

# HEALTHCARE + COLLABORATION *Re-Imagined*











### **TECHNOLOGY INNOVATION CENTER**





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Sincerely,

Fait 33 Non

Paul Nagy, PhD, FSIIM Co-Director, Technology Innovation Center, Associate Professor of Radiology

2015, a pivotal year for digital health innovation, was the year the Johns Hopkins Technology Innovation Center (TIC) hit its stride.

Officially launched in late 2014, the TIC is a professional software development group, and a collaboration hub bringing together clinical leaders, researchers and technologists to build and deploy digital health solutions. These collaborations have yielded new ideas and novel solutions with real impact at Johns Hopkins. TIC applications transport tens of thousands of secure clinical messages daily, guide thousands of clinical decisions weekly, and introduce new professional development tools to hundreds of Johns Hopkins caregivers every month. The TIC now has over 40 applications in use at Johns Hopkins Medicine that help clinicians deliver patient-centered care. Johns Hopkins Medicine Business Development and Johns Hopkins Tech Ventures are working closely with us to extend our impact beyond Johns Hopkins to the healthcare industry.

As an inherently cross-disciplinary process, innovation thrives on culture and community. In 2015, the TIC mobilized to build a Johns Hopkins community of developers, clinicians, and entrepreneurs. We hosted the Apple ResearchKit event around the EpiWatch release, organized developer forums, and helped run two Johns Hopkins University health IT hackathons. Last fall, we ran our first Johns Hopkins Medicine internal accelerator program. The 2015 program included three teams of clinical inventors with business, design and engineering students from across Johns Hopkins. The clinical software solutions designed by these teams are now in the development and deployment for these new Baltimore startups.

The TIC reflects Johns Hopkins culture, reaching across Johns Hopkins University and the health system to build interdisciplinary high-performance teams that can lead healthcare's transformation. We have numerous people to thank, as illustrated on the last page, but need to recognize that the TIC would not have been possible without the tremendous vision and leadership from Jonathan Lewin, Chair of Radiology and Senior Vice President of Integrated Healthcare Delivery, Stephanie Reel, CIO, and Peter Greene, CMIO.

Despite all of the innovative and groundbreaking discoveries made at Johns Hopkins, there remains tremendous untapped potential. In the coming year, the TIC will focus on community building, improving access to existing technology, and providing high quality software engineering services. We aspire to play the roles of connector, convener, collaborator and technologist to help Johns Hopkins lead and invent next generation digital health solutions.

Dwight Raum\_

**Dwight Raum** Co-Director, Technology Innovation Center, Johns Hopkins Chief Technology Officer

## **OUR TEAM**

**MISSION: Engaging world-class** scientists and clinicians in an interdisciplinary community to re-imagine healthcare and deliver the promise of medicine.

### **TECHNOLOGY INNOVATION CENTER TEAM**

Marc Amick	Amy Hushen	Katie Patras	Gorkem Sevinc
Julia Brown	Brandyn Lau	Srilalitha Pusuluri	Will Shah
Rahiem Burgess	Emily Marx	lan Rashkin	Kirby Smith
Kelly Bystry	Jasmine McNeil	Dwight Raum	Josh Spangler
Michael Cohen	Paul Nagy	Ed Reyes	Jay Syed
Joe Daniels	Matt Nesbitt	Joe Roberts	Cao-ly Tran
Phil Gianuzzi	Tolu Oloruntoba	Eric Schmitt	Laura Vail
Steve Handy	Patrick Ostendarp	John Scott	Jerome Williams
Kulo Hastu			

## **CORE VALUES**



### **CREATE RESPONSIBLY**

Make a firsthand impact on ideas that change the world.



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**BE OPEN** 

Value cross-disciplinary perspectives and collaboration.



**AVOID CLUTTER** 

Don't build if we don't have to.



LEAD WITH 3 C'S

Courage to disrupt Caring for those we affect Commitment to our work



### **HAVE FUN**

Take pride in your work, work hard and play hard.



### **PRACTICE PATIENT-**CENTEREDNESS

Consider the impact on patient as central to what we build.



**CO-DEVELOP** WITH CUSTOMERS

Work with the customer, not for the customer.



### **USE DESIGN** THINKING

Focus on the solution, not the tool.



### PRIORITIZE **MENTORSHIP**

Learn and teach something new everyday.



The impact of TIC applications in the clinical setting is reliant on our codevelopment with clinical champions. In each of the following features you will read about a clinical champion who devoted time and unique clinical insight to solve problems affecting patient care. We are amazed and humbled by the devotion all of our Johns Hopkins clinical champions exhibit in partnering with our center and finding digital health solutions that aid them in leading positive change to better serve their patients.

# **FEATURED** APPLICATIONS

## **PeerReview** EMPOWERING RADIOLOGISTS TO CHANGE THE COURSE OF PATIENT CARE

How do you turn a compliance tool that interrupts the workflow of radiologists into powerful, quality review software that affects the course of patient care?

> CLINICAL CHAMPION: David M. Yousem, MD, MBA

*m, MD, MBA* This was the dilemma radiologists faced at Johns Hopkins Medicine when conducting peer review – the



quality assurance review of prior radiology studies for discrepancies. The compliance software that most radiology departments

use for peer review does not anonymize the reviewer or specify the discrepancy in the reports. The bigger barrier: radiologists don't see the value in completing peer review because their reviews aren't submitted in a timely fashion to favorably impact patient care.

Dr. David M. Yousem, Vice Chairman of Radiology at Johns Hopkins Medicine identified these obstructions to workflow and motivation and connected with the Technology Innovation Center to solve them.

With guidance from Yousem, the Technology Innovation Center built a custom peer review system that fit with the workflow and motivational needs of his department. The advanced Peer Review tool brought patient care back to the center.

Traditional peer review is retrospective and relies on cases that are weeks to months old from prior related studies. If an error is caught, there may not be much the physician can do about it if an untoward event has already happened or a tumor has already doubled in size. That error (e.g., nondetection of a cancer) may be months old.

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"It is much more valuable and motivating because we feel like we are intervening at a time when patient care could be beneficially changed as opposed to a time when there is merely the shame of potentially having missed the case."



## **30,000 +** peer reviews completed



The redesigned peer review system is short-term retrospective. Cases for peer review are selected within the previous 24 hours, in some cases less than hours from initial reporting. Radiologists can now review the case, catch errors early on, and change the course of patient care immediately if a mistake has been made. The TIC also analyzes the radiologists' workflows to ensure these reviews fit with the natural progression of their day.

"It is much more valuable and motivating because we feel like we are intervening at a time when patient care could be beneficially changed as opposed to a time when there is merely the shame of potentially having missed the case," said Yousem.

In 9 months of use, there were 12 instances where reviewers were able to notify clinicians of an important change that changed the patient's diagnosis or management within 24 hours of the error.

"Most people think of it [Peer Review] as demanding and merely a compliance annoyance as opposed to being designed with patient care in mind," said Yousem. "The changes the TIC has made converted peer review into a valuable endeavor rather than merely a checkbox process."

## **MileMarker** REDESIGNING RESIDENCY TRAINING

The challenge: significantly rethink and redesign residency training programs for the 21st Century.

**CLINICAL CHAMPION:** *Carisa Cooney, MHA, MPH* 



**4628** surgical evaluations since July 2013 Redesigning a residency program was a lofty challenge from the Institute for Excellence in Education (IEE) in early 2013 through its Residency Redesign Challenge Grant. The IEE announced it in anticipation of major requirement changes. Carisa Cooney, Assistant Professor and Clinical Research Manager of the Department of Plastic and Reconstructive Surgery, was part of the team that stepped up to tackle the problem.

While Cooney's team included clinical specialists (Dr. Scott Lifchez, Dr. Damon Cooney, and Dr. Richard Redett) primed to redesign plastic surgery training, they lacked technical expertise to understand what might be feasible when building a software application. That's when the team heard about the Technology Innovation Center through one of their residents.

Over two years, Cooney's team has worked with the TIC to build MileMarker, a web and mobile tool built for trainees to quickly perform a self-assessment after a procedure. Trainees then pass their self-assessment to a trainer for follow-up rating. The tool captures procedure data and also helps teams evaluate resident progress every six months. Residents can view how they rank for a procedure in relation to average scores of their peers. Attendings can also view relative scores.

The application accumulated over 4628 evaluations for Hopkins plastic surgery residents since July 2013.

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We think that this has the potential to revolutionize graduate medical education and may be able to shorten training times."



The program now has volume of objective data needed to provide more effective feedback to residents.

"We think that this has the potential to revolutionize graduate medical education and may be able to shorten training times," said Cooney.

Since joining up with the TIC, the MileMarker team has received a Maryland Innovation Initiative Grant, and they are looking at potentially starting a business that would help bring back licensing shares to Johns Hopkins. The team has also received inquiries from hospitals interested in piloting the training tool. In January 2016, MileMarker launched at its first external site: University of North Carolina at Chapel Hill.

What's after launching to other plastic surgery residencies across the country? According to Cooney, the tool has application with any training program, including other procedure-based medical specialties and nursing.

"It is cool to see how the concept clicks across many different specialties," said Cooney.

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# MurmurQuiz NOVEL TRAINING FOR LISTENING TO THE HEART

A deficit in the teaching of heart sound assessment drove Dr. Reid Thompson and Dr. Gary Beasley of pediatric cardiology to fill that void.

> **CLINICAL CHAMPIONS:** *Reid Thompson, MD and Gary Beasley, MD*



807 clinical cases translated into quiz format Dr. Beasley has found deficits in his own cardiology training. Dr. Thompson has observed the lack of a system for teaching auscultation, or the art of listening to organs to evaluate sounds they produce.

"Auscultation proficiency is declining because people don't have a good way of teaching it. The skill set is dying," said Thompson. "There are no standards for evaluating competency. We are trying to create a standardized platform for teaching and evaluation of auscultation skill using heart sounds recorded from many patients."

Thompson took the first step toward realizing this platform with MurmurLab.org, a site for auscultation students to read about the patient's case, listen to the heart sounds, enter their description of the sounds and diagnosis, and review their responses in comparison to others. Thompson teamed up with a Johns Hopkins medical student, Charles Tuchinda, to create MurmurLab, but they also dreamed of adding a quiz module that would allow for more efficient learning and evaluation of progress.

"We wanted to offer a quiz format that was faster, easier, and more likely to result in return visits, given the time constraints of today's medical students," said Thompson.

Thompson learned of the Technology Innovation Center through the business development group at Johns Hopkins and partnered with them to create MurmurQuiz.org, a gamified version of MurmurLab. "We wanted to offer a quiz format that was faster, easier, and more likely to result in return visits, given the time constraints of today's medical students."



Users hear heart sounds from patients with and without heart disease, decide first if any abnormality exists, then drill down further into what specifically is abnormal about the sounds and the potential diagnoses that would fit best with the exam. Trainees track progress over time through individualized and comparative analytics.

In 2015, Johns Hopkins medical students and pediatric residents began training with MurmurQuiz. The site was released to the public in February 2016. Thompson anticipates MurmurQuiz will be popular among many different specialties, nurses, and physician's assistants.

Thompson sees the application evolving to improve healthcare training internationally. He hopes information gleaned from MurmurQuiz will lead to standardized evaluations for auscultation competency of health care workers involved in patient care, including screening for heart disease, especially in countries without readily available sub-specialists or access to advanced imaging. For now, he is focused on working with the Technology Innovation Center on the second phase of MurmurQuiz.org, which will further customize the application for students and teachers.

"Creating a new method for teaching auscultation is a bit like writing a novel," he said about the evolution of the project. "You don't know in advance what it is going to look like at the end."

## PolicyLogic **EVERY HOSPITAL DOCUMENT** YOU NEED IN ONE PLACE



Hopkins Policies Online

Imagine a shelf filled with binders of health policies, multiplied across a health system. How might you make those documents accessible in one place, with the search and management tools for thousands of employees?

> **CLINICAL CHAMPION:** Maria Cvach DNP, RN, FAAN



For six years Maria Cvach, who directs Policy Management and Integration for Johns Hopkins Health System, has worked to create a single institutional site for policy management.

The problem: Johns Hopkins Health System is multi-faceted. Policies, procedures, and other documents are needed across the institution, and when Cvach started, every group at Johns Hopkins referenced a different website or kept their documents as paper copies on a shelf.

Working with nursing administration Cvach researched this problem and brought it to the enterprise services team, which now serves as part of the development team for the Technology Innovation Center. The team saw an opportunity to build a customized platform for health policy management that could eventually serve the whole health system.

In 2009 Hopkins Policies Online, powered by PolicyLogic, came online with just five regulatory required manuals. Since then it has grown to over 100 manuals with over 200 policy editors for the site and 6500 hits per week. The application is a document management system built for a complex hospital system, with views, search, and navigation finetuned to match the needs of Johns Hopkins' many entities.



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to sharpen the applications functionality.

"We want to make it as simple as an ATM," said Cvach. "We don't want staff to think, 'We have to go through this manual.' We want them to enter a search term and find where they are."

Cvach navigates through PolicyLogic seamlessly. Where a policy took an extra secretary a month to get signatures and post online before becoming accessible, it now takes minutes in a meeting and one click to send out for e-signature.

"I could not do my job effectively without this tool," said Cvach.

In 2015 PolicyLogic hit its stride. Affiliate hospitals began logging into the system, and Cvach plans to get the entire umbrella of Johns Hopkins health system online and navigating policies by July 2016.

"We identified a need," said Cvach. "And when the administration saw that it was capable of integrating with the entire health system, they supported that need."

"I just see this as essential if you want to integrate policies, procedures, and documents. It is an essential first step to find information. And information is power."

## 66

*I just see this as essential if you want to integrate* policies, procedures, and documents. It is an essential first step to find information. And information is power."

## 8500+ monthly users

## Hospitalist Dashboard IF YOU CAN'T MEASURE IT, YOU CAN'T CHANGE IT

It took hospitalists over a week to complete discharge summaries (documents summarizing a patient's inpatient stay) when Dr. Daniel Brotman, Director of the Hospitalist Program at Johns Hopkins Hospital, rolled out the Hospitalist Dashboard. A year and a half later, the average turnaround time is 2.65 days.

> **CLINICAL CHAMPION:** Daniel Brotman, MD

**5.75** day decrease in discharge summary turnaround time over 1.5 years That drop in turnaround time is thanks to a dashboard that surfaces that metric for Johns Hopkins hospitalists.

"Physicians tend to be a competitive bunch," said Brotman. "Just saying that you are worse than your peers in a particular metric is motivating."

Brotman and his team observed the motivating power of metrics like this one. He also recognized that the standard approach to team evaluation for hospitalists isn't telling the whole story. He created the Hospitalist Dashboard to address these factors, and reached out to the Technology Innovation Center for assistance with visualizations, management, and institutional integration.

In 2015, 57 hospitalists used the dashboard, which displays an individual scorecard for a range of performance metrics, like: time of discharge, compliant VTE prophalaxis, and patient satisfaction. Hospitalists view how they are performing over time, relative to their peers, and group performance. Some adjust their workflow to improve their performance; others may begin a quality improvement project if workflow doesn't provide the fix.





"It is really in true Johns Hopkins spirit," said Brotman. "The idea here is that it facilitates high quality patient care."

"It is really in true Johns Hopkins spirit," said Brotman. "The idea here is that it facilitates high quality patient care."

Prior to the dashboard, the discharging hospitalist would bear all responsibility for the patient's hospital stay, but might only provide 10 percent of that care. To Brotman, hospital care is a team sport. The dashboard uses billing data to better weigh the time each team member spends with the patient and attributes that to individual metrics. It brings the complete picture of patient care into focus while also leveraging financial data and incentives to motivate physicians.

"The biggest success is having an understanding on the part of providers about what metrics are being monitored and rewarding them for excelling in those metrics," Brotman said.

"Simultaneously improving quality and constraining cost is what defines improving value," said Brotman. "As an organization we continue to believe that's really paramount."

# LEADERSHIP PROGRAMS

The TIC training programs and events featured in the following pages span leadership, entrepreneurship, advanced informatics, and technology exploration. We view this work as essential to growing a connected base of Johns Hopkins faculty, staff, and students with the mindset and skills to co-develop patient-centered Health IT solutions. We are committed to expanding this programming to build a strong community of leaders and usher in the next wave of digital health at Johns Hopkins.

## **ANALYTICS LEADERSHIP IN** PATIENT SAFETY PROGRAM (ALPS)

## 56 quality projects implemented over the course of a year

66 Aside from the weekly presentations that are informative and engaging, the best part of ALPS is the networking opportunities. *I* got to meet many analysts and clinicians from diverse departments within the organization. *The relationships I built with my group have* already proven to be valuable to my career."

Leighann Posey Performance Improvement Data Analyst for JHCP ALPS Fellow Class of 2015

### FEATURED PROJECTS



A REPORTING DASHBOARD FOR AN OUTREACH PROGRAM THAT INCENTIVIZES BETTER QUALITY OF CARE TO MEASURE PROGRAM SUCCESS AND GAPS

The Technology Innovation Center partners with the Armstrong Institute for Patient Safety and Quality to offer the Analytics Leadership in Patient Safety (ALPS) program. This nine-month program provides training for future leaders within Johns Hopkins Medicine to apply advanced clinical analytics, transforming the safety and quality of care. The hands-on program educates participants on the technologies deployed at Johns Hopkins Medicine for analytics as well as the theories and methodologies related to health care data compilation, analysis and use.





A WEB-BASED TOOL TO AUTOMATE DATA COLLECTION FOR BIOMEDICAL AND PATIENT-CENTERED OUTCOMES

## **HEXCITE ENTREPRENEURIAL** ACCELERATOR



The Hexcite Initiative at the Technology Innovation Center brings new health IT ideas in the clinical space to market by leveraging Baltimore's technology community and pairing it with the university academic networks. The initiative coalesces innovators that span the range of Johns Hopkins Medicine practice settings and partnerships. Teams bring their concepts through the crucial beginning stages of market feasibility, customer discovery and technology development by harnessing the immense resources and hands-on clinical experiences available at Johns Hopkins Medicine and in the local startup community.

*This fellowship is unlike any other training I have* 66 had in my clinical career. Apart from the training to create a healthcare technology start-up, it has exposed me to completely new ways of thinking while designing solutions in the healthcare arena. One of the most valuable parts of this fellowship is the focus on doing customer interviews and then to use the insights gained from the customer interviews to develop our products/ideas."

Krishnaj Gourab, MD. Medical Director. Rehabilitation Informatics and Analytics Hexcite Clinical Fellow Class of 2015

### FEATURED PROJECTS



A DISCHARGE SUMMARY NAVIGATOR AND MEDICATION ADHERENCE APPLICATION FOR CARDIAC PATIENTS



A REHABILITATION ANALYTICS PLATFORM THAT DIRECTS THERAPISTS TO PRIORITIZED PATIENTS

market and technology concepts validated or invalidated in 16 weeks

## **CLINICAL INFORMATICS FELLOWSHIP**

The Clinical Informatics Leadership Fellowship is a yearlong program that guides select residents, fellows, and other clinicians through professional development in health informatics. The program's goal is to provide those clinical leaders who are interested in informatics and the career path of the Chief Medical Information Officer with a broad baseline of knowledge as well as support to complete a specific informatics project during the fellowship. Fellows are introduced to informatics experts and other leadership at Johns Hopkins Medicine and beyond. They also spend focused time in the Technology Innovation Center lab, learning about the technologies and processes that drive the center.

**S** As part of the Quality and Informatics Fellowship, I spent a year learning the basics of informatics, assisting with the deployment of our new PACS, and working to improve room utilization and decrease outpatient delays in the Interventional Radiology section. These projects not only gave me the opportunity to learn the fundamentals of programming in several languages but also let me glimpse a rarely seen side of administration. The experience helped me form several key professional relationships and acquire unique skills that differentiate me in the marketplace."



Davood Abdollahian Chief Resident, Radiology Clinical Informatics Fellow Class of 2015





fellows trained over a year-long fellowship







A REAL-TIME, DIGITAL SCORECARD THAT PROVIDES FEEDBACK THROUGHOUT THE RADIOLOGY RESIDENCY



A RESEARCH TOOL THAT AIDS THE FIRST STEPS OF **RESEARCH AROUND SPECIFIC** PATIENT POPULATIONS AND THEIR DATA



## **BUILDING FUTURE LEADERS** FOR DIGITAL HEALTH INNOVATION

## **Designing the Next** Health **IT Workforce**

The Technology Innovation Center hosts a summer internship program for local high school and college students interested in growing their skills in healthcare informatics, software development, and design. This unique program brought in nine students for the summer of 2015. Each student receives professional and skills-based mentorship through two mentors and is challenged with a Health IT project to complete during their time at the Technology Innovation Center. These projects have significant impact on the work done at the TIC.



9 LAB INTERNS

## Some projects completed by interns in 2015:



MOBILE APP TO HELP HOSPITAL VISITORS NAVIGATE JOHNS HOPKINS MEDICINE



### SECURE, PATIENT ADMISSION FORM FOR BREAST IMAGING CLINIC



LOGO AND GRAPHIC DESIGN FOR CARDIOLOGY TEACHING APPLICATION



SAFETY SURVEY

### A ResearchKit Roadmap



As part of its mission to re-imagine healthcare, the Johns Hopkins Medicine Technology Innovation Center sponsors events to educate the Johns Hopkins community on emerging technologies as resources for innovation. On October 20, 2015, the center put together an event that helped guide researchers through how research is changing due to mobile technology. The Johns Hopkins Medicine Technology Innovation Center organized a consortium of speakers, including representatives from Apple, software developers who specialize in ResearchKit and research professionals at Johns Hopkins. The event guided participants through a roadmap for conducting their first ResearchKit study based on the experiences of the Johns Hopkins EpiWatch team.



# 60+ DEVELOPERS







# 140+ RESEARCHERS

## Convening Like-Minded **Developers to Talk Health IT** and its Future

The Technology Innovation Center kicked off regular forums for developers and technologists across Johns Hopkins in 2015. Developers convene to learn about new technologies and projects across the university, and engage in discussion around software, process, and technology's evolution. The goal of the forums is to share best practices and break-throughs, ultimately enabling the developer community at Johns Hopkins to build more efficiently and explore innovative methods to make their work more impactful.



# **BOUNDARYLESS IMPACT**

# **FEATURED APPLICATIONS**



peer reviews completed



since July 2013



clinical cases translated

into quiz format

**LEADERSHIP PROGRAMS** 







**DEVELOPERS FORUM 60+ DEVELOPERS**  RESEARCHKIT 140+ RESEARCHERS

**INTERN PROGRAM** 



ANALYTICS LEADERSHIP PROGRAM (ALPS)

56

quality projects implemented over the course of a year

HEXCITE ENTREPRENEURIAL ACCELERATOR

95

market and technology concepts validated or invalidated in 16 weeks

> CLINICAL INFORMATICS FELLOWSHIP

> > 36

fellows trained over a year-long fellowship

## ACCOLADES



Johns Hopkins – Luminox Deal Sets up Accelerator for Israeli Digital Health **Startups:** 

September 4, 2015

Learn of the plans for the upcoming Hexcite IL program, a spinoff to the Technology Innovation Center's Hexcite program that pairs Israeli start-ups with Johns Hopkins faculty and staff. (MedCityNews)

**Fostering Innovation from** Within: Lessons from Johns **Hopkins and Partners** Healthcare: November 9, 2015

Paul Nagy reveals the Technology Innovation Center's recipe for innovation through collaborative genius. (Healthcare Informatics)

**Analytical Informatics Offers** License Agreement with Johns **Hopkins for REACH Radiologist** Video Collaboration Software: December 4, 2015

Analytical Informatics and the Johns Hopkins Medicine Technology Innovation Center announce licensing agreement for distribution of its application, REACH. (Analytical Informatics)

SIIM 2015: The Narrative and Navigation of Healthcare Analytics: May 30, 2015

Gorkem Sevinc talks about the most important aspects when considering data in healthcare.



### **Hopkins Tech Center Creates Better Software with Physicians' Input:** June, 11, 2015

Paul Nagy and radiology video conference application REACH are featured in the Baltimore Business Journal after the official launch of the Technology Innovation Center. (Baltimore Business Journal)



### Johns Hopkins Tech Innovator: **Breaking the Chains on Data:** August 25, 2015

Gorkem Sevinc answers questions about the future of imaging and emerging Health IT technologies. (Health Imaging)



**SmartCEO Executive** Management Award: CIO/CTO December, 2015

Gorkem Sevinc was notified in December 2015 that he received the SmartCEO Executive Management Award for the CIO/CTO category for his work with emocha, a mobile public health company and a Technology Innovation Center partner.

### 2015 Health Innovator Award

Paul Nagy received a 2015 Health Innovator Award from the Baltimore Business Journal for his work as an educator of clinical leaders at Johns Hopkins Medicine.

### 2015 Minnies Award for Best **Radiologist Training Program**

The Johns Hopkins Radiology Training Program received a 2015 Minnie Award for best training program, thanks in part to the **Technology Innovation Center** designed and developed resident training dashboard.

## **SPECIAL THANKS TO:**

### **JOHNS HOPKINS MEDICINE**

eter Greene MD	Stephani	ie Reel MBA	an Lewin M	D, FACR Karen Horton MD Dalal Ha					Haldem	aldeman PhD, MBA			
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Mike Cardamone	Ed Be	ranek MBA	Ashimi	yu Duro	jaiye MS	5									
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Amita Shukla MBA	Chris	s Meenan MBA	Ash	iwini Da	ivison M	vison MD, MS			Eli Park-Yanovitch MBA						
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Russ Taylor PhD	Greg H	lager PhD, MSI	E Jo	anne Se	nne Selinski PhD, MSE			F	Roger Williams MPA, MEd			MEd	Jim	Liew Ph	D
Avi Rubin PhD, MSI	E Del	bbie DeFord	Youse	eph Yaz	di PhD,	MS, ME	BA	ŝ	Sharon	Kim Ph[	þ	Phillip	Phan I	PhD	
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Emily Williams JD	Joe P	owers PhD, MI	Ed, MS	Rebe	ecca Fre	edman	JD								

eter Greene MD	Stephanie Reel MBA Jonathan Lewin MD, FACR					Ka	Karen Horton MD Dalal Haldeman PhD, MBA					
eter Pronovost MD,	, PhD, FCCM	Renee D	emski MSV	V, MBA Mary Myers			N, MS	Christop	oher Chi	ute MD		
usan Phelps BSN, N	MBA Har	rold Lehmanr	n MD, PhD	Daniel Brotman MD				en Sissor	n MD	Ellio	t Haut MD, Ph	D
awn Corun Sh	nerri Flaks	David Baro	on Joyc	e Slater	Reid	Thomps	son MD	Gary	Beasley	MD		
arisa Cooney MHA	, MPH Da	amon Coone	y MD, PhD	Scott	: Lifchez I	MD	Nancy E	dwards-N	Aolello N	ИS	Ken Lee DrF	'H, MHS
ryan Barshick MS, I	BSN Pau	la Kent RN, E	3SN, MBA	Matt A	ustin MS	, PhD	Rhond	Rhonda Wyskiel RN, BSN, MSN				
aron Watkins MA	Maria Cva	ach DNP, RN,	, FAAN	Stacia Je	sner	Krishn	rishnaj Gourab MD, MBBS John Adamovich, N					
ancoise Marvel ME	D Kayode	e Williams MD	D, MBBS, MI	BA Co	ory Sand	one MA	, CMI, FAI	MI D	avid M.	Youse	m MD, MBA	
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uss Taylor PhD	Greg Hager	PhD, MSE	Joanne	ne Selinski PhD, MSE			Roger	Roger Williams MPA, MEd			Jim Liew PhD	
vi Rubin PhD, MSE	ISE Debbie DeFord Yousep			h Yazdi PhD, MS, MBA			Sharo	Sharon Kim PhD Phillip Pha				
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mily Williams JD	Joe Powers PhD, MEd, MS Rebecca Freedman JD					D						

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Julie Simon	Me	gan	Wahler	ahler Mark Vanderz					
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