The human brain is an unimaginably complex organ. It contains 100 billion neurons—the same number as there are stars in our galaxy; these neurons are surrounded, sustained, and supported by at least as many, possibly trillions, of glial cells. Perceived as “command central” for the body, the brain controls virtually everything we do, from voluntary activities such as playing sports to involuntary ones such as breathing and regulating body temperature. We depend, utterly and completely, on our brain.
Brain and spinal diseases exact a tremendous toll on individuals and society. Approximately 17,000 people in the United States are diagnosed with primary brain cancer each year; many more are diagnosed with tumors that have metastasized to the brain from elsewhere in the body. Stroke, for example, is the leading cause of serious, long-term disability in our country, impacting not only the patient but also family, friends, neighbors, and other loved ones. Chronic pain is a devastating condition that impairs one’s ability to work, perform simple daily tasks, and to live a normal life. Each year, an estimated 1.7 million people sustain a traumatic brain injury, and 52,000 of these individuals die. These high-impact conditions and devastating events are the domain of Neurosurgery.

THE CHALLENGES OF BRAIN SURGERY ARE DAUNTING…

When something goes wrong in the brain—such as a brain tumor, stroke, traumatic head injury—we look to medical experts to rescue us. Brain surgery is the only hope for patients with certain conditions including aggressive brain tumors, blood clots in the brain, cerebral bleeding or infection, and cerebral aneurysm. Neurosurgery also offers hope for patients facing intractable symptoms such as severe nerve or facial pain (such as trigeminal neuralgia), and it is used to implant electronic devices for certain otherwise untreatable brain diseases (notably Parkinson’s Disease or severe epilepsy).

RISING TO THE CHALLENGE

A CALL TO ACTION

Rising to the Challenge: The Campaign for Johns Hopkins will raise unprecedented levels of support to attract, sustain, and further empower the people of Johns Hopkins—our students, faculty, and researchers—who through their work improve the lives of millions around the world. Together with our philanthropic partners we will:

ADVANCE DISCOVERY AND CREATIVITY through support of our exceptional faculty and researchers. Their innovative work drives the development of new knowledge, new forms of expression, and new ways to save lives and improve health, and furthers progress across our core disciplines in science and technology, the humanities and arts, and public health and medicine.

ENRICH THE STUDENT EXPERIENCE by investing in scholarships and fellowships, inspirational spaces for collaborative learning and social opportunities, and new programs that will enhance student-faculty interactions, ensure diversity on campus, link learning in the classroom to life after graduation, and strengthen connections between our students and our surrounding communities.

SOLVE GLOBAL PROBLEMS AS ONE UNIVERSITY by creating new cross-disciplinary solutions in crucial areas such as sustaining global water resources, revitalizing America’s cities, advancing individualized and population health, and understanding how we learn and teach.

The Johns Hopkins Department of Neurosurgery is committed to playing a key role in the success of the campaign. Please join with us in this important mission.
New, sophisticated technologies are allowing our faculty to make rapid progress, indeed breakthroughs, in brain research and neurosurgical operations.
**THE JOHN HOPKINS DEPARTMENT OF NEUROSURGERY**

**RISING TO THE CHALLENGE**

**W. STANLEY ANDERSON, A PHYSICIST-TURNED-PHYSICIAN, HAS STUDIED A DEVICE CALLED NEUROPACE THAT SHORT-CIRCUITS EPILEPTIC SEIZURES BY DETECTING ABNORMAL ELECTRICAL PATTERNS IN THE BRAIN.**

**IMPROVING PATIENT CARE**

Providing the best possible patient care is the motivating force behind all efforts in the Department of Neurosurgery. We are continually seeking ways, through research and patient-centered supportive care, to optimize patients' outcomes and experiences. For example, we recently established a Neurosurgery Access Center (akin to an enhanced “call center”), the mission of which is to improve efficiency of and access to neurosurgical care. The Center streamlines the interface between patients, referring physicians, and surgeon-scientists in Hopkins Neurosurgery. It will design and implement patient safety initiatives in the Hopkins operating rooms, intensive care unit (ICU), emergency department, radiology, and neurosurgery inpatient service. And it will disseminate discoveries made at Hopkins to other corners of the world, coordinate neuroscience teaching programs worldwide, and conduct global neurosurgical medical missions to underserved areas.

**SUPPORTING OUR SCIENTISTS**

Endowed chairs are the most coveted of positions in academic medicine, for they allow the holders to truly focus on their work, to plunge into their research with undiluted vigor, and to devote time to their students and trainees. We aim to establish a series of endowed professorships, for clinical and research divisions in Neurosurgery. These endowed chairs will allow our most brilliant and accomplished faculty the freedom to lead, engage in research, innovate and discover, and teach, mentor, and train junior neurosurgeons, while providing excellent patient care.

**CREATING THE BEST POSSIBLE RESEARCH ENVIRONMENT**

Research flourishes when outstanding scientists are provided with the resources, facilities, and support to think freely and expansively, and when they have at their disposal all of the “tools” necessary to explore, experiment, study, and test novel ideas. An optimal scientific environment is thus a critical ingredient to research success in neurosurgery.

**LABORATORY SPACE.** Our growing research programs need additional laboratory space, in order to move forward with research that we believe holds greatest promise for advancing the science underlying neurosurgery. We envision new or improved, state-of-the-art spaces at our East Baltimore, Bayview, Suburban, and Sibley campuses.

**INSTITUTES AND CENTERS.** To spearhead brain research in the most productive way possible, we plan to establish or expand the following research institutes and centers focused on neuroscience. Each one of these entities represents a multi-disciplinary research powerhouse with potential for global impact. Their core functions will be to conduct leading research, promote interaction and collaboration among investigators, synergize with other centers, support young researchers, aid in the development of new technologies, and pioneer new and promising treatment approaches for neurosurgical diseases.

- **The Johns Hopkins Comprehensive Brain Tumor Center** is one of the largest brain tumor treatment and research centers in the world. Our multi-disciplinary faculty is internationally renowned for their expertise in providing individualized care to patients with all types of brain tumors. Work within the Brain Tumor Center is organized by specialized Centers of Excellence, each devoted to a specific tumor type or neurosurgical approach. We seek philanthropic funds to support significant progress in five Centers of Excellence, which are focused on: glioma, meningioma, metastatic brain cancer, skull base tumor, and pituitary tumor.

**The concept of Neurosurgery began at Johns Hopkins.**
In the same place where modern medicine was born, the concept of Neurosurgery also began and took root. In being first to surgically—and successfully—remove a human brain tumor, Hopkins surgeon Harvey Cushing single-handedly ushered in the field of modern neurosurgery. From that time forward, Johns Hopkins neuroscientists have led the field with advances in research, new teaching techniques, and improvements in patient care.

Today, our scientists are on the cusp of numerous breakthroughs:

- Novel medication delivery systems, such as ones using microchips and nanotechnology
- Modification of brain stem cells such that they seek out and destroy tumor cells
- Treatment for chronic pain through stimulation of the brain from outside the scalp
- Creation of less invasive surgical procedures such as endoscopy skull base surgery where tumors are removed through the nose
- Control of blood cells that threaten the brain, using compounds that counter inflammation and help prevent stroke
- Personalized brain tumor vaccines
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STROKES AND ANEURYSMS: We developed a new surgical method that allows for the clipping of aneurysms on both sides of the brain; this allows patients to undergo only one operation, instead of two. We also developed nitric oxide-releasing polymers which can be used to potentially decrease blood vessel spasms and strokes after subarachnoid hemorrhage.

NERVE TUMORS: We developed surgical techniques that remove extremely painful nerve tumors. We invented techniques to repair damaged nerves by splicing in nerves from an arm or leg to restore some, and sometimes all, of the otherwise lost function. Thanks to this procedure, some patients who were told they would never walk again are now able to do so.

HYDROCEPHALUS: We enhanced a life-saving medical device—an antibiotic-impregnated shunt used to treat pediatric hydrocephalus. This invention cut the procedure’s infection rate to almost zero.

Philanthropic investments will lead to further breakthroughs in scientific understanding, and to the development of new neurosurgical treatments.

PHILANTHROPY PLAYS A CRITICAL ROLE
Philanthropy can catalyze scientific and clinical breakthroughs. The breakthroughs in Neurosurgery highlighted below were directly supported by private philanthropy during our last capital campaign.

BRAIN TUMORS: We developed a dime-size polymer wafer that can be implanted in the brain to release chemotherapy directly to malignant cells. This innovation minimizes side effects, allows the strongest possible treatment to be applied right to the tumor, and vastly improves patients’ chances for survival.

HYDROCEPHALUS: We enhanced a life-saving medical device—an antibiotic-impregnated shunt used to treat pediatric hydrocephalus. This invention cut the procedure’s infection rate to almost zero.

Our knowledge of the brain is still limited, but thanks to amazing technologies and brilliant minds, we are learning fast. In increasing our knowledge, there is no more vital area to explore than the brain. Philanthropic support will enable us to move nimbly and creatively, to rapidly advance the science, and to bring new discoveries into clinical practice—to help the many thousands of people affected each year by spinal, nerve, and brain-related diseases.

WHAT WILL IT TAKE?

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Philanthropic investments will lead to further breakthroughs in scientific understanding, and to the development of new neurosurgical treatments.

“I was diagnosed with a benign brain tumor that was pressing on my optic nerve and could have caused me to lose my vision. I am forever grateful to my neurosurgeon and honored to support the world’s best neurosurgeons in their efforts to attack life-altering conditions in our body’s most complex organ.”

Josh Fidler, Chairman, Neurosurgery Advisory Board