

Brigham Digital Innovation Hub²⁰¹⁹

BRIGHAM DIGITAL INNOVATION HUB 2019

Our Story

Disrupting Medicine™

Founded in 2013, the Innovation Hub, or iHub, at Brigham and Women's Hospital was started with the goal of supporting innovation across Brigham Health. Since then, we have held three hackathons, spun out over six companies, and supported countless Brigham staff in actualizing their ideas. Three years into this journey, the iHub began to transition from supporting all types of innovation to focusing on digital health. The iHub functions as the center for digital health at Brigham and Women's Hospital. Our team is focused on promoting, sourcing, and creating digital solutions to benefit Brigham Health, its staff, patients, and visitors. Now known as the Digital Innovation Hub, our work can be categorized into four pillars: Foundational Work in Digital Health, Outside-In Innovation, Inside-Out Innovation, and Digital Transformation.



innovation hub 





The Brigham and Women's Hospital (BWH) Digital Innovation Hub (iHub) mission is to drive more patient-centered, efficient and safe care through the use, development, evaluation and commercialization of digital health. The iHub does this by identifying and evaluating internal and external technology to address hospital challenges and by matching potential solutions to meet hospital needs. The iHub also focuses on advancing early-stage ideas from internal BWH clinicians, scientists and employees and building and implementing a digital health infrastructure. Additionally, the iHub works to foster a culture of innovation dedicated to the digital transformation of healthcare.

Our Mission

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**“There is no doubt that without the
iHub, I would still be a dreamer.”**

Raja - Elie Abulnour, MD

Assistant Professor in Medicine, Pulmonary Division,
Brigham and Women's Hospital

What We Do



innovation hub 



Four Pillars





Startups



Industry

OUTSIDE IN

BRIGHAM HEALTH



BRIGHAM AND
WOMEN'S HOSPITAL

MISSION: Drive more patient-centered, efficient,
and safe care through use, development,
evaluation, and commercialization of digital health.

FOUNDATION: A culture of innovation and collaboration.

INSIDE OUT



Clinicians



Scientists

+ Foundational
+ Inside Out
+ Outside In
+ Digital Transformation



Foundational



The iHub creates a culture of innovation at BWH through hospital-wide events, community engagement, and other activities that foster cross-disciplinary collaboration around digital health.



Inside-Out



The iHub provides support to BWH clinicians, researchers, and administrators to help them turn digital health ideas into reality. As an advisory service, the iHub interacts and provides guidance and feedback on digital health concepts at all stages – from back of the napkin ideas to fully formed and validated solutions.

Digital Health Innovation Guide



Impact:

The Digital Health Innovation Guide (DHIG) was created as a streamlined process to expedite digital pilot readiness, especially for technologies that require integration with BWH information systems. As part of the DHIG process, a multidisciplinary group of stakeholders including security, legal, contracting, and IRB is convened on a regular basis to advise each pilot and surface potential blockers. The DHIG committee and process reduces risk for both individual projects and for the broader organization, improving the likelihood of success by ensuring proper approvals and best practices are followed. It is a checklist-driven process that includes pre-approved/customizable guardrails and regular check-ins to keep projects on track. An academic article was published measuring the magnitude and effectiveness of the DHIG process.

<https://www.sciencedirect.com/science/article/pii/S2213076417300490>

Open Innovation Studio

Impact:

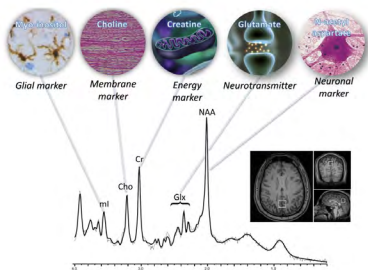
The Open Innovation Studio is a place for internal innovators to engage with members of the iHub and others within the innovation ecosystem to accelerate and advance their digital solutions and ideas, through brainstorming, coaching, advice, strategy mapping and being connected to the right resources. The studio is designed to facilitate whiteboarding and projecting digital tools for product design and focus groups.





Ventures Spun Out

- + **BrainSpec**
 - + **Herald Health**
 - + **Twiage**
- 
- 
- 



EVENTS		
No filters applied		
47624222	May require home VNA	09/13 16:06:31
Hoffman	Chief complaint of fall and age > 60	
13234823	Frequent ED Utilizer	09/13 16:05:31
Ocampo	4 ED visits in past 14 days	

Outside-In

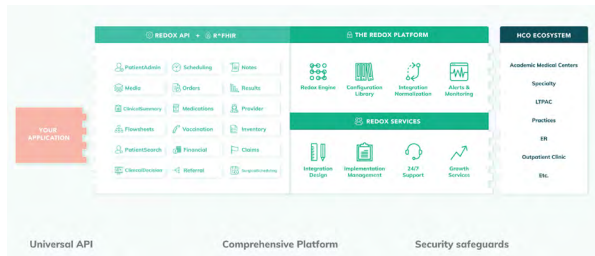


The iHub leads sourcing of digital health solutions for Brigham and Women's Hospital by engaging with promising startups to improve care delivery. The iHub manages startups.partners.org, a public website that enables startups to share their digital health products with organizations across Partners Healthcare. This resource, along with the iHub's community engagement efforts, facilitates matchmaking between digital health startups, clinical champions and operational leaders to test and validate new technology in different care settings.



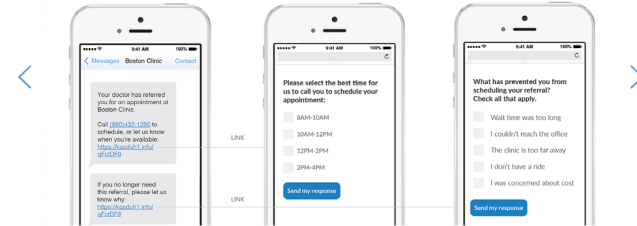
Successful External Integrations

- + Redox
 - + TORq
 - + LogicJunction
 - + Medumo
 - + Orbita
- 
- 
- 



REDOX

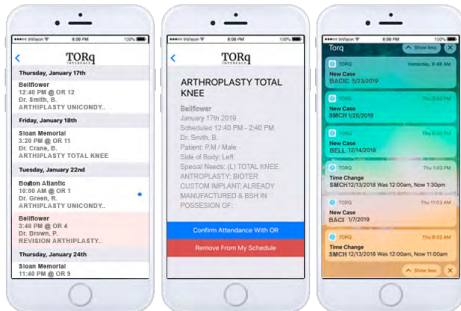
SAMPLE REFERRAL MESSAGES
sent immediately after a referral



MEDUMO



logicjunction



TORq
Interface



orbita

Voice Assistant Entry Point

HIMSS19



The Faulkner Voice Assistant is a voice based, in-hospital information guide which provides a new and interactive experience for Faulkner Hospital patients and visitors.

"How do I get to the Spine Center?"

"What's on the café menu?"

"When is the next shuttle arriving?"

"Where can I get a coffee?"

"Where is a bathroom?"

- Lives on a Guest WiFi Network
- Uses familiar hardware devices
- No session information is saved
- Leveraged existing Wayfinding data
- Strategically located and clear signage
- New central device management
- Customized alerting and alarming
- Onsite IS support during pilot
- Usage reports and activity frequency
- Compliments Patient Experience Initiative

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Digital Transformation



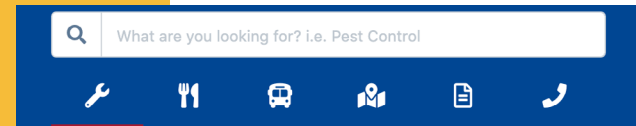
The iHub specializes in digitizing existing solutions when appropriate to enhance operations, the Brigham and Women's Hospital campus, and the patient and staff experience.



Brigham at its Best

Brigham at its Best is an employee facing mobile resource application built by the iHub as a quality improvement initiative. The application took into account surveyed employee needs and enables:

- + Reporting of spills, cleaning requests, and maintenance issues
- + Access to cafeteria menus and online ordering
- + Live shuttle tracking
- + Online paging directory
- + Additional employee resources



Brigham @ Its Best

Send a FixIt Request

Brigham at its Best screenshot.

Brigham Mobile Research Platform

The Brigham Mobile Research Platform was created by the iHub to allow researchers to unlock the potential of mobile devices to make discoveries and advance care.

Each study on the platform involves two key technology components:

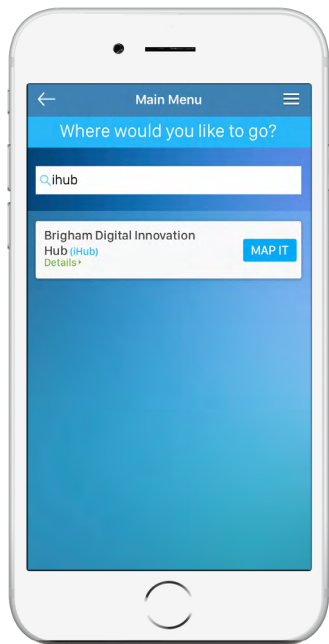
- + A researcher-friendly study administration tool
- + A customizable patient-facing mobile app

The platform is an ideal solution for studies of any size where off the shelf survey app solutions are too restrictive and where the risk, costs, and effort involved in custom development is not warranted.

<https://bwh-mhp.adkalpha.com/>

Maps

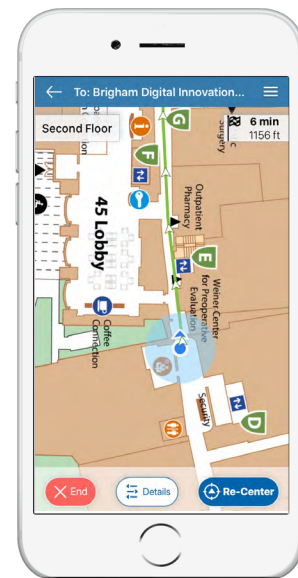
In collaboration with colleagues in real estate, patient access, information services, and marketing, in March 2018, the iHub developed and launched a maps portal for in hospital turn-by-turn directions. A website version has been released and a mobile version is in testing which will be able to pinpoint a users current location and direct them to another location at the Brigham.



“The wayfinding tool is another example of how Brigham is moving forward with technology that is designed to make life easier for our patients, their families, and our colleagues.”

Helen Thompson

Manager of Patient Access Services, Brigham and Women's Hospital



Services

The iHub works with entrepreneurs, innovators, digital health leaders and the healthcare community to foster a culture of innovation. iHub team members provide a variety of services within BWH and to the external community. Some of these activities are listed on the next page to provide a general sense of the role of the iHub. Services listed present a snapshot of iHub activities and are subject to change.

iHub Services

Ideation

Helping innovators formulate their ideas and concepts

Education

Providing education on healthcare innovation to medical residents and the healthcare community

Matching

Facilitating connections between entrepreneurs, innovators and digital health leaders

Coaching

Providing guidance to innovators to support and mature their ideas

Strategy & Analysis

Assisting innovators with developing business plans, strategy and market analysis

Development

Supporting innovators by refining their ideas and products

Implementation

Executing digital health pilots and testing innovative solutions

Validation

Assessing the accuracy of innovative solutions

Who We Are



The talented people advancing digital innovation and improving patient care in collaboration with iHub.



innovation hub 



Adam Landman

MD, MS, MIS, MHS

Chief Information Officer

Brigham Health

ADAM LANDMAN Chief Information Officer at Brigham Health, Associate Professor of Emergency Medicine at Harvard Medical School, and an attending emergency physician at Brigham and Women's Hospital. He is an expert in health information technology and digital health design, development and implementation. In his current role, he is responsible for developing strategic IT initiatives, with the goal of evolving the next generation of information systems and digital health solutions across the Brigham Health enterprise, while maintaining a focus on safety, security and excellence.



Santosh Mohan

MMCi

Managing Director

Brigham Digital
Innovation Hub

INTERESTS : Ecosystem Partnerships, App Marketplaces, APIs and Platform Plays, Emerging Technologies, User Digital Experience, Consumerism

EXPERIENCE / EDUCATION:

Managing Director of Brigham Digital Innovation Hub

Health care technology experience spanning provider (Duke, Stanford), product (Cerner, athenahealth), and consulting (The Advisory Board Company) domains

Track record of innovation and collaboration with design, build, and execution of programs, partnerships, products, and services to improve delivery and experience of patient care

Fellow of HIMSS (FHIMSS) and Certified Professional in Healthcare Information and Management Systems (CPHIMS)

Member and Past chairperson of HIMSS Innovation Committee; recipient of HIMSS Founders Leadership Award

Master of Management in Clinical Informatics from Duke University – The Fuqua School of Business and Bachelor of Technology in Bioinformatics from VIT University (India)



Mark Zhang

DO, MMSc

Medical Director

INTERESTS: Mobile Applications, Progressive Web Applications, Entrepreneurship, Palliative Care, Internet of Things

EXPERIENCE / EDUCATION:

Triple board certified - Internal Medicine, Palliative Care, Clinical Informatics

Associate Program Director - Partners Clinical Informatics Fellowship

Founder and first president of AMIA Clinical Informatics Fellows (ACIF)

Creator of Palliative Care Fast Facts - one of the most utilized palliative care reference applications in the world

Co-founder of Cake - a venture backed startup in digital advance care planning

Medical school - Lake Erie College of Osteopathic Medicine - Erie, PA.

Residency - Internal Medicine - Allegheny General Hospital,

Fellowship - Palliative Care - Mass General Hospital/DFCI,

Fellowship - Clinical Informatics Partners Healthcare



Chen Cao

MPH

**Innovation
Strategy
Manager**

INTERESTS: Access, Provider Well-Being, Emerging Technologies, UI/UX Design, Sustainability, Public Health

EXPERIENCE / EDUCATION:

Previous experience at academic medical center including the Brigham and Dana-Farber

Led social media and communication initiatives for sustainability@BU

Member of Boston University Young Alumni Council

Worked at Apple Retail Store

Disease Control in Humanitarian Crisis Intern, World Health Organization (WHO); supported coordination efforts at WHO Global Response Team in Geneva during Super Typhoon Haiyan.

MPH, Global Health and Program Management, Boston University School of Public Health; BA, Boston University



Caroline Coy

MPH

**Innovation
Strategy
Manager**

INTERESTS : Entrepreneurship, Patient and Staff Experience, Public Health

EXPERIENCE / EDUCATION:

Led strategic initiatives for the Office of the National Coordinator for Health IT (ONC), U.S. Department of Health and Human Services

Former Presidential Management Fellow at NIH and Policy Analyst at CDC

Previous experience working at an academic medical center and non-profit organizations to support mental health and children's health programs

MPH from Emory University, Rollins School of Public Health and BA from Case Western Reserve University



Mimi Dunn

**Innovation &
Operations
Analyst**

INTERESTS : Integrative Care, Microbiome & Nutrition, Patient Experience, Wearable Devices

EXPERIENCE / EDUCATION:

Worked as a technology consultant at IBM and held internships as a healthcare consultant and healthcare strategic markets analyst.

Studied Traditional Chinese Medicine in Shanghai, China

BA in Economics from University of Notre Dame



Don Gummow

**Innovation &
Operations
Analyst**

INTERESTS : Entrepreneurship, Mental Health, Process Improvement

EXPERIENCE / EDUCATION:

Built People Operations department and streamlined business processes as an Operations Manager at Affect Mental Health, an early-stage mental health focused startup incubator

BS in Computer Science from Boston College



Rintaro Sato

**Innovation &
Operations
Analyst**

INTERESTS : Artificial Intelligence (AI), International Health, Corporate Healthcare System Partnerships

EXPERIENCE / EDUCATION

Project Manager for AI consulting and development startup in Tokyo, worked directly with CEO to support talent, operations, marketing, client facing web projects and image recognition project management

Supported project management of enterprise-level system upgrades for a US State Department of Human Services as a Business Technology Analyst at Deloitte Consulting

BS in Information Systems with an additional major in International Relations and Politics from Carnegie Mellon University



Aaron Pikcilingis

**Innovation
Specialist**

INTERESTS : Health Equity, Social Determinants of Health, Patient Reported Outcomes/Data, Modular Use of Technology and Resources

EXPERIENCE / EDUCATION:

Led innovation design sprint teams and projects for ViiV Healthcare's hive innovation unit, devising and testing novel programs for people living with HIV

Key member of The Online Advocate team at Boston Children's Hospital, which developed, implemented, tested, and scaled multiple patient-focused technology projects

BA in Social Psychology from Skidmore College, focusing on the mechanisms and impacts of social stratification



Mary Schneider

MBA

**Innovation
Specialist**

INTERESTS : Clinical Innovation and Quality Improvement, Older Adult Healthcare, Research Administration and Healthcare Financial Management Research/Project Manager for the Division of Geriatric Medicine at BWH

EXPERIENCE / EDUCATION:

Finance /Business Manager on leadership team for the BWH Center for Clinical Investigation and research core services

Division Manager for the MA/RI Poison Control Center and Division of Toxicology at Boston Children's Hospital

Certified Research Administrator (CRA) Research Administrators Certification Council

MBA in Finance and Entrepreneurship from Babson College and a BA in Business Administration from the University of Vermont with a focus in Finance and Environmental Studies



iHub Alumni



Pothik Chatterjee, MA, MBA

Josh DiFrances, MBA

Josie Elias, MPH, MBA

Jeff Greenberg, MD, MBA

Beverly Hardy

Andrea Ippolito, MS

Cassandra Lee

Melissa Spinks Littlefield, MBA

Brian Mullen, MS, PhD

Siddarth Parmar, MD, MPH

Alexandra Pelletier, MBA

Lesley Solomon, MBA



**“I came for the free lunch and cookies
and got \$20,000.”**

Ritu R. Gill, MD

Radiologist

Our Portfolio

Since 2013, the iHub has focused on matchmaking market solutions with internal challenges, accelerating the development, use and commercialization of BWH-developed solutions, and fostering a culture of digital innovation and collaboration. Through these channels, the iHub has worked collaboratively with various Brigham clinicians, researchers, and staff to accelerate innovative ideas, while also partnering with external collaborators to address institutional initiatives and priorities. The highlighted projects showcase a selection of solutions supported by the iHub.



Virtual PSA Monitoring Program (VPSAM)

Lead:

Rich Boyajian, NP

Summary:

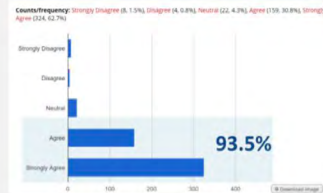
The Virtual PSA Monitoring Program (VPSAM) saves prostate cancer survivors travel time by leveraging technology to monitor for signs of recurring prostate cancer remotely using a combination of software and nurse practitioner lead remote encounters to provide care. Through VPSAM, patients get reminders to get their prostate-specific antigen (PSA) levels checked at participating sites closer to home. They also are monitored using a combination of telephone visits with a nurse practitioner and prostate cancer screening online questionnaires. Feedback from patients has been overwhelmingly positive: Over 90% of all patients questioned thought VPSAM made their healthcare easier, more convenient, and reduced travel related stress. Importantly, VPSAM virtual visits have increased the number of new patient slots within the department of radiation oncology, contributing to an overall increase in 15% gross revenue for the department since implementation.

How iHub Helped

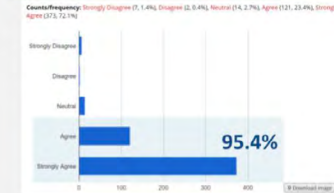
Ideation, Coaching, Strategy and Analysis, Development. BCRISP winner.

PATIENT SATISFACTION 537 post visit surveys have been returned by the participants and reflect overwhelming satisfaction with the program.

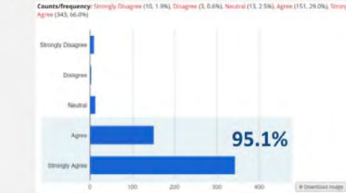
VPSAM made my health care easier



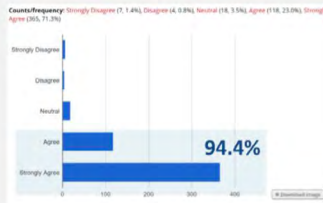
Important DF/BWH continue to monitor



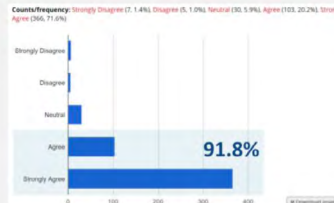
Comfortable with this form of PSA monitoring



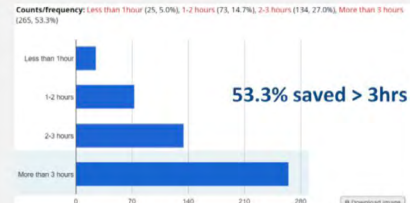
VPSAM more convenient



Reduced travel related stress



Amount of time saved



Hospital Voice Assistant Skill

Lead:

Steve Penney

Summary:

Navigating inside a busy hospital can be a stressful experience, with both patients and visitors often needing assistance knowing where to go and what to do. For a busy care-giving organization, this can be a difficult need to predict and consistently address. The Faulkner Voice Assistant is a voice based, in-hospital information guide which provides a new and interactive experience for hospital visitors, enabling them to ask information desk focused questions, through strategically placed smart speaker devices within the hospital. Created at Brigham Health, the Faulkner Voice Assistant is one example of how BWH iHub is exploring avenues to leverage voice technology to enhance the hospital experience.

How iHub Helped

Ideation, Coaching, Strategy and Analysis, Development, Implementation



Need Assistance?

Just Ask!

"I need directions."

"Do you have mother's room?"

"What's on the cafeteria menu?"

"I need to buy flowers."

Voice and Conversational AI Pain Management Tool (Briggie)

Lead:

Samir Tulebaev, MD

Summary:

Acute pain associated with surgical and diagnostic procedures remains inadequately managed and leads to adverse outcomes. Patient communication to nurses is often dependent on call buttons, which are one-way communication only and nurses can't confirm/set expectations for when they're coming. Dr. Samir Tulebaev and a team of inpatient nurses are working on Briggie, an integrated voice assistant being designed to augment nursing care by executing hourly comfort rounds at the bedside, increasing staff efficiency and enhancing patient engagement and experience. The prototype voice assistant will assess the patient's pain at regular intervals and will communicate results and nurse responses via speech to text conversion.

How iHub Helped

Coaching, Ideation, Matching, Development

Functional Pain Scale (FPS)

The FPS was developed to assess pain in older adults. It incorporates both subjective and objective components to assess pain, based on the pain's perceived tolerability and interference with functioning. The FPS is best used for older adults who are unable to self report pain level. The FPS may be superior to other approaches if visual or mild-moderate cognitive impairments are present.

0	2	4	6	8	10
No Pain	Activities <u>unaffected</u>	Prevents some active <u>activities</u>	Prevents all active, (not passive) <u>activities</u>	Prevents all passive activities	Incapacitated, unable to even speak due to pain
Active activities : usual activities or those requiring effort (turning, walking, etc) Passive activities: talking on phone, watching TV, reading					
Tolerable			Intolerable		



IV. Policy

BWH collects comprehensive data to identify/diagnose the patient's pain problems

Assessment of Persons with Pain:

- A comprehensive pain assessment will be completed for all patients by a licensed professional staff member within 24 hours of admission or sooner based on patient condition. This admission assessment will include a review of acute and chronic pain issues.
- Pain assessment for all outpatients will be completed as condition warrants and annually during their primary care visit.

Pain Management Policy
Administrative and Medical Staff Manual

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RA Voice Enabled Flare and ePRO Application

Lead:

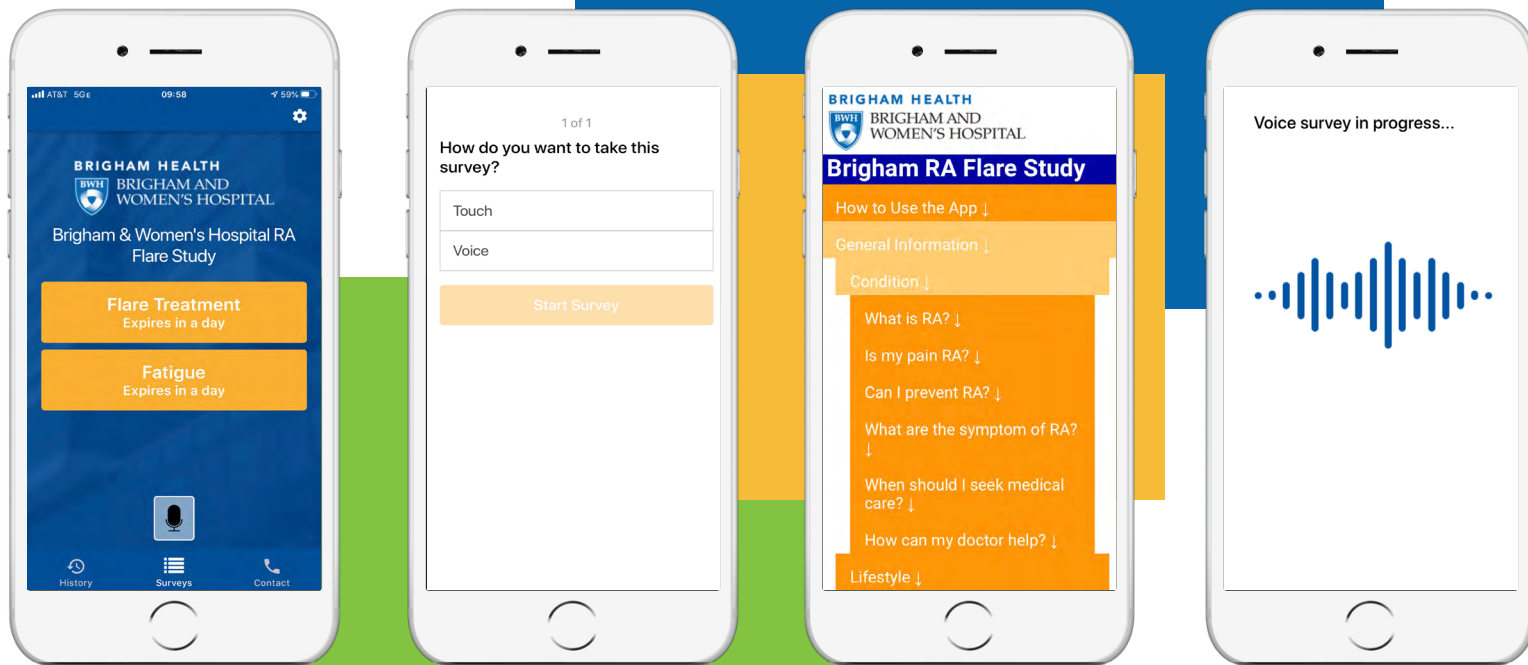
Dan Solomon, MD, MPH

Summary:

Built on the Brigham Mobile Research Platform, the Rheumatoid Arthritis (RA) application by Dr. Daniel Solomon helps Brigham patients and clinicians better manage chronic disease through the collection of Patient Reported Outcomes and enhanced patient-clinician communication. The iHub facilitated a collaboration between a pharmaceutical company, a voice startup (Orbita), and the BWH Division of Rheumatology to enable the creation of a voice-enabled interface for the RA app. Over 150 conversational pathways have been built to date, with ongoing continued development based on positive feedback for the prototype from patients and clinicians.

How iHub Helped

Ideation, Matching, Development, Implementation



Surgical Preparation and Recovery Guide (recoupERAS)

Lead:

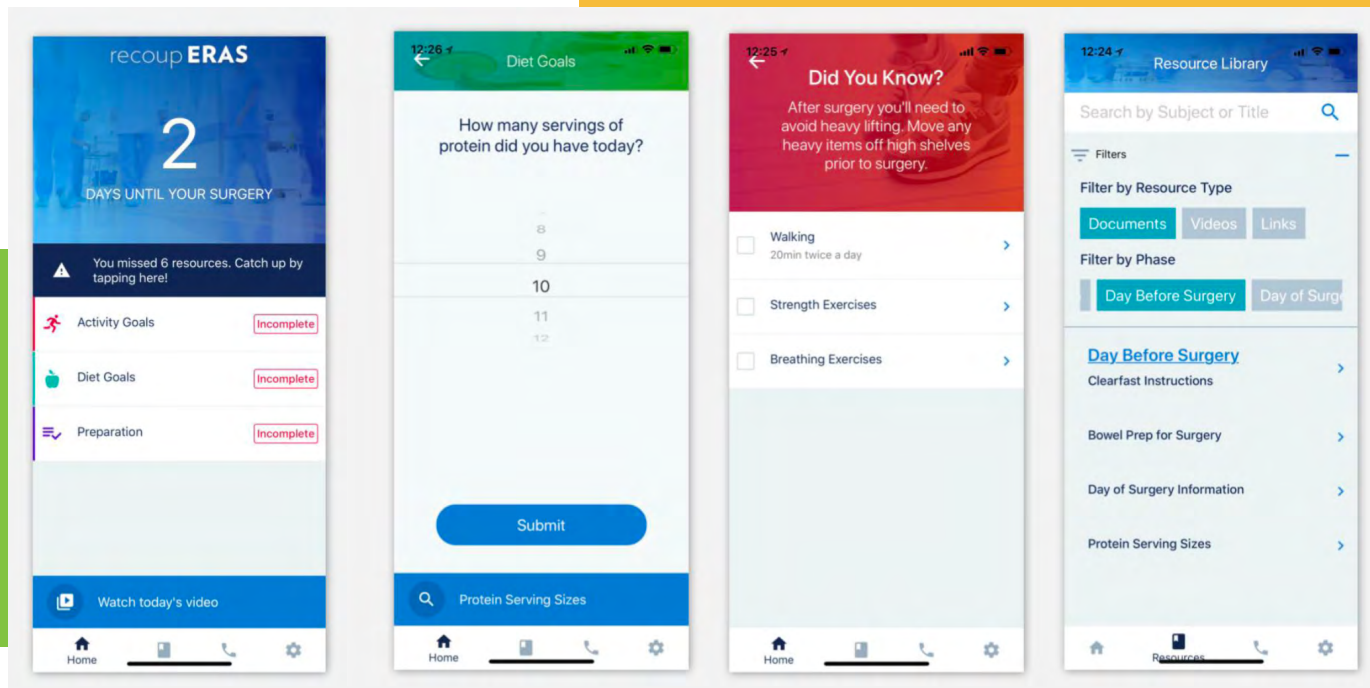
Kevin Elias, MD

Summary:

recoupERAS is a mobile app designed to help prepare patients for surgery, guide them through the hospital stay, and help them recover faster, safer, and more easily from surgery. The recoupERAS app is a coach, reference tool, and educational resource all in one. The recoupERAS app is part of the Brigham Enhanced Recovery After Surgery efforts (ERAS®) initiative with the goal to reduce post-operative complications, shorten length of stay, and reduce hospital costs for women undergoing surgery at BWH.

How iHub Helped

Coaching, Strategy and Analysis, Matching, Development. recoupERAS is built on top of BMRP



recoupERAS screenshot.

Social Platform to Address the Emotional Needs of Young Adults with Cancer (iaya)

Lead:

Karen Fasciano, PsyD, Katelyn MacDougall, MSW, LICSW
Paige Malinowski, Hanneke Poort, PhD

Summary:

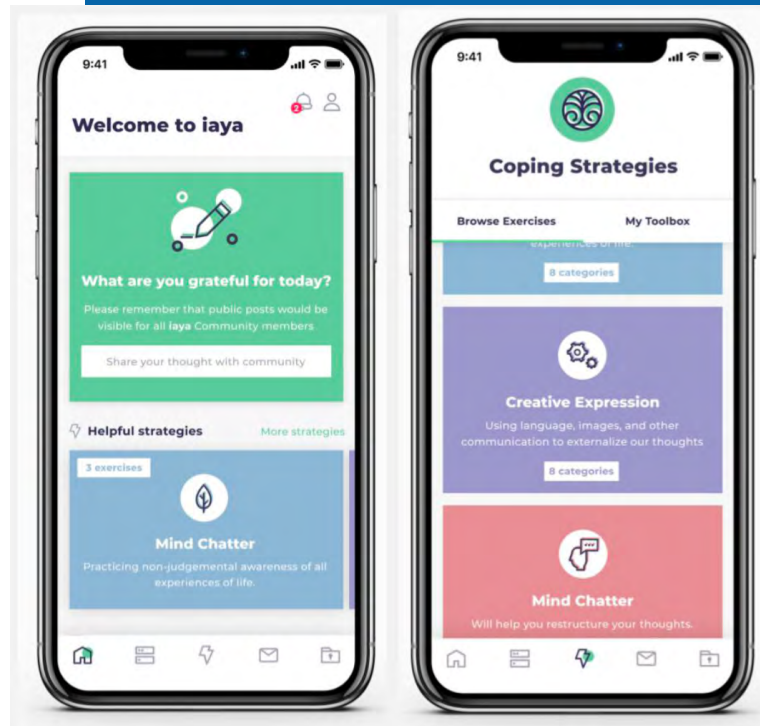
iaya is a smartphone application custom developed and launched within the BWH/DFCI network which addresses the emotional needs of young adults coping with cancer. iaya focuses on easing and understanding strong emotions, dealing with uncertainty, effectively communicating with caregivers, and helping with the feeling of being alone. Since initial development, the iaya team was awarded a \$500k grant to test the feasibility of the application.

How iHub Helped

Ideation, Matching, Coaching, Strategy and Analysis, Development

\$500k

Grant
Awarded



iaya screenshot.

Visual Tool to Understand Lumpectomy Outcomes (BeautyMarks)

Lead:

Esther Rhei, MD

Summary:

BeautyMarks provides a resource for both patients and clinicians to have a more informed discussion around lumpectomy surgery. This database holds various images of women's breasts after undergoing lumpectomy surgery, which the patient can then filter by skin color, size of breasts, tumor size, body weight, location, and patient demographics in order to help envision what their breasts could look like after surgery.

How iHub Helped

Ideation, Matching, Coaching, Strategy & Analysis, Development



**“A visual tool demystifying the
range of outcomes that result from
lumpectomy.”**



beautymarks

Internet of Things Buttons for Real Time Notifications in Hospital Operations

Lead:

Peter Chai, MD, Loay Kitmitto, CMIP

Mark Zhang, DO MMSc, Labina Shrestha, MM

Summary:

Internet of Things (IoT) programmable buttons were deployed throughout the hospital to explore use cases for this technology. The IoT buttons, based off of the Amazon IoT button technology, were deployed by Dr. Chai, the Brigham Environmental Services, and the iHub to give Brigham and Women's Hospital visitors a way to alert staff when a public bathroom needed service.

Other use cases explored included re-stocking wheelchair depots in public areas, alerting when hand sanitizers needed to be refilled, and using IoT buttons to alert staff that radiology is needed within BWH operating rooms.

How iHub Helped

Ideation, Strategy and Development, Implementation, Validation



“There are a lot of simple, repetitive tasks that occur in a hospital that rely on human intervention. When you can just push a button that sets into motion a series of events, it becomes much easier and faster to accomplish them, leading to a better experience for patients and employees.”

Dr. Peter Chai

Making the Virtual Biopsy a Reality (BrainSpec)

Lead:

Alexander Lin, PhD

Summary:

Brainspec is a secure cloud-based software platform that provides a “virtual biopsy” using Magnetic Resonance Spectroscopy (MRS). Brainspec combines the latest in processing technology with an intuitive and accessible interface to put all the power of MR spectroscopy in the hands of doctors everywhere. Each scanning protocol comes with a complete set of automatic reports generated for each examined case, bringing together the most important information from the exam in one easy to reference place.

Brainspec was formed in 2015 after a BWH iHub lead brainstorming session. The idea ultimately was spun out of Brigham Health and was part of the 2017 Techstars Boston cohort.

How iHub Helped

Ideation, Matching, Coaching, Strategy and Analysis



BRAINSPEC

MAKING THE VIRTUAL BIOPSY A REALITY

www.brainspecmed.com

\$1.8million

in Funding

Medical Role Playing Video Game (Healer)

Lead:

Raja-Elie Abdulnour, MD

Summary:

The idea originally started from the Pulmonary Innovation Series held by the Brigham Digital Innovation Hub in May 2014. Dr. Abdulnour wanted to create an educational role-playing medical video game for Continuing Medical Education (CME) credit. This ultimately became known as The Healer project. The Healer project received funding from The New England Journal of Medicine.

How iHub Helped

Ideation, Coaching



Healer screenshot.

Smartphone-Based Semen Quality Analysis for At-Home Male Fertility Assessments

Lead:

Hadi Shafiee, PhD, John Petrozza, MD

Charles Bormann, PhD

Manoj Kumar Kanakasabapathy, MTech

Summary:

Although male infertility is as common as female infertility, it often goes undiagnosed because of socioeconomic factors such as stigma, high cost of testing, and availability of laboratory facilities.

Dr. Shafiee and his team developed a smartphone based system for semen analysis that can be used to facilitate testing at home or in a remote clinic without access to laboratory equipment. The approach uses an inexpensive device that attaches directly to a phone and is operated through a smartphone application that automatically measures the vital statistics.

The system performed as well as clinical systems when tested by both trained and untrained users and is being used for human infertility, vasectomy testing, general health monitoring, and animal husbandry. The findings have been published in the Science Translational Medicine Medical Journal.

How iHub Helped

Coaching, Matching, Strategy and Analysis, Fundraising

OUR SOLUTION



Brigham Comprehensive Opioid Response Education Program (B-CORE)

Lead:

Scott Weiner, MD, MPH

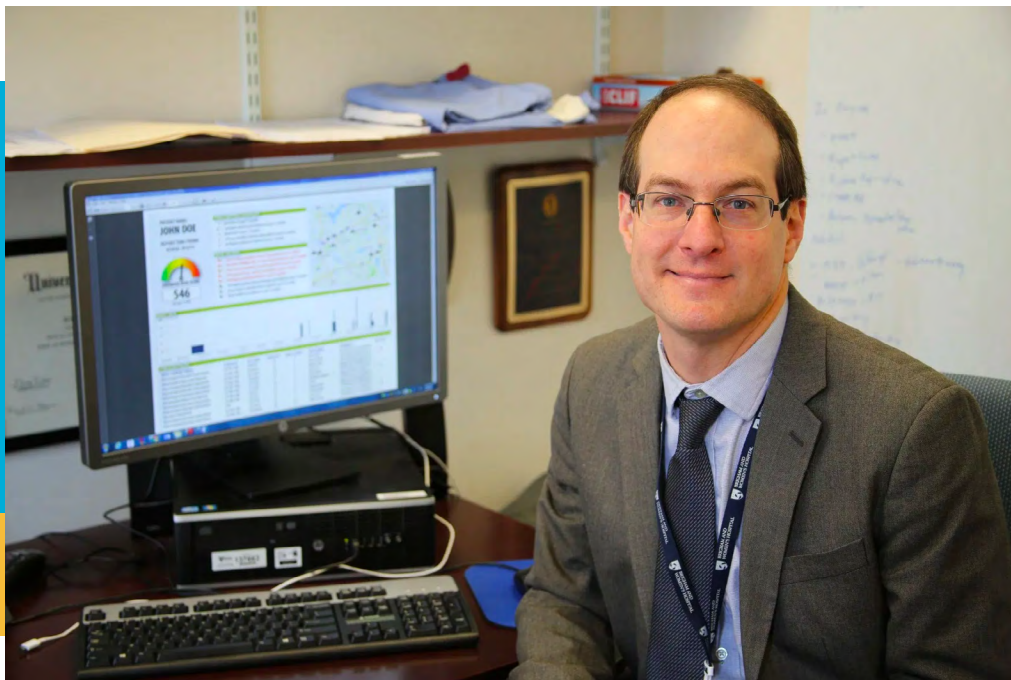
Summary:

The U.S is in the midst of an opioid epidemic, and Massachusetts has suffered disproportionately. In response, we have launched the Brigham Comprehensive Response and Education (B-CORE) Program. This program is designed to serve the entire Brigham and Women's Hospital system to address all aspects of opioids as they relate to patients and our community.

In close collaboration with the iHub, B-CORE launched the Opioid and Pain Innovation Program, a multi-disciplinary, multi-specialty endeavor to facilitate research and innovation for academicians from across the Brigham who are working hard to address the epidemic.

How iHub Helped

Coaching, Strategy and Analysis



Scott Weiner, MD, MPH

The Augmented and Virtual Reality in Oncology Lab (DICOM VR)

Lead:

Christopher Williams, PhD

Summary:

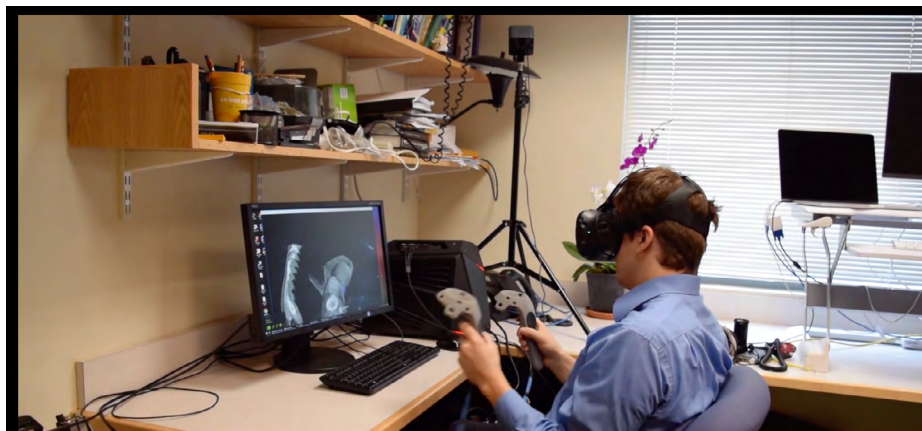
The DICOM VR team has developed a cutting-edge platform for fast and efficient viewing and manipulation of standard 3D medical scans such as CT, MRI or ultrasound using a virtual reality interface. Their goal is to create safer radiation therapy and surgical plans for patients undergoing cancer treatment.

This system enables:

- + Standard volumetric imaging scans to be viewed and manipulated in a fully intuitive room-scale 3D environment
- + Multiple users to interactively work in the same virtual environment from different locations
- + Modules for medical education and patient engagement

How iHub Helped

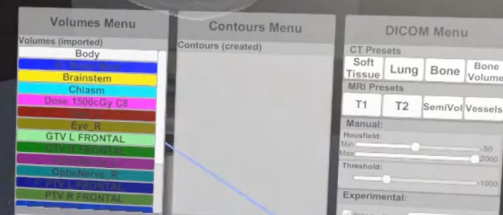
Ideation, Coaching, Strategy and Analysis, Matching to funds



You are now working with **medical imaging** in **virtual reality**!

<http://dicomvr.com/>

All structures can be **toggled** on/off in the **main** menu



Intelligent Platform to Guide, Track, and Triage Patients (Medumo)

Lead:

Jennifer Naylor, MD

Summary:

A startup co-founded by a BWH resident, Medumo utilizes a multichannel approach including SMS, phone, paper mailings to reach patients at every step in their care. The iHub was an early sponsor of Medumo including championing the company in MassChallenge HealthTech. iHub supported the key validation pilot study at BWH in colonoscopy appointment reminders, demonstrating ROI using the Medumo solution. Medumo has since been acquired by Royal Philips.

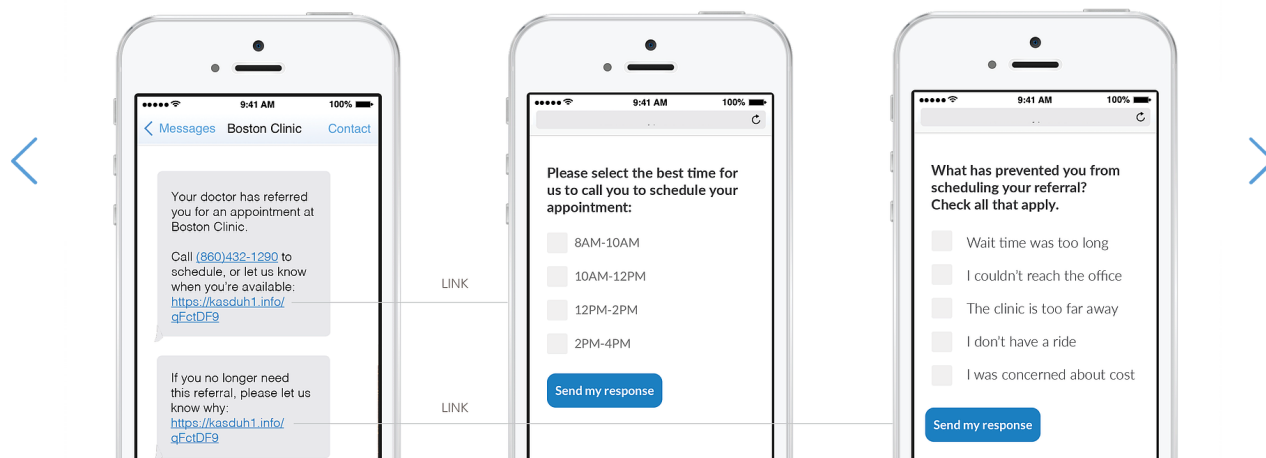
How iHub Helped

Coaching, Strategy and Analysis, Implementation, Validation, Matching

MEDUMO

SAMPLE REFERRAL MESSAGES

sent immediately after a referral



Screenshot of MEDUMO app.

Platform to Streamline Workflows and Accelerate Care for EMS and ED Teams (Twiage)

Lead:

YiDing Yu, MD

Summary:

Founded by former BWH Internal Medicine resident, YiDing Yu, MD at a Brigham iHub Hackathon, Twiage has grown significantly from that initial idea. Twiage is an advanced cloud-based platform that uses best-in-class security technology to put telemedicine at the fingertips of emergency first responders and physicians to accelerate life-saving patient care.

By giving hospitals a complete picture of all incoming ambulances in one central location, Twiage helps hospitals efficiently manage resources for stroke, heart attack, sepsis, and trauma to save time, save money, and save lives.

How iHub Helped

Ideation, Coaching, Strategy and Analysis



Screenshot of Twiage app.

Platform Delivering Intelligent Workflows and Care Delivery Processes (Herald Health)

Lead:

Brad Diephuis, MD, MBA

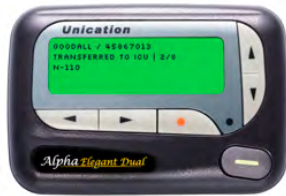
Summary:

Herald Health aims to help providers deliver responsive care with actionable data. The platform flexibly integrates with and plugs into existing workflows and data streams, sending important, timely and customizable information through push notifications, such as meaningful changes in medical profiles.

Dr. Diephuis started his journey as a computer scientist and an Internal Medicine resident here at Brigham and Women's Hospital, positioning himself as a unique and enterprising innovator with a knack for spotting pain points. He co-founded and launched Herald Health in 2015 during the third iHub Hackathon. Herald Health was acquired by Persistent Systems in 2018.

How iHub Helped

Ideation, Coaching, Matching, Strategy and Analysis, Development, Implementation, Validation



EVENTS		
No filters applied		
47624222 Hoffman	May require home VNA Chief complaint of fall and age > 60	09/13 16:06:31
13234823 Ocampo	Frequent ED Utilizer 4 ED visits in past 14 days	09/13 16:05:31

Screenshot of Herald Health screens.



“Sometimes ideas can just sit in notebooks for a long time, but being a part of the Brigham community really gave us the ability to bring the right people together in order to bring Herald Health to life,” explains Diephuis.

“Being part of the Hackathon gave us access to connect with the Brigham Digital Innovation Hub, and to receive the Health IT mentorship and perspective from Adam Landman, MD, CIO of Brigham Health. They were able to guide us and tell us if this idea was worth it.”

An Artificial Intelligence System for Brain Tumor Frozen Section Diagnosis

Lead:

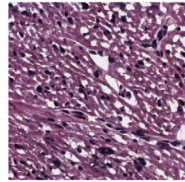
Jeffrey A. Golden, MD

Summary:

Dr. Jeffrey Golden and his team wanted to develop an AI system that employs state-of-the-art machine learning methods to diagnose frozen sections of brain tumor tissues. Doing this would help enable an accurate and real-time histopathology evaluation of the frozen tissue section to determine the optimal surgical intervention during brain cancer tumor removal.

How iHub Helped

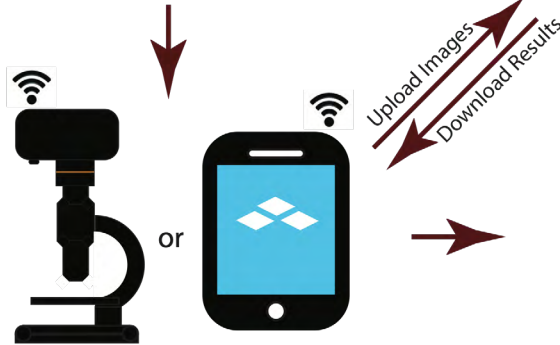
The iHub's Schlager Family Award for Early Stage Digital Health innovation enabled them to extend the AI platform to analyze frozen section slides and evaluate its clinical utility. Members of iHub also helped with consultation and presentation direction before award series.



Frozen Section
of the Brain



Machine-Learning Based
Artificial Intelligence Cloud System



Digitalize the Image through
a Microscope Camera or
a Smartphone App

Recommendations and
Decision Support

Virtual Teaching Sets for Digital Pathology Education

Lead:

Scott B. Lovitch, MD, PhD

Summary:

Pathology education has not kept pace with advances in educational technology due to the logistical constraints of physical access to a microscope. Dr. Lovitch believed Virtual Microscopy (VM), which replicates the experience of using a physical microscope in digital form, could potentially alleviate these educational constraints.

Dr. Lovitch and team developed annotated virtual slide sets coupled with online modules for self-directed learning and assessment as digital tools for pathology education. These materials will be accessible to any learner with an Internet-connected device, including smartphones and tablets.

How iHub Helped

The Schlager Family Award for Early Stage Digital Health Innovation has enabled Lovitch to significantly scale his efforts and begin scanning large numbers of virtual slides.



Electronic Tablet Based System to Automate Obtaining & Documenting Individualized Symptom Descriptions

Lead:

Jennifer Shin, MD, SM

Summary:

Currently patients visit physicians to discuss the solutions for their problems, but lose one-third of their time together to symptom descriptions. Although time consuming and a major contributor to physician burnout, symptom documentation remains necessary. Dr. Shin wanted to create a system that would document symptoms prior to the in person appointment.

The tablet-based system enables a virtual patient interview in advance of a face-to-face visit. It asks adaptive questions, based on patients' ongoing responses, then completes the clinicians' documentation for them. This frontline system makes clinical interactions more efficient and enables visits to be focused on discussing the patient's needs instead of their symptoms.

How iHub Helped

Coaching, Strategy and Analysis, Matching, Development

During your previous visit, sinus infection or nasal drainage was your chief complaint. Is this a follow up appointment or do you have a new issue?

Your last visit was 11/9/18

Follow up New Issue

Please confirm your birth month and year

MONTH YEAR

Please Select 1990

NEXT →

Screenshot of Wireframe from Ongoing Development.



Simple, Scalable Healthcare Data Exchange (Redox)

Lead:

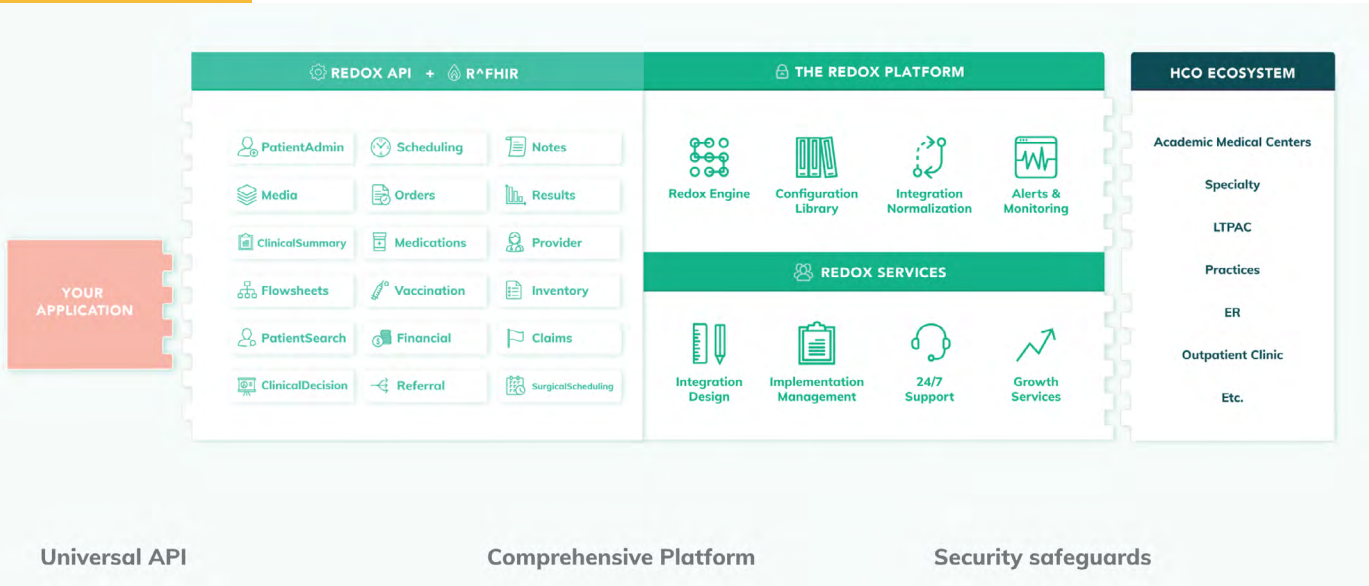
Jay Cheung, MBA
David Miles
Solomon Shafer

Summary:

Redox enables an API layer on top of the EMR and other data sources. The iHub sponsored Redox as a MassChallenge HealthTech Champion. BWH was the first Academic Medical Center to implement the Redox Engine as an API layer for healthcare applications.

How iHub Helped

Matching, Implementation, Validation



Screenshot of Redox API.



Surgical Scheduling Platform for Medical Device Vendors (TORq)

Lead:

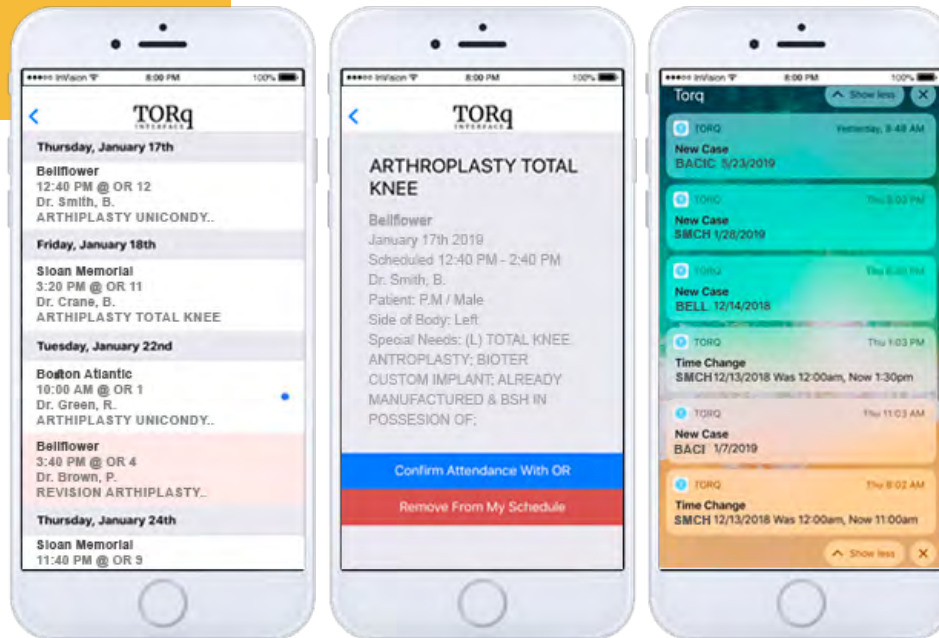
Paul Riley

Summary:

TORq is a HIPAA-compliant platform that connects medical device reps and hospitals during surgical planning. The iHub sponsored TORq as a MassChallenge HealthTech Champion. BWH was the first hospital to test and validate TORq.

How iHub Helped

Coaching, Development, Matching, Implementation, Validation



TORq
Interface

Screenshot of TORq Interface



Indoor Wayfinding Solution (LogicJunction)

Lead:

Mark Zhang, DO, MMSc

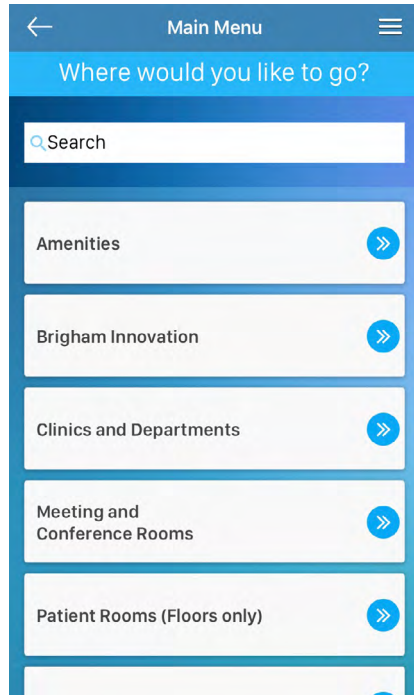
Josie Elias, MPH, MBA

Summary:

LogicJunction provides scalable indoor navigation systems. iHub team worked closely with Logic Junction to enable online wayfinding tools at Brigham and Women's hospital and Brigham and Women's Faulkner Hospital.

How iHub Helped

Strategy and Analysis, Implementation, Validation



Main Menu screenshot.



iHub Map screenshot.

Conversational AI for Healthcare (Orbita)

Lead:

Steve Penney

Summary:

Orbita helps healthcare organizations utilize voice assistants, chatbots, and other conversational AI technologies to engage patients, improve care, and reduce costs. The iHub supported multiple internal innovators in the utilization of the Orbita platform to create exploratory conversational AI based clinical and research tools.

How iHub Helped

Matching, Implementation, Validation



Screenshot of Orbita Solution



Community

BRIGHAM HEALTH
BRIGHAM AND
WOMEN'S HOSPITAL

innovation hub 

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