WHITING SCHOOL OF ENGINEERING

Redefining What is Possible
INNOVATING FOR OUR FUTURE

In the hundred years since the first engineering students matriculated at Johns Hopkins University, our school has emerged as a world leader in engineering research and education. The history of today’s G.W.C. Whiting School of Engineering is marked by intellectual curiosity and passion and punctuated by celebrated breakthroughs, from the work that brought clean water to millions around the world to the cardiopulmonary research that led to the creation of the portable defibrillator.

Today we build on our proud history, routinely expanding the traditional bounds of engineering to address this century’s most urgent challenges. Whether it is improving our ability to diagnose and treat cancer, averting the global water crisis, building earthquake-resistant structures, or better understanding energy markets, engineers, working collaboratively and across disciplines, provide the enabling technologies and systems approaches that such challenges demand.

Beyond the breadth and depth of our people’s accomplishments and expertise, the Whiting School has enriched Johns Hopkins University in the broadest sense, crossing departmental and divisional boundaries, and indeed geographic and political boundaries, to better define problems and join with others to design, build, innovate, and implement solutions.

Now, more than ever, it is this capacity that will be the keystone to real progress in the field of engineering and in our ability to address effectively the challenges and opportunities on which we and our colleagues across Johns Hopkins have set our sights. At the Whiting School, we are focused on four strategic priorities: educating for leadership, leveraging data to knowledge, engineering human health, and improving global well-being and security. To support these priorities, we seek to establish new professorships and scholarships, and enhance programs and facilities, not only to further our technological expertise, but also to facilitate collaborations across the university. Supported by alumni and friends who share our belief in the centrality of cross-disciplinary thinking to our future success, we are poised and committed to advance our school, our university, and the field of engineering in innovative and exciting ways.
We will provide an engineering education of the highest caliber in an environment that encourages and supports collaboration, innovation, and entrepreneurship and that prepares students to flourish in a global environment.

The complex, technology-based challenges of the 21st century require engineers to be nimble problem solvers, transformational thinkers, and ethical leaders. The Whiting School of Engineering's rigorous academic program combines core scientific principles with unparalleled research and entrepreneurial opportunities and access to the full spectrum of resources of the Johns Hopkins Institutions. Our students are immersed in an environment where creativity is valued, where the study of engineering intersects with multiple disciplines—from health care to the humanities, social sciences, and the arts—and where the integration of engineering practice and theory are combined through application to real-world problems. Our graduates possess a deep understanding of engineering's role in society and are leaders in research, industry, and the public sector.

In today's rapidly changing world, it is imperative that we continue to attract an extraordinary caliber of students, further grow our reputation for excellence and innovation in engineering education and research, and prepare our students to be global leaders, able to anticipate and address tomorrow's challenges. The Whiting School is committed to providing this next generation of students with ample opportunities to unleash entrepreneurial spirit, engage in pioneering research, and cultivate a love of learning that extends beyond both the classroom and their years at Johns Hopkins University.

Tomorrow's engineering leaders must be prepared to address the demands of an increasingly complex world. Investment in the Whiting School's students, faculty, and infrastructure will enable us to continue to attract the most committed and qualified students, further grow our reputation for excellence and innovation in engineering education and research, and prepare our students to be global leaders.

"Our vision for Whiting School undergraduates is to create Johns Hopkins engineers who possess deep knowledge and pursue boundless innovation with noble aim. The kind of personalized education we provide fosters critical thinking, data savvy, global perspective, and the capacity for collaboration with other disciplines, both within and outside of engineering."

Michael Falk, Associate Professor, Materials Science and Engineering

ABOVE: REBECCA SCHULMAN, AN ASSISTANT PROFESSOR IN THE DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING, IS WORKING WITH GRADUATE STUDENT ABDUL MAJEED MOHAMMED TO BUILD CIRCUITS TO CONNECT NANOSCALE DEVICES. HER RESEARCH COULD PAVE THE WAY FOR FASTER COMPUTERS AND MORE SENSITIVE MOLECULAR DETECTION SYSTEMS.

LEFT: EVERY YEAR, UNDERGRADUATES ON THE WHITING SCHOOL'S BAJA TEAM, A POPULAR STUDENT-RUN PROGRAM, GET THEIR HANDS DIRTY DESIGNING AND CONSTRUCTING A SINGLE-SEAT OFF-ROAD VEHICLE FOR NATIONAL COMPETITIONS. "BAJA RELIES ON THE MOTIVATION AND INTEREST OF THE STUDENTS," EXPLAINS ONE TEAM MEMBER.

ABOVE: MASTER'S STUDENTS IN THE WHITING SCHOOL'S CENTER FOR BIOENGINEERING INNOVATION AND DESIGN WORK WITH CLINICIANS AT JOHNS HOPKINS MEDICINE, PRIMARY HEALTH CARE PROVIDERS IN THE DEVELOPING WORLD, AND MEMBERS OF INDUSTRY TO IDENTIFY AND SOLVE GLOBAL HEALTH CARE CHALLENGES BY CREATING NOVEL MEDICAL DEVICES.
progress in data acquisition, management, and analysis—work that will be the enabling and transformative technology behind many of the university’s top research priorities. We are leading data-driven initiatives that are providing new insights into the diagnosis and treatment of heart disease, improving our ability to utilize wind energy, and tracking global pandemics. The impact of the new scientific approaches and associated analytical tools will be profound and far-reaching. Ultimately, the Whiting School has the potential to direct national and international priorities and policies in critical areas as diverse as global health, climate change, financial markets, energy, environmental regulation, and cybersecurity.

Digital data has opened a new realm of science that promises to revolutionize how we understand the world. The Whiting School and its partners are poised to create an unprecedented resource for discovery, problem solving, and collaboration and establish our reputation as a world leader in data science.

We will advance scientific inquiry, the creation and sharing of knowledge, and our understanding of the world by conceiving, developing, and implementing new approaches to the acquisition, management, and analysis of vast data sets.

Advances in computation, modeling, and simulation, coupled with the availability of data at a previously unimagined scale, enable us to quantify and analyze nearly every aspect of the human condition, our Earth, and beyond. This explosion in the quantity of data we now have at our disposal presents us with tremendous possibilities. It is an unprecedented resource that, if harnessed and used to its full potential, will enable us to advance scientific knowledge and spawn wholly new areas of research and economies.

Because of their access to the vast data generated across the Johns Hopkins Institutions and considerable strength in data mining, statistics, machine learning, and pattern recognition, Whiting School of Engineering researchers hold a unique competitive advantage in this arena. Working with colleagues across the university, our engineers already are making huge progress in data acquisition, management, and analysis—work that will be the enabling and transformative technology behind many of the university’s top research priorities. We are leading data-driven initiatives that are providing new insights into the diagnosis and treatment of heart disease, improving our ability to utilize wind energy, and tracking global pandemics. The impact of the new scientific approaches and associated analytical tools will be profound and far-reaching. Ultimately, the Whiting School has the potential to direct national and international priorities and policies in critical areas as diverse as global health, climate change, financial markets, energy, environmental regulation, and cybersecurity.

“Big Data has emerged as a new frontier for science and technology. In almost every field, we are subjected to a deluge of data due to our ever-increasing ability to measure, record, simulate, and store. Now we face the challenge of how to extract fundamental knowledge from these data. In my research group, we study the mechanics of highly intermittent turbulent flows, where our approach to storing data from large-scale computer simulations has provided us with new ways of doing science. Better understanding of turbulence intermittency will one day help us design better wind farms and energy systems subjected to highly variable sources.”

Charles Meneveau, Louis M. Sardella Professor of Mechanical Engineering
We will lead multidisciplinary research and educational initiatives in critical areas that will improve the well-being and security of our planet and its inhabitants. The same scientific and technological discoveries that have improved many aspects of society have also engendered a multitude of new threats to the health, safety, and security of mankind and our natural environment. To our increasingly complex and interdependent world, new approaches are needed to understand and manage current vulnerabilities and identify emerging threats in areas as diverse as our natural and built environments, global climate change, pandemics, natural hazards, water supply and sanitation, alternative energy sources, national defense, global economic systems, and electronic data.

The Whiting School will build upon its collaborative research and educational programs across the Johns Hopkins Institutions, as well as with government and industry, in order to deepen our understanding of these global threats. Through the application of sound engineering approaches, we will lead the creation of scalable and effective solutions to these problems. Safeguarding the well-being and security of our planet and its inhabitants is central to the Whiting School’s mission, and to our future. Our people stand ready to embrace this audacious challenge, and to chart the course for a more secure tomorrow.

For more than a century, the people of Johns Hopkins engineering—our faculty and students, staff, donors, alumni, and friends—have boldly taken on many of society’s most pressing challenges and made strides on behalf of mankind. We are now uniquely positioned to aggressively further our research mission and generate the technologies that lead to fundamental new approaches in the engineering disciplines and translate into improved quality of life and enhanced safety and security of future generations.

The opportunity for advancement is great and our aim is high. We will reach these heights only through collaboration with the right partners whose knowledge and resources are essential to our ability to achieve our goals. In order to maximize our impact on the world, we need interdisciplinary partners from across Johns Hopkins University and we need your belief in us, your informed guidance and, more than ever, your generous investment. Partnering with the Whiting School of Engineering in our efforts will enable us to build upon our existing strengths, invent, discover, educate the next generation of engineering leaders, and rise to the challenges of our time.

“We engineers, I think we have a responsibility. We have to not just care about erecting structures, but think about what kind of impact they will have on society. At Johns Hopkins, we are integrating engineering, medicine, and public health to improve our understanding of how natural and technological hazards impact critical infrastructure systems and are developing interdisciplinary computational tools to assess emergency preparedness and predict community resilience.”

Judith Mitra-Reiser, Assistant Professor of Civil Engineering

““This is a watershed moment. Across a whole spectrum of components—molecular genetics, epigenetics, imaging, diagnostics, and treatment—we are doing pioneering work in engineering and in medicine. Hopkins is probably better positioned than anyone to make revolutionary advances in human diseases, like cancer, that could only be imagined a decade ago. It’s just a question of how we bring it all together.”

William Nelson, Marian I. Knott Professor & Director, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
TAKING THE NEXT STEP

Rising to the Challenge: The Campaign for Johns Hopkins is a multi-billion-dollar effort that focuses on helping people—our faculty, students, and the countless individuals around the world whose lives will be improved through our work.

Accomplishing our ambitious goals will not only require the renowned drive and expertise of Whiting School people and individuals from across the university, but significant philanthropic investment in their efforts.

The Whiting School has committed to raise $275 million as part of the Rising to the Challenge campaign. With your unwavering support we know we can reach this ambitious target, and we invite you to partner with us in commitment to the following goals:

**People**
- Establish at least 100 new undergraduate scholarships and 50 new graduate fellowships that will enable the best and brightest students to attend the Whiting School, regardless of their financial need.
- Invest in providing students with additional experiential opportunities that will enhance their leadership skills, provide them with a global perspective, and offer them opportunities to apply engineering concepts to complex, real-world problems.

**Programs**
- Endow at least 10 new full professorships and at least five new faculty scholar awards to enable us to recruit and recognize the very best faculty whose research has the potential to make a global impact.
- Fund the development and expansion of our full-time and part-time master’s degree programs to prepare future generations of technical leaders in industry and government.

**Infrastructure**
- Develop state-of-the-art facilities that foster and empower collaboration across and beyond engineering disciplines and house cross-disciplinary efforts.
- Establish and support a design studio that serves as an environment in which to nurture technological innovation for our faculty and students.
- Invest in modern teaching and laboratory facilities that enhance learning and enrich the student experience.

**Nurture and support technological development and commercialization, and build an entrepreneurial culture through the establishment of a technology accelerator and innovation ecosystem that provides our faculty and students with access to mentors, business consultants, and experts.**
- Invest in the Homewood undergraduate experience to create programs that enrich campus life; allow students to delve deeply in the world of knowledge, freely traverse societal, cultural, and disciplinary boundaries in the creative application of their skills; and tackle the most important problems facing humanity today.

**Programs**
- Raise $10 million in flexible funds to enable the Whiting School leadership to provide academic venture capital as opportunities emerge.
- Raise $5 million in endowed funds and $10 million in outright gifts for key initiatives and programs that will advance the strategic directions of the Whiting School.
- Increase opportunities for active and interdisciplinary learning, and for more fully integrating experiential learning, independent research, and professional experiences in the Johns Hopkins engineering curriculum.

**Infrastructure**
- Develop state-of-the-art facilities that foster and empower collaboration across and beyond engineering disciplines and house cross-disciplinary efforts.
- Establish and support a design studio that serves as an environment in which to nurture technological innovation for our faculty and students.
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**People**
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- Fund the development and expansion of our full-time and part-time master’s degree programs to prepare future generations of technical leaders in industry and government.

To pursue any of these options, please contact:

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