Exciting technologies are being developed at Johns Hopkins every day. Some are on the verge of becoming marketable products, and Johns Hopkins Technology Ventures (JHTV) works to give those technologies the best possible chance of reaching their full potential. In this issue of the FastForward Innovations Newsletter, read about some of these technologies, including a device that can detect post-surgical blood clots before they happen and a product that spots electronic medical record breaches in real time.

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Johns Hopkins Faculty Members and Researchers Present, Network and Collaborate on Technology Development at Annual Alliance Meeting

Since 2003, the Johns Hopkins Alliance for Science and Technology Development has brought faculty members and investors together for an annual daylong meeting to foster important biotechnical and pharmaceutical developments.

This year, 14 faculty members or teams of faculty members from The Johns Hopkins University and seven from the University of Maryland, Baltimore, presented work, as did eight startups affiliated with each university. Four Johns Hopkins University researchers received monetary awards for translational development of their inventions at the April 20 annual joint meeting of the alliance and the University of Maryland, Baltimore’s Commercial Advisory Board.

Although only a limited number of awards are available, every presenter receives valuable feedback and advice from investors, and the event is a unique opportunity for faculty to network and form relationships that can lead to startup partnerships and commercialization of breakthrough medical technologies.

“It’s a fantastic way to showcase what the two universities have in their pipeline at various stages of development, and it gives faculty members an opportunity to meet funders and industry partners with whom they can work to help commercialize their research,” says alliance member and joint meeting investor Kyparissia Sirinakis, co-founder and managing partner of Epidarex Capital, a venture capital firm investing in early-stage, high-growth life science and health technology companies in the U.S. and U.K.

For Sirinakis, the joint meeting functions in part as “a platform to see new things” in development. Last year, Epidarex Capital chose to fund one of the researchers who presented at the meeting. “Funding is the fuel these companies need in the early continued on page 7
 Barely three months old, the new FastForward East business innovation hub on Johns Hopkins’ East Baltimore campus is almost at maximum capacity. Nearly all of its seats, offices and lab benches are rented out, and its whiteboard walls are filled with ideas, equations and solutions.

FastForward East is built around open, communal spaces that encourage spontaneous collaboration and impromptu cross-pollination of ideas between the entrepreneurs and startup companies there.

It complements the original, 2-year-old FastForward Homewood hub, which—although it has dedicated lab space—doesn’t yet have communal space, says Ian Tolfree, venture manager for both hubs. The two hubs both have opened in the last two years with strong support from senior university administration officials, including Johns Hopkins University President Ronald J. Daniels.

FastForward East includes a lounge flooded with sunlight on sunny afternoons, a conference room, six dedicated offices, 28 shared seats and two shared wet labs with a total of seven lab benches. FastForward East residents also have access to several other conference rooms elsewhere in the building.

Because the hub is so close to the Johns Hopkins medical campus, it’s an ideal location for therapeutic and medical device startups and the burgeoning health information technology marketplace, Tolfree says.

“There is a great, energetic space, and its proximity to [The Johns Hopkins Hospital] and the Bloomberg School of Public Health allows us more collaborative time with medical advisors and clinical experts,” says Sebastian Seiguer, chief executive officer at emocha Mobile Health Inc., which is working on a mobile health platform for remote patient management and rents an office in FastForward East.

“FastForward East is our meeting place for creating new ventures, exchanging ideas and—most importantly—offering a support system that is rapidly evolving within the university to support the translation of great science” from ideas in a research lab to marketable products, adds Albine Martin, a FastForward Mentor-in-Residence who has held leadership and operating roles at three public life sciences companies.

The camaraderie fostered by the communal spaces builds networks between new and more experienced entrepreneurs, helping first-timers learn the ropes to startup success more quickly than if they were working on their own.

FastForward helps make those relationships happen. “Part of our job is to connect people,” to see possible collaborations between entrepreneurs and connect the dots between them, Tolfree says. FastForward also links entrepreneurs with mentors—including entrepreneurs and industry experts—outside the lab.

FastForward startups are assigned a Mentor-In-Residence, who provides expertise and experience not usually found on university campuses. Companies are matched with mentors based on their needs and available mentor expertise.

The FastForward team is in the process of planning a series of scheduled mentorship events for FastForward entrepreneurs and mentors. Drop-in office hours, in which the entrepreneurs can work with mentors, are also being planned, as well as legal and accounting clinics for the entrepreneurs.

Another highlight of FastForward East is the equipped wet lab space it offers to startups. The labs are designed to suit a variety of uses. “We did our best to outfit the labs with as much shared equipment as possible” so that companies don’t have to spend precious capital on lab equipment on day one, Tolfree says.

FastForward East has the last leasable fume hoods in Baltimore City, which has made the hub particularly attractive to entrepreneurs needing lab space. Fume hoods are expensive to purchase and install, and there’s a shortage of wet labs with fume hoods in the Baltimore area.

Space at FastForward East rents for $200 a month for a seat, $750 a month for a three-person office and $800 a month for a lab bench. Currently, all lab bench space is fully occupied—a sign of the high demand for this type of space in Baltimore.

While leases are yearlong, entrepreneurs can expand or get out of leases with just 30 days’ notice. This flexibility is crucial to fostering startups, which might land an investment at any time, making it possible for immediate expansion beyond what they’ve rented.

At FastForward, high turnover is a good thing. It means the hub is doing its job of fostering a collaborative spirit and helping get new startups off the ground and on their way toward market success.
We are pleased to announce that Neil Veloso will join Johns Hopkins Technology Ventures as the executive director of technology transfer, effective May 18, 2015.

Neil has extensive experience in technology transfer and commercialization. He has spent the last nine years of his career in a variety of roles at Cleveland Clinic Innovations (CCI) in Ohio. Currently, he is serving as the senior director of innovation management, a role in which he directs technology commercialization at Cleveland Clinic and at seven of CCI’s Innovation Alliance Partners. In this role, Neil focuses on commercialization strategy across a broad portfolio of both academic and hospital system assets. He manages a team that advises inventors, administers intellectual property, and promotes commercialization through licensing, new venture creation and the development of industry partnerships. Neil’s collaborative leadership style and ability to work with myriad constituents has been cited repeatedly as one of his great strengths by former colleagues and industry partners.

In addition to demonstrating strong management skills, strategic vision and deep proficiency in deal execution, Neil also has a strong record of working with physician-scientists and researchers to identify technologies with commercial potential and develop technology value based on industry feedback and experience. Through this experience, he has developed a customer service orientation that will serve all of our constituents well—both faculty and industry partners.

Kenneth Kinzler, professor of oncology, director of the Ludwig Center at Johns Hopkins and chair of the search committee, described Neil’s selection: “Neil demonstrated throughout the process that he has the experience, vision, and collegial style that are necessary to make an effective executive director of technology transfer. I look forward to working with him as we forge new paths in technology commercialization at Johns Hopkins.”

Neil is no stranger to Johns Hopkins, having spent four years here as an undergraduate, earning a B.A. in biology. He also holds an M.B.A. and an M.S. in environmental health sciences, both from Case Western Reserve University.

We would like to thank the search committee for its diligence in conducting a nationwide search before enthusiastically recommending Neil Veloso. We would also like to wholeheartedly thank Jill Uhl, senior director of intellectual property, who has ably served as the interim director of technology transfer for the last nine months. Jill provides exemplary service to the Johns Hopkins faculty and student community through her understanding of complex intellectual property, and we are grateful for her leadership during the transition.

Neil will be a wonderful new addition to the team at Johns Hopkins Technology Ventures, and we are grateful he has accepted our offer. Please join us in welcoming him and his family to Johns Hopkins and to Baltimore.

Shedding Light on Immunity in Johns Hopkins-MedImmune Collaboration

Research coming out of the lab of one Johns Hopkins doctor is illuminating the nature of protective immunity to infections—literally.

Lloyd Miller, associate professor of dermatology, infectious diseases and orthopedic surgery at the Johns Hopkins University School of Medicine, has developed a way to study bacterial infection and immune responses by visualizing the dynamics of bioluminescent bacteria and fluorescent immune cells during an infection.

Miller’s research is helping MedImmune, in collaboration with Johns Hopkins, develop antibodies that target a deadly pathogen, methicillin-resistant Staphylococcus aureus (MRSA). Miller says, “MedImmune is collaborating with us because our techniques of noninvasive bioluminescence and fluorescence imaging provide real-time information about bacterial burden and immune response for rapid feedback and improvements,” Miller explains. This research is part of a five-year, $6.5 million collaboration between Johns Hopkins and MedImmune.

MedImmune is using the information gleaned from Miller’s work to develop a therapeutic agent—a monoclonal antibody—that targets virulence mechanisms of MRSA bacteria, which cause skin infections and other invasive and often life-threatening infections, such as sepsis, endocarditis, osteomyelitis and pneumonia, Miller says. “The idea is to develop a therapy that can prevent patients from becoming infected or reduce their risk of disease complications or mortality should they become infected by the bacteria,” Miller explains.

Miller has been a pioneer in the field of visualizing infections and immune responses in preclinical models for nearly 15 years, including the past three years at Johns Hopkins and, before that, at the David Geffen School of Medicine at the University of California, Los Angeles.
Johns Hopkins Technology Ventures Announces 2015 Mentors-in-Residence

Among this year’s Mentors-in-Residence at Johns Hopkins Technology Ventures are a senior-level biomedical executive, a chief executive at a company developing novel treatments for neurodegenerative diseases, a two-time medical device industry Most Valuable Thought Leader and an American Pain Foundation chairperson.

These are just four of the 14 entrepreneurial leaders serving at Johns Hopkins as Mentors-in-Residence in 2015, the second year of the program. All 14 mentors this year are business leaders, entrepreneurs and development-driven experts with a passion for innovation and growth.

The mentors will be available throughout the year to advise faculty in the process of commercializing their ideas, and they will work with Johns Hopkins Technology Ventures and with the entrepreneurs working out of Johns Hopkins’ business incubator hubs—FastForward Homewood and FastForward East—to provide advice complementing that of the Johns Hopkins Technology Ventures team.

Each mentor is an expert in a particular area of technology or life sciences, and each is committed to Johns Hopkins’ commercialization efforts. They receive a small stipend for their work and provide expertise and experience not usually found on university campuses.

Of the 14 mentors this year, seven are returning, and seven are new. Of the seven returning mentors, three are certified by Maryland TEDCO and The Johns Hopkins University as official Maryland Innovation Initiative Site Miners, who assist startups and faculty members with submitting applications for Maryland Innovation Initiative awards.

This year’s three Site Miners—and returning mentors—are:

- **Graham Allaway**, chief executive officer of Cureveda LLC (a Johns Hopkins University spinout), which is developing compounds that upregulate antioxidant pathways as novel treatments for several inflammatory, autoimmune and neurodegenerative diseases
- **Albine Martin**, who has more than 20 years of technology commercialization, portfolio management and corporate development experience with three public companies representing the biotechnology, diagnostics, genomics and life sciences sectors
- **Bob Storey**, managing director of the Maryland branch of VIC Technology Venture Development, a private, for-profit development firm; at VIC, he assists in the assessment and creation of new ventures, and often serves as chairman or chief executive officer for newly formed portfolio companies

The remaining four returning mentors are:

- **Walter Jin**, founder and managing partner of Three Fields Capital, a health care investment firm that manages assets for family offices, high-net-worth individuals and other capital partners
- **Joseph Migliara**, a senior-level health executive and proven builder of successful fast-growth businesses
- **Daniel Roche**, an entrepreneur and business and government advisor passionate about developing and applying technology to improve the human condition; founder, co-founder, chief executive officer, executive and board member for numerous startup companies; and alumnus of the Johns Hopkins University Whiting School of Engineering
- **Brian Stansky**, a long-term venture capital investor with Integral Capital Partners, hedge fund technology investor and past public equity fund manager with T. Rowe Price

This year’s seven new mentors are:

- **Jim Campbell**, M.D., president and chief scientific officer of Cemtrexion, and board member of Anesiva, Detroit Trading Company, Arcion Therapeutics and Amplimmune
- **Peter Chakales**, chief operating officer of CRE Technologies, where he leads efforts in the development of cyber solutions and products for the commercial landscape; he is a successful serial entrepreneur in the information technology space
- **Al DiRienzo**, who has been recognized twice as the medical device industry’s Most Valuable Thought Leader by business consultancy Frost & Sullivan, and as Technologist of the Year by the Technology Alliance of Central New York
- **Renny McPherson**, co-founder of The Twenty, a Baltimore-based data science services and analytics advisory company founded on the premise that data science offers great reward, but only if it is focused on both business value and technical excellence
- **Michael Richman**, president and chief executive officer of Amplimmune; he has more than 30 years of experience working in research, intellectual property and business development
- **Amita Shukla**, founder and chief executive officer of Vitamita and former principal at venture capital firm New Enterprise Associates; she is an innovator and entrepreneur focused on discovering, developing and scaling simple-yet-powerful ideas for human well-being

Read more about this year’s mentors on the Johns Hopkins Technology Ventures website at ventures.jhu.edu/mentors-in-residence.
O'Connor Fund Offers Grants to Support Undergrad Entrepreneurs

Undergraduate Johns Hopkins University students with ideas for startups have a new source of funds to which they may apply for capital to enter the entrepreneurial ecosystem.

These funds have been made possible by a generous gift from Ralph O’Connor, a Johns Hopkins University Krieger School of Arts and Sciences alumnus.

O’Connor’s gift established the Ralph O’Connor Undergraduate Entrepreneur Fund, which became available at the beginning of this year, says Seth Zonies, O’Connor Fund manager, senior technology analyst for Johns Hopkins Technology Ventures (JHTV) and program manager for Johns Hopkins’ Commercialization Academy, a student internship program in which students work with JHTV to learn about how new technologies are assessed for commercial potential.

“O’Connor wanted to make sure that in these new efforts to develop resources and programs for faculty to begin startup companies for technologies they have developed, there were also programs for students,” Zonies says. The fund will act as an “engagement mechanism and a way to coordinate all of our resources so that student projects and talents get the proper mentorship and guidance,” he adds.

Grants from the O’Connor Fund are between $2,000 and $10,000. To be considered for a grant, a team of applicants must be composed of and led by Johns Hopkins University undergraduates, and the team must have both a clear commercial or entrepreneurial focus and a defined project. The team must know what materials and technologies are needed to develop its entrepreneurial idea, and it must have a set budget, Zonies explains. A team “doesn’t need to be a startup” or already have funding, but the fund is a way “to move these projects along the development spectrum,” he adds.

The application process begins with an intake meeting between an applying team and JHTV staff members, who offer the team advice on how to develop its application to be as competitive as possible, Zonies says. Then, proposals are presented to an advisory committee consisting of Christy Wyskiel, special advisor for enterprise development to Johns Hopkins University President Ronald J. Daniels, and entrepreneurs with a track record of success. The committee makes the final decisions about which projects receive funding, he says.

So far, Zonies has received applications from several teams, one of which—Aezon—has received a grant already. Aezon is developing a personalized diagnostic tool to be used in a clinical setting, and the team was awarded $10,000 from the O’Connor Fund to develop its project further. Aezon is a finalist for the $10 million Tricorder Prize, a global competition for the development of consumer-focused diagnostic devices.

In the future, Zonies and the advisory committee may follow a cohort approach, in which a year’s applicants will apply at the same time and selected teams will develop their projects simultaneously, with access to a mentor and other resources, Zonies says.

Visit the O’Connor Fund website (ventures.jhu.edu/oconnor-fund-process) for more information. To apply for a grant from the O’Connor Fund, send an email to oconnorgrants@jhu.edu. Application steps are listed on the website.

Sonavex Snags Multiple Awards for Blood Clot Detection System

Johns Hopkins University spinoff Sonavex—which is developing a patent-pending, ultrasound-based system to pinpoint potential postsurgical blood clots—is reeling in the grants to get its goods to market.

So far, Sonavex has won TEDCO Maryland Innovation Initiative Phase 1 and Phase 3 awards, a Coulter Translational Research Award and a BioMaryland LIFE award, and it beat out nearly 50 competing startups to win top prize in the 2015 Association of University Technology Managers New Venture Forum.

Johns Hopkins alumni Devin O’Brien Coon and David Narrow started developing EchoSure, Sonavex’s ultrasound system, in 2012, when they were in their first semester of Johns Hopkins’ biomedical engineering graduate program at the Center for Bioengineering Innovation and Design.

O’Brien Coon, now president of Sonavex and a fellow in The Johns Hopkins Hospital’s Department of Plastic and Reconstructive Surgery, was on academic break from his surgery training at Johns Hopkins. Narrow, now Sonavex’s chief operating officer, had prior experience as a medical entrepreneur after inventing a bicycle adapted for use by stroke survivors. The duo collaborated with two Johns Hopkins scientists who provided expertise in medical imaging and ultrasound: Jerry Prince, professor of electrical and computer engineering, biomedical engineering, and radiology and radiological science; and Emad Docter, assistant professor of radiology and radiological science.

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Johns Hopkins Med Students Develop Protenus to Detect Inappropriate Access to Medical Records

Halfway through medical school at the Johns Hopkins University School of Medicine, Nick Culbertson and Robert Lord took a walk on the entrepreneurial side and developed a digital platform to protect the privacy of health records across the Johns Hopkins Health System.

Their product detects Health Insurance Portability and Accountability Act (known as HIPAA) violations, recognizes when an electronic medical record is accessed by someone who doesn’t have authority to see it, and identifies the clinical context of a breach, Culbertson says.

It’s very much a homegrown Johns Hopkins enterprise. Culbertson and Lord developed the product during their participation in the DreamIt Health Baltimore 2014 business incubator, for which The Johns Hopkins University and Johns Hopkins Medicine were co-sponsors.

They started out wanting to work together on an academic research project in medical school, but when they learned about Dreamit, they thought it would be “a great opportunity to leverage some great resources to build an idea from the ground floor,” Lord says. The startup company they formed during Dreamit is called Protenus, Latin for “onwards.”

Culbertson and Lord were one of nine teams participating in Dreamit that year in Baltimore. On the last day of the program—April 30, 2014—when the teams presented their ideas to an audience of advisors and strategic partners, they walked away with a development contract with the Johns Hopkins Health System.

The two bring a unique combination of nontraditional backgrounds to the project. Before medical school, Culbertson was in the U.S. military’s special operations intelligence community, and Lord worked for a hedge fund. They joined forces to develop something the medical community could really use, although it took some time to determine what to develop, Culbertson says.

Their product, for which a provisional patent is being filed, is the result of “a tremendous amount of research and listening to experts in the field,” and talking with hospital executives about which security concerns keep them up at night, Culbertson says.

Peter Greene, chief medical information officer at Johns Hopkins Medicine and associate professor of surgery at the Johns Hopkins University School of Medicine, provided assistance throughout the project. Stephanie Reel, Johns Hopkins University’s chief information officer, helped connect Culbertson and Lord with a mentor.

“Robert and Nick are insightful and innovative, and are focused on addressing compelling privacy and security issues that must be creatively tackled,” Reel says.

Through the Dreamit accelerator, Culbertson and Lord had access to a variety of resources, including free legal and accounting support, and advice from investors, mentors and advisors. “Every time we talked to someone, we felt like we got a little closer to a stronger idea,” Culbertson says.

“The best part of going to the Dreamit accelerator was that it was an opportunity to reserve some time to focus completely on an idea, versus doing something part time or during free time,” he says.

“It was a legitimate reason to say, ‘We’re going to put med school on hold,’ ” use the resources available “and test our idea and see if it has legs or not,” he adds. “Without Dreamit, we’d never have been able to take that time and put that energy into one concept like this.”

The product’s pilot test at Johns Hopkins HealthCare recently was completed, and the two are in discussions on how to fully implement it across the health system.

Protenus employs nine people and is headquartered at the new FastForward East business incubator location on Johns Hopkins’ East Baltimore campus. Culbertson’s and Lord’s seed fundraising, initiated after landing the Johns Hopkins contract, garnered $1.2 million and was oversubscribed. The duo also received $100,000 from Maryland’s TEDCO Cybersecurity Investment Fund and an additional $50,000 from the fund’s “Seed Baltimore Option.”
stages of developing an idea to take it from the university to the commercial world,” she says.

Alliance member and joint meeting investor Albert Di Rienzo, president of concept-to-commercialization company Red Sky, looks forward to attending the meeting every year to learn more about cutting-edge developments in biotechnology and pharmaceutical and health science, but also to participate in the collaborative environment the meeting fosters.

“It’s a great joy to work with the inventors, providing feedback to help them commercialize their innovations, which not only help the economy, but also help people live longer, healthier, more productive lives,” Di Rienzo says.

Kannan Rangaramanujam, professor of ophthalmology and co-director of the Center for Nanomedicine at the Wilmer Eye Institute at Johns Hopkins, won a Johns Hopkins University School of Medicine Dean’s Award of $25,000 for his work on developing targeted nanotechnologies to treat cerebral palsy. Frank Bosmans, assistant professor of physiology at the Johns Hopkins University School of Medicine, won an Abell Foundation Award of $50,000 for his research in treating epilepsy. The team of Devin O’Brien Coon and David Narrow, co-founders of the startup Sonavex, won a BioMaryland LIFE award of $25,000 for their development of EchoSure, a product that uses ultrasound to detect postsurgical blood clots before the clots happen.

The winners of both BioMaryland LIFE awards also have received Maryland Innovation Initiative awards. This year was the first in which an award with a monetary prize was offered to a startup.

“The alliance meeting is an annual tradition resulting in the formation of startup companies and large licensing deals for the Johns Hopkins Technology Ventures office,” says Christy Wyskiel, senior advisor to the president of The Johns Hopkins University.

“We are grateful to the Abell Foundation for the Abell Foundation Awards and to the state of Maryland Department of Business and Economic Development for the BioMaryland LIFE awards, both of which support faculty inventors as they attempt to move their ideas to the marketplace,” Wyskiel says.

In working out of Johns Hopkins’ FastForward Homewood, the team pooled its knowledge, resources and experience to develop an ultrasound-based product line to detect postsurgery blood clots, Narrow says. EchoSure comprises a bioabsorbable marker that is placed around newly connected vessels during surgery and an ultrasound software package that can be operated by a nurse without sonographic training.

Together, the marker and software package help nurses guide an ultrasound probe directly to the surgical site, where there is risk of a blood clot forming in the early period after surgery. The artificial contrast generated by the marker makes the surgical site simple to locate in an ultrasound image.

Nothing on the market serves the same purpose as their ultrasound system, Narrow says. “By delivering visual and quantitative blood flow data, surgeons can detect potentially catastrophic clots while there is still time to save the surgery,” he explains.

Every year, more than 550,000 U.S. patients undergo procedures in which arteries or veins are surgically connected, according to Sonavex’s website.

EchoSure not only improves outcomes for these patients; it “also spares the payer substantial expense by minimizing revision procedures,” Narrow adds.

The recent grants and awards have helped get Sonavex “to a point of technical and commercial inflection,” Narrow says. There’s still a need for additional funds before launching the product in the market, but the grants provide visibility and validation—from both technical and business standpoints—to investors, which helps Narrow and O’Brien Coon raise additional private funding.

The FastForward team also has put the pair in touch with potential investors, Narrow says. “In addition to the office space, the nonphysical resources provided by FastForward have lowered what would usually be a high barrier to get a medical technology startup off the ground. Without FastForward and Johns Hopkins Technology Ventures, we might not be where we are now,” he says.

“With the combination of cutting-edge science from places like Hopkins, and with early-stage translational support from organizations like TEDCO, Technology Ventures and the Coulter Foundation, Maryland is really beginning to develop an exciting culture of technology entrepreneurialism,” O’Brien Coon says.