

UCLA Technology Development Group

INNOVATION MAGAZINE

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A MESSAGE FROM THE ASSOCIATE VICE CHANCELLOR, CEO & PRESIDENT



WELCOME TO THE FOURTH EDITION OF UCLA TECHNOLOGY DEVELOPMENT GROUP'S (TDG) INNOVATION MAGAZINE. In this this issue we are happy to feature our spinout companies [NeuroSigma](#), [Bruin Biometrics](#) and [Flex Logix](#). All of them introduced new products based on research performed at UCLA by its faculty members. You will read about some of TDGs many recent initiatives like the Faculty Innovation Fellows program and the Second Annual Bioscience Innovation Day. We are pleased to give you a picture of these recent successes: Development of ground-breaking partnering events, licensing life-changing technologies and supporting the next generation of innovation leaders.

This year, TDG's dedicated team reached more researchers, students, faculty, investors and industry professionals than ever before. The results are clear. We've doubled the number of licenses executed by our office, our 2019 Bioscience Innovation Day proved that Los Angeles is now a hub for bioscience innovation and former TDG tech fellows have reported back that they are now working as industry leaders, thanks to the experience they gained with our team.

At UCLA TDG, we serve as a campus-wide gateway to innovation, research and entrepreneurship every day. We are pleased to present you with this issue of *Innovation Magazine*, so you can learn more about our activities, initiatives, the achievements of our partners and what we do to make all of this come to life. If you would like to know more about how we can help you with patents, licensing, business collaboration and startups, please contact us at marketing@tdg.ucla.edu, or visit our website at www.tdg.ucla.edu. We also invite you to follow us on Facebook, Twitter, LinkedIn and YouTube.

We hope you enjoy this issue of *Innovation Magazine*.

Sincerely,

Amir Naiberg

Associate Vice Chancellor,
CEO and President

GROWING VENTURE CAPITAL (VC) INVESTMENT proved the exceptional market value of UCLA spinout companies.

VC dollars raised by UCLA startups surpassed \$661 million in 2018, bringing overall VC dollars invested in UCLA companies to \$1.9 billion.

DOUBLED the number of executed exclusive license agreements – In 2018, TDG executed 43 exclusive license agreements – **TWICE** the average number achieved each year since 2008.

Continued startup success – Building on a rich history of enterprise formation, TDG helped to launch more than 20 startups in the past year.

UCLA Innovation Fund grows and excels – Pelage, a startup that was one of the first intellectual properties developed with UCLA Innovation Fund support, was fully funded by Allergan. The Innovation Fund helped to transform this once nascent project into a high-quality investment opportunity. In the last year, the Innovation Fund has added nine new projects – five in therapeutics, and four in medical device/diagnostics.

Industry sponsor research and material transfer activity accelerates – This year, 275 contracts were executed, securing more than \$39 million in funding for industry sponsored research activity. In addition, 1,381 contracts were executed to facilitate the receipt and transfer of tangible materials, software or data for use in research by UCLA faculty or their collaborators and research partners. The ISR team also successfully completed implementation of a TDG-integrated IT system as the primary award database for industry sponsored research and material transfer activity while maintaining necessary reporting to the central UCLA system, as well as the UC Office of the President. This change will enable TDG to achieve internal efficiencies and better leverage its information while maintaining the integrity of UCLA's data.

Initiated the Faculty Innovation Fellows pilot program.

This new campus-wide program, formed in collaboration with Startup UCLA and the vice chancellor for research, which is aimed at advancing entrepreneurial excellence and startup culture, is now open to all UCLA faculty. This year, it identified 10 faculty-led teams to participate in dedicated mentoring with Startup UCLA through a 12-week "accelerator," focused on pitch development, business strategy and venture consulting.

Reached more UCLA students – TDG expanded its student outreach. In addition to its longest-running and largest student program, the Technology Fellows Program, TDG introduced the Legal Extern Program and the New Ventures Fellows Program. The Legal Extern Program is a five-month boot camp that offers law students the ability to earn a full semester of credits. The New Ventures Fellows Program provides students from the Anderson School of Management's Healthcare Business Association and PhD candidates the opportunity to become involved in the UCLA Innovation Fund by performing diligence, sourcing strategic partners and assisting with project management activities.

INDUSTRY SPONSORED RESEARCH AND MATERIAL TRANSFER SPOTLIGHT ACHIEVEMENT

[Judith Currier](#), chief of the Division of Infectious Diseases at the UCLA David Geffen School of Medicine and principal investigator for the UCLA AIDS Prevention and Treatment Clinical Trials Unit, was named chair of the National Institutes of Health-funded AIDS Clinical Trials Group (ACTG), the world's largest clinical trials network focused on HIV. Her appointment puts UCLA at the helm of the ACTG's Leadership and Operations Center, which was transferred from the Brigham and Women's Hospital in Boston. In addition to her clinical HIV/AIDS research, Dr. Currier has demonstrated long-standing devotion to community outreach and education. Her commitment to bring this to AIDS research and education inspired Dr. Currier to serve as UCLA's principal investigator with the ACTG.

UCLA TDG's Industry Sponsored Research and Materials Transfer team plays a significant role in the collaboration between the university and ACTG, due to its strong relationships with many of the nation's top medical and pharmaceutical enterprises. Healthcare businesses collaborate with the ACTG to gain knowledge about new options for people living with HIV/AIDS so they can offer them the most innovative and effective treatments available. TDG proudly takes the lead in negotiating agreements between these medical/pharma industry businesses and the ACTG.

Established in 1987, the ACTG's mission is to cure HIV infection and reduce the burden of disease due to its complications. It establishes and supports the largest network of expert clinical and translational investigators and therapeutic clinical trial units in the world, including sites in resource-limited countries. The group has more than 60 locations in 12 nations. UCLA has been participating with the organization since the ACTG's inception.

TDG BIDS A FOND FAREWELL TO EMILY LOUGHRAN

“... retiring from your primary career is not merely an act of ending, but, more opportunistically and relevant, an act of commencement and of the promise of a meaningful future.” —Alan Spector

EMILY LOUGHRAN retired from her position as UCLA TDG’s senior director of licensing and strategic initiatives on June 27, 2019 after more than a quarter century of dedication to UCLA innovation and entrepreneurship. Since 1994, Emily has protected and licensed UCLA inventions arising from its annual \$1 billion research enterprise, brought research discoveries to the market place for the public benefit, assisted in the entrepreneurial efforts of UCLA researchers and put programs into place to grow the ecosystem.



EMILY
LOUGHRAN

“Emily’s longtime work has left an indelible mark, not only on TDG, but on UCLA as a whole,” said Amir Naiberg, UCLA TDG’s associate vice chancellor, Technology Development Corporation CEO and president. “Her consistency in putting big ideas into action and dedication to expanding opportunities for UCLA entrepreneurs has helped UCLA’s innovation in the marketplace. Her enthusiasm and expertise will be missed, and we wish her the best in all she pursues in the future.”

Emily has brought UCLA’s technology transfer capacity to new heights through her strategic, creative and scalable achievements, including:

- Conceptualizing and implementing TDG’s MedTech Partnering Conference. Now seven years strong, this outreach and networking event attracts more than 300 industry leaders, investors and entrepreneurs in the medical device industry. MedTech is a platform for UCLA innovators to form partnerships that lead to medical advancements and better health outcomes in the future.
- Establishing FirstFridays monthly mixers to bring UCLA entrepreneurs together with like-minded business people in the community, where attendees share opportunities and make lasting professional connections.
- Successfully defending the University of California through three rounds of litigation as a Regents designated witness for the most valuable IP asset to date, [Xtandi](#), which was later monetized for \$1.14 billion.

“During my 25 years at UCLA, I have had the privilege of working at the dynamic and challenging intersection of business, science and law to help bring critically important research discoveries to market, which have the potential to change lives, as well as the world,” Emily said. “I’ve seen nascent technologies transform into societally useful products. Whether it is cancer therapy such as Xtandi or [Erleada](#), an aesthetic tool such as [Kybella](#), a non-drug neuro-stimulating intervention for ADHD, or a filter for water purification, it is always immensely gratifying.”

TDG is grateful to Emily for her enthusiasm, intelligence and unyielding dedication to entrepreneurship. We wish her well as she embarks on the exciting adventures that surely await her in this next chapter of her life.

INARI ADDS POWERFUL PLANT BREEDING TOOLS THROUGH EXCLUSIVE LICENSE TO UCLA EPIGENETICS PATENTS



INARI, A COMPANY THAT IS REVOLUTIONIZING PLANT BREEDING by tapping natural genetic diversity, announced it has secured exclusive patent licenses for epigenetics from the University of California,

Los Angeles (UCLA). The agreement, through UCLA's Technology Development Group, gives Inari access to tools that will positively influence crop performance without altering a plant's genetic code.

[Steve Jacobsen](#), the UCLA professor who discovered this technology, is a scientific co-founder of Inari and a world-renowned expert in plant epigenetics, natural mechanisms that will enable Inari to re-introduce genetic diversity. When applied to plant breeding, epigenetics has the potential to dramatically improve field performance and confer other beneficial characteristics to crops.

"Discoveries that take place in our labs directly help solve global issues, and the fragility of the food system has been an issue of concern for some time now," said [Roger Wakimoto](#), UCLA vice chancellor for research. "By licensing our technology to Inari, we're able to apply

high-impact research and scientific techniques to the private sector and watch the benefits unfold."

Inari's license through UCLA differentiates and strengthens its product development process, known as the Seed Foundry, and broadens its toolset to transform plant breeding and address global challenges, including climate change. The company is currently developing its first wave of commercial crops, including corn, soy and wheat.

"Collaboration and partnerships drive change that addresses the critical problems we face globally in agriculture," said Ponsi Trivisvavet, CEO of Inari. "Licensing this technology from UCLA provides us with a robust new approach that strengthens our efforts to create a winning food system."

Jacobsen's research appeared in the [Nature Communications](#) publication. Other Jacobsen epigenetics discoveries were featured Feb. 7 in [Cell](#), a pre-eminent scientific journal that "publishes findings of unusual significance" in areas of experimental biology.

Sources: inari.com (<http://inari.com>), <https://www.prnewswire.com/news-releases/inari-adds-powerful-plant-breeding-tools-through-exclusive-license-to-ucla-epigenetics-patents-300794398.html> (<https://www.prnewswire.com/news-releases/inari-adds-powerful-plant-breeding-tools-through-exclusive-license-to-ucla-epigenetics-patents-300794398.html>)

INTERDISCIPLINARY UCLA TEAM WINS FUNDING FOR LASER EYE RESEARCH

AN INTERDISCIPLINARY TEAM of UCLA engineers and medical professionals has won an award from the UCLA Innovation Fund for their work in advancing efforts to image structures of the eye using lasers. The endeavor is a collaboration between [Kouros Nouri-Mahdavi](#), an assistant professor of ophthalmology in the glaucoma division of the UCLA Jules Stein Eye Institute, [Chee Wei Wong](#), professor of electrical and computer engineering in the UCLA Samueli School of Engineering, and Jinghui Yang and Yoon-Soo Jang, two research scientists in [Wong's lab](#).

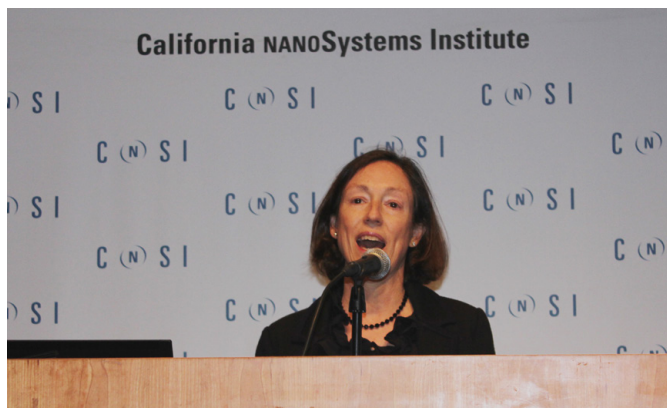
Organized by the UCLA Technology Development Group, the UCLA Innovation Fund's goal is to more quickly move technologies from idea to the market, bridging the gap between academia and industry / investor interest. Successful outcomes include, but are not limited to, 1) license to an existing company; 2) license to a newly

created company; 3) find that a project no longer has technical or commercial potential.

The collaborative ophthalmology team's project is on sub-micrometer precision high-rate laser medical imaging at the thermodynamical limits. The glaucoma advanced imaging laboratory at the Stein Eye Institute specializes in laser optical coherence tomography for glaucoma diagnostics. In parallel, UCLA electrical and computer engineering has developed precision measurements based on ultrafast mode-locked lasers. Combining their expertise, the Samueli-Stein Eye team is advancing efforts to image the retina and optic nerve head structures at sub-micrometer resolution.

Source: <http://newsroom.ucla.edu> (<http://newsroom.ucla.edu/dept/faculty/interdisciplinary-engineering-and-medical-team-wins-funding-for-laser-eye-research>)

SEVENTH ANNUAL MEDTECH CONFERENCE DRAWS LARGEST ATTENDANCE EVER



MEDTECH, TDG's annual medical device industry partnering event, started in 2013 as a small experiment. The goal was to build upon UCLA's early successes in medtech--such as the nicotine patch and the GDC coil – by bringing together medical device industry leaders, venture capitalists and UCLA innovators around early stage research, startup companies and other medtech industry topics. On March 5, 2019, the 7th Annual MedTech conference drew more than 300 attendees from academia, industry and venture – its largest turnout ever – proving that it is now a fully developed networking opportunity that draws interest and action from throughout the medical device ecosystem.

Each year, the conference focuses on the funding environment for early stage medtech companies, fast pitches from academic medtech startups, highlights of cutting edge research and expert discussions around the challenges specific to the medtech industry. It is a unique opportunity for investors, executives and UCLA inventors to establish new relationships for furthering innovation.

This year, the conference featured industry and venture capital panels and showcased recent developments from some of Southern California's leading medical technology institutions and investors, including [Baxter Healthcare](#), [Silicon Valley Bank](#) and [Olympus Medical Systems](#). Panel discussions and speakers drew crowds eager to hear the latest about healthcare venture financing and trends, early investment opportunities, multi-disciplinary research innovations and initiatives, and an FDA perspective on what it takes to bring innovative medical devices to market. A highlight was hearing from UCLA entrepreneurs who have successfully brought their medical device innovations from idea to startup to industry success.

"I'm proud that the MedTech conference has established itself as a prime "go-to event" for the medtech industry," said Emily Loughran, TDG's senior director of licensing and strategic alliances, who provided the idea and inspiration for MedTech seven years ago. "UCLA has premiere medical and engineering schools side-by-side with a top-tier business school – all located in an academically rich region. That is a recipe for medtech success."

BRUIN BIOMETRICS' SEM SCANNER CHALLENGES EVERYTHING KNOWN ABOUT PRESSURE ULCERS



BRUIN BIOMETRICS, LLC (BBI) has been granted U.S. Food and Drug Administration (FDA) marketing

authorization for the SEM Scanner, a wireless handheld device that is indicated for use as an adjunct to the standard of care when assessing patients who are at increased risk for pressure ulcers.

The SEM Scanner is the world's first FDA-authorized device to objectively alert clinicians to specific anatomical areas of a patient's body at increased risk for developing pressure damage. Patient risk assessments are performed with the SEM Scanner before visible damage manifests at the skin surface – a world and clinical first.

Current clinical decision making relies on assessing a patient's overall risk for pressure ulcer development and then completing a subjective skin and tissue assessment. Both methods suffer from not being able to direct clinicians to where the risk is building until damage is visible at the skin's surface. Once pressure injuries (also known as pressure ulcers, or bed sores) become visible on the skin's surface, tissue damage has already occurred.

Elevated readings from the SEM Scanner provide objective clinical information that directs clinicians to heels and sacrum at risk of developing pressure ulcers, even before the damage is visible. This data can facilitate earlier, anatomically specific interventions designed to reverse the damaging effects of pressure and shear, and prevent the pressure injuries from breaking through the skin.

Still the number one most reported patient safety harm in many U.S. states, pressure ulcer incidence has remained stubbornly persistent. Every year, more than 2.5 million people develop bed sores in the United States, including nearly one out of 10 patients in hospitals and almost one-third of patients in long-term acute care.

Bed sores can lead to pain, disfigurement, infection and complications such as sepsis, cellulitis, and MRSA. Sixty-thousand Americans die each year from complications from pressure ulcers – a mortality rate equivalent to the opioid crisis -- at an annual cost of up to \$11.6 billion to the U.S. health care system. These injuries result from pressure and shear causing localized damage to the skin and underlying tissue, typically at areas of bony prominence, such as the heels and sacrum.

Outside the United States, clinicians have been using the SEM Scanner in conjunction with existing risk assessment tools since 2014. The UK NHS and private providers have won numerous awards for innovation and patient safety, including the Health Service Journal's Patient Safety Award for Innovation (2017) and the Journal of Wound Care's Most Innovative Product (2018) for their use of the SEM Scanner.

The FDA granted marketing authorization for the SEM Scanner under its de novo review process for novel low-to moderate-risk devices that are not substantially equivalent to an already legally marketed device.

FDA authorization was based, in part, on data from a clinical study assessing performance of the SEM Scanner compared to visual skin assessment by nurses in 182 patients at risk for pressure ulcers at 12 hospitals and skilled nursing facilities in the US and UK.

The SEM Scanner received European CE Mark approval in 2014 and Health Canada clearance in 2016. It is now in full commercial use in the UK and Canada. No adverse events have occurred from SEM Scanner use.

"Anatomically specific risk information gives nurses valuable advance notice to institute additional preventive treatment tailored to patients' unique needs," said Ruth Bryant, a SEM Scanner study investigator, author of ["Acute & Chronic Wounds"](#) (2016), certified wound ostomy continence nurse, director of nursing research at Abbott Northwestern Hospital in Minneapolis and president-elect of the Association for the Advancement of Wound Care. "This specific information combined with tailored preventive actions may ultimately translate into fewer pressure sores, decreased costs, increased quality of patient care and satisfaction and decreased risk for adverse events due to pressure ulcers, such as in-hospital mortality, prolonged length of stay, discharge to an extended-care facilities and infection,"

"Objective scientific data from the SEM Scanner can give clinicians the confidence they need to take action and intervene to prevent pressure ulcers," said [Barbara Bates-Jensen](#), a professor at the UCLA School of Nursing and the David Geffen School of Medicine and co-inventor of the SEM Scanner, who developed the technology along with [Majid Sarrafzadeh](#), [William Kaiser](#) and a team of engineering doctoral students.

BRUIN BIOMETRICS' SEM SCANNER

CONTINUED

Representative [Ted W. Lieu](#) (D-CA), representing the Los Angeles district where BBI is based, stated: "With the SEM Scanner, nurses have a new tool to risk assess patients for injuries that disproportionately impact the elderly, disabled veterans and others with limited mobility."

BBI CEO [Martin Burns](#) welcomed FDA's decision: "Our singular objective is to reduce pressure injury incidence by helping clinicians make prevention real," he said. "Prevention success demands objective, early, anatomically specific data. For the first time, clinicians will have access to this, which can be gathered from increased risk patients in all care settings. We are optimistic about the impact this data will have on prevention strategies here in the US. With this FDA decision, wound prevention has finally

caught up with other areas of healthcare that have long benefitted from medical technologies.

BBI is a pioneer in modernizing health care with biometric sensor technology for early detection and monitoring of chronic, preventable conditions in collaboration with clinicians. BBI's work on the SEM Scanner has been recognized with a Frost & Sullivan New Product Innovation Award and a Health Service Journal Best Product or Innovation for Patient Safety Award.

Source: <http://bruinbiometrics.com> (bruinbiometrics.com/us/component/k2/item/126-fda-grants-de-novo-marketing-authorization)

UCLA LICENSES TECHNOLOGY TO COMBAT HAIR LOSS TO COMPANY FOUNDED BY FACULTY MEMBERS



L TO R: WILLIAM LOWRY, HEATHER CHRISTOFK, MICHAEL JUNG

UCLA RESEARCHERS have discovered a new way to activate the stem cells in hair follicles that are responsible for hair growth.

Research led by three UCLA faculty members — [Heather Christofk](#), an associate professor of biological chemistry; [William Lowry](#), a professor of molecular, cellular and developmental biology; and [Michael Jung](#), a distinguished professor of chemistry and biochemistry — led to the discovery of compounds that, in research in mice, [enabled hair follicle stem cells to promote lactate production](#) and, consequently, hair growth.

The compounds and the technology have been exclusively licensed by UCLA to Pelage Pharmaceuticals, a startup company founded by Christofk, Lowry and Jung. Pelage leadership said the company will continue development of the new technology and to develop new drugs that promote hair growth for people with baldness or alopecia,

which is hair loss associated with factors including hormonal imbalance, stress, aging and chemotherapy treatment.

Pelage has entered into an exclusive option with Allergan, a global pharmaceutical company headquartered in Dublin, Ireland, and a leader in medical esthetics, to acquire 100% of the shares of Pelage stock.

"We are thrilled to see this technology advancing, and we hope to bring to market a solution for people with hair loss," Lowry said. "Losing hair is more than just a result of aging and genetics. People of all ages and genders, and those with an array of conditions may experience hair loss. Currently, there are a limited number of options for these people. We believe that our technology could help address this problem."

In 2017, Christofk, Lowry and Jung received an award from the [UCLA Innovation Fund](#) to help develop their technology. The fund, which was seeded by California State Bill AB 2664 in 2016, aims to move technologies more quickly from idea to the market, bridging the gap between academia and industry and, ultimately, allowing new biomedical inventions to benefit the public faster. The award is presented by the UCLA Technology Development Group, UCLA Health and the David Geffen School of Medicine at UCLA, the UCLA Samueli School of Engineering, the UCLA School of Dentistry and the UCLA College's divisions of life sciences and physical sciences.

Source: <http://newsroom.ucla.edu> (<http://newsroom.ucla.edu/releases/hair-loss-drug-formula-licensed>)

FLEX LOGIX LAUNCHES INFERX™ X1 EDGE INFERENCE CO-PROCESSOR THAT DELIVERS NEAR-DATA CENTER THROUGHPUT AT A FRACTION OF THE POWER AND COST



FLEX LOGIX® TECHNOLOGIES, INC. has leveraged its core patent-protected interconnect technology from its embedded FPGA (eFPGA) line of business combined with inference-optimized nnMAX™ clusters to develop the InferX X1 edge inference co-processor. Unveiled in a presentation at the Linley Processor Conference in Santa Clara, the Flex Logix InferX X1 chip delivers high throughput in edge applications with a single DRAM, resulting in much higher throughput/watt than existing solutions. Its performance advantage is especially strong at low batch sizes which are required in edge applications where there is typically only one camera/sensor. The technology was originally developed by [Dejan Markovic](#), UCLA professor of electrical engineering.

InferX X1's performance at small batch sizes is close to data center inference boards and is optimized for large models, which need 100s of billions of operations per image. f2 megapixel images at batch size = 1. Performance is roughly linear with image size. For example, for YOLOv3 real time object recognition, InferX X1 processes 12.7 frames/second of frame rate approximately doubles for a 1 megapixel image. This is with a single DRAM.

InferX X1 will be available as chips for edge devices and on half-height, half-length PCIe cards for edge servers and gateways. It is programmed using the nnMAX Compiler, which takes Tensorflow Lite or ONNX models. The internal architecture of the inference engine is hidden from the user.

InferX supports integer 8, 16 and bfloat 16 numerics with the ability to mix them across layers, enabling easy porting of models with optimized throughput at maximum precision. InferX supports Winograd transformation for integer 8 mode for common convolution operations which accelerates throughput by 2.25x for these functions while minimizing bandwidth by doing on-chip, on-the-fly conversion of weights to Winograd mode. To ensure no loss of precision, Winograd calculations are done with 12 bits of accuracy.

"The difficult challenge in neural network inference is minimizing data movement and energy consumption, which is something our interconnect technology can do amazingly well," said Geoff Tate, CEO of Flex Logix. "While processing a layer, the datapath is configured for the entire stage using our reconfigurable interconnect, enabling InferX to operate like an ASIC, then reconfigure rapidly for the next layer."

Tate explained that, because most of their bandwidth comes from local SRAM, InferX requires just a single DRAM, simplifying die and package, and cutting cost and power. Their on-chip Winograd conversion further reduces bandwidth due to weight loading because weights are 1.8x larger in Winograd format. Their mixed numerics capability enables customers to use integer 8 where practical, but falls back to floating point as needed for achieving the desired prediction accuracy.

"This combination of features allows for high prediction accuracy, high throughput, low cost, and low power edge inference," he said.

Flex Logix has emerged as a market leader in the eFPGA market, with customers such as MorningCore/Datang Telecom, DARPA, Boeing, Harvard, Sandia, SiFive RISC-V and many more designing chips based on this platform. The new nnMAX neural inference engine leverages the same core interconnect technology used in eFPGA combined with multiplier-accumulators optimized for inference and aggregated into clusters of 64 with local weight storage for each layer.

In neural inference, computation is dominated by trillions of operations (multiplies and accumulates), typically using 8-bit integer inputs and weights, and sometimes 16-bit integer or 16-bit bfloat floating point. It is possible to mix these numerics layer by layer as needed to achieve target precision. The technology Flex Logix has developed for eFPGA is also ideally suited for inference because eFPGA allows for re-configurable data paths and fast control logic for each network stage. SRAM in eFPGA is reconfigurable as needed in neural networks where each layer can require different data sizes, and Flex Logix interconnects allow reconfigurable connections between SRAM input banks, MAC clusters, and activation to SRAM output banks at each stage.

The result is an nnMAX tile of 1024 MACs with local SRAM, which in 16nm has ~2.1 TOPS peak performance. nnMAX tiles can be arrayed into NxN arrays of any size, without any GDS change, with varying amounts of SRAM as needed to optimize for the target neural network model, up to to >100 TOPS peak performance. High MAC utilization means less silicon area/cost, and low DRAM bandwidth means fewer DRAMs, less system cost and less power. InferX is programmed using TensorFlow Lite and ONNX, two of the most popular inference ecosystems.

nnMAX is in development now and will be available for integration in SoCs by Q3 2019. InferX X1 will tape-out in Q3 2019, and samples of chips and PCIe boards will be available shortly after. For more information, prospective customers can go to www.flex-logix.com to review the slides presented today at the Linley Processor Conference and/or contact info@flex-logix.com for further details of nnMAX and InferX under NDA.

Source: [prnewswire.com](https://www.prnewswire.com/news-releases/flex-logix-launches-inferx-x1-edge-inference-co-processor-that-delivers-near-data-center-throughput-at-a-fraction-of-the-power-and-cost-300829575.html) (<https://www.prnewswire.com/news-releases/flex-logix-launches-inferx-x1-edge-inference-co-processor-that-delivers-near-data-center-throughput-at-a-fraction-of-the-power-and-cost-300829575.html>)

BONE BIOLOGICS RECEIVES HUMAN RESEARCH ETHICS COMMITTEE (HREC) APPROVAL FOR THE FIRST CENTER OF PILOT CLINICAL TRIAL TO EVALUATE NB1 (NELL-1/DBX®) IN AUSTRALIA



[Bone Biologics Corporation](#), a developer of orthobiologic products for domestic and international spine fusion markets, received Human Research Ethics Committee (HREC) approval on March 20, 2019, for the first site of a multi-center pilot clinical trial to evaluate NB1 (NELL-1/DBX®) in 30 patients in Australia. The pilot study will evaluate the safety and effectiveness of NB1 in adult subjects with degenerative disc disease (DDD) at one level from L2-S1, who may also have up to Grade 1 spondylolisthesis or Grade 1 retrolisthesis at the involved level who undergo transforaminal lumbar interbody fusion (TLIF). This product stems from UCLA research led by UCLA Professors [Chia Soo, Kang Ting](#) and [Ben Wu](#), and its licensing was executed by UCLA TDG.

The study design was reviewed by the US Food and Drug Administration's (FDA's) Division of Orthopedic Devices in a pre-submission. It is intended to support progression to a pivotal clinical study in the United States. The Therapeutic Goods Administration (TGA) in Australia will be notified of the conduct of the study through the Clinical Trial Notification Scheme.

"This marks a significant milestone in the advancement of NELL-1/DBX®," remarked the company's chief operating officer, Jeffrey Frelick.

Lumbar DDD is one of the most common causes of low back pain. It also leads to substantial disability, with many patients suffering from decreased ability to walk, sit, stand and/or sleep. For some people, DDD is part of the natural aging process and is a significant medical issue that is increasing as the global population ages.

Bone Biologics (OTCQB:BBLG) was founded to pursue regenerative medicine for bone. The company is undertaking groundbreaking work and building upon unprecedented research on the NELL-1 molecule that has produced a significant number of studies and publications in peer-reviewed scientific literature.

Bone Biologics currently focuses its development efforts on its bone graft substitute product on bone regeneration in spinal fusion. NELL-1 is a recombinant human protein growth factor that is essential for normal bone development.

For more information, please visit the company's website at www.bonebiologics.com.

Source: [www.businesswire.com](https://www.businesswire.com/news/home/20190325005038/en/) (<https://www.businesswire.com/news/home/20190325005038/en/>)

SHOWCASING CAMPUS-WIDE INNOVATION; UCLA FACULTY INNOVATION FELLOW PITCH EVENT



L TO R: DAVID SHORTER, LI CAI, ALEXANDER YOUNG, JEFF BURKE, DANIEL LEVI, KARIDA BROWN, ARIANA ANDERSON, HIRSCH PERLMAN, JASMINE ZHOU, MITCHELL SPEARRIN

WHEN TDG, the Office of the Vice Chancellor for Research and Creative Activities and Startup UCLA launched the Faculty Innovation Fellows program (FIF), they aimed to take UCLA's entrepreneurial excellence and startup culture to the next level. The program's rapid success was indisputable on May 22, 2019, when the inaugural 10 fellows took the stage at the UCLA Samueli School of Engineering for the program's first "Pitch Showcase."

Each fellow presented their innovation before an audience of industry leaders, venture capitalists and others with the power to propel UCLA entrepreneurs towards becoming the next generation of top-tier industry leaders. The fellows hail from both North and South campus, representing the diverse landscape of knowledge and excellence that distinguishes UCLA. Together, they presented a world of new possibilities, from leading-edge enhancements in entertainment, to empowering agents of social change, to saving lives through early cancer detection.

TDG congratulates these fellows for displaying excellence in research and the pioneering spirit that makes UCLA a leader in delivering the life-changing technologies of tomorrow.

1. **ARIANA ANDERSON**, assistant professor-in-residence, Department of Psychiatry and Biobehavioral Sciences, Semel Institute for Neuroscience and Human Behavior: **ChatterBaby** – a new technology tool that deciphers the meaning of infant cries

2. **KARIDA BROWN**, assistant professor, Department of Sociology, UCLA School of Letters and Sciences – Division of Social Sciences: **Du Boisian Scholar Network: W.E.B. Du Bois** – an online social change platform that connects and empowers sociologists and grassroots social activists to collaborate on today's most pressing social justice issues

3. **JEFF BURKE**, professor-in-residence and associate dean, Department of Theatre – Center for Research in Engineering, Media and Performance, of Theater, Film and Television, School of Theatre, Film and Television: **XRA IV** – a platform that brings live theatre and augmented reality together to create a next-generation entertainment experience

4. **LI CAI**, professor, co-director, Graduate School of Education and Information Studies: **BESSTT (Building Educational Solutions for Students, Teachers and Trainers)** – research-based educational assessment tools that improve student learning outcomes

CAMPUS-WIDE INNOVATION

CONTINUED

5. **DANIEL LEVI**, professor, Department of Pediatric Cardiology, David Geffen School of Medicine: **Pediatric Covered Stents** – stents designed specifically to meet the needs of pediatric heart patients

6. **HIRSCH PERLMAN**, professor, Department of Art, School of Arts and Architecture : **Desktop Sculptures and Archeology** – a web platform for artist and archeologist providing modestly priced and modestly sized art objects, enabling cultural preservation, education and activism

7. **DAVID SHORTER**, professor, Department of World Arts and Culture, School of Arts and Architecture: **Archive of Healing, Ritual, and Transformation** – a searchable database of world-wide approaches to healing

8. **MITCHELL SPEARRIN**, assistant professor, Department of Mechanical and Aerospace Engineering, Henry Samueli School of Engineering and Applied Science: **Rocket Project** – a four-year program that teaches university students how to build rockets and become the space engineers of the future

9. **ALEXANDER YOUNG**, professor, Department of Psychiatry and Biobehavioral Sciences, Semel Institute for Neuroscience and Human Behavior: **mWellness** – an app that monitors patient mental health, allowing for early intervention and prevention of mental health crises

10. **JASMINE ZHOU**, professor, Department of Pathology and Laboratory Medicine, David Geffen School of Medicine: **EarlyDiagnostics, Inc.** – an accurate, affordable and non-invasive tool for early cancer detection

The FIF program is an accelerator designed to hone innovators' great ideas and put them into action. Each year, 10 faculty-led teams with academic projects that have potential to create real-world impact through new startup companies, centers or non-profits are chosen to participate in the 12-week program. Fellows collaborate with mentors and colleagues to increase their competitiveness in the areas of pitch development, business strategy and venture consulting. The most commercially viable projects and startups that develop from the FIF program may receive financial support from TDG's Innovation Fund.

The FIF program is open to all UCLA faculty-led teams. More information is coming soon about the 2020 application process. If you'd like to stay informed, please email: InnovationFund@tdg.ucla.edu.

UCLA TDG offers its Transitional Research Seminar Series featuring experts in bringing innovations from the lab to the marketplace.

SEMINARS ARE SCHEDULED FOR:

SEPTEMBER 13, 2019	FEBRUARY 14, 2020
OCTOBER 11, 2019	MARCH 13, 2020
NOVEMBER 8, 2019	APRIL 10, 2020
	MAY 8, 2020

Guest speaker and location information will be available soon!

To receive updates, please email innovationfund@tdg.ucla.edu.



To learn more about the Technology Development Group please visit: TDG.UCLA.EDU
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BATTERY STREAK – CHARGING AHEAD FAST!



DAVID GRANT

WHETHER talking on a mobile phone, driving an electric car, or operating a forklift in a large industrial warehouse, running low on battery and waiting hours for a device to charge is a frustrating inconvenience we would all rather live without. Say hello to [Battery Streak](#), a company that can untie anyone from the charging cord in just minutes.

Battery Streak's unique lithium ion battery technology enables almost any device to charge in 10 minutes or less. Imagine a cell phone ready to go by the time you've finished a quick coffee break, or an electric car fit to hit the road in the time it takes to pick up the dry cleaning.

David Grant is president of Battery Streak. He is a ULCA alumnus and serial entrepreneur whose devotion to his alma mater led him to volunteer at UCLA TDG as an entrepreneur-in-residence. TDG showed him a new, fast-charging battery technology developed by UCLA Professors [Bruce Dunn](#) and [Sarah Tolbert](#), and venture capital firm Act One helped him create a start-up

company to commercialize it. TDG and Battery Streak negotiated a license agreement, and the company officially launched in 2017.

"When it comes to battery life, I believe there are two universal truths," David said. "Batteries power everything, and they take too darn long to charge. So, I'm thrilled that Battery Streak is taking technology that was developed at UCLA and transferring it to the market, where it will change the way people think about battery charging time."

Consumers do not have long to wait until they can access this unique technology. Right now, prototypes are developed, and samples have been sent out for final evaluation. David predicts that Battery Streak products will hit their first markets within 24 months.

Partnerships between inventors like Professors Dunn and Tolbert, entrepreneurs like David Grant and venture capital firms are what bring the benefits of innovation into our everyday lives. TDG is excited about the improvements the Battery Streak products offer over currently available technology, and we're glad to have a role in making these products available to the public.

TDG'S TECHNOLOGIES FOR A SUSTAINABLE FUTURE CONFERENCE – INNOVATORS, INDUSTRY AND INVESTORS PARTNER TO BUILD A BETTER TOMORROW



TDG'S FIRST ANNUAL TECHNOLOGIES FOR A SUSTAINABLE FUTURE CONFERENCE successfully built a framework to bring together UCLA innovators and entrepreneurs with investors, industry and sustainability

planners to explore opportunities to create and implement sustainable technologies. On October 30, 2018, more than 175 people gathered at UCLA's California NanoSystems Institute for the event, which was based on the successful model of TDG's Medtech conference.

Participants heard from early stage investors who shared the latest about investment trends, UCLA researchers with ground-breaking carbon-neutralizing inventions and local and state leaders discussing sustainability initiatives. Top-tier industry leaders and venture capitalists attended the event, offering UCLA researchers an ideal opportunity to take their innovations from the lab to the marketplace. Ultimately, these science-to-business collaborations can form the foundation needed to create a sustainable future worldwide.

FDA PERMITS MARKETING OF FIRST MEDICAL DEVICE FOR TREATMENT OF ADHD



THE U.S. FOOD AND DRUG ADMINISTRATION permitted marketing of the first medical device to treat attention deficit hyperactivity disorder (ADHD). The prescription-only device, called the Monarch external Trigeminal Nerve Stimulation (eTNS) System, is indicated for patients ages 7 to 12 years old who are not currently taking prescription ADHD medication. It's the first non-drug treatment for ADHD granted marketing authorization by the FDA. The device was developed by NeuroSigma, which has licensed a number of technologies from UCLA faculty [Christopher DeGiorgio](#), [Lara Schrader](#), [Ian Cook](#), [Patrick Miller](#), and [Antonio DeSalles](#).

"This new device offers a safe, non-drug option for treatment of ADHD in pediatric patients through the use of mild nerve stimulation, a first of its kind," said Carlos Peña, Ph.D., director of the Division of Neurological and Physical Medicine Devices in the [FDA's Center for Devices and Radiological Health](#). "Today's action reflects our deep commitment to working with device manufacturers to advance the development of pediatric medical devices so that children have access to innovative, safe and effective medical devices that meet their unique needs."

The Monarch eTNS System is intended to be used in the home under the supervision of a caregiver. The cell phone-sized device generates a low-level electrical pulse and connects via a wire to a small patch that adheres to a patient's forehead, just above the eyebrows, and should feel like a tingling sensation on the skin. The system delivers the low-level electrical stimulation to the branches of the trigeminal nerve, which sends therapeutic signals to the parts of the brain thought to be involved in ADHD. While the exact mechanism of eTNS is not yet known, neuroimaging studies have shown that eTNS increases activity in the brain regions that are known to be important in regulating attention, emotion and behavior.

The Monarch eTNS System's efficacy in treating ADHD was shown in a clinical trial that compared eTNS as the sole treatment, or monotherapy, to a placebo device. A total of 62 children with moderate to severe ADHD were enrolled

in the trial and used either the eTNS therapy each night or a placebo device at home for four weeks. The trial's primary endpoint was improvement on a clinician-administered ADHD Rating Scale, ADHD-RS. ADHD-RS scales are used to monitor severity and frequency of ADHD symptoms. A higher score is indicative of worsening symptoms. The ADHD-RS uses questions about the patient's behavior, such as whether they have difficulty paying attention or regularly interrupt others. The trial showed that subjects using the eTNS device had statistically significant improvement in their ADHD symptoms compared with the placebo group. At the end of week four, the average ADHD-RS score in the active group decreased from 34.1 points at baseline to 23.4 points, versus a decrease from 33.7 to 27.5 points in the placebo group.

The most common side effects observed with eTNS use are: drowsiness, an increase in appetite, trouble sleeping, teeth clenching, headache and fatigue. No serious adverse events were associated with use of the device.

The FDA reviewed the Monarch eTNS System through the de novo premarket review pathway, a regulatory pathway for low- to moderate-risk devices of a new type. This action creates a new regulatory classification, which means that subsequent devices of the same type with the same intended use may go through the FDA's 510(k) premarket process, whereby devices can obtain marketing authorization by demonstrating substantial equivalence to a predicate device. The FDA granted marketing authorization of the Monarch eTNS System to [NeuroSigma](#).

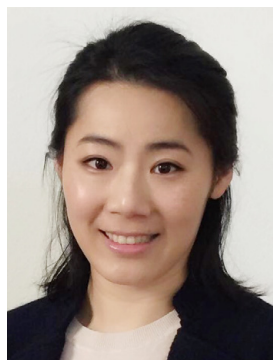
Source: [fda.gov](https://www.fda.gov/news-events/press-announcements/fda-permits-marketing-first-medical-device-treatment-adhd) (<https://www.fda.gov/news-events/press-announcements/fda-permits-marketing-first-medical-device-treatment-adhd>)

UCLA TDG TECH FELLOW PROGRAM

THE TDG TECH FELLOWS PROGRAM offers graduate students paid internships that offer in-depth, hands-on experience in the business of technology transfer and intellectual property management. Along with real-world job skills, the program exposes fellows to new, meaningful career opportunities related to transferring inventions from the lab to the marketplace

and, ultimately, to changing the lives of people worldwide through science. Among the skills the fellow acquire are technology evaluation, marketing and business development and tech commercialization. During this unique experience, fellows actively contribute to the commercialization of UCLA technologies.

FROM THE UNIVERSITY TO THE BUSINESS WORLD – A CURRENT FELLOW AND AN ALUMNI SHARE THEIR EXPERIENCE WITH THE TDG TECH FELLOW PROGRAM:



SUE TSUI

Candidate: PhD in Biochemistry and Molecular Biology 2019, UCLA
UCLA TDG Tech Fellow 2015 to present

"I want my work to make an impact. So, I will be pursuing a career in technology transfer. I would never have discovered that career path without my fellowship at TDG. This experience has helped me look at science from a completely different perspective. When you take scientific innovation to the next level, it can change the lives of human beings in crisis. Our inventions help people at risk of disability, those with critical illnesses, all of us who face threats from the effects of climate change and so much more. I want to be a part of making that happen and, with the experience I've gained at TDG, my resume makes me more marketable in the technology transfer industry. I found my place at TDG, and I hope more students access the opportunity that the Tech Fellows Program offered to me."



ALLISON SARGOY

Senior Manager, Business Operations, Technical Operations
Kite Pharma
PhD in Neurobiology 2014, UCLA
UCLA TDG Tech Fellow 2012 to 2014

"The TDG Tech Fellows Program provided me with an opportunity to help commercialize innovative UCLA technologies. As a tech fellow, I gained invaluable experiences and insights into the commercialization process by working cross-functionally with a diverse team from the scientific, legal and business development disciplines. This opportunity exposed me to the various paths a career in STEM can provide and enabled me to discover my ambition to help bring innovative technologies to market. These experiences helped me transition to Amgen's Business Development team where I reviewed licensing opportunities with the therapeutic area leads and established strategic academic partnerships. In 2018, I joined Kite Pharma's Strategy and Business Operations group where I currently lead the Business Operations team. The TDG Tech Fellows Program has been instrumental in my career and has afforded me the rare and unique opportunity to diversify my skill set, broaden my perspective as a graduate student and build lifelong colleagues and friendships at UCLA. I appreciate the opportunity TDG provided me, and I look forward to learning about innovative technologies from the current and future tech fellows."

TECH FELLOW PROGRAM

CONTINUED

UCLA IS PROUD OF THE WORK OF OUR CURRENT CLASS OF TECH FELLOWS.

Michelle Bradley	Chemistry and Biochemistry
Ruxi Dai	Inorganic Chemistry, Chemistry and Biochemistry
Jiaying (Nebula) Han	Gene Therapy, Molecular Pharmacology
Travis Holloway	Molecular and Medical Pharmacology
Elliot Horlick	Law
Dian Huang	Microscopy, Bioengineering
Anna Kataki-Anastasa	Chemical Biology, Chemistry and Biochemistry
Diane Kim	Cancer Immunology, Bioengineering
Ariella Machness	Materials Science
Shuin (Sue) Park	Cardiology, Medicine
Bau (Nathan) Pham	Bioengineering and Biomedical Engineering
Elaine Qian	Bioengineering
Sui Tsui	Biochemistry and Molecular Biology
Elaine Wang	Microfluidic Biotech, Bioengineering

UCLA TDG is a campus-wide gateway to innovation, research and Entrepreneurship. Our website is YOUR gateway to TDG!

tdg.ucla.edu



CHECK IT OUT! YOU'LL FIND:

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- Funding opportunities
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* images not scaled to size and may differ on electronic devices



UCLA'S SECOND ANNUAL BIOSCIENCE INNOVATION DAY MARKS LOS ANGELES AS AN ENTREPRENEURIAL BIOSCIENCE HUB



THE 2019 UCLA BIOSCIENCE INNOVATION DAY

exceeded all expectations and served as evidence that Southern California is the premier emerging hub for bioscience innovation. More than 700 researchers, investors, industry and entrepreneurs heard from 55 speakers who shared the very latest about bioscience innovation and investment. The event showcased significant new initiatives to build the biotech ecosystem in the Los Angeles region, as well as translational research at UCLA and local area institutions including [Cedars-Sinai Medical Center](#), [City of Hope](#), Caltech and the [Lundquist Institute \(formerly LA Biomed\)](#).

The UCLA Bioscience Innovation Day was hosted at the UCLA Meyer and Renee Luskin Conference Center on May 23, 2019 after a pre-event reception and dinner

the previous evening. Leaders attended from many of the most renowned pharmaceutical and investment enterprises, including [Amgen](#), [Goldman Sachs](#), [Genentech](#), [Gilead](#) and more. The keynote speaker was Anna Lee Fischer MD, astronaut, first mother in space and dedicated UCLA alumnus. A highlight of the conference was when 12 selected UCLA faculty investigators spoke about their research innovations with life-changing potential, which included everything from cell therapies to cure blindness, to new small molecules that could increase breast cancer survival rates.

More than just a passive opportunity to learn and discover, Innovation Day included ways for attendees to actively pursue their next-level business goals. A poster plaza displayed more than 100 investigator's posters so that



BIOSCIENCE INNOVATION DAY

CONTINUED

business leaders and investors could see how research programs and inventions fit with their companies' strategic growth plans. The Jujama partnering app enabled industry, inventors and startup leaders to schedule meetings in real time and meet face-to-face in one of two onsite partnering rooms. After the event, a wine and hors d'oeuvre reception allowed for even more opportunities to network and form lasting business relationships.

In just its second year, the 2019 UCLA Bioscience Innovation Day surpassed last year's highly successful inaugural event by nearly every measure. Sponsor investment more than doubled, attendance grew by 28%, the number of companies represented grew by 120%, and Southern California institution participation nearly tripled.

"It's satisfying to know that this event has quickly become a regional hub where innovators and industry come together to advance inventions from the lab into the marketplace, enabling development of life-changing treatments of tomorrow," said Mark Wisniewski, TDG's senior director of biopharmaceuticals. "TDG will continue to host this event annually due to its unique benefits for both established companies and startups, and because of the important role it plays in commercializing technologies that impact healthcare worldwide."

The next UCLA Bioscience Innovation Day is scheduled for May 21, 2020. For information about sponsorship, registration or participation in the event, please email mark.wisniewski@tdg.ucla.edu.



UCLA TECHNOLOGY DEVELOPMENT GROUP

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TRACK 1

Therapeutics

Therapeutic Agents for Ectopic Calcification

Arjun Deb, MD; Michael Jung, PhD

Activation of Tau Regulator in Alzheimer's Disease

Daniel Geschwind, MD, PhD; Michael Jung, PhD

Novel Excipient for Protein Stabilization and Biological Products

Heather Maynard, PhD

Iet-7/LIN28 Regulators for Acute Myeloid Leukemia (AML)

Martina Roos, PhD, PharmD; John Chute, MD; William Lowry, PhD;
Michael Jung, PhD

Novel Estrogen Receptor Ligand to Treat Multiple Sclerosis

Rhonda Voskuhl, MD; Michael Jung, PhD

TRACK 2

MedTech

Medical Devices, Diagnostics, Digital Health

Next Generation Optical Coherence Tomography (OCT)

Chee Wei Wong, PhD; Kouroos Nouri-Mahdavi, MD

High-throughput Early Diagnosis and Monitoring of Antimicrobial Resistance

Aydogan Ozcan, PhD; Omai Garner, PhD; Dino Di Carlo, PhD

Blood-based Biomarker to Diagnose Irritable Bowel Syndrome (IBS)

Lin Chang, MD; Swapna Joshi, PhD

Acoustofluidic Platform for Cell and Gene Therapy

Paul Weiss, PhD; Steven Jonas, MD, PhD; Ali Khademhosseini PhD; Don Kohn, MD

MISSION

The UCLA Innovation Fund's goal is to more quickly move technologies from idea to the market, bridging the gap between academia and industry/investor interest.

The UCLA Innovation Fund focuses on commercialization activities not supported by basic research grants, solicits feedback from external industry/investors and provides dedicated project management.

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UCLA TECHNOLOGY DEVELOPMENT GROUP (TDG) promotes UCLA innovation, research, education and entrepreneurship to benefit society. Working with UCLA TDG helps facilitate the translation of UCLA discoveries into new products and services that create economic value to support UCLA's scholarly and educational missions. The UCLA TDG office manages a large portfolio of technologies and license agreements and has a rich history of startup company formation.

For more information, please visit:
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