

SEMICONDUCTOR



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FOCUSED ON EMERGING SEMICONDUCTOR COMPANIES

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Radar Scope

Cerebras

Cerebras Systems was founded in 2016 “to solve problems others are afraid to tackle.” The company is backed by premier venture capitalists and technologists, and raised roughly \$25 million in December 2016 from Benchmark and others, according to industry sources. Cerebras was founded by the team that founded SeaMicro, a developer of a high density, low power, single-box cluster computers, which was sold to AMD for \$355 million in 2012. Rumors suggest that Cerebras may be developing deep learning processors.

Andrew Feldman, Founder and CEO (previously Corporate VP and GM at AMD via the acquisition of SeaMicro, where he served as founder and CEO. The SeaMicro team became the Data Center Server Solutions business unit inside of AMD)

Gary Lauterbach, CTO (previously Corporate VP & DCSS CTO at AMD and CTO and Co-founder of SeaMicro)

Bill Lynch, Ph.D., VP, Engineering (previously VP, Engineering at Huawei)

Jean-Philippe Fricker, Founder and Chief System Architect (previously Senior Hardware Architect for DSSD Hardware, EMC, an AMD Fellow and

Consultant, System Architect at Pluribus Networks and SeaMicro)

Sean Lie, Founder and Chief Hardware Architect (previously Chief Hardware Architect at SeaMicro and Chief Architect, DCSS at AMD)

www.cerebras.net

Deepscale

DeepScale was founded in Sept. 2015 to develop perception systems for autonomous vehicles. The founders are Deep Learning experts from UC Berkeley with strong academic and industry track records. In October 2016, the company raised \$500K in angel funding and in March 2017, DeepScale closed \$3 million in seed funding from Greylock Partners, Bessemer Venture Partners, and Autotech Ventures. DeepScale says it has already attracted the interest of key players in the automotive industry.

In collaboration with researchers at UC Berkeley, DeepScale has released several open source projects:

SqueezeNet is a deep neural network (DNN) model designed to be the smallest possible while preserving reasonable accuracy on a computer vision dataset. While SqueezeNet is designed for full-image classification, SqueezeDet performs the task of object localization and detec-

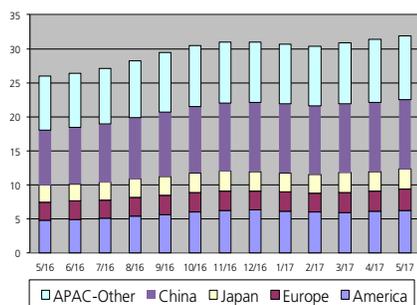
tion. As of December 2016, SqueezeDet is simultaneously the fastest, smallest, and most accurate model on the KITTI object detection benchmark. The BeaverDam tool is a web interface for labeling data.

On a single GPU or a single-socket CPU system, DNNs can take weeks or months to train on publicly available datasets. The FireCaffe training system scales DNN training over a cluster of servers, enabling faster time-to-solution in training, and also enables training DNNs on larger volumes of data in a fixed amount of time. Using FireCaffe, DeepScale accelerated the training of the GoogLeNet model from 3 weeks to 10 hours.

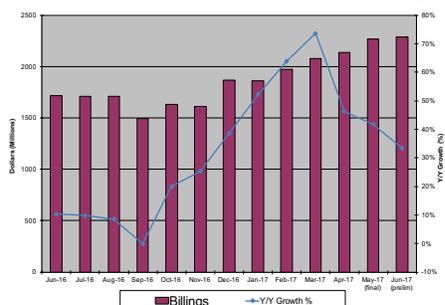
Today, most Deep Learning models require high performance processors, such as NVIDIA GPUs. We believe DeepScale is developing Deep Learning technology that can run on low cost processors.

Forrest Iandola, Co-founder & CEO (previously a PhD student at Berkeley focused on deep learning for computer vision)

SIA Global Sales (\$B)



SEMI's N. American Equipment Billings



IN THIS ISSUE

- Radar Scope..... 1
- Startup Profiles..... 2
- People 4
- Funding 5
- Mergers & Acquisitions 6
- Business & Financials 7
- Market Research 7
- Emerging Trends 7
- Products 8
- Company Financials 8
- Licensing & Partnerships 10
- Design Wins..... 10
- Stock Charts..... 11

Radar Scope

(Continued from page 1)

Kurt Keutzer, Co-founder (Professor of EECS at University of California, Berkeley; previously CTO and SVP of Research at Synopsys)

Ben Landen, Director of Business Development (previously a senior business manager at Maxim, responsible for infotainment and ADAS product lines)

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IonQ

IonQ was founded in 2015 to develop general-purpose quantum information processors. The company's mission is "to make reliable, scalable quantum computing a reality." IonQ recently completed a \$20 million Series B round led by New Enterprise Associates and GV (formerly Google Ventures), with participation from new strategic investors. The company has raised approximately \$22 million in total, including an earlier \$2 million from invested by NEA in 2016. The company has 15 employees.

Today, there are quantum computing activities within several VC-funded companies as well as within larger corporations such as IBM, Google, and Microsoft. According to IonQ, most large technology companies initiating quantum computing research attempt to leverage their core semiconductor technology by developing superconducting qubits. Additionally, IonQ has collaborations with many of these "competitors."

IonQ believes its trapped ion technology, which uses lasers to cool and isolate individual ions, will prevail because trapped ions are identical (unlike manmade qubits), are inherently quantum objects even at room temperature (unlike manmade qubits), are more stable, can be better controlled, and are therefore likely to scale with better performance and greater predictability. IonQ's trapped ion approach combines unmatched physical performance, perfect qubit replication, optical networkability via a photonic quantum channel, and highly-optimized

algorithms to create a quantum computer that is as scalable as it is powerful, and that will support a broad array of applications across a variety of industries.

Co-founders Christopher Monroe and Jungsang Kim are leading experts in the field of trapped-ion quantum computing. Professors Monroe and Kim also maintain large academic research groups at the University of Maryland and Duke University, respectively, with a combined government funding of roughly \$10M per year. This pioneering work is the cornerstone of IonQ's technology.

D-Wave offers a quantum computer; however, it is a quantum annealer, rather than a universal computer. The IonQ system is a universal quantum computer. IonQ plans to bring general-purpose quantum computers to market by late 2018.

David Moehring, Ph.D., CEO (most recently at U.S. Intelligence Advanced Research Projects Activity (IARPA), charged with oversight of government-sponsored quantum computing initiatives)

Professor Christopher Monroe, Ph.D., Co-founder & Chief Scientist (Distinguished Professor, University of Maryland)

Professor Jungsang Kim, Ph.D, Co-founder & Chief Strategy Officer (Professor at Duke University)

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ionq.co

Tachyum

Tachyum was founded in 2016 "to conquer the performance plateau in nanometer-class chips and the systems they power." The company is developing "disruptive intelligent information processing products." Tachyum received seed funding in 2016.

Based on new proprietary computational mechanisms, created specifically to unlock the performance of nanometer-size devices, Tachyum will deliver solutions with unprecedented speed, power, and

cost to solve the most complex problems in the cloud, big data, deep learning, mobile devices, autonomous systems, and large-scale computing. Tachyum plans to deliver increases of more than 10X in processing performance, at fraction of the cost of competing products.

Dr. Radoslav Danilak, Co-founder and CEO (previously founder and CEO of Skyera, which was acquired by WD in 2014. He architected the 10GHz Processing Element for Wave Computing's deep learning DPU. Also cofounder and CTO of SandForce, which was acquired by LSI)

Rodney Mullendore, Co-founder and Chief Architect (cofounder of Skyera and chief hardware architect at SandForce)

Igor Shevlyakov, Co-founder and VP Software Engineering (previously worked on performance optimization of the flash-translation layer of Skyera's storage systems)

Ken Wagner, Co-founder & VP business Development (co-founder of Wave Computing, Silicon Analytics, and Theseus Logic)

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tachyum.com

Startup Profiles

CORNAMI

CORNAMI is a name change from SVIRAL, a company founded in 2011 to develop technology for highly efficient and accelerated multi-core programming. Headquarters is in Silicon Valley, with offices in Sacramento and Boston. The company has 20 employees.

CORNAMI is an AI high performance computing company that has developed multi-core technology that efficiently uses large numbers of smaller cores in a highly concurrent, parallel manner. CORNAMI's technology enables highly efficient multi-core processing that dramatically changes the output-to-power performance at the petabyte data-set scale.

In September 2016, CORNAMI closed \$3 million in Series B financing led by

Impact Venture Capital. In addition, two technology entrepreneurs participated in the round and joined the company. Yatish Mishra joined the company as president and COO, and Denoid Tucker as VP of product and services. The company is currently raising Series C funding to complete production and finance go-to-market strategies.

Today, most applications typically use only a single core at any given time, leaving the unused cores idle. This is because the von Neumann programming model, which underlies modern computing, works well when dealing with a single core, but fails when dealing with multiple cores. CORNAMI argues that it has solved the problem, delivering the ability to fully utilize the idle or dark processors that exist in conventional off-the-shelf processors and systems.

CORNAMI TruStream implements a highly efficient and extensible model of concurrent programming. By using a standardized runtime concurrency model called TruStream, heterogeneous multi-core processor resources are abstracted into a common homogenous core pool. Programmers can easily implement concurrency through CORNAMI's TruStream control structures embedded in standard languages. TruStream's programming model and associated core fabric, TruFabric, improves performance and latency of fine-grained workloads by dynamically and efficiently allocating processor resources so they match changing real-time demands.

Cornami has developed a new parallel architecture with independent decision-making capabilities at each processing core, interspersed with high-speed memory, and all interconnected by a biologically inspired network to produce a scalable "sea of cores". It's based on the TruStream Compute Fabric (TSCF), which is extensible across multiple chips, boards, and racks, with each core being independently programmable. This drives higher silicon utilization and programmability without the overhead of current industry approaches.

By using Cornami's TruStream Programming Model (TSPM), multi-core

processor resources are abstracted into a common homogenous core pool. TruStream is implemented in both software and hardware and runs across the TSCF.

TruStream supports a direct concurrency abstraction, allowing applications to seamlessly scale using a fabric of cores ranging from intra-CPU to WAN-linked datacenters. TruStream supports concurrency simply and deterministically (no locks) increasing performance, with no performance falloff, as more cores are utilized. Programmers can easily implement concurrency through the TruStream control structures that are embedded in higher level standard languages.

TruStream runs on bare metal — no software stack, no virtual machine, no operating system, no context switching, no task dispatching, and no caching. The company provides a SDK supporting big data frameworks such as Apache Spark that allows applications to be programmed in higher-level languages, including C++, in order to provide an easy-to-use migration path for the existing code base.

TruStream is implemented in software and runs on single or networked heterogeneous multi-core CPUs and operating systems (x86, ARM, Android, Linux, and Mac OS). Whether purely with software or with hardware augmentation, TruStream increases performance, reduces power consumption and latency, and introduces additional forms of application concurrency previously unavailable.

CORNAMI's technology can also take a topology with interconnections and actions and efficiently accelerate it utilizing its "TruStream Compute Fabric" (TSCF) on its ultra-high core density, ultra-high memory bandwidth data center chip (DCIC). CORNAMI's chip architecture is programmable and "source compatible", unlike fixed function silicon in today's GPU and ASICs. The initial product will support over 1000 processors in an appliance that can be scaled across multiple systems.

The company initially worked with Asian customers delivering its technology in

software. The company has now moved its technology into hardware for even higher performance and further protection of its IP.

CORNAMI is currently working with early customers and benchmarking applications in the cloud. The company is working with large customers in areas of robotics and mobile ad serving. In an early engagement with a key Wall Street bank using their algorithm, TruStream was able to increase application processor utilization from 13.4% to 96.5%, increasing overall trading system performance by 14X.

Gordon Campbell, Co-Founder, Chairman and CEO (Founder and CEO of SEEQ, founder, Chairman and CEO of CHIPS & Technologies, President and CEO at 3dfx, founder and Executive Director of Techfarm)

Yatish Mishra, President and COO (previously President, CEO and Board Member of Xand Corp, an ABRY Partners Private Equity owned company providing data center and cloud computing IT solutions)

Paul Master, Co-Founder and CTO (previously CTO at Techfarm and co-founder of QuickSilver; >100 patents issued or pending, >35 professional publications and 13 first pass ASIC successes)

Dr. Fred Furtek, Co-Founder and Chief Scientist (founded Concurrent Logic, the world's second FPGA company, worked at Quicksilver)

Marty Franz, VP Engineering (previously VP of Engineering at YESvideo and Vidomim, and VP of Technology for Segasoft)

Darlene Kindler, VP Marketing (previously VP, Consumer Marketing/Third Party for 3dfx. Most recently worked at LeoNovus, a distributed cloud company)

Denoid Tucker, VP Product and Services (previously with TierPoint via the 2014 acquisition of Xand, where he served as CTO)

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www.cornami.com ■

People

Akoustis (NASDAQ: AKTS), a manufacturer of single-crystal bulk acoustic wave (BAW) high-band RF filters, has appointed **Suzanne Rudy** to its Board of Directors. **Steve Miller** was also appointed as an independent member of its Board. His addition brings the total number of directors to seven. Miller co-founded Sawtek in 1979 and served as Sawtek's President and later as CEO and Chairman for 22 years. Sawtek was acquired in 2001 by TriQuint for approximately \$1.3 billion.

Akoustis has named **John Kurtzweil** as CFO, replacing **Cindy Payne**, who will remain with the Company as VP of Finance and Corporate Controller. Concurrent with his appointment as CFO, Kurtzweil has resigned as a Director on the Akoustis Board. Kurtzweil was previously VP Finance at Cree and CFO of Wolfspeed, a Cree company. He currently serves on the Board of Axcelis. He has also served as SVP, CFO and Special Advisor to the CEO of Extreme Networks, EVP of Finance, CFO and Treasurer of Cree, SVP and CFO of Cirrus Logic and SVP and CFO of ON Semi.

AMD has appointed **Abhi Talwalkar** to its board of directors. Talwalkar was president and CEO of LSI from May 2005 until the completion of LSI's merger with Avago in May 2014. Prior to LSI, he held a number of senior management roles at Intel over the course of 12 years, including corporate VP and co-GM of the Digital Enterprise Group and VP and GM of the Intel Enterprise Platform Group.

Applied Materials has appointed **Dan Durn** as SVP and CFO, starting August 24. Durn is currently CFO of NXP after having served as CFO of Freescale up until the merger with NXP. Prior to Freescale, he was CFO and EVP of finance and administration at GLOBALFOUNDRIES. Previously, he was head of M&A and strategy at Advanced Technology Investment Company

(ATIC), a \$15 billion private equity company, and he also served as a VP in technology investment banking at Goldman, Sachs. **Bob Halliday** will remain with the company to support a smooth transition and move to a new role focused on business development. Halliday is planning to retire towards the end of 2018.

Autotalks, a leader in V2X (Vehicle to Everything) communication solutions, is expanding its operations with the opening of three new sites, two in Japan and a third in South-Korea. Heading the Asia-Pacific organization and business operations is **Ram Shalom**, VP of Business Development and Marketing Asia-Pacific, who relocated from headquarters in Israel to the new office in the Tokyo area. Autotalks' second site in Japan, providing R&D and technical support to customers and partners, is located in Nagoya. It is headed by **Gilad Meller** who has more than eight years of experience in leading V2X R&D and managing customer V2X projects. Recently recruited **Eunho Kim**, a local technical manager with vast experience in V2X development, will head the Seoul site.

Autotalks' expansion into Asia was accelerated significantly with the decision of **DENSO**, a Japanese electronics giant, in 2016, to incorporate the Autotalks' V2X chipset into the V2X platform it provides to car manufacturers. The mass production of the V2X solution, initially designed for the North American market, is expected to begin in 2019.

Brewer Science has appointed **Dr. Srikanth (Sri) Kommu** to its senior executive leadership team. As an Executive Director, Dr. Kommu will be responsible for running the semiconductor business. Dr. Kommu most recently served as CTO and SVP at MEMC/SunEdison Semiconductor.

Cadence has elected **Maggie Wilderotter**, former Executive Chairman

and CEO of Frontier Communications, to its board of directors.

Marvell has appointed **Gerri Elliott** to its Board of Directors. Elliott currently serves on the boards of Whirlpool and Imperva and was on the board of Bed, Bath and Beyond until June 2017. She previously served as EVP and Chief Customer Officer for Juniper Networks. Prior to Juniper, she served as Microsoft's CVP, WW Public Sector, and also held senior leadership positions with IBM.

NXP announced that CFO **Daniel Durn** is leaving to become CFO of Applied Materials. **Peter Kelly** will return to the role of EVP and CFO, which he held for over three years. He will continue to retain his responsibilities for Strategy and M&A of NXP.

Peregrine Semi has promoted **Keith Bargroff** to VP of engineering, and has appointed **Sumit Tomar** as VP of product marketing. For the last two years, Bargroff has led Peregrine's technology platforms department. Prior to Peregrine, he served as CTO of Enverv and co-founder, principal engineer and director of technical strategy for RF Magic, which was acquired by Entropic. Tomar previously served as GM of Qorvo's wireless infrastructure business unit. In 2016, he co-founded C-RAN, a startup that is developing a 5G RF system prototype.

Resonant (NASDAQ: RESN), a designer of filters for RF front-ends, has appointed **Jean Rankin** as its newest board member. Rankin served as EVP, Secretary and General Counsel for LSI from 2007 to May 2014, when it was acquired by Avago.

TI has named **Brian Crutcher** to its board of directors. Crutcher is EVP and COO of TI.

Vishay Precision Group (NYSE: VPG), has appointed two new independent members to its Board of Directors, **Bruce Lerner, Ph.D.** and **Wes Cummins**. Dr. Lerner currently serves as

President and CEO of PeroxyChem, a private equity-backed, global specialty chemicals company. Cummins has been an analyst with Nokomis Capital, an investment advisory firm that currently owns approximately 15.9% of VPG's outstanding common stock. ■

Funding

Brain Corp, an A.I. company specializing in the development of self-driving technology for robots, has closed a \$114 million Series C funding round led by the SoftBank Vision Fund. **Qualcomm Ventures**, Brain's first institutional investor, also invested in the round. BrainOS, the foundation of Brain technology, is a proprietary operating system that integrates with off-the-shelf hardware and sensors to provide a cost-effective "brain" for robots. EMMA (Enabling Mobile Machine Automation), the first commercial application of BrainOS, is an A.I. system that autonomously drives commercial floor-cleaning equipment. Brain is planning to port BrainOS onto Qualcomm's Snapdragon Mobile Platform.

Energous (NASDAQ: WATT), developer of WattUp, a wire-free charging technology, announced that **Dialog Semi** is investing an additional \$15 million in Energous and will continue as the exclusive component supplier of WattUp technology. This adds to Dialog's initial investment of \$10 million at the beginning of the partnership in November 2016. WattUp differs from older wireless charging systems in that it delivers power at distances of up to 15 feet, to multiple devices, in any orientation.

The partnership combines Energous' uncoupled wireless charging technology and Dialog's power saving technologies. Energous' WattUp technology uses Dialog's SmartBond Bluetooth low energy solution as the out-of-band communications channel between the wireless transmitter and receiver. Dialog's power management

technology is then used to distribute power from the WattUp receiver IC to the rest of the device while Dialog's AC/DC Rapid Charge power conversion technology efficiently delivers power to the wireless transmitter.

Graphcore has closed 30 million in Series B funding, led by Atomico. Existing investors Amadeus Capital, Robert Bosch Venture Capital, C4 Ventures, Dell Technologies Capital, Draper Esprit, Foundation Capital, Pitango and Samsung Catalyst Fund also participated. AI pioneers Demis Hassabis (DeepMind), Greg Brockman (OpenAI), Ilya Sutskever (OpenAI), Pieter Abbeel (UC Berkeley/OpenAI), Scott Gray (OpenAI) and Zoubin Ghahramani (University of Cambridge, Chief Scientist at Uber) have also joined the round as angel investors.

The new funding comes as the company prepares to ship its first Intelligence Processing Unit (IPU) hardware to customers later this year, with scale-up production for enterprise datacenters and cloud environments in 2018. The IPU is designed specifically for machine intelligence and will deliver between 10x to 100x acceleration compared to today's hardware, according to the company. Graphcore is building a community of developers around its Poplar graph-framework software, which provides a seamless interface to multiple machine learning frameworks, including Tensorflow, MxNet, Caffe2 and PyTorch. Poplar abstracts the graph-based machine learning development process from the underlying graph processing IPU hardware.

Inpria, a pioneer in high-resolution metal oxide photoresists for extreme ultraviolet lithography (EUV), has secured \$23.5 million in Series B funding from a syndicate representing leading players from across the semiconductor manufacturing ecosystem. This new financing was led by existing investor, Samsung Ventures, and included participation from current investors ALIAD (Air Liquide's venture capital

investment arm), Applied Ventures (the venture capital arm of Applied Materials), and Intel Capital. Leading photoresist supplier JSR also joined as a new investor.

Comprised of tin-oxide molecules, Inpria photoresists offer greatly improved resolution with building blocks a fraction the size of traditional polymer-based resists. At the same time, these materials can quadruple the efficiency with which EUV photons are absorbed, thereby improving sensitivity and reducing pattern variability. Fueled by growing customer demand, Inpria will use the funds to complete its pilot manufacturing facility and to commence commercial production.

Light Polymers, a nanochemistry startup with R&D operations in Silicon Valley, Taiwan and Korea, has closed a \$5M Series B strategic funding round led by Tsingda International Venture Capital and TEL Venture Capital. TEL is a global leader in semiconductor and flat panel display manufacturing equipment. By working with TEL, Light Polymers can advance the use of their proprietary chemistry in the OLED flat panel market.

Light Polymers has conducted extensive application and commercialization research on the use of lyotropic liquid crystals in LED lighting, LCD and OLED displays, building materials and biomedical fields. Light Polymers OLED chemistry is now in trial stages with a number of potential commercialization partners.

Osram has acquired a strategic 25.1% share in **LeddarTech**, a Canadian company that develops a LiDAR technology integrated into semiconductors and sensor modules for self-driving cars and driver-assistance systems. LeddarTech specializes in solid-state LiDAR (Light Detection And Ranging) systems that use infrared light to monitor the area around them, and its advanced optical sensing technology is highly complementary with Osram's

Funding

(Continued from page 5)

semiconductor products. The two companies already work together and Osram has now made an investment in LeddarTech in the mid double-digit million euros. This investment is part of a larger financing round currently under way by LeddarTech and expected to be finalized shortly. Osram is already the leading provider of sensor lights for autonomous vehicles.

Spectra7 (TSX: SEV) has closed the final tranche of its private placement. The aggregate gross proceeds, inclusive of the proceeds from the first tranche which closed on June 27, 2017 and \$337,000 of subscriptions from the CEO and certain directors of the Company, is \$1.4 million. This follows the \$4.6 million public offering of 11,500,000 units at \$0.40 per unit closed by the Company on June 27, 2017 for aggregate gross proceeds of \$6.0 million. The Offering was underwritten by a syndicate of underwriters led by Canaccord Genuity and including Eight Capital and Echelon Wealth Partners.

The Company expects to report revenues of approximately \$3.1 million for Q2'17, an increase of approximately 15% from the prior quarter and 19% from the same quarter in 2016. Second quarter growth was driven by broad-based adoption of the Company's patented active copper cable (ACC) technology. ■

Mergers & Acquisitions

ARM has acquired **Simulity Labs** from Foresight Group. Foresight received £11.4M and will receive up to £0.3M of deferred consideration after 12 months subject to certain conditions, implying a cash on cash return of 3x on the £4M invested in October 2016. Simulity provides embedded operating system software and related server systems for SIM cards and embedded SIMs, allowing IoT devices to securely connect to networks.

INVECAS, a provider of IP and ASIC Design Services, has signed a definitive agreement to acquire **Lattice Semi's HDMI design team and Simplay Labs subsidiary**, which oversees standards compliance and interoperability testing services. This transaction will include the transfer of approximately 150 R&D staff, labs and other assets from Lattice's operations in San Jose, CA, Hillsboro, OR, Hyderabad, India, as well as Shanghai and Shenzhen, China. Terms were not disclosed.

Kulicke & Soffa has acquired **Liteq BV**. Liteq, founded in 2014, has developed a dedicated step-and-repeat tool serving the requirements of Advanced Packaging lithography. Liteq's modular offerings of high-throughput, modular i-line steppers utilize a laser-light source, as opposed to more commonly used mercury-vapor-lamp sources. VLSI research anticipates the advanced packaging lithography market to grow to \$296 million in 2021, from \$186 million in 2016.

Littelfuse (NASDAQ:LFUS) has acquired **U.S. Sensor**, a manufacturer of thermistors and probe assemblies used in the most demanding temperature sensing applications. Terms were not disclosed. Littelfuse does not expect this transaction to have a material impact to its 2017 revenue or adjusted earnings projections. Founded in 1989, U.S. Sensor manufactures an extensive variety of high quality negative temperature coefficient (NTC) thermistors as well as thermistor probes and assemblies.

Semtech has signed a definitive agreement to acquire **AptoVision**, a provider of uncompressed, zero-frame latency, Video over IP solutions addressing the Pro AV market, for \$28 million in cash and additional contingent consideration of up to \$47 million. The Company expects the deal to be neutral to its fiscal 2018 non-GAAP earnings and to be accretive to its fiscal 2019 non-GAAP earnings. The acquisition is expected to add over 30 employees based in

Montreal. AptoVision's CEO, **Kamran Ahmed**, will join Semtech reporting to Gary Beauchamp, EVP and GM, Signal Integrity Products Group. Semtech

AptoVision's BlueRiver technology addresses the need for flexible software defined AV that can be carried over low-cost IP networks without compression or latency. Software Defined Video over Ethernet (SDVoE™) is the only approach to Video over IP based on an interoperable ecosystem of Pro AV products and companies, and AptoVision's BlueRiver™ technology is the underlying technology driving SDVoE applications and ecosystem. The technology is being quickly adopted into Pro AV applications, and several tier-one companies are launching SDVoE-based products.

Versum Materials (NYSE: VSM), a materials supplier to the semiconductor industry, has agreed to acquire **Dynaloy** from Eastman Chemical Company (NYSE: EMN) for approx. \$13 million. Dynaloy is a supplier of formulated cleaning solutions for the semiconductor and specialty manufacturing industries. With a strong patented product portfolio and customer relationships, the acquisition enhances Versum's Surface Prep and Clean (SP&C) technology capabilities and product offerings to the advanced packaging materials market. It will be funded from cash on hand and is expected to be accretive to earnings in the first full year of operation.

XMOS has completed the acquisition of **Setem Technologies**, pioneer of Advanced Blind Source Signal Separation technology. Setem's patented algorithms enable consumer devices to focus on specific voice or conversation within a crowded audio environment to achieve optimized input into speech recognition systems. The acquisition allows XMOS to extend the development and deployment of algorithms capable of driving the rapid adoption of voice user interfaces. Setem has been working with XMOS for over 18

months. **Jochen Meissner**, Setem CEO, will become GM of the XMOS Boston office and join the XMOS Board of Directors. ■

Business

Cypress has reached a cooperation and settlement agreement with former CEO **T.J. Rodgers**. The settlement was negotiated on behalf of Cypress by Steve Albrecht, Chairman of the Board, Hassane El-Khoury, President and CEO and Dan McCranie, who was elected to the Cypress Board at the Annual Meeting in June 2017. Cypress and Rodgers have entered into a standstill and mutual non-disparagement agreement through the earlier of May 31, 2019 and the conclusion of the 2019 Annual Meeting, so long as Dan McCranie and Camillo Martino (the Rodgers Nominees) are nominated by the Cypress Board for election at the 2018 and 2019 Annual Meetings. Cypress has agreed to reimburse Rodgers for expenses of up to \$3.5 million, in connection with the 2017 proxy contest.

NXP announced a \$22 million program that expands its operations in the U.S., enabling the Company's US facilities to manufacture security chips for government applications that can support critical US national and homeland security programs. Upon completion of the expansion project, NXP facilities in Austin and Chandler will be certified to manufacture finished products that exceed the highest domestic and international security and quality standards.

Rudolph Technologies (NYSE: RTEC), a provider of process characterization equipment, lithography equipment and software for wafer fabs and advanced packaging facilities, has reached a patent settlement with **Camtek**. The parties will dismiss all current litigation matters and Camtek will pay to Rudolph a one-time payment of \$13 million. The dispute began in 2005 and has included multiple claims of misap-

propriation of Rudolph's technology as well as violations of an injunction on sales of certain Camtek products. The settlement further gives Camtek a perpetual right to sell its existing products, as well as future products. Camtek granted similar rights to Rudolph on Camtek's patent for Kerf inspection. In addition, the parties agreed to a quiet period of three years.

Seoul Semi (KOSDAQ: 046890), a leader in LEDs, announced Q2 revenues of KRW 267 billion (~\$239 million). The rise in revenue came from strong sales in general lighting and strengths across all divisions within the company. The year over year rise in automotive lighting sales proved highly profitable for the company. The company has provided revenue guidance of KRW 260 to 280 billion for Q3. Seoul Semi said it is the only Korean company to maintain revenue growth despite intensifying competition from Chinese LED manufacturers.

Sigma Designs has engaged Deutsche Bank as a financial advisor to assist in its exploration of strategic alternatives that may enhance stockholder value. Sigma has been reviewing all of its product lines to determine which offer the best synergistic fit with its long-term growth plans. This review may result in Sigma continuing to implement value-enhancing initiatives as a standalone company, such as the continued implementation of its previously announced restructuring plans, a sale of the company or certain product lines, or other possible transactions.

STMicro declared that the recent media speculation reported by Bloomberg (ST may resume taking MCU orders after year-end, Taipei-based Economic Daily News reports) is false. ■

Market Research

Worldwide sales of semiconductors reached \$31.9 billion for the month of May 2017, an increase of 22.6% compared to the May 2016 total of \$26

billion and 1.9% more than the April 2017 total of \$31.4 billion, reports the **SIA**. Year-to-year growth in May was the global market's largest since September 2010. All major regional markets notched year-to-year increases of more than 15% in May, and the Americas led the way with growth of 30.5%.

North America-based manufacturers of semiconductor equipment posted \$2.29 billion in billings worldwide in June 2017, according to **SEMI**. The three-month average of worldwide billings of North American equipment manufacturers in June 2017 was \$2.29 billion, 0.8% higher than the final May 2017 level of \$2.27 billion, and 33.4% higher than the June 2016 billings level of \$1.72 billion. Through 1H'17 equipment billings are 50% above the same period last year.

Worldwide semiconductor revenue is forecast to total \$401.4 billion in 2017, an increase of 16.8% from 2016, according to **Gartner**. This will be the first time semiconductor revenue has surpassed \$400 billion. The market reached the \$300 billion milestone seven years ago, in 2010, and surpassed \$200 billion in 2000. The booming memory market, with revenue forecast to increase 52% in 2017, is expected to shake up semiconductor market share rankings. As the largest memory supplier, Samsung is set to gain the most, and gives Samsung its best shot at capturing the #1 position from Intel for the first time. However, the memory bubble is expected to go bust in 2019 as memory vendors add new supply and Samsung could lose a lot of the gains it makes this year and next. ■

Emerging Trends

Three leading U.S. universities are the latest recipients of funding from the **Nano-Bio Manufacturing Consortium** (NBMC), operated by **SEMI**. NBMC's mission is to further the development of human performance

Emerging Trends

(Continued from page 7)

monitoring (HPM), thereby broadening the use of advanced electronics in this application space. The new awards total more than \$870,000 and include:

The **University of Arizona** will focus on determining which HPM sweat patch configuration is best suited to meeting performance requirements.

UCLA will partner with **i3 Electronics** of Binghamton, NY to investigate the use of Fan-Out Wafer Level Packaging (FOWLP) methods as a new way to build versatile, biocompatible physically-flexible heterogeneous electronic systems. **University of Massachusetts at Amherst** will conduct a detailed systematic assessment of microfluidic subsystem architecture and operational approaches for sweat-based biomarker detection. ■

Products

AMD has released two models of its mainstream-priced, high-efficiency AMD Ryzen 3 desktop processor – the AMD Ryzen 3 1300X and AMD Ryzen 3 1200 CPUs. The Ryzen 3 lineup includes two 4-core, 4-thread desktop CPUs, both of which support the new AM4 platform found throughout the entire mainstream Ryzen processor family.

Ryzen 3 1300X delivers a base clock of 3.5 GHz, a precision boost of 3.7GHz, and can clock as high as 3.9 GHz with XFR in the presence of premium cooling. The Ryzen 3 1200 maintains a base clock of 3.1 GHz and a precision boost of 3.4 GHz. All Ryzen 3 processors feature a neural network to learn about applications to send workloads down the fastest pathway inside the CPU for optimized performance.

Helix Semi is sampling of its eMpower HS100 chipset, its first production IC. Based on Helix's patented MuxCapacitor voltage reduction technology, the eMpower HS100's capacitive-based voltage reduction features high efficiency even in light load and no-load scenarios. Converting AC mains to 5VDC, the HS100 enables more than 90% end-to-end efficiency from its full load range of 10W all the way down to 100mA, which represents 5% of full load. Next-gen products include a 0.18u chipset for higher power applications, initially targeting 30W, and a 48V DC-DC device for Power over Ethernet, electric/hybrid vehicles and datacom/telecom applications.

IDT has added MEMS-based flow sensor modules for liquids and gases to its growing portfolio of sensor products. The solid-state sensor element design eliminates cavities and diaphragms

Company Financials – July Earnings Releases

Company	Symbol	Next Qtr Outlook	Current Qtr				Last Qtr			Yr-ago Qtr			Sales Growth	Qtr	Ending
			Sales	Net	Margin	GM	Sales	Net	GM	Sales	Net	GM			
Ambarella	AMBA	\$69-72M	64	2.6	4%	64%	88	18.4	67%	57	1.8	64%	12%	1Q18	30-Apr
AMD	AMD	Up 20-26%	1222	-16.0	-1%	33%	984	-73.0	34%	1027	69.0	31%	19%	2Q17	1-Jul
Amkor	AMKR	Up 5-13%	989	115.5	12%	17%	914	-10.0	16%	917	4.7	14%	8%	2Q17	30-Jun
AMS (euro)	AMS	260-290M	182	-17.8	-10%	35%	149	-16.2	49%	132	19.6	53%	37%	2Q17	30-Jun
ASML (euros)	ASML	€2.2B	2101	466.3	22%	45%	1944	452.1	48%	1740	353.8	43%	21%	2Q17	3-Jul
Brooks Auto	BRKS	\$172-178M	182	17.4	10%	39%	169	14.0	38%	148	8.6	37%	23%	2Q17	30-Jun
Cabot Micro	CCMP	n/a	128	19.9	16%	49%	119	18.3	50%	108	18.7	48%	18%	3Q17	30-Jun
Cadence	CDNS	\$475-485M	479	69.1	14%	87%	477	68.3	87%	453	49.3	86%	6%	2Q17	1-Jul
Cavium	CAVM	n/a	242	-11.1	-5%	53%	230	-50.5	40%	107	-7.4	67%	126%	2Q17	30-Jun
Ceva	CEVA	n/a	21	3.9	19%	92%	21	4.1	92%	17	2.7	92%	20%	2Q17	30-Jun
Cirrus	CRUS	\$390-430M	321	42.9	13%	50%	328	35.1	50%	259	18.1	49%	24%	1Q18	24-Jun
Cohu	COHU	\$88-95M	94	10.4	11%	40%	81	6.8	40%	76	2.5	35%	23%	2Q17	24-Jun
CyberOptics	CYBE	\$13-15M	16	1.1	5%	47%	12	-0.2	45%	19	2.0	44%	-12%	2Q17	30-Jun
Cypress	CY	\$585-615M	594	-22.9	-4%	40%	532	-45.8	37%	532	-46	37%	12%	2Q17	2-Jul
Dialog	DLG	\$340-370M	256	17.1	7%	46%	271	23.1	45%	246	16.8	46%	4%	2Q17	30-Jun
DSP Group	DSPG	Up	31	-0.6	-2%	46%	28	-2.9	44%	36	1.1	44%	-14%	2Q17	30-Jun
Entegris	ENTG	\$325-340M	329	40.0	12%	46%	317	32.5	44%	303	32.9	46%	9%	2Q17	1-Jul
First Solar	FSLR	n/a	623	52.0	8%	18%	892	9.1	9%	1016	-11.4	18%	-39%	2Q17	30-Jun
FormFactor	FORM	\$136-144M	144	17.6	12%	43%	129	5.2	37%	83	36.9	31%	73%	2Q17	1-Jul
GSI Tech	GSIT	\$10-11M	11	-1.5	-14%	52%	10	-1.3	57%	13	0.3	52%	-17%	1Q18	30-Jun
IDT	IDTI	n/a	197	16.7	8%	56%	176	30.2	58%	192	20.9	56%	2%	1Q18	2-Jul
Infineon (ME)	IFX	Flat	1831	253.0	14%	38%	1767	199.0	37%	1632	186.0	37%	12%	3Q17	30-Jun
Intel	INTC	\$15.2-16.2B	14763	2808.0	19%	62%	14796	2964.0	62%	13533	1330.0	59%	9%	2Q17	1-Jul
IXYS	IXYS	Up 4-6%	84	5.5	7%	32%	83	9.3	35%	81	3.0	30%	4%	1Q18	30-Jun
KLA-Tencor	KLAC	n/a	939	256.2	27%	63%	914	253.6	62%	919	271.5	63%	2%	4Q17	30-Jun
Knowles	KN	\$205-235M	190	-29.7	-16%	38%	194	-3.2	35%	190	-24.6	38%	0%	2Q17	30-Jun
Kulicke & Soffa	KLIC	\$200-215M	244	30.8	13%	46%	200	29.0	45%	216	31.8	46%	13%	3Q17	1-Jul
Lam Research	LRCX	\$2.25-2.45B	2345	526.4	22%	46%	2154	574.7	45%	1546	258.9	45%	52%	4Q17	25-Jun
LTX-Credence	XCRA	n/a	104	7.5	7%	45%	80	2.6	43%	82	3.2	44%	26%	3Q17	30-Apr
M/A-COM	MTSI	\$165-174M	195	-27.7	-14%	48%	186	-130.1	37%	142	22.6	52%	37%	3Q17	30-Jun
Maxim	MXIM	\$555-595M	602	163.3	27%	65%	581	140.2	63%	566	92.3	61%	6%	4Q17	24-Jun
Melexis (euros)	MEX.BE	€29M	128	30.8	24%	46%	124	25.4	46%	112	23.1	45%	14%	2Q17	30-Jun

typically found in competitive offerings, and features a protective silicon-carbide coating, making it the most robust and reliable flow sensor element also compatible with food-grade applications.

OmniVision has introduced the OV16B10, a high-performance, power-efficient and high-resolution image sensor designed for the next generation of flagship smartphones. Built on OmniVision's second-generation, 1.12u PureCel®Plus-S pixel architecture, the OV16B10 16-Megapixel sensor features high full-well capacity, high-sensitivity imaging and phase-detection autofocus (PDAF) to deliver industry-leading performance to both single- and dual-camera applications.

With advanced features such as PDAF and zigzag high dynamic range (zHDR), the OV16B10 delivers profes-

sional-grade images that consumers typically associate with DSLR cameras. PDAF is faster and more accurate than the conventional contrast-detection autofocus approach, making it the popular autofocus choice for premium smartphones. The OV16B10 implements a new PDAF architecture that improves sensitivity when compared with previous generations of PDAF technology. zHDR technology extends the dynamic range capabilities of sensors by using a long and short exposure in a single frame. Samples now; production in Q4.

Toshiba has developed the first BiCS FLASH™ 3D flash memory utilizing Through Silicon Via (TSV) technology with 3-bit-per-cell technology. Shipments of prototypes started in June; product samples are scheduled for release in 2H'17. Combining a 48-layer 3D flash process and TSV technolo-

gy has allowed Toshiba to increase product programming bandwidth while achieving low power consumption. The power efficiency of a single package is approximately twice that of the same generation BiCS FLASH memory fabricated with wire-bonding technology. TSV BiCS FLASH also enables a 1-terabyte (TB) device with a 16-die stacked architecture in a single package.

TSMC 10-nm shipments accounted for 1% of total wafer revenue in Q2'17; 16/20-nm process technology accounted for 26%; and advanced technologies, defined as 28-nm and more advanced technologies, accounted for 54% of total wafer revenue. The Company's owned capacity in 2017 is expected to reach above 11 million (12-inch equivalent) wafers, including capacity from three advanced 12-inch GIGAFAB facilities, four eight-inch fabs,

Company Financials – July Earnings Releases

Company	Symbol	Next Qtr Outlook	Current Qtr				Last Qtr			Yr-ago Qtr			Sales Growth	Qtr	Ending
			Sales	Net	Margin	GM	Sales	Net	GM	Sales	Net	GM			
Micron	MU	n/a	5566	1647.0	30%	47%	4648	894.0	37%	2898	-215.0	17%	92%	3Q17	1-Jun
Microsemi	MSCC	\$463-487M	458	13.6	3%	64%	443	41.2	64%	431	115.2	62%	6%	3Q17	2-Jul
Mono Power	MPWR	\$124-128M	112	15.0	13%	55%	100	14.5	55%	94	11.2	54%	19%	2Q18	30-Jun
MoSys	MOSY	Up	1	-4.0	-286%	50%	1	-4.4	50%	1.6	-6.0	38%	-13%	2Q17	30-Jun
Nanometrics	NANO	\$60-64M	64	8.3	13%	52%	59	5.4	48%	56	6.0	51%	15%	2Q17	1-Jul
Nova	NVMI	\$51-56M	45	13.3	30%	75%	54	13.4	60%	25	3.2	60%	77%	2Q17	30-Jun
NXP	NXPI	n/a	2202	49.0	2%	49%	2211	1305.0	49%	2365	-13.0	46%	-7%	2Q17	2-Jul
Parade Tech	4966.TVVO	\$83-91M	86	14.8	17%	40%	76	12.0	40%	69	10.8	41%	25%	2Q17	30-Jun
PDF Solutions	PDFS	n/a	24	0.2	1%	53%	24	0.5	53%	27	2.1	60%	-9%	2Q17	30-Jun
Power Int	POWI	\$108-\$114M	108	13.9	13%	50%	105	14.1	48%	98	11.4	49%	10%	2Q17	30-Jun
Qorvo	QRVO	\$800-820M	641	-30.6	-5%	37%	643	55.9	36%	699	-5.7	40%	-8%	1Q18	1-Jul
Qualcomm	QCOM	\$5.4-6.2B	5371	866.0	16%	54%	5016	749.0	56%	6044	1444.0	58%	-11%	3Q17	25-Jun
Rambus	RMBS	\$96-102M	95	2.6	3%	77%	97	3.0	80%	77	3.9	82%	24%	2Q17	30-Jun
Rudolph Tech	RTEC	\$64-68M	67	9.2	14%	53%	61	7.2	53%	63	7.6	55%	7%	2Q17	30-Jun
Sequans	SQNS	\$15-17M	13	-6.0	-45%	42%	12	-5.6	47%	10	-5.1	44%	33%	2Q17	30-Jun
Sigma Designs	SIGM	n/a	40	-14.9	-38%	47%	43	-8.7	50%	54	-8.1	45%	-26%	1Q18	29-Apr
Silicon Labs	SLAB	\$193-199M	190	16.6	9%	60%	179	15.4	59%	175	15.6	62%	9%	2Q17	1-Jul
Silicon Motion	SIMO	\$122-129M	133	24.0	18%	49%	127	23.5	51%	141	29.0	48%	-6%	2Q17	30-Jun
Siliconware	SPIL	n/a	675	71.3	11%	18%	646	33	19%	717	93	24%	-6%	2Q17	30-Jun
Skyworks	SWKS	\$980M	901	246.2	27%	50%	852	224.9	50%	752	185.0	50%	20%	3Q17	30-Jun
ST Micro	STM	Up 9%	1923	151.0	8%	38%	1821	108.0	38%	1703	23.0	34%	13%	2Q17	1-Jul
Sunpower	SPWR	\$300-350M	337	-93.8	-28%	5%	399	-134.5	-8%	421	-70.0	10%	-20%	2Q17	2-Jul
T.I.	TXN	\$3.74-4.06B	3693	1056.0	29%	64%	3402	997.0	63%	3273	819.0	61%	13%	2Q17	30-Jun
Teradyne	TER	\$445-485M	697	175.0	25%	56%	457	85.2	58%	532	-223.5	53%	31%	2Q17	2-Jul
TowerJazz	TSEM	\$355M	345	50.0	14%	26%	330	45.5	26%	305	38.5	24%	13%	2Q17	30-Jun
TSMC	TSM	\$8.1-8.2B	7061	2235.0	32%	51%	7721	2189	52%	7322	2380	52%	-4%	2Q17	31-Mar
Ultra Clean	UCTT	\$235-245M	228	20.2	9%	19%	205	14.3	18%	130	0.7	15%	76%	2Q17	30-Jun
UMC	UMC	Flat	1234	94.0	8%	18%	1230	-49.0	20%	1216	20.0	22%	1%	2Q17	30-Jun
Versum Mat	VSM	n/a	291	52.7	18%	45%	271	44.9	43%	243	47.8	0.4	20%	3Q17	30-Jun
ViXS	VSX	n/a	5	1.2	25%	31%	8	-1.9	31%	6	-3.2	32%	-16%	1Q18	30-Apr
Xilinx	XLNX	\$605-635M	615	167.2	27%	69%	610	153.4	70%	575	163.0	71%	7%	1Q18	1-Jul
Xperi	XPER	\$90-97M	91	-39.1	-43%	99%	67	-11.0	98%	67	23.5	100%	36%	2Q17	30-Jun

Products

(Continued from page 9)

one six-inch fab, as well as TSMC's wholly owned subsidiaries, WaferTech and TSMC China.

Vayyar Imaging has launched its sensor technology within the automotive and autonomous driving markets. Vayyar's embedded 3D sensors scan the interior of a car and give a real-time picture of everything happening within the vehicle. Its 3D imaging sensors can be used to remove blind spots, identifying nearby obstacles, cyclists, vehicles that are too close and self-parking, providing perimeter information both vertically and horizontally, or large or small vehicles. Vayyar's sensors are agnostic to environmental factors such as darkness, excessive light, heat or fog, allowing them to provide an increased level of safety. Vayyar's 3D sensors also enable volumetric sensing and increased efficiencies in cargo management.

Western Digital has developed four bits per cell, X4, flash memory architecture offering on 64-layer 3D NAND, BiCS3, technology. BiCS3 X4 technology delivers storage capacity of 768 gigabits on a single chip, a 50% increase from the prior 512 gigabit chip that was enabled with the three bits per cell (X3) architecture. Future generations of 3D NAND technology, including the 96-layer BiCS4, are also expected to feature X4 capabilities. ■

Licensing & Partnerships

Andes Technology, an Asia-based supplier of 32/64-bit embedded CPU cores, announced that Hong-Kong-based **AppoTech** has selected Andes N968A for a next-gen audio codec SoC. Andes N968A's superior performance, compact code size resulting from the ability to intermix 32-bit and 16-bit instructions contributed to AppoTech's choice of Andes over competitive alternatives. Also attractive was the N968A's Audio extensions and data

local memory feature that speeds memory access.

Kilopass announced that **Cista Design**, a developer of advanced digital imaging solutions for mobile handsets, consumer electronics and surveillance camera markets, has licensed Kilopass XPM OTP, anti-fuse, NVM memory IP. Cista Design will include the Kilopass IP in a new CMOS Image Sensor (CIS) being fabbed on the SMIC independently developed 130nm back-side illumination (BSI) technology platform. Kilopass OTP IP will store trimming data for the analog and mixed signal circuits, in addition to pixel mapping data for the new chip. The low leakage SMIC process uses three aluminum metal layers for reduced cost and supports pixel sizes down to 1.4u for implementing Cista's 8MP resolution CIS.

NXP is working with **Amazon Web Services** to complete the integration of Amazon Greengrass on NXP's Layerscape Intelligent Gateway platform. Amazon Greengrass extends AWS Cloud capabilities to local devices, making it possible for them to collect and analyze data closer to the source of information, while also securely communicating with each other on local networks. The NXP Intelligent Gateway Platform uses the company's QorIQ Layerscape processor architecture.

ON Semi and **PowerSphyr** have formed an agreement to develop and market wireless power solutions. The agreement calls for ON to integrate its efficient power management components with PowerSphyr's wireless power transfer (WPT) technology, which combines near-field and far-field wireless charging, to create a new class of chipsets. The companies expect to develop the first universally compatible wireless charging solutions that support interoperability with the major wireless power standards.

Picosun, a supplier of advanced industrial Atomic Layer Deposition (ALD)

solutions, the National Chiao Tung University (NCTU, Taiwan), and Atom Semicon (Taiwan), have started a joint collaboration on the improvement of GaN (gallium nitride) devices with Picosun's ALD technology. Intelligent ALD solutions improve the performance and reliability of the devices and speed up the R&D phase of novel components. NCTU has used PICOSUN ALD equipment for years to develop GaN technology. ■

Design Wins

Toshiba's Visconti™4, its latest image-recognition processor dedicated to automotive applications, is being deployed by **DENSO** in next-gen, front-camera-based active safety systems. Visconti4 is a multi-engine road-safety solution that provides drivers with real-time analytics of road conditions and potential dangers. Visconti4 has double the number of processing engines of its predecessor, the Visconti™2, used by DENSO since 2015. The global market of vehicle-mounted cameras is expected to approach \$9.6 billion in 2021.

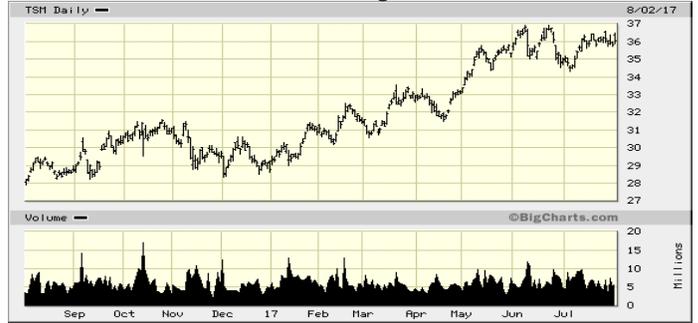
The Visconti4 image recognition processor is equipped with eight media processing engines, allowing it to execute eight applications simultaneously. It can detect and analyze camera-generated images and recognizes traffic lanes; nearby vehicles, both parked and moving; traffic signs and signals; the headlights of oncoming vehicles; and bicyclists and pedestrians.

VeriSilicon announced that **Shenzhen Goke Semiconductor** (SGKS) has selected VeriSilicon Vivante GC7000UL-VX for the SGKS6802X Advanced Driver-Assistance Systems (ADAS) chip, part of SGKS's ADAS product line used by automotive electronic components partners. The SGKS 6802X is an advanced vehicle-quality SoC with heterogeneous computing units including a programmable Vision GPU Processor and hardware-implemented functions for ADAS applications. ■

Philadelphia SOX Index



TSMC – Foundry Barometer



Micron – DRAM Barometer



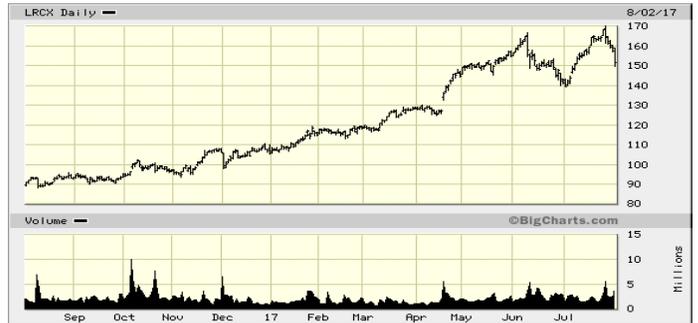
Western Digital (SanDisk)



Intel



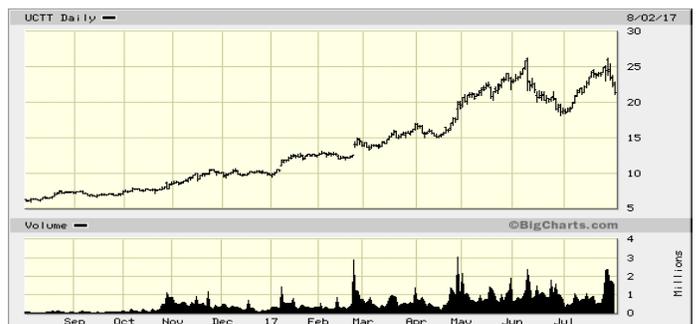
Lam Research



Formfactor



Ultra Clean



Startups In This Issue

- ✓ **Cerebras** – *Unknown, Possibly Deep Learning Processors*
- ✓ **CORNAMI** – *Multi-Core Processing Technology*
- ✓ **Deepscale** – *Perception Systems for Autonomous Vehicles*
- ✓ **IonQ** – *General-Purpose Quantum Computers*
- ✓ **Tachyum** – *“Disruptive Intelligent Information Processing Products”*

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