted a series of roundtable discussions with the leadership of the 5G-to-Next G Initiative. The 5G-to-NextG Initiative is leading the US Department of Defense's research and development of fifth-generation wireless technologies. In its endeavors to help semiconductor startups succeed, Silicon Catalyst sees the 5G-to- NextG Initiative as a leading voice in enabling new capabilities and applications within the commercial ecosystem. Silicon Catalyst and the 5G-to-NextG Initiative look to partner with the private sector to accelerate 5G innovation to rapidly take full advantage of its capabilities, while also addressing the security challenges that 5G presents. It's kind of a big deal. You can visit siliconcatalyst.com/sic-accelerating-5g-to-xg-solutions if you missed the event.

Stay safe. Enjoy this issue and inspire those around you.



SILICON STARTUP SOLUTIONS

Silicon Catalyst Collaborates with Arm to Accelerate Semiconductor Startups

On Silicon Catalyst's 5 Year anniversary, Arm joins ecosystem as both a Strategic and In-Kind Partner

Silicon Valley, CA, April 29, 2020 - Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon, announces that Arm has joined as a Strategic Partner and as an In-Kind Partner - the first company to join the incubator in both roles. The partnership provides startups with no-cost access to a broad range of Arm® IP, tools and support, and further strengthens Silicon Catalyst's leading role in helping new semiconductor companies address the challenges in moving from idea to realization.

As a Strategic Partner, the collaboration provides Arm early access to review and help select the early-stage silicon startups seeking to participate in the Silicon Catalyst Incubator. As an In-Kind Partner, Arm joins the Silicon Catalyst ecosystem of In-Kind Partners that enable startup companies in the incubator to build a hardware prototype at greatly reduced cost.

The partnership coincides with the launch of Arm Flexible Access for Startups, a program from Arm which offers no-cost access to the world's most trusted IP portfolio, tools, training and full support for early-experimentation, design and prototype silicon.

"There is a huge opportunity for early-stage silicon startups, but in today's challenging business landscape, they need a low risk, low cost journey to working prototypes," said Dipti Vachani, senior vice president and general manager, Automotive and IoT Line of Business, Arm. "This partnership gives startups zero-cost access to trusted IP and support from Arm, combined with Silicon Catalyst's expertise, enabling them with the best opportunity to attract investment and scale."

Silicon Catalyst has created a unique ecosystem to provide critical support to semiconductor hardware startups, including tools and services from a comprehensive network of In-Kind Partners (IKPs) to dramatically reduce the cost of chip development. In its fifth year of operation, Silicon Catalyst has reviewed over 300 early-stage companies and has now admitted a total of 26 startups into the incubator. These Portfolio Companies utilize IKP tools and services including design tools, simulation software, design services, foundry PDK access and MPW runs, test program development and tester access. Companies accepted into the incubator have two years of no-cost or significantly discounted access to these IKP tools and services during the incubation period. Additionally, the startups can tap into the world-class Silicon Catalyst network of advisors and investors.

"Arm is the world's leading silicon IP company, and we are thrilled to have them join the Silicon Catalyst ecosystem. This announcement coincides with the 5 year anniversary of our launch event held at Avaya Stadium in Silicon Valley," said Nick Kepler, COO of Silicon Catalyst. "Their desire to connect with and support startups has led Arm to be the first company to join Silicon Catalyst as both a Strategic Partner and an In-Kind Partner. The Arm Flexible Access for Startups program creates a wonderful opportunity for startups to develop ICs with the best IP available, and as a Silicon Catalyst In-Kind Partner they will provide additional value to the startups in the Silicon Catalyst Incubator. Our partnership connects Arm with Silicon Catalyst's curated portfolio of some of the most interesting silicon solutions startups, and makes Arm more accessible to these startups."

STMicroelectronics Joins Silicon Catalyst as both an In-Kind and Strategic Partner

Silicon Valley, California, and Geneva, Switzerland, June 8, 2020 - Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon, and STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, jointly announce that ST has joined Silicon Catalyst as both a Strategic and In-Kind Partner. As a Strategic Partner, the collaboration provides STMicroelectronics with early access to review and help select the early-stage silicon start-ups seeking to participate in the Silicon Catalyst Incubator. The initial focus of the In-Kind collaboration will be MEMS sensors and actuators.

"Innovation through silicon is driving advancements in technology. Hardware development is challenging, which is why Silicon Catalyst plays a key role in enabling silicon start-ups to develop their technology and fueling the new cycle of semiconductor innovation," said Kirk Ouellette, Vice President Strategic Marketing and Strategy Development, STMicroelectronics. "ST has a strong collaborative R&D and industrialization culture, which makes a perfect fit with Silicon Catalyst. As both a Strategic and In-Kind Partner, ST looks forward to providing guidance and resources for start-up partners as well as gaining access to cutting-edge silicon innovation."

Silicon Catalyst has created a unique ecosystem to provide critical support to semiconductor hardware start-ups, including tools and services from a comprehensive network of In-Kind Partners (IKPs) to dramatically reduce the cost of chip development. In its fifth year of operation, Silicon Catalyst has reviewed over 300 early-stage companies and has now admitted a total of 31 start-ups into the incubator. These Portfolio Companies utilize IKP tools and services including design tools, simulation software, design services, foundry PDK access and MPW runs, test program development and tester access. Companies accepted into the incubator have two years of no-cost or significantly discounted access to these IKP tools and services during the incubation period. Additionally, the startups can tap into the world-class Silicon Catalyst network of advisors and investors.

"We are extremely pleased to welcome STMicroelectronics to further enable our mission of accelerating business growth for start-ups in the semiconductor market. Our combined efforts will focus on delivering innovative solutions across diverse application segments," stated Pete Rodriguez, CEO of Silicon Catalyst. "STMicroelectronics is the second company to join the Silicon Catalyst ecosystem as both a Strategic Partner and In-Kind Partner, following our recent announcement of Arm joining our ecosystem. The addition of ST's market-leading MEMS capabilities, as a first step of our partnership, will expand our reach into the rapidly evolving innovations in the sensor and actuator markets."

About STMicroelectronics

ST is a global semiconductor leader delivering intelligent and energy-efficient products and solutions that power the electronics at the heart of everyday life. ST's products are found everywhere today, and together with our customers, we are enabling smarter driving and smarter factories, cities and homes, along with the next generation of mobile and Internet of Things devices. By getting more from technology to get more from life, ST stands for life.augmented. In 2019, the Company's net revenues were $9.56 billion, serving more than 100,000 customers worldwide. Further information can be found at www.st.com.

SILICON STARTUP SOLUTIONS

Mentor Becomes the Thirty-Second In-Kind Partner of Silicon Catalyst's Incubator for Chip Startups

March 24, 2020 - Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon, announced today that Mentor, a Siemens business, has joined its growing ecosystem of In-Kind Partners.

A longtime global leader in electronic design automation (EDA) technology, Mentor provides electronic hardware and software design solutions, consulting services, and award-winning support for the world's most successful electronic, semiconductor, and systems companies. Mentor also operates a comprehensive embedded software division.

As a Silicon Catalyst In-Kind Partner, Mentor will target solutions for the silicon photonics, 2.5/3D advanced packaging and Internet of Things markets. Among the product lines now available to the Portfolio Companies in the Silicon Catalyst Incubator are the Mentor's Calibre™ platform, Tanner™ AMS software, Tessent™ software, Xpedition™ tools, and Analog FastSPICE platform.

PETE RODRIGUEZ
SILICON CATALYST
CEO

"Mentor has decades of experience in SoC solutions, and we recognize the vital importance of startups in the semiconductor innovation cycle," said Bill Heiser, vice president of Technology Solutions Sales for Mentor, a Siemens business. "We are delighted to work with Silicon Catalyst to provide solutions to their growing list of companies."

"Our collaboration with Mentor will provide our startups access to a suite of world-class EDA solutions including support for MEMS, PCB design, photonics, IC physical verification and embedded system design, which will complement our existing In-Kind Partners products and services," said Pete Rodriguez, CEO of Silicon Catalyst.

ARM HOLDINGS
STRATEGIC AND IN-KIND PARTNER PROFILE

arm

Over 160 billion chips with Arm IP shipped worldwide

PHIL BURR

DIRECTOR OF BUSINESS TRANSFORMATION AT ARM

As Arm join Silicon Catalyst as a Strategic Partner, Phil Burr, director of business transformation at Arm discusses how Arm is evolving its approach to supporting semiconductor startups.

TELL ME ABOUT YOUR ROLE AT ARM

I am responsible for delivering new ways to make it easier for customers to access and use Arm technology, and last year led the introduction of Arm Flexible Access, a new and hugely popular program. As a result of its success, Arm is now widening the availability of this program so that early stage startups can access and prototype with Arm IP without paying any fees to Arm. I joined Arm with over 20 years in the semiconductor industry, including a period with a startup, so have direct experience of the thrill of being in a startup business (as well as some of the challenges faced).

HOW DO YOU SEE THE EVOLUTION OF COMPUTING?

We are at an exciting time in computing, the number of connected intelligent devices has continued to accelerate – many times the number of people on the planet. With an incredible 160 Billion chips with Arm processors, Arm and Arm customers have been at the forefront of this revolution. If anything, this pace of acceleration will continue as more and more intelligence is moved "to the edge" as the cost and latency of sending huge quantities of data to be centrally processed is a problem for some use cases like autonomous automotive and AI. Now, devices themselves are becoming even more intelligent and processing data to make decisions locally.

HOW HAS THE INDUSTRY AND ARM ALIGNED TO THOSE CHANGES?

As computing diversifies this provides opportunities for small companies and startups seeking to address niche applications and build innovative products. The evolution is rapid, and the race to be first to market is heating up. To win, startups need to accelerate their time-to-market but keep tight control of their burn rate and minimise their risks. To really hit the needs of their chosen niche, startups also need to be able to experiment and explore to develop solutions.

TELL ME MORE ABOUT THE ARM FLEXIBLE ACCESS PROGRAM?

Arm Flexible Access was launched in July 2019 to make it much easier for Arm customers to access and start designing with Arm IP. It brings a whole new business model to the semiconductor industry. In this business model, IP access is decoupled from IP consumption, so with a small annual access fee, customers can evaluate, experiment and do full designs with a wide range of proven Arm IP. With direct hands-on access, it makes it much easier for customers to choose the right mix. Ultimately, they only pay for the IP used in the design before going for tape-out. We've included the majority of our CPUs along with many GPUs and other SoC building blocks. Arm only wins when customers win, so we include the training, expert support, development tools and the physical IP to help customers deliver successful projects.

HOW HAS THE MARKET RESPONDED? HOW HAS THE PROGRAM EVOLVED SINCE ITS LAUNCH?

Customers like the ability to evaluate and experiment before committing to a specific IP for their design. The simple commercial processes let the customer focus on the work that matters. The number of customers signing up to Flexible Access has exceeded our expectations, and includes established companies as well as younger startups. The program has also proved popular with companies who provide ASICs or

SILICON STARTUP SOLUTIONS

ARM HOLDINGS
STRATEGIC AND IN-KIND PARTNER PROFILE

arm

ASIC design services, many of whom collaborate with and support startups.

The program has continued to evolve since launch. For example, in February we added additional IP such as image signal processors (ISP) and the safety packages required for some "functional safety" use cases. We have added Corstone reference designs which combine multiple IP blocks within a subsystem to significantly cut our customers' development time.

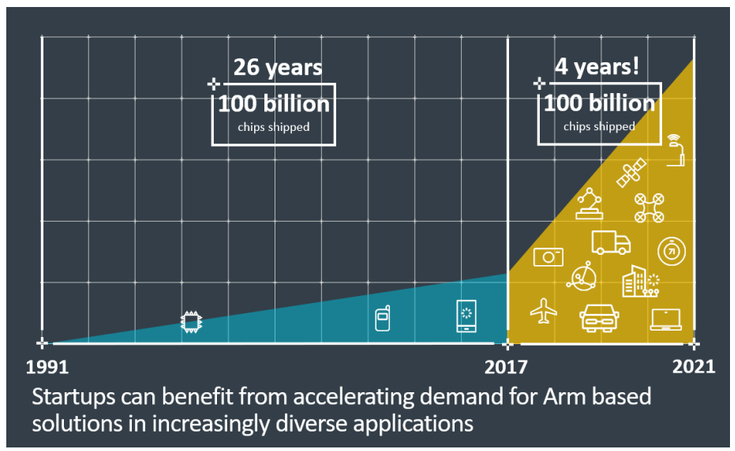
We have now just extended Flexible Access to make it easier for early stage startups to get the benefits. As we continue to evolve the program, we can serve more customers and address a greater number of use cases.

WHY A SEPARATE PROGRAM FOR STARTUPS? IS THE EXISTING FLEXIBLE ACCESS PROGRAM NOT A GOOD FIT?

Although Flexible Access has delivered on its promises, early stage startups face a particularly acute set of challenges – limited funding, small teams and the need for fast development. That's why for early stage startups with funding of less than $5 million, Arm has fine tuned the program's commercial structure and removed the annual fee. At $0-cost access to Arm IP, startups can experiment, design and tape-out proof-of-concepts and prototypes and help attract additional funding.

CAN ARM REALLY HELP STARTUPS REDUCE THEIR BURN RATE?

We certainly believe so. Arm has the most extensive ecosystem in our industry, with hundreds of companies developing and optimizing their tools, software and services for Arm. From EDA tools through to foundries, every step of the way is on a path well-trodden. Studies have shown that Arm IP can be shorten the time to commercial silicon by six months to 12 months than competing offerings with more predictable PPA results and a much lower risk of re-spins. On a typical medium complexity SoC at the industry common 28nm node, it is estimated that this equates to a saving of 52 percent in total development cost vs competing platforms.



Startups can benefit from accelerating demand for Arm based solutions in increasingly diverse applications

WITH MORE THAN 160 BILLION ARM-BASED CHIPS SHIPPED SO FAR, ARM ALREADY HAS A STRONG INDUSTRY PRESENCE. WHY INCREASE ITS FOCUS ON STARTUPS?

Arm has a rich history of partnering with startups, many which have gone on to be successfully acquired or to be commercially successful in their own right. By tailoring this new program to early stage startups, Arm helps them negotiate through the tricky initial phase to reach the next stage in product maturity and the next wave of funding. I firmly believe that this program is a win-win for both silicon startups and Arm.

HOW DO YOU SEE THE STRATEGIC PARTNERSHIP WITH SILICON CATALYST?

We've been working closely with Silicon Catalyst and it is clear that both companies share the common goal of helping silicon startups to quickly make progress with the minimum of risk. It is very clear that the programs of Arm and Silicon Catalyst are very complimentary. Silicon Catalyst's business mentoring, free access to EDA tools and wafer shuttles complements the free access to IP, tools and support that Arm offers in the Flexible Access for startups program. Each startup faces unique challenges, and we believe that we can work together to define unique and tailored solutions to help each startup to succeed.

https://arm.com

CIRRUS LOGIC
STRATEGIC PARTNER PROFILE

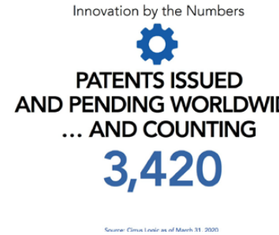
Cirrus Logic looks to expand leadership position in high precision, low power mixed signal technologies

A tremendous amount of innovation is taking place within the silicon start-up community. As a new strategic partner with Silicon Catalyst, Cirrus Logic looks forward to new relationships and helping to develop these emerging businesses.

For more than three decades, Cirrus Logic has built its reputation as an expert and innovator in low-power, high-precision, mixed-signal processing. These days, the company is extending its leadership beyond its roots in audio and voice and into new technologies for exciting new markets that leverage its mixed-signal experience. It's all about executing on real-world engineering challenges for some of the most well-known and respected consumer OEMs on the planet, applying that mixed-signal expertise into new market challenges and new customer opportunities.

Elevating the user experience in how consumers interact with their electronic devices is at the heart of what makes Cirrus Logic unique: world-class, low power mixed-signal products that bridge the analog world around us with the digital world of our technology.

If innovative features define the consumer experience, quality and execution drive the business. Cirrus Logic focuses on exceeding expectations through world-class solutions. The company has built its reputation around supply chain expertise, delivering high-quality components that ramp into production quickly to meet aggressive product launch schedules for some of the world's most recognized – and demanding – customers. And doing so time and again, year after year, with each product introduction.



Headquartered in Austin, Texas, and with locations around the world, our global workforce solves complex challenges daily, developing cutting-edge innovations for today's consumer applications. Cirrus Logic leverages its intellectual property portfolio of more than 3,400 patents to develop highly proprietary ICs that deliver advanced features.

BEYOND AUDIO: MIXED-SIGNAL FOUNDATION DRIVES NEW MARKET OPPORTUNITIES

Cirrus Logic built its reputation in audio, developing pioneering solutions for over 30 years. For more than a decade the company has been a market leader in mobile with its innovative low-power ICs and embedded software, offering such products as smart codecs, boosted amplifiers, digital to analog converters (DACs) and analog to digital converters (ADCs).

In recent years, the human voice has become an increasingly important method of how we interact with our devices. Through the rise of digital voice assistants, consumers are now accustomed to using their voice to issue verbal commands. Enabling your mobile, wearable, or smart home device to always stand at the ready, listening and poised to intercept your voice command, is made possible through Cirrus Logic's expertise in ultra-low power mixed-signal technologies, such as always-on/always listening smart codecs that are the gateway to your device's user features. Open an app, make a phone call, send an email or text ... all with your voice, not your fingers.

In haptics, the company is propelling its market-leading position in smartphones and into new market opportunities where low-latency ICs play the key role at enriching consumer experiences through innovative new tactile features – while driving sleeker, smaller form factors. While audio, voice and haptics represents the company's technology focus today, edge-processing mixed-signal expertise is the foundation of the company that will drive the company forward, solving complex system-level engineering challenges that could drive innovative new features and applications beyond audio, voice and haptics.

It's truly a great time to be serving the mobile and portable markets with continued innovation and a drive toward flawless execution. Cirrus Logic has built great relationships with the world's top consumer electronics companies who seek out Cirrus Logic's expertise to help them deliver innovative new features and user experiences year after year with each new major product introduction.

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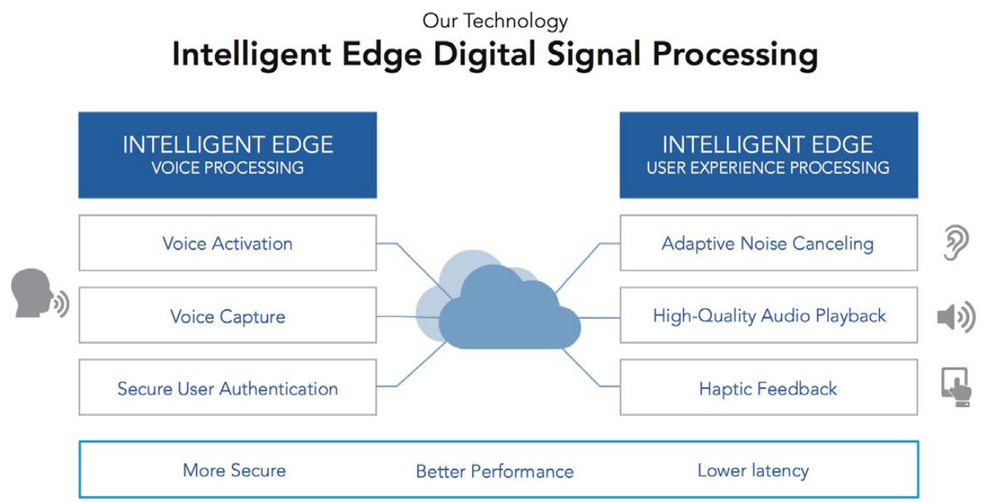
Cirrus Logic will continue to drive low-power, mixed-signal innovation, continuously solving new problems and forging partnerships with the startup ecosystem. Opportunities always exist to explore to new ideas that could bring to life revolutionary products for tomorrow's global consumer. Cirrus Logic continues to look for and partner with the brightest ideas coming from the start up community.

https://cirrus.com



Dave French Joins Silicon Catalyst Board

DAVE FRENCH

SILICON CATALYST
BOARD OF DIRECTORS

January 17, 2020, Silicon Valley, CA -
Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon, is pleased to announce that Dave French has joined the board of directors. Dave's career has been built around a very broad set of experiences in virtually all aspects of research, design, manufacturing, marketing and business management within the semiconductor industry.

"We are extremely pleased to welcome Dave to our board. His expertise and deep experience in our industry is truly world-class, spanning a broad range of all aspects of building and growing semiconductor businesses. He has demonstrated a constant emphasis on coaching and development of some of the industry's leading technologists as they have brought their ideas from early formulation to dramatic growth and financial success" stated Rick Lazansky, co-founder and Board Chairman, Silicon Catalyst.

Dave is best known for his nearly twenty year focus on the proliferation of Digital Signal Processing (DSP) technology and solutions as he led successful initiatives at Texas Instruments and later Analog Devices. In addition, as CEO he spearheaded the transition of Cirrus Logic's business from a supplier of logic chips for personal computers to a profitable industry leader in mixed signal audio components and solutions. More recently Mr. French contributed to the financial success of NXP Semiconductors as Executive Vice President of its Mobile and Computing Business Unit, and later by leading numerous fruitful business divestitures in China. Dave is currently Chairman of Silicon Power Technology, a Sino-foreign joint venture located in Chengdu, Sichuan Province, China, the first incubator in China dedicated to serving startups in the power semiconductor industry. Dave is also Vice Chairman of ASMC and on the boards of startup companies in the U.S., China and Israel.

"I am thrilled to join the board of directors of Silicon Catalyst, whose unique position has allowed it to play a pivotal role in furthering semiconductor innovation. I have found the leaders and advisors of Silicon Catalyst, as well as the entrepreneurs whose ideas are at the heart of their portfolio companies, a truly inspirational group of semiconductor executives and technologists committed to achieving breakthrough industry advancements," stated Dave French.

SILICON STARTUP SOLUTIONS

Lattice Semiconductor Joins Silicon Catalyst In-Kind Partner Ecosystem to Foster Broader Use of FPGAs

April 2, 2020 - HILLSBORO, Ore. and SANTA CLARA, Calif. - Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon, and Lattice Semiconductor Corporation (NASDAQ: LSCC), the low power programmable leader, today announced the addition of Lattice to Silicon Catalyst's In-Kind Partner (IKP) program. As an IKP member, Lattice will contribute development kits featuring Lattice's low power field programmable gate arrays (FPGAs) and easy-to-use design software to the startup companies in the Silicon Catalyst portfolio.

Silicon Catalyst continues to work with key industry players to further develop a complete value chain that economically and effectively supports the semiconductor startups accepted in the incubator. These startups utilize a full spectrum of design tools and silicon MPW/shuttle runs, build development and production boards, and gain access to a world-class network of advisors, networking, marketing acumen, and a path to funding needed to successfully launch their businesses.

Lattice Semiconductor is the global leader in smart connectivity solutions, providing market leading intellectual property and low power, small form-factor FPGAs that enable more than 8,000 global customers to quickly and easily add low power data processing to a wide range of applications, including AI for IoT, hardware security, embedded vision, 5G infrastructure, and industrial/automotive automation.

"Lattice's low-power programmable products are the perfect match for SPARK's low-power UWB transceiver products," said Fares Muburak, CEO of SPARK Microsystems, a Silicon Catalyst portfolio company. "Lattice and SPARK enable IoT and 5G system designers to build high data rate and ultra-low latency wireless Edge products with microwatt power budgets."

"By providing the Silicon Catalyst incubator companies with Lattice FPGA development boards and design software, Lattice will equip these startups with the low power processing capabilities of FPGAs, which allows them to incorporate Lattice technology in their end-market systems," said Jim Tavacoli, Senior Product Marketing Director, Lattice Semiconductor.

"We are very pleased to welcome Lattice to our growing ecosystem of In-Kind Partners. Our Portfolio Companies are developing products for a broad spectrum of market segments and can now take advantage of the wide variety of Lattice development platforms supporting AI, industrial, automotive, communications/computing, and consumer applications," stated Tarun Verma, Managing Partner at Silicon Catalyst.

About Lattice Semiconductor

Lattice Semiconductor (NASDAQ: LSCC) is the low power programmable leader. We solve customer problems across the network, from the Edge to the Cloud, in the growing communications, computing, industrial, automotive and consumer markets. Our technology, long-standing relationships, and commitment to world-class support lets our customers quickly and easily unleash their innovation to create a smart, secure and connected world. For more information about Lattice, please visit www.latticesemi.com. You can also follow us via LinkedIn, Twitter, Facebook, YouTube, WeChat, Weibo or Youku.

Harvest Management Partners joins Silicon Catalyst's Ecosystem of In-Kind Partners

July 14, 2020 - Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon, announced today that Harvest Management Partners LLC (HMP) has joined its ecosystem of In-Kind Partners. Harvest Management Partners is an exclusive investment banking firm focused on mergers and acquisitions of technology companies around the world.

HMP's primary area of expertise is in the semiconductor arena which includes AI/ML, embedded systems, technical software, IoT, transportation, and security. HMP strategically positions and optimizes client technology offerings and overall company value versus financial metrics alone.

"We are honored to have been selected by Silicon Catalyst as its preferred investment banking partner. We share a common vision with all Silicon Catalyst entrepreneurs and understand the challenges faced by these startups. We are committed to leveraging our decades long technical and business relationships to aid in their success," stated Alain Labat, HMP Managing Director and co-founder.

"HMP's years of professional, operational, and investment banking experience have garnered a deep understanding of technology, strategic alignments, and how to best position our clients and structure deals for optimum value. Our team is looking forward to working with the companies in the Incubator, assisting them through the M&A process," added Kyle Park, HMP Managing Director and co founder.

Silicon Catalyst has created a unique ecosystem to provide critical support to semiconductor hardware start-ups, including tools and services from a comprehensive network of In-Kind Partners (IKPs) to dramatically reduce the cost of chip development. These Portfolio Companies utilize IKP tools and services including design tools, simulation software, design services, foundry PDK access and MPW runs, test program development and tester access. Additionally, the startups can tap into the world-class Silicon Catalyst network of advisors and investors.

"Our ecosystem of In-Kind Partners has proven to be an invaluable asset to the companies in our Incubator. The comprehensive products and services available span the pre-silicon and post-silicon phases of chip development. At the corporate level, our Portfolio Companies have access to legal, banking and intellectual property support. HMP's expertise and experience brings to bear an important ingredient to cover the full life-cycle of these startups, as they prepare for their liquidity events," stated Pete Rodriguez, CEO of Silicon Catalyst.

Harvest Management Partners LLC.

About Harvest Management Partners

Harvest Management Partners (HMP) is an exclusive investment banking firm leveraging decades of experience as technology and operational executives, a global ecosystem of corporate executives and advisors, and a differentiated understanding of the key technologies in their target markets to drive optimal transaction outcomes for their clients. More information at www.harvestmp.com

SILICON STARTUP SOLUTIONS

Since our last newsletter, Silicon Catalyst has admitted nine new portfolio companies

Rick Lazansky, Chairman and co-founder of Silicon Catalyst

"I'm very excited to see nine amazing companies admitted in Silicon Catalyst's 10th and 11th cohorts. They are building entirely different products and each has taken a very novel approach to solving a big problem in their respective markets. That's why we created Silicon Catalyst - to help breakout companies at the frontier of innovation. The first impression of true innovation is sometimes one of incredulity or even incongruity. That's been a hallmark of Silicon Catalyst startups to date. It continues with these new companies, and we should all expect great things from each."

Tim Frasier, Regional President, Automotive Electronics, Bosch North America

"Silicon Catalyst has established a dedicated and strong ecosystem for the development of new semiconductor solutions, addressing the needs of early-stage semiconductor companies for the development of their innovative product. As a Strategic Partner, Bosch was pleased to host the Fall 2019 Final Screening for applicants to the Silicon Catalyst Incubator at our facility in Silicon Valley. The diversity and caliber of these newly selected companies is impressive and a testament to the value that is uniquely offered by Silicon Catalyst."

5D Sensing
- Advanced CMOS Sensors for Smart City and Safe City applications
- Headquarters: Israel

Beam Semiconductor
- MicroHorn™ 60/28 GHz Phased Array Transceiver Technology
- Offices in Rehovot, Israel and Toronto, Canada

California Memory Technologies
- DDR Memory Controllers and PHY IP
- Headquarters: Silicon Valley

Digital Light
- High-speed Dynamic Light Field Sensors for the Age of AI
- Offices in Silicon Valley

Dover Microsystems
- Delivering CoreGuard® technology, the only cybersecurity solution for embedded systems that prevents the exploitation of software vulnerabilities
- Offices in Waltham, MA

Multifractal Semiconductors
- Fully-integrated E-band mmWave front-ends in silicon
- Headquarters: South Africa

SigmaSense
- Advanced SigmaDrive™ concurrent drive and sense technology for touch solutions
- Offices in Austin, Texas

Teramics
- Leading mmWave Solutions
- Headquarters: Silicon Valley

Trameto
- Enabling Battery-free IoT with HarvestAll™ power management technology
- Offices in Wales, UK

5D SENSING

www.5d-sensing.com

5D Sensing has built a unique sensor that solves the "smart camera" sensing technology requirements by adding the 2D night vision, 2D daylight vision, ultra low-light and 3D point cloud into a single CMOS sensor. 5D Sensing is using multiple technologies to make advanced sensors: proprietary AMS readout circuit for the SPAD detector, proprietary time domain signal processing allowing for the capture of both 2D and 3D images concurrently, advanced noise cancellation to implement S-SiPM, wafer bonding, back-side illumination and optical optimizations.

beam

www.beamshaping.io

Beam Semiconductor has developed innovative millimeter wave RF silicon and unique antenna technology to address demanding 5G wireless infrastructure applications such as cellular backhaul, fiber extension and broadband / fixed wireless access last mile. Beam's 60 GHz and 28 GHz transceiver technology utilizes analog beam-

steering RF electronics that allow the antenna to automatically shape and steer the beam to eliminate manual positioning. Beam's patented MicroHorn™ phased array antenna integrates complex 3D internal structures, forming a buried waveguide architecture that 'squeezes' the energy through it (much like a trumpet / horn) which provides power, gain and tremendous instantaneous bandwidth. The focus for Beam has been to combine the RF circuits and antenna into a cohesive scalable module solution for wireless OEMs and wireless system providers. Beam is headquartered in Rehovot, Israel and has venture investor backing in Canada, Japan and the United States.

www.memtech.ai

California Memory Technologies is a memory solutions company providing the world's smallest DDR(Double Data Rate) SDRAM Controllers, PHY IPs, SDK Kits and Firmware using proprietary technology for AI/ML & HPC, Data centers, Automotive and Consumer markets. Our unique architecture gives us the advantage of building the smallest designs (30%-50% smaller than the competition), offering 300+ custom features in Controller and PHY combined for most applications. Memory solutions are also available for persistent memories, like MRAM-DDR3, MRAM-DDR4 and 3D X-point.

www.digitallight.ai

Digital Light is a stealth-mode semiconductor company, building the definitive first link in the autonomous vehicle value chain. An executive team that combines over sixty years of experience working with hardware and a track record for delivering complex products in high volume manufacturing, is bringing their expertise to bear on optical sensing market. Existing solutions are delivering a prohibitively expensive sensor ecosystem that provides sub-optimal data inputs, leaving the perception modules struggling to make sense of low signal-to-noise ratio information. As a result, there is a recognition that autonomy will be not be possible without an exponential increase to the efficacy of data inputs. Digital Light is solving this problem through the development of an Active Light Field Camera, a hardware/software stack providing a 1000x improvement to the signal-to-noise ratio, at a speed and cost that are enabling deployment.

www.dovermicrosystems.com

Dover Microsystems is the first company to bring real security, safety, and privacy enforcement to silicon. Dover's patented CoreGuard technology is the only solution for embedded systems that prevents the exploitation of software vulnerabilities and immunizes processors against entire classes of network-based cyberattacks. Traditional cybersecurity solutions are vulnerable to attack because they are based in software and all complex software contains up to 50 bugs per thousand lines of code, including cybersecurity software. Dover embeds security at the lowest possible level-in the silicon - because silicon cannot be subverted over the network. CoreGuard integrates with all RISC architectures to monitor every instruction executed to ensure it complies with a defined set of security, safety, and privacy rules. If an instruction violates a rule, CoreGuard stops it from executing before any damage can be done. As a result, CoreGuard can protect against 94% of known software vulnerabilities, including 100% of buffer overflow, code injection, and data exfiltration attacks.

SILICON STARTUP SOLUTIONS

Since our last newsletter, Silicon Catalyst has admitted nine new portfolio companies

www.multifractalsemi.com

Multifractal Semiconductors is developing fully-integrated E-band front-ends in base silicon (CMOS/BiCMOS) as a single IC for the telecoms and automotive markets. Existing E-band links are bulky, expensive, power hungry and not suited for mass production as required by small cell densification and massive MIMO. Our key enabling technology includes actively enhanced high-Q E-band diplexers, which will be integrated with the LNA, PA, switches and mixers - all on-chip. Our customers can feed the output of our IC directly into their digital back-end. This will enable miniaturization of the entire E-band link and for the first time allow E-band small cell and massive MIMO to be realized.

www.sigmasense.com

SigmaSense, the global leader in touch sensing performance, is changing the world of traditional analog sensing solutions with a new advanced digital approach. We are pioneering a comprehensive sensing technology that delivers an order of magnitude improved performance that was previously not possible. SigmaVision™ capacitive imaging technology provides both touch and object detection on or in proximity to the sensing surface, thus enabling a new generation of perceptive devices that are interactive and engaging. Products that utilize sensing surfaces ranging in size from small wearables to surfaces larger than 100 inches can now adopt a superior sensing experience that reduces costs and lowers design risk. Headquartered in Austin, TX, SigmaSense provides semiconductor and board level products with development tools and support.

www.teramics.com

Teramics has developed the most linear and efficient power amplifiers in Ka/Q/V bands. Complementing these innovative power amplifiers are a variety of cutting edge mmWave solutions from Teramics such as low noise amplifiers, and up and down converters. Teramics is also offering integrated solutions for full mmWave phased-array products to be deployed in commercial, defense and space applications.

www.trameto.com

Trameto is a UK-based fabless semiconductor company whose products will enable the elimination of batteries from the many interconnected smart sensors and wireless devices which can communicate with each other in the Industrial Internet of Things. The company is addressing opportunities in markets such as infrastructure monitoring, asset tracking, smart buildings, defense, transportation and smart metering. Trameto has recently become one of fewer than 3% of recent applicants for the European Commission's Horizon 2020 funding programme, to be awarded Phase 2 grant funding. The €3,000,000 project will accelerate development of Trameto's HarvestAll® power management integrated circuits (PMICs) to make energy harvesting viable in a multitude of new applications. Their functionality is not currently available anywhere else.

STARTUPS: SEE THIS TIME OF UNCERTAINTY AS OPPORTUNITY

By Dr. Lance Bell, Partner, Silicon Catalyst reprinted from arm.com/blogs/blueprint

Silicon Catalyst recently celebrated its fifth anniversary, and it was marked by a partnership with Arm that we're still buzzing over. Arm Flexible Access for Startups sees Arm join us on a journey we've been on since 2015. As the world's only incubator focused exclusively on accelerating solutions in silicon, we've given hundreds of early-stage startups free access to the tools and support they need to bring their incredible ideas to life.

LANCE BELL

SILICON CATALYST PARTNER

I'm hugely confident that Silicon Catalyst's partnership with Arm will make a real difference to many early-stage semiconductor startups in the near future. But it'd be remiss of me not to acknowledge the effects of the unprecedented global situation that formed the backdrop to an announcement we'd already been working on for a number of months before the world was turned—if not upside down but certainly a degree sideways.

The long tail of the COVID-19 pandemic will be felt throughout this industry for months, perhaps years to come. But while established companies take a breath to work out how to adapt their models and forecasts to the changed global business environment, the opportunity for early-stage startups has never been greater.

This sector has already seen rising research and development costs, and dramatic slashes to budgets, in the past five years. Companies that were already struggling to balance innovation with product delivery may well find themselves pushing pause on innovating while they work on ensuring the supply lines and processes they need for continued operation remain available.

STARTUPS MUST INNOVATE THROUGH THIS CRISIS

Yet go to any business school and they will tell you that in a downturn, you have to double down on your marketing. I believe there's probably a similar phenomenon with R&D and it'll enable those with truly game-changing ideas to actually get ahead during this crisis.

Those who use this time locked away in isolation to keep pushing forward, keep innovating through it, are the ones who will emerge out the other side a step ahead of the competition. And in this respect, it's those early stage startups—with nothing more than an idea and suddenly a whole lot of time on their hands—that might actually benefit from this situation rather than be hindered from it.

SILICON STARTUP SOLUTIONS

The global COVID-19 crisis is creating challenges for the tech sector. But, says Silicon Catalyst's Lance Bell, there's a silver lining for innovative startups.

Of course, this is also a time of uncertainty for the startup community. I'm sure each and every startup's founding member has spent nights awake over the past few months, re-evaluating their businesses, their investments, whether this or that deal will still be on the table given unavoidable delays or whether to perhaps shift focus towards something that might directly help in the crisis. All of it carries tremendous risk.

Yet risk, or more accurately the reduction of it, is the very foundation of the Silicon Catalyst value proposition. It's what made our co-founders want to figure out, and remove, the bottlenecks faced by hardware entrepreneurs.

What they found was a community able to achieve initial funding, but once that seed capital had been obtained, they'd have to write a check to someone for license fees and overheads, and they would be poor again.

STRETCHING EVERY DOLLAR

Since then, we've been focused on removing the current bottlenecks facing entrepreneurs in the semiconductor sector, namely accessing and affording leadership design tools, fabrication and testing of chips.

"the opportunity for early-stage startups has never been greater."

Of course, this is still very much a cash business. To that end, in 2019 we assisted in the launch of the Silicon Catalyst Angels, specifically looking to provide early-stage funding dollars for the startups. But by offering potentially millions of dollars' worth of in-kind services from companies such as Arm, Silicon Catalyst is able to stretch every dollar through either dramatically discounted or free services. In doing so, we're helping hundreds of early-stage startups escape the vicious cycle of pay-to-play.

And given the number of startup success stories from all disciplines within the industry (Internet of things (IoT), automotive, energy harvesting and artificial intelligence (AI) applications to name but a few) that have emerged successfully from this process I truly believe that despite everything, the semiconductor startup community is in the best shape it's been for years.

In Arm's announcement a few weeks ago, [Flexible Access director] Phil Burr wrote that he saw early-stage startups as the tech sector's beacon of opportunity. That's as true today as it ever was. But it does need our collective help in order to bring those big, world-changing ideas to life, and that's why this partnership is so important—now more than ever.

Those startups who see these trying times as an opportunity, that persist with innovation because of their courage to balance risk vs reward, will leapfrog the competition—big or small. Programs like Arm Flexible Access for Startups will be vital in removing as much of that risk as possible, stretching every dollar and giving new startups the best possible opportunity to get on that ladder and climb as high as they can.

If you're an early-stage startup with a great idea, now has never been a better time to realize your device dreams with Arm Flexible Access for Startups. Learn more and apply now to join this unique program.

https://www.arm.com/blogs/blueprint/lance-bell-silicon-catalyst

May 19, 2020

HIGHLIGHTS FROM SILICON CATALYST ADVISOR MEETING

Richard Dasher, Ph.D.

Technology Management In the Era of U.S. – China Friction presentation by Richard Dasher, Ph.D. Director of the US-Asia Technology Management Center at Stanford

click here for video

HOW WE GOT HERE

THE US SIDE

Economic / commercial interests from 1980 – 2016
- Economic reforms, open markets to foreign firms, sent students abroad to study, groundwork for private sector economy
- State tacitly gave some power to markets
- U.S. had expectations of "convergence" (value systems would converge along with increasing economic integration)
- Highlight: China accession to WTO in 2001

U.S. firms motivated by:
·Huge potential markets experiencing steady, rapid growth
·Inexpensive and literate labor force

Turning Point
co-occurred with rise of Xi Jinping in 2012
- China presented less attractive opportunities to U.S. firms
- (Natural) slow-down of economic growth
- GDP growth = 10.6% (2010) to 6.9% (2015), est. 6.5% (2019)
- Increase in protectionism
- Increases in cost of labor, especially East Coast cities
- Drastic rise in China investment capital (less need for U.S.)
- Appearance of connections to China government policies, public relations concerns
- View in U.S. of China as threat (economic and security)
- Xi consolidated power, strengthen domestic industry
·(Independent trend) U.S. resurgence of isolationist ideas

THE CHINA SIDE

Long-term domestic trends (1978 – 2008)
- General sense that life is getting better for everyone
- Pride in the economic miracle
- People already had (or developed) skills for thriving in an authoritarian regime with low transparency
- Getting by = more important than improving system

Gradual rise of private sector
1978: first recognition of private economy as legitimate "supplement to the socialist state-owned economy"

Pvt. ent.:	90,000 in 1989 to 3 million (2003)
Indv bus.:	12.47 million (1989) to 3.53 million (2003)
SOEs:	1.55 million (1992) to 1.05 million (2003)

Turning Point
around time of 2008 financial crisis
- Global downturn had relatively little impact on China
- U.S. model appears to have less to teach China
- China growth (around 9.9%) played major role in global recovery
- China sees itself as more of natural world leader
- Already-accelerating awareness of importance of becoming "innovation-driven" economy
- Policy "Indigenous Innovation"
- Public sector spending: acquire first generation technologies from abroad (with tech transfer requirements); from second generation develop in China
- Rising nationalistic consumer sentiment, public attitudes
- Seeing more private sector global business expansion

WHERE ARE WE GOING?

Short-term (2020):
- China is providing good excuses for U.S. political actions
- Some criticisms & policies directed specifically at China

Longer-term:
- Bi-partisan (but not universal) support for increased decoupling from China
- Complex relationship, so lots of room for errors
- Biggest unmet needs on U.S. side
- Coordinating U.S. China policy with Allies
- Directing policy toward reciprocal market access (not old-style balance of trade)
- What should U.S. industry do?

Short-term (2020):
- Continue to assert more world influence – take advantage of apparent vacuum left by U.S.
- Belt and Road Initiative
- Continue policy focus on innovation & global status
- Emerging shift in startup company innovation

Longer-term:
- Complex power structure inside China
- China is making some mistakes
- Perhaps the biggest question: Is the idea of a state-controlled market-driven economy a sustainable concept?

SILICON STARTUP SOLUTIONS

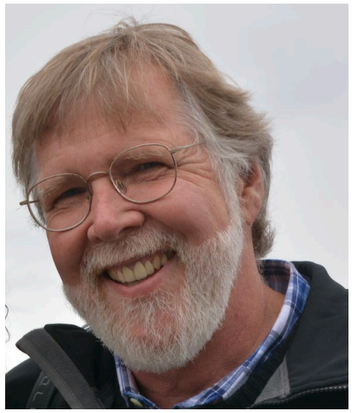
SILICON CATALYST ADVISOR PROFILE

From Rick Bahr

"I have been trying to think of a hook that was a) true, that b) captured my motivations and that c) also left a touch of inspiration … So let me start with what's below

"I always joined a great team first, and it had to be a team aiming at a really tough problem. The name on the company's door was a third consideration, and the specific position hardly mattered. I just trusted that I would find my place." That north star has served Rick Bahr well in his company choices placing him at the first integrated processors at HP, at the first super-minis at Prime, at the first 32 bit workstations at Apollo and led eventually to his leadership of MIPS processor and Cray Supercomputer HW developments at SGI. It has served Rick well in his plunge into startups, where his team at Atheros paced Wi-Fi CMOS chipset industry firsts; and then post-acquisition, setup his last industry role as Qualcomm's head of Wi-Fi technology. Aiming at challenge is also what drew Rick to MIT to begin his engineering education, and now to an adjunct prof post at Stanford where he spends his retirement.

Rick also feels blessed by his ride on Moore's Law over the decades.



RICK BAHR

PROCESSOR ARCHITECTURE AND COMMUNICATION

That 50 year journey has left a wake of creative destruction, with older industries faltering and new ones springing to life, driven by the cost structure changes of the merciless integration. Mainframes gave way to minicomputers, to superminis, to workstations, to personal computers, and now to games and handsets. That same path has led to the possibilities of fully integrated wireless communications, and so also to our present surround of a growingly sentient environment expressed succinctly as the "Internet of Everything". "The emergence of new industries driven by semiconductor integration not only coincides with my career, but made it all possible," Rick adds. Looking retrospectively, it was his jumping when the technology was ripe for the next wave of computing or communications that paced his work. Rick has seen many acronyms recycled too, "Every once in a while when someone says RTL, I think of the 'Resistor-Transistor Logic' rather than 'Register Transfer Language'."

While Moore's freight train may be pulling into the last few stops, the semiconductor technology is now so formidable that application opportunities seem limited only by imagination (and lots of software). It's for that reason Rick is also honored to be a Silicon Catalyst advisor where he hopes to both and be inspired by the next generations as they hone their craft.

FINDING SOLUTIONS IN SILICON: AN INTERVIEW WITH RICHARD CURTIN OF SILICON CATALYST

By Hailey Stewart, reprinted from eepower.com/market-insights/

In this interview, EE Power editor Hailey Stewart spoke with Silicon Catalyst Managing Partner Richard Curtin about how silicon-based startup companies are finding a place in the vast semiconductor industry with the help of an acceleration incubator.

When the co-founders of Silicon Catalyst started their company in 2015, they imagined a more streamlined and cooperative way for startup companies to bring solutions to the market. That's how Silicon Catalyst came to be one of the only incubators focused exclusively on accelerating solutions in silicon.

In this interview, EE Power editor Hailey Stewart spoke with Silicon Catalyst Managing Partner Richard Curtin about how silicon-based startup companies are finding a place in the vast semiconductor industry with the help of an acceleration incubator.

Curtin said more than 300 young companies have connected with Silicon Catalyst over the last five years. As of 2020, 26 companies have participated in the incubator program.

While the semiconductor space is a very mature industry, Curtin said there is still a strong drive for innovators to create something unique and bring their solution to potential investors.

EE POWER: WHAT WAS THE DRIVING FORCE BEHIND STARTING SILICON CATALYST?

Curtin: In 2015, we launched Silicon Catalyst with a simple mission — to create an incubator solely focused on early-stage entrepreneurial teams looking to create and deliver innovative solutions in silicon. Our vision, model, and thought leadership earned Silicon Catalyst the prestigious UBM/Canon Startup Company of the Year.

Rick Lazansky, our Chairman and co-founder, along with our two other co-founders, studied the startup landscape over the course of a year in an effort to understand why so few hardware startups were able to get off the ground. One of the key observations was that when an entrepreneur landed seed funding, on average $1M - $2M, they ended back up in the poor house because those funds would immediately be dispensed to purchase needed goods and services such as EDA tools and the like, putting them nearly back to square one in search of funding. To change this paradigm, we realized what was missing was a robust ecosystem comprised of semiconductor companies willing to offer their services for free or at a substantial discount to promising startups in exchange for, or at least in the hope of, finding a new customer for themselves.

Because of our founders' deep-seated relationships with the leadership of the major design services companies and foundries, we were not only able to have these companies see our vision, but we were able to convince them to do the unheard of, to offer their services for free or nearly so. The entire industry realizes the importance of startups in the innovation cycle. After years of consolidation and reduction of R&D budgets, innovation at many companies had taken a backseat, in an era

SILICON STARTUP SOLUTIONS

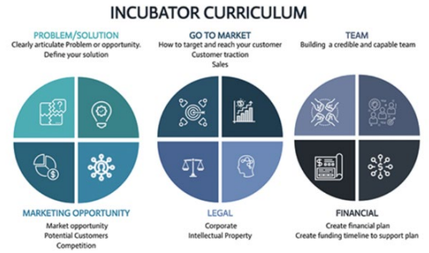
when AI, IoT, AuT, robotics, and machine learning are reshaping the entire landscape.

Over the past five years, we've had discussions with over 300 semiconductor startup teams and now have 26 companies in our Incubator.

EE POWER: WHAT IS SILICON CATALYST'S ROLE IN THE SEMICONDUCTOR INDUSTRY?

Curtin: Simply put, our role and our goal are to take startups from an idea to a product to a market, and ultimately to an exit via acquisition, a licensing deal, or an IPO. This starts with removing some of those first hurdles in their company's evolution. The companies we chose for our 24-month incubator program have access to pre-silicon & post-silicon products (EDA, MPW shuttles, design testing, packaging, etc.), as well as business and legal services, that are either free or nearly free.

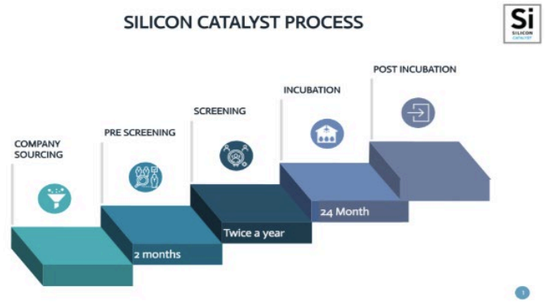
During the time in the incubator, the companies also have interaction and support from our extensive network of Advisors. These Advisors have immeasurable



and invaluable semiconductor industry experience, spanning technology, marketing and sales, operations and legal / IP aspects.

This model is really flipping the equation upside down. We help the companies in many cases get from PowerPoint to prototype with a technology-proven solution. This leads to the engagement of early market validation and discovery. And then when they're ready within the incubation period, we'll help them raise money with the network of investors that we have in our ecosystem.

EE POWER: WHAT IS THE SELECTION PROCESS FOR COMPANIES LOOKING TO JOIN SILICON CATALYST?



Curtin: Application to our Incubator is easy, starting with the simple form on our website. This kicks off our rigorous pre-screening process, where we have the startup upload their business plans to ProSeeder®, an enterprise software database, leading to discussions with our team and a few of our Advisors. Typically, the companies that apply are led by semiconductor technologists, with varying degrees of business or operational experience. They believe that they know what the market could use, but we also encourage them to think about what it would take to create a viable business. So, part of this screening process allows us to get into the thought processes of these entrepreneurs — how they plan to build, grow and scale a semiconductor business.

Our Ecosystem Partners actively participate in the vetting of our applicants. Our screening process is a key factor in Silicon Catalyst's ability to de-risk the startup landscape within our incubator. Because we take an equity stake in each startup Portfolio Company, we are vested financially as well as fiduciarily to maximize their

By Hailey Stewart, reprinted from eepower.com/market-insights/

chances for success. In addition, during our screening process, our In-Kind Partners (who are providing services to our startups) along with our Strategic Partners, Texas Instruments, Bosch, On Semiconductors, Soitech, and Cirrus Logic, along with our network of advisors assess the likelihood of startups success based on what we collectively can provide them with in terms of tools, time, wisdom, and treasure. Because of this, a company admitted to our incubator has a significantly greater chance of succeeding and therefore becomes a significantly de-risked investment.

Twice a year, in the Spring and in the Fall, we hold final screening sessions. In addition to the Silicon Catalyst management team, we invite some of our Advisors and Strategic Partners to these meetings. Those applicant companies that get a "thumbs up" are then invited to join our Incubator. As a result of the Fall 2019 Final Screening, we admitted five companies.

Our upcoming Spring 2020 screening process begins after the application deadline of January 27, with final screening taking place in March.

EE POWER: WHAT IS THE BASIS OF THE INCUBATION PROCESS?

Curtin: When the startup begins working with us, we walk them through everything from potential technology evolution to early market traction with their target customers. First, we start the on-boarding process, identifying the In-Kind Partner (IKP) products and services they will require during their 24-month journey with our team. Additionally, one of the Silicon Catalyst Partners is assigned as the Advocate, acting as the startups' key contact to assist them on all aspects of growing their business – including product family planning, technology requirements, corporate branding and messaging, go-to-market strategies and funding plans.

EE POWER: AT WHAT POINT DO MOST STARTUPS COME TO YOU FOR HELP THROUGH BEGINNING A BUSINESS?

Curtin: It's all over the map really. On one end of the spectrum, we find some people who just left a large, multinational company and they want to launch their new company with some notion of an early business plan. And on the other end of the spectrum are post-Series A companies that want to join our network for the connections to an extensive ecosystem of advisers and investors.

EE POWER: WHAT KIND OF PARTNERSHIPS DOES SILICON CATALYST OFFER TO STARTUPS WORKING IN THE INCUBATION PROCESS?

Curtin: From the outset, we focus on providing strong mentorship, creating a solid foundation for our Portfolio Companies. That mentorship varies from pre-silicon to post-silicon to business advice. Our IKPs span all aspects of company needs, e.g. design software, foundry access, intellectual property attorneys, banking relationships, legal firms, CFOs. We provide everything you would need to build and scale an early-stage company in the semiconductor business.

Additionally, each of the companies in our Incubator have an opportunity to directly interact with our Strategic Partners (TI, OnSemi, SOITEC, Bosch and Cirrus Logic), to explore how the innovative semiconductor products might be of value to create or expand their product offerings.

EE POWER: WHAT MAKES THIS LIST OF ADVISERS AND PARTNERS WANT TO WORK WITH THESE STARTUPS?

Curtin: Silicon Catalyst is unique, in that we are solely focused on chip startups. Even though there might be a couple of hundred accelerators/incubators in the U.S. and probably thousands worldwide, we are the only one in the world solely focused on chip companies.

We have roughly 160 advisers now, all with many years of experience in the semiconductor industry, which is unique in the accelerator/incubator segment.

Our Advisors are truly invaluable to the companies in our Incubator and are committed to "pitching in". Part of it is that these senior executives want to give back, but the other aspect of it is that it enables them to stay in touch and participate in the next wave of innovation in the semiconductor industry.

EE POWER: HOW DID THE SILICON ANGELS PROGRAM INTERSECT WITH SILICON CATALYST'S INCUBATION PROGRAM?

Curtin: During our twice per year Portfolio Company Update meetings, we invite our whole ecosystem for presentations by each of the CEOs of the startups in our Incubator. It was during one of the 2018 Update sessions that we saw that there was strong interest from the audience to invest in the presenting companies – this was the impetus to start the planning to launch an investment group. The Silicon Catalyst Angels group was operational as of July 2019 and as of December 2019, the members have invested in two companies in our Incubator.

The deal flow for the Angel group stems from the companies in the Silicon Catalyst Incubator. After six months in the Incubator, the companies are invited to submit a request to present to the Angel group. The assigned Advocate and the contributing Advisors assist in putting together an investor presentation, which is then pitched during one of the quarterly Angel group meetings. As appropriate, the members then decide to conduct due diligence towards an investment decision.

EE POWER: WHAT SETS SILICON CATALYST APART FROM OTHER INCUBATORS IN THE POWER INDUSTRY?

Curtin: As far as we've seen, Silicon Catalyst is unique in the overall semiconductor industry, never mind the power segment of semis. Our team is comprised of senior executives that have built many successful companies, especially in the power space. With the enormous growth in the IoT and edge computing sectors, we've seen many applicants focused on creating more power-efficient devices. Just a couple examples of companies in the Incubator delivering innovative energy management solutions include EcoCircuits and Trameto.

Also, in January 2019, we established a joint venture with Silicon Power Technology specifically targeted at power semiconductors.

What we've done is taken our own model of incubation and In-Kind and Strategic Partnerships and used it as a template to collaborate in the creation of an incubator for the semiconductor power segment in China. It focuses on everything power devices for transportation to the consumer level.

EEPOWER: WHAT ARE SOME OF THE MOST PREVALENT CHALLENGES YOU'VE FOUND WORKING WITH STARTUP COMPANIES IN THE SEMICONDUCTOR SPACE?

Curtin: It really runs the gamut, as we see so much passion in the startups in our Incubator. But when we look for these great entrepreneurs, the real question to address is how to funnel the passion and energy into developing a successful company, whether they start from "friends and family" funding or from a post-Series A status.

First, we look at how to nurture the growth of a CEO, building out their management team, developing the persona to showcase the company to investors and potential clients.

On the other side of that is how we help them grow their business. How do you scale up the operational side? How do you maintain quality? How do you maintain the cohesiveness of the team? How do you add to that team?

In summary, the challenges are as multidimensional as you could imagine, with great rewards for the entrepreneurs, for our Strategic Partners, investors and ultimately for the semiconductor industry.

https://eepower.com/market-insights/finding-solutions-in-silicon-an-interview-with-richard-curtin-of-silicon-catalyst/

SILICON STARTUP SOLUTIONS

THE PATH TOWARD FULLY AUTONOMOUS, SELF-DRIVING CARS

MathWorks

At the 1939 New York World's Fair, General Motors unveiled its vision of a future world that supported smart highways and self-driving cars. Although that dream has yet to emerge some 80 years later, autonomous car technology has advanced considerably. Networks of sensors—including cameras that read road and traffic signs, ultrasonics that sense nearby curbs, laser-based lidar for seeing 200 meters out or more, and radar that measures range and velocity—are being developed to assist drivers. Paired with artificial intelligence, these technologies help drivers park, back up, brake, accelerate, and steer; detect lane boundaries; and even prevent sleepy motorists from drifting off behind the wheel.

Nearly 36,000 people in the United States died in traffic accidents in 2018—with more than 90% of those accidents caused by human error.

Although these advances have not yet completely replaced a human in the driver's seat, doing so could save lives. According to the latest numbers from the National Highway Traffic Safety Administration, nearly 36,000 people in the United States died in traffic accidents in 2018—with more than 90% of those accidents caused by human error. Pedestrian fatalities have risen by 35% in the past decade, reaching more than 6,000 per year. Vehicle perception technology that could "see" its surroundings better than a human and react more quickly could significantly reduce injuries and deaths.

While there is agreement that perception technology will surpass human ability to see and sense the driving environment, that's where the agreement ends. The automotive industry has not yet reached consensus on a single technology that will lead us into the era of driverless cars. In fact, the solution will likely require more than one. Here are three technology companies advancing vehicle perception to usher in a future of fully autonomous, self-driving cars.

HEAT WAVES

Advances in lidar, radar, and video camera technology will help move autonomous driving technology into the future. But no sensor can accomplish the job alone. "They all have their strengths and they all have their weaknesses," says Gene Petilli, vice president and chief technical officer at Owl Autonomous Imaging, based in Fairport, New York.

Conventional lidar is extremely accurate, but snow, rain, and fog reduce its ability to tell animate from inanimate objects, says Petilli. Traditional radar, on the other hand, can see through the snow, is excellent at long distances, and can judge the relative speed of objects, but it alone cannot distinguish what those objects are. Cameras can classify as well as read traffic lights and street signs, but glare can disrupt the quality, and at night, they can only see what the headlights illuminate.

"The trick is to pick a suite of sensors that don't have the same weaknesses," says Petilli.

Owl AI's team fills in the gaps with 3D thermal imaging, which senses heat signatures given off by people and animals, and greatly simplifies object classification. Called Thermal Ranging™, the company's sensor is a passive system—meaning it doesn't have to emit energy or light and wait until it bounces back—that can pick up the infrared heat of a living object. It sees the object, whether it's moving or stationary, in day or night and in any weather conditions, up to 400 meters away, and can calculate the object 3D range and velocity up to 100 meters away.

The device is made of a main lens, similar to that found in a regular camera, plus an array of very small lenses positioned between the main lens and a detector. The array breaks the scene into a mosaic of images, each one looking at the object of interest from a different angle. An algorithm measures the subtle differences between the images to calculate how far away the object is.

Petilli says the company is using MATLAB to perfect the system. Because they're trying to measure very small differences between elements in the microlens array, any distortion in the lens can create errors in the range calculation. So, they model the entire system in MATLAB to perfect the algorithms that correct for the lens distortion. They also run driving simulations to train the deep neural network AI algorithm that creates the 3D thermal images. Deep learning will be used to evaluate neural network algorithms to convert the mosaic of images into a 3D map.

"Autonomous vehicles won't be accepted by the public until they are safer than a human driver," says Petilli.

ENHANCING SAFETY

Vehicle perception technologies are key to providing a safe automated driving experience. To deliver on the promise of fully autonomous, self-driving cars, tech companies are using AI and computer vision to help vehicles see and sense their environment. And although fully autonomous cars aren't the norm yet, these companies are bringing us closer while improving the safety systems in new cars today.

SILICON STARTUP SOLUTIONS

STARTUP PROMISES WIRELESS GAMING DEVICES WITHOUT BLUETOOTH LAG

c|net

By Stephen Shankland reprinted from cnet.com

March 19, 2020

There's a surge of interest in ultra wideband. The wireless standard, which was designed for data transfer, fizzled more than a decade ago but is now experiencing new life as a method for finding an object's precise position. UWB has already been built into the U1 chip that Apple added to its iPhone 11, and carmakers like BMW and Volkswagen could offer key fobs with UWB that unlock your vehicle when you get close.

Now Montreal-based SPARK Microsystems wants to use UWB for its original intent -- it wants to see UWB in wireless gaming controllers, keyboards, headphones and mice. Gamers today often use wired peripherals that have minimal communication lag, but if Spark succeeds, the technology could challenge Bluetooth's future growth.

On Wednesday, SPARK said its SR1000 radio chips will ship in the third quarter of 2020 and companies can test prototypes now. The chips will cost less than $1 apiece, said Fares Mubarak, who took over as SPARK's chief executive in 2018.

Bluetooth has spread widely over the last two decades and is commonly used to connect earbuds speakers, headphones, mice and keyboards to phones and laptops. Using UWB will allow for faster data transfer, lower battery use and shorter communication delays that can hobble gaming, SPARK's executives argue. They also tout it for virtual reality and augmented reality headsets and for internet of things devices.

SPARK wants its chips to handle tasks that would benefit from a 10X improvement in performance and power consumption, like gaming peripherals, Mubarak said. "People are not going to switch for something that's only 20 percent better," he said.

The Bluetooth Special Interest Group, the industry consortium that develops the technology, didn't immediately comment.

PROPRIETARY UWB TECH TODAY, STANDARD TOMORROW?

The Bluetooth Special Interest Group, the industry consortium that develops the technology, didn't immediately comment.

Today, SPARK's technology is proprietary, meaning that anyone wanting to build it into a product has to buy its radio chips for both ends of the wireless connection. Once it's got products on the market, though, SPARK hopes to standardize its version of UWB so others can join in. That standardization could come in 2022 or 2023, said Chief Technology Officer and co-founder Frederic Nabki, but selling working products today is necessary first step.

"First we're going after market traction and credibility, then development partners and customers who can help us go to standardization of the next generation," Mubarak said.

UWB is a different variety of wireless communications compared with other standards like Bluetooth, Wi-Fi and Zigbee. Instead of using a relatively narrow slice of the radio spectrum, it spreads across a wide swath, sending data as very short pulses -- up to a billion of them, per second, which means each lasts only a nanosecond. To avoid disrupting other communications, UWB requires pulses to be very low power.

Because UWB pulses are so fleeting, they can be used for locating objects in space by precisely tracking the timing of those radio signals. That's why UWB is showing promise for location tracking technology. In principle, SPARK's variety of UWB can be used for location, too, but it isn't in its products today.

Although phone makers aren't as likely to adopt UWB data-transfer technology if it requires a second chip, SPARK does benefit when they build in UWB location technology. That's because the phone maker has made the important decision to add UWB-compatible antennas, which paves the way for other potential future UWB uses, Mubarak said. And in the longer run, as standards develop, SPARK's approach could be used for location tracking, too.

SPARK's UWB chips transfer data at as fast as 20 megabits per second. That's 10 times fast than Bluetooth 5 at 2Mbps, though still much slower than USB. At a 1Mbps connection, SPARK's UWB link uses 40 times less battery power than Bluetooth.

SPARK will sell two chips, the SR1010 that works uses radio spectrum from 3.1GHz to 6GHz and the SR1020, which uses 6GHz to 9.5GHz. Both are designed to work reliably despite Wi-Fi and other radio chatter, including Wi-FI's likely new expansion to the 6GHz band.

Chip technology firm Arm to ease fees for startups, join incubator

REUTERS®

(Reuters) - Arm Inc, the British firm whose chip technologies power most smart phones, said on Wednesday it was easing fees for startup companies and providing free offerings to an incubator for early-stage chip firms.

Arm, owned by Japan's Softbank Group Corp, licenses its intellectual property to companies like Qualcomm Inc, Apple Inc and Samsung Electronics Co Ltd, which in turn use the technology in their respective chips for smartphones and other devices. Arm charges a range of licensing fees to access its technology, including some that must be paid for potentially several years of design and development time before a company ever sees its first physical chip.

Those costs are more difficult for small companies to absorb, so last year Arm opened up about three-quarters of its portfolio of chip technology for a new "flexible access" program that delayed many of those fees until after its customers had a chip in hand that they could begin to sell. Arm also faces competition from RISC-V, an open-source chip technology with fewer licensing costs.

On Wednesday, Arm extended that effort, saying it would eliminate its annual access fees for startups with less than $5 million in funding.

An Arm spokesman said the program will carry some costs to Arm, but the company views it as a long-term investment to ensure smaller chip companies can become familiar with its technology.

Arm also on Wednesday joined Silicon Catalyst, a California-based firm that provides support to small chip firms, as an "in-kind partner" by providing some of its offerings for free to the firm's portfolio companies.

Silicon Catalyst has persuaded many of the highest-cost suppliers of software and intellectual property for designing chips to donate to its companies to defray millions of dollars of development costs before physical chips roll off a manufacturing line.

Pete Rodriguez, a former NXP Semiconductors executive who is now Silicon Catalyst's chief executive, told Reuters that having free access to some of Arm's intellectual property will help the firm's portfolio companies survive long enough to get to the point of manufacturing physical chips, raise additional rounds of funding and eventually begin paying for Arm's technology.

"It's really hard to raise money for hardware – and it's even harder to do it with just a PowerPoint presentation," Rodriguez said. "We don't give our In-Kind Partners anything other than a healthy customer."

SILICON STARTUP SOLUTIONS

OUR CEO'S INTRODUCTION LETTER FROM SILICON CATALYST'S SPRING PORTFOLIO COMPANY UPDATE

June 16, 2020

Welcome to Silicon Catalyst's Spring 2020 Portfolio Company Update.
We truly appreciate your participation and hope you and your families are staying safe

This meeting is being held as an on-line event, as we believe it's most appropriate due to the challenges that we're all facing due to the pandemic.

We would like to thank all of our Ecosystem partners and especially to Arm and STMicroelectronics. Each of these companies have joined our ecosystem as both Strategic and In-Kind Partners.

arm

life.augmented

Some highlights since the Fall Portfolio Company Update in November 2019 held at TSMC:

- We held our 11th screening event and our first online in April and we had nearly twice the number of participants of our regular in-person attendance

- We now welcome 4 new companies into our family of Portfolio Companies:
5D Sensing, California Memory, Multifractal and Teramics bringing our total to 30 companies that have been admitted to our Incubator

- Mentor, a Siemens company, has joined as a new In-Kind Partner

- Silicon Catalyst Angels, launched in July 2019, will end their first year of operation with funding for 5 companies from our Incubator

- Our Joint Venture with Silicon Power Technologies in Chengdu China was launched in January 2019 and has already admitted 12 portfolio companies

- Continued expansion of our Advisor ecosystem, now in excess of 170 members

- Our network of Investors which includes VCs, corporate, angels and angel groups, now in excess of 250.

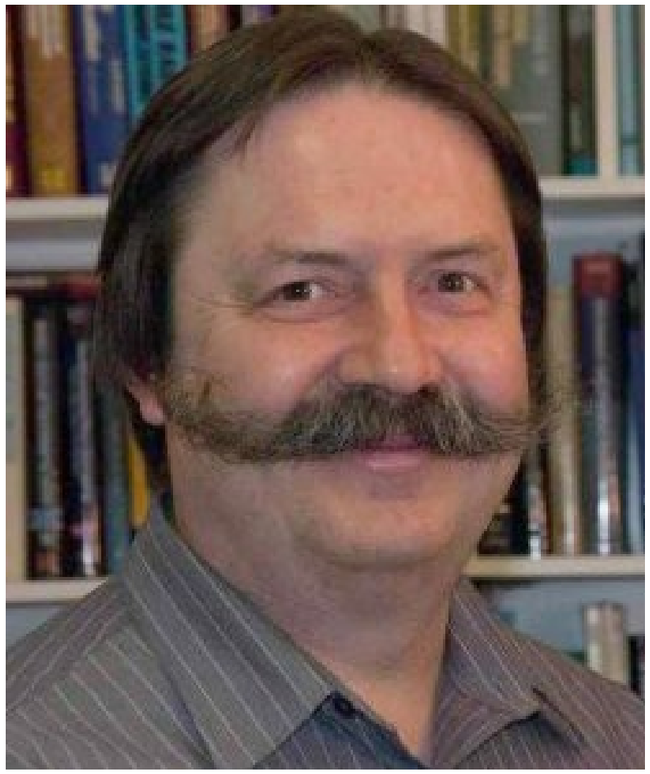
- Launched our university and accelerator program, with events held with semiconductor industry major centers of learning

Thank you for your continued support of our efforts to build a world-class ecosystem for startup companies focused on accelerating solutions in silicon.

Pete Rodriguez
CEO

IN MEMORIAM

Earl McCune, CTO and Co-Founder of Eridan



EARL MCCUNE

CTO AND CO-FOUNDER OF ERIDAN COMMUNICATIONS, INC

It is with great sadness that we announce the sudden and untimely death of Earl McCune, IEEE Fellow ('18) on May 27, 2020, in Santa Clara, California, USA. He was 63 and is survived by his wife, Barbara. At the time of his passing, Earl was a Professor of Delft University of Technology, the Netherlands, a tireless and long-time IEEE volunteer, as well as CTO and co-founder of Eridan Communications, Inc., California, USA. Earl's longstanding passion for sustainable and energy efficient radio frequency communications was an essential part of Eridan's founding inspiration, and his colleagues are deeply saddened to lose his vision, steady leadership and generous spirit. That vision and commitment will also be missed by the IEEE communities that relied on his expertise in developing standards, guiding a roadmap for future network generations, or his willingness to provide necessary reality checks. Although Earl's time at Delft was sadly cut short, the staff and students of the Microelectronics Department will always remember him for his boundless enthusiasm, humor and unselfish commitment to education and research in the field of wireless communication. His expertise and devotion to radio electronics - and equally importantly - his ability to bring all kinds of students, scientists and businesspeople together, and inspire them with his ideas and dreams, will be greatly missed in Delft, in California, and by his many friends and collaborators around the world.

John Schmitz
Delft University of Technology, The Netherlands

Doug Kirkpatrick
Eridan Communications, Inc., California, USA

Ashutosh Dutta
IEEE Future Networks Initiative

SILICON STARTUP SOLUTIONS

IN MEMORIAM

Earl McCune, CTO and Co-Founder of Eridan

I first met Earl in the beginning of 2013 when I was diligencing a possible startup looking at RF applications of GaN-on-diamond. There was something about Earl that immediately communicated "I am going to tell you what I think" – politely, but with no burden of hidden agendas. When it was clear that the GaN-on-diamond opportunity was still in the early science phase, Earl, Dubravko Babic, and I found the opportunity to follow up on those discussions with a re-thought approach that became Eridan. This learn-recognize-pivot approach is something I've seen in all serially successful entrepreneurs. Earl had this quality in abundance.

Like most of the great engineers I've had the honor to know he eschewed complex answers in favor of the simpler explanations as a starting point: he loved to teach and he was extremely good at it. All of us that had the joy of working with Earl quickly learned the "Earl-isms" that drove his process:

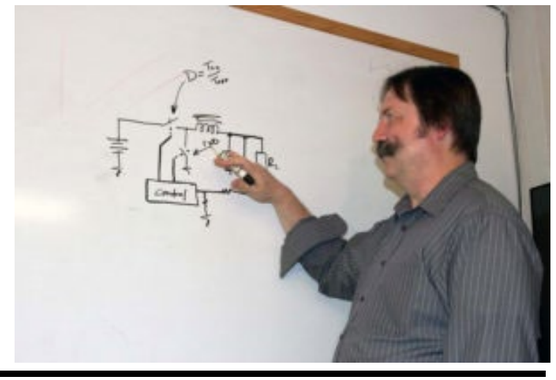
- "FIRST make it work, THEN make it better."
- "All you need is Ohm's Law and the Fourier Transform."
- "You can't improve what you can't measure."
- "All communication happens at the receiver."

All of us that had the honor of working with Earl will be forever marked by his imprint. From his contemporaries and colleagues, it will feel as if we're missing a stroke-oar in our ship. From the multitude of younger engineers that he tutored in companies and universities around the world, a guiding light has dimmed. But the teachings, the message, and the vectors remain. Well lived, my friend, well lived.

Doug

EARL MCCUNE BIOGRAPHY

Earl McCune (S'78–M'79–SM'97–F'18) received the B.S.E.E./C.S. degree from the University of California (UC), Berkeley, CA, USA, the M.S.E.E. degree from Stanford University, and the Ph.D. degree from UC Davis, CA, USA. He was a Silicon Valley serial entrepreneur, with 93 issued U.S. patents and the author of two books. His research interests included RF circuits and systems, including modulation design, with an emphasis on the joint optimization of throughput and energy efficiency while also minimizing implementation cost. He was an emeritus MTT Distinguished Microwave Lecturer, a member of multiple IEEE conference committees and served as the Chair of the Energy Efficient Communications Hardware Standards Working Group. His considerable work experience included stints at NASA, Hewlett-Packard, Watkins-Johnson, Cushman Electronics, Digital RF Solutions (start-up #1), Proxim, Tropian (start-up #2) and Panasonic, and Eridan (start-up #3) where he was CTO. He was a Professor of Delft University of Technology, where he held the chair of sustainable wireless systems.



SILICON CATALYST ANGELS
INVESTING IN THE INNOVATION

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

Silicon Catalyst Angels was spawned from Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon.

What makes Silicon Catalyst Angels unique is not only our visibility into an exclusive deal flow pipeline, but our membership is comprised of seasoned semiconductor veterans who bring with them a wealth of knowledge along with their ability to invest. Driven by passion and a desire to 'give back', our members understand the hardware space thanks to a lifetime of engagement in the industry. When you couple our members enthusiasm, knowledge, and broad network of connections with companies that have been vetted and admitted to Silicon Catalyst, you have a formula that is to date, non-existent within the investment community.

After launching our group in July 2019, we're pleased to announce that our members have provided funding to 6 companies from the Silicon Catalyst Incubator, with total investment in excess of $800,000.

If you're an accredited investor and are interested in learning more about membership, please contact richard@siliconcatalystangels.com

Board members, Raul Camposano, Amos Ben-Meir & Michael Joehren

DOVER MICROSYSTEMS

Stopping Network-Based Attacks with Hardware-based Cybersecurity

ESPRE TECHNOLOGIES

Chipsets, Modules, & Sensor Solutions for BoT & IIoT

ERIDAN

The world's most efficient radios for 5G and beyond

MENTIUM TECHNOLOGIES

Processors for complex video analytics on the Edge

OWL AUTONOMOUS IMAGING

The smartest choice for the road ahead

AyarLabs

Enabling the next phase of Moore's Law through optical connectivity

Silicon Catalyst Expands its In-Kind Partner Ecosystem to Israel

August 16, 2020 - Silicon Catalyst, the world's only incubator focused exclusively on accelerating solutions in silicon, announced today the expansion of its ecosystem of In-Kind Partners to Israel, welcoming the premier IP Firm Ehrlich Group and premier law firm Gross, Kleinhendler, Hodak, Halevy, Greenberg, Shenhav & Co. (GKH). The Israel-based companies within the Silicon Catalyst Incubator can now have local access to experienced intellectual property and corporate legal services.

Silicon Catalyst has created a unique ecosystem to provide critical support to semiconductor hardware start-ups, including tools and services from a comprehensive network of In-Kind Partners (IKPs) to dramatically reduce the cost of chip development. These Portfolio Companies utilize IKP tools and services including design tools, simulation software, design services, foundry PDK access and MPW runs, test program development, tester access, and banking and legal services. Additionally, the startups can tap into the world-class Silicon Catalyst network of advisors and investors. "The ecosystem of In-Kind Partners provides great value to the Silicon Catalyst portfolio companies. With the recent admission of the second Israeli start-up into the incubator, it is important for us to provide local legal and intellectual property support in addition to the global support we already offer with tools and services in areas like design, manufacturing, and test. The expertise and experience of Ehrlich Group and GKH will significantly help our Israeli startups, as they prepare for their successful growth", said Danny Biran and Moshe Zalcberg, Managing Partners, Israel, Silicon Catalyst.

EHRLICH GROUP
TURNING IDEAS INTO VALUE

About Ehrlich Group

Ehrlich Group, a leading international Intellectual Property firm in Israel, founded in 1995, houses more than 150 highly experienced IP professionals. The group provides clients with a complete range of services, from filing and registering a large raft of patents, trademarks, and designs, to protecting copyrights and plant breeders' rights, defending any IP infringement in court and representing all parties to IP litigation. By combining the patent agents and patent and trademark attorneys of Ehrlich & Fenster with the litigators of boutique IP law firm Ehrlich, Neubauer & Melzer, and legal experts of IPTrade, Ehrlich Group can service all of its clients' needs. www.ipatent.co.il

"We have the great privilege of being a partner with Silicon Catalyst, which is currently expanding in Israel. As the leading IP player in Israel, we will do our best to always bring the tech ecosystem to the front of innovation, and we are happy to do it, this time, with Silicon Catalyst" said Roy Melzer , Head of Software and Information Sys. Department, Ehrlich Group.

GKH LAW OFFICES

About GKH

Gross, Kleinhendler, Hodak, Halevy, Greenberg, Shenhav & Co. (GKH) is one of Israel's largest and most influential law firms, and has been a leader for more than 40 years, particularly in the fields of capital markets, mergers and acquisitions (M&A), hi-tech and venture capital, corporate law and cross border transactions. GKH's legal team is one of the strongest and most experienced in the Israeli tech eco-system and includes highly respected professionals specializing in all areas of corporate and commercial law, as well as in tax, labor, litigation, privacy, energy and environment. Combining profound legal understanding, cutting-edge expertise in business trends and best practices, academic depth and an innovative approach, the firm is widely recognized for its local and global transactional experience, and is ranked as one of the top law firms in Israel by Legal 500 and Chambers Global, BDI and Duns100. www.gkh-law.com/

"We have excellent working relationships with many of the leading players in the technology space, whether venture capital and private equity funds, serial entrepreneurs, multinationals and other important actors in the field. We are known to be deal-makers and extremely business focused counsel, and we look forward to working with Silicon Catalyst and its partners" said partners Rick Mann and Chen Manzur of GKH.

WHAT INVESTORS LOOK FOR IN HIGH-TECH AND SEMICONDUCTOR STARTUPS

By Mukul Yudhveer Singh, reprinted from ElectronicsForU Network

During the June 2020 edition of India Technology Week (a monthly online event organized by the EFY Group), an eminent panel of leaders from the tech industry discussed the following big question: What do VCs lookv for in high-tech and semiconductor startups? The sobering report that prompted this discussion was that of the US$ 1.3 billion that semiconductor startups raised over the past five years, 55 per cent of VC funding went to North American entrepreneurs, with Asia (minus China) receiving just a paltry 6 per cent. The China region was not included in the study. The panel was moderated by Poornima Shenoy, co-founder, THE GAIN. The panellists included Hemant Mallapur, co-founder and executive VP, engineering, Saankhya Labs; C. Muthukrishnan, CEO, Semiconductor Fabless Accelerator Lab (SFAL); Sanjeev Keskar, MD, Arrow Electronics India; Dr P.K. Sundararajan, founder and CEO, BluArmor; and Tarun Verma, managing partner, Silicon Catalyst.

THE IMPORTANT QUESTIONS

A wide audience attended the online panel discussion, and asked pertinent questions that were subsequently addressed by the panelists. Some of the key questions included:

- What do VCs look for in high-tech and semiconductor startups?
- What does a perfect pitch include?
- What is the risk appetite for investors?
- What can one do to secure the funding?
- What are emerging technologies that will interest the market as well as investors?

Sanjeev Keskar, MD, Arrow Electronics India noted that, "The design cycles in the semiconductor as well as the high-tech industry are very long. Typically, this is around 18 to 24 months. If you're starting to design a chip today, it might see the light of day only after two years or more. So an investor will surely look at the design cycle time as the key differentiator, since that is the top factor which determines whether you are eligible for funding or not." The answers given during the panel discussion to some of these questions are listed below, and will guide aspiring startups on how to successfully solicit investor funds.

WHAT YOU SHOULD KEEP IN MIND BEFORE ENTERING THE SEMICONDUCTOR SPACE?

- Many big names are supporting the 'Make in India' initiative. However, these big names prefer startups that focus on design-led manufacturing rather than just manufacturing.
- From a global perspective, start building for India first, followed by building for the global markets.
- Angel funding in India has to be largely from the local ecosystem. The cost of sourcing wafers in India is high.
- Semiconductors is a capital-intensive industry. Access to at least US$ 1 million is a necessity to even step into the semiconductor space.
- Always remember that investors can sniff out good from bad products and solutions. They have big teams to do that.
- Your core IP must be strong.
- Getting into the semiconductor space is a long-term commitment.
- There are two types of investors—venture capitalists and strategic investors.
- Identify teacher customers who will guide you on the solutions you are creating in the early stages, and pay you for the product or service you're developing.

Tarun Verma, managing partner, Silicon Catalyst, pointed out, "Getting to know what the customers want should be a startup's top priority. Many tend to be tech-savvy and neglect the real pain points. The investor appetite has always been there. Startups need to remember that technology investors have been doing this for years and they have the ability to sniff out the extraordinary from the merely good products."

WHAT INSPIRES AN INVESTOR'S CONFIDENCE?

- Unless you have something that differentiates your product or service from others in terms of applications, funding companies won't show any interest.
- What you will do with the funds received, how you will return them, and what your long-term plans are should be made clear at all stages.
- Team formation is of critical importance. A lot of Indian entrepreneurs operate alone. Remember that single founder companies are not really liked by investors. Have at least three co-founders on board. More co-founders help investors assess risk in a better manner.
- Focus on the design cycle time. The design cycle times are very long (at least 18 months), so anticipating what the market needs two to three years earlier is not that easy. Errors in market calculations can derail your goals!
- You might create a wonderful product. But what if it turns out to be a white elephant? Investors won't be interested in it at all! The right architecture for becoming techno-commercially successful is a must.
- As technologies advance, it becomes easier for big names to launch a counter solution within months after a startup launches. Unless the differentiator is big, investors won't feel secure in funding your startup.
- Getting to know what customers want is the first necessity. Investors love startups that know their target audience.
- Prove that you can do the market analysis right. If you do, investors might come to you instead of you going to them.
- Investors don't like 'Me too' ideas at all! Presenting such ideas decreases your funding chances drastically.
- Knowing about the product's life cycle is most important. A TAM (total available market) analysis is very important for semiconductors.

Dr P.K. Sundararajan, founder and CEO, BluArmor, advised, "For a minute, think of yourself as the investor and your startup as somebody else's venture; would you now invest? Tailoring the pitch can make a lot of difference to your chances of securing the funding round. What you are going to do with the funding, what differentiates you from others, and what are your plans to scale up should always be a part of the pitch."

WHAT DOES A PERFECT PITCH INCLUDE?

- The problem you are solving.
- What differentiates your startup from others.
- Plan for taking the solution from Power Point to the prototype stage.
- Target audience information.
- The world before your product.
- The world after your product.
- What makes you confident that customers will pay for it?
- What is your path and map for scaling up?
- What is the path to profitability?
- Specs vs price plan and mapping.
- How are you going to invest the money?

Hemant Mallapur, co-founder and executive VP of engineering, Saankhya Labs, said, "Success in the high-tech business is a mix of three things—the value of your idea, your ability to build it and your ability to sell it. If not 'ten on ten', each of these must still be able to score a decent value in the startup report card."

WHERE DO THE BIG OPPORTUNITIES LIE?

- AI, ML and deep learning: Not many low-level infrastructure IPs have been created in these domains and hence there is a lot of scope for startups.
- 5G is just starting, and the boom for the semiconductors required for the 5G industry will be big. This is one big area that startups can focus on.
- Telehealth and contactless products are here to stay. So is the energy-saving segment as the world is becoming more environmentally cautious.
- Another segment is ADAS (advanced driver assistance systems) as the trend is just picking up. Tesla has already changed the automotive game in the USA. The rest of the world awaits the change, and the startups that will make it happen.
- Automation is going to be adopted at a very fast rate. Designing solutions in this vertical should also be a focus of startups.
- IoT: As everything becomes connected, the world will require a lot of connectivity modules. Even the smart meters need to be connected via IoT. Industrial, home, or government - almost every device will be connected with IoT modules. Designing these can be a focus of startups.

C. Muthukrishnan, CEO of SFAL, Semiconductor Fabless Accelerator Lab, said, "Don't just look at VCs for funding. Reaching out to corporate houses can prove to be a game changing strategy. On close analysis you may find that a lot of big names can benefit from your solutions; so align them with their business goals."

Strategic Ecosystem Partners

In-Kind Ecosystem Partners

SILICON STARTUP SOLUTIONS

About Us

Silicon Catalyst is the world's only incubator focused exclusively on accelerating solutions in silicon, building a coalition of In-Kind and Strategic Partners to dramatically reduce the cost and complexity of development. Close to 350 startup companies have engaged with Silicon Catalyst since April 2015, with a total of 31 startup and early stage companies admitted to the incubator.

Silicon Catalyst exists to help semiconductor startups succeed. We have created a growing ecosystem of In-Kind partners, industry-leading companies, expert advisors, investors, leading universities and industry organizations such as the Global Semiconductor Alliance and SEMI, which enables our startups to form deep relationships with people that provide value to their long-term success.

We provide the startups we incubate with several millions of dollars worth of goods and services from our network of industry-leading In-Kind partners to dramatically reduce the cost of development. These goods and services include EDA tools, PDK access, foundry wafers, test equipment, design services, and other valuable technical and business capabilities which include, but are not limited to, software development, patent filing, and financial management.

Silicon Catalyst startups interact with a valuable network of expert advisors. In addition, our strategic partners share their experience and actively look for opportunities to work together with our startups.

Our two-year incubation program also provides a path to funding through our connections with venture capitalists, strategic investors, individual angel investors, angel investment groups, and government agencies that provide grants.

In our first year we were awarded the prestigious UBM Canon Startup Company of the Year, in anticipation of our impact on the semiconductor industry. We are proud to have created a broad ecosystem which provides our startups with the greatest opportunity for a successful exit.

Silicon Catalyst Angels was formed to foster the startup companies admitted into the Silicon Catalyst incubator. Comprised of seasoned semiconductor veterans who bring with them a wealth of knowledge along with their ability to invest they are driven by passion and a desire to 'give back'. Our members understand the hardware space thanks to a lifetime of engagement in the industry. When you couple our members enthusiasm, knowledge, and broad network of connections with companies that have been vetted and admitted to Silicon Catalyst, you have a formula that is to date, non existent within the investment community.

A VALUABLE RESOURCE FOR THE SEMICONDUCTOR STARTUP COMMUNITY

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