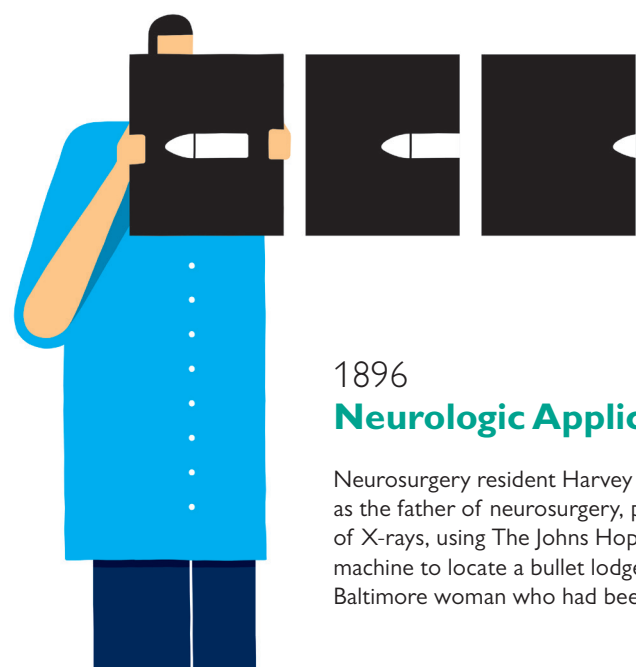


125 Years of Innovation

1893–2018



Welcome to a special issue of *Insight* celebrating 125 years of discovery and innovation at the Johns Hopkins University School of Medicine. While *Insight* usually highlights recent innovations and technology, the 125th anniversary of the school of medicine is a great time to look back at some of the innovations since 1893.



1896

Neurologic Application of X-rays

Neurosurgery resident Harvey Cushing, who would later become known as the father of neurosurgery, performs the first neurologic application of X-rays, using The Johns Hopkins Hospital's first, hand-cranked X-ray machine to locate a bullet lodged in the sixth cervical vertebra of a Baltimore woman who had been shot.

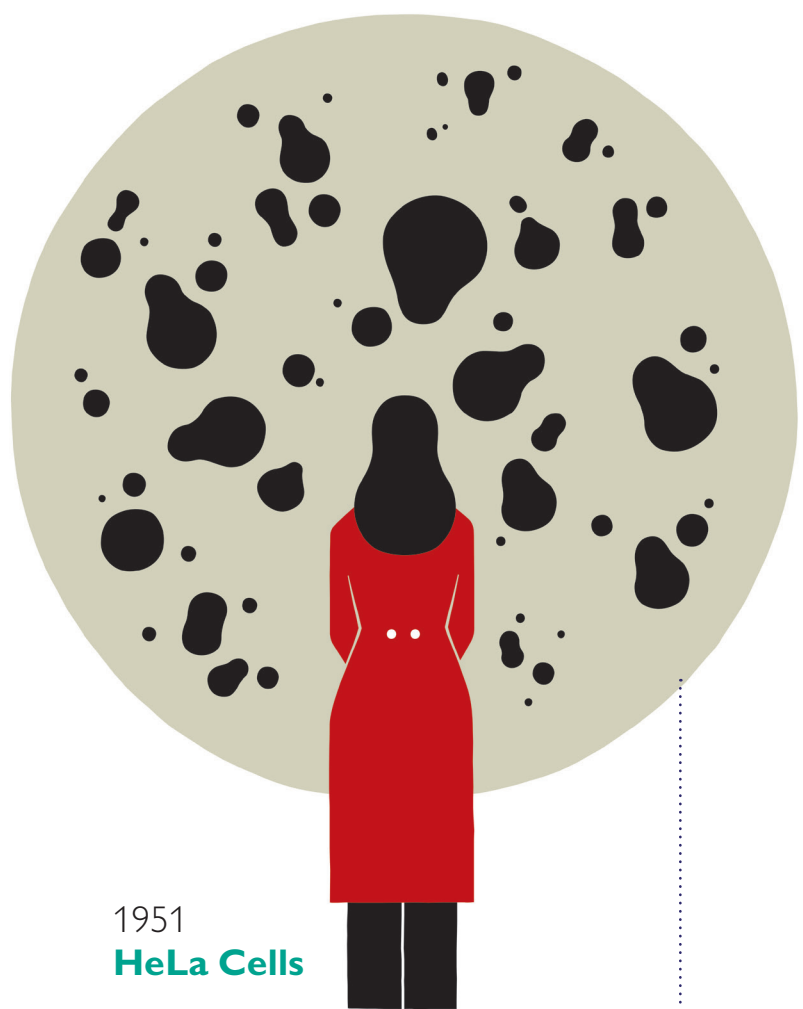


MARTIN LEON BARRETO / MARLENA AGENCY

1923

Postoperative Intensive Care Unit

Neurosurgeon Walter Dandy establishes what is considered the forerunner of today's intensive care units. He creates a 24-hour, specialized nursing unit where critically ill neurosurgical patients receive specialty care and recover after surgery.



1951

HeLa Cells

George Gey, director of the Department of Surgery's tissue culture laboratory, establishes the world's first continuously multiplying human cell culture—HeLa—with cervical cancer cells obtained from Henrietta Lacks. Gey distributes the HeLa cells for free to scientific researchers worldwide. Over the next 60 years, they prove instrumental in development of the polio vaccine, human papillomavirus (HPV) vaccines, chemotherapy breakthroughs, cloning, gene mapping, in vitro fertilization and landmark research on HIV and tuberculosis.

1968

Discovery of Restriction Enzymes

Microbiologist Hamilton O. Smith discovers restriction enzymes, the proteins that can cut DNA at precise points in its genetic sequence. Microbiologist Daniel Nathans uses the discovery to analyze the DNA of a virus that causes cancer in animals, achieving the first practical application of restriction enzymes. These accomplishments, along with Swiss microbiologist Werner Arber's initial theorizing on the existence of restriction enzymes, would earn the trio the 1978 Nobel Prize in Medicine.



1993

The Immune System As Medicine

Scientists at Johns Hopkins find that mistakes in so-called mismatch repair genes, first identified by scientists at Johns Hopkins and elsewhere two decades before, may accurately predict who will respond to certain immunotherapy drugs known as PD-1 inhibitors. Such drugs aim to disarm systems developed by cancer cells to evade detection and destruction by immune system cells. In 2017, a drug was FDA-approved for cancer treatment when genetic testing reveals defects in mismatch repair genes.





A look at innovative developments outside the halls of Johns Hopkins Medicine

Apps for Mental Health

Developed by a team of Stanford psychologists, **Woebot chats with people about their day via text message.**

The chatbot offers conversation prompts, videos and other tools in a format modeled on cognitive behavioral therapy to encourage positive thinking. As more language data is collected and processed, Woebot's responses become increasingly personalized; should it detect the user is in crisis, it refers the person to real-world resources. 🗣️

The IntelliCare collection provides 13 apps so users can customize a therapy program for their unique mental health needs. Each app was developed by researchers at Northwestern University to target specific symptoms linked to anxiety and depression. Users can work on their sleep problems with IntelliCare's Slumber Time sleep diary, for example, or manage obsessive thinking through exercises in the Worry Knot app. 🗣️

Created by a Buddhist monk, **Headspace brings mindfulness to the user's pocket through guided meditations, articles and videos.**

Meditation is linked to numerous mental and physical health benefits such as reduced stress, lower blood pressure and better regulation of thoughts and emotions. Headspace offers motivation to maintain a meditation practice by "gamifying" the experience and awarding badges for usage streaks. The app is subscription-based and has millions of users in more than 190 countries. 🗣️

Website Hosts 45-Plus Johns Hopkins Apps



Clinical mobile app use continues to grow, with more than 100,000 new medical apps entering the market annually. To present the collection of clinical mobile apps from Johns Hopkins, the Internet Strategy and Web Services division of Marketing and Communications worked with the Technology Innovation Center (TIC) to establish a central listing on hopkinsmedicine.org.



"Web visitors can discover apps intended for general health, clinical use or academic learning, gain a basic understanding of their purpose and functionality and download them directly from the major app stores," says Aaron Watkins, senior director of internet strategy and digital content marketing, strategic marketing and outreach.

The listing was created to integrate the apps developed by faculty and staff members and the TIC, an entity that provides design and software engineering services for building and deploying clinical information systems across Johns Hopkins Medicine.

The site also has a place for app creators to submit their Johns Hopkins apps for inclusion on the site.

"It's an organic project and we hope to update the site as new apps are released," says Watkins.

Once an app has been approved by the newly formed App Review Committee, the TIC will perform a technical review. The internet strategy team will then list the app on the site.

As of November 2017, there were more than 45 Johns Hopkins apps on the site for health care providers, students, patients and caregivers.

An example for providers is an app to help diagnose and treat psychiatric conditions. It puts hundreds of pages of clinical information in one app. For students, there is an app for practicing the use of a stethoscope to diagnose heart diseases. Patients and caregivers can find apps tracking symptoms of epilepsy or mood.

Check out the clinical mobile apps from Johns Hopkins at hopkinsmedicine.org/apps.

Patients Can Now Schedule Video Visits in MyChart



Upgrades to both Epic and MyChart are making it easier for Johns Hopkins Community Physicians providers to offer videoconferencing appointments to their patients. Since March 2017, patients have been scheduling video visit appointments through MyChart.

It's designed to be no different than scheduling a traditional medical appointment. "It's just another way we are delivering care," says Cindy Diaz, manager of systems development in the Office of Information Technology.

Patients who have a computer or smartphone can choose a video visit, while staff members use the exact same workflows in Epic as if they were seeing the patient in person, says Diaz.

Currently, the appointments are limited to medication monitoring and treating conditions such as rash, vomiting, diarrhea, anxiety and depression, because providers are comfortable discussing and treating such conditions via telecommunications, says Rebecca Canino, administrative



director of the Johns Hopkins Medicine Office of Telemedicine. If someone has an earache or sore throat, the provider would prefer to see the patient in person.

In order to schedule video visits in MyChart, patients must have a participating provider who

they have seen within the last 18 months, and they must live in Maryland and have insurance that covers telemedicine.

Prior to an appointment, the patient tests the device to ensure it is ready. On the day of the visit, the patient logs in to MyChart to attend the

video visit. Clinic staff members greet the patient, complete registration and then connect the patient to the doctor.

Since July 2016, this and other Johns Hopkins telemedicine programs have connected patients to physicians more than 6,000 times.