



PHYSICS

Faculty, graduate and undergraduate students transforming our understanding of the natural world

Physics is one of the broadest and most active fields of science. Its goal is to understand the behavior of matter and energy on every level, from the origins of the universe in the Big Bang to the interior of atoms. Profound mysteries remain alongside exciting opportunities, and fundamental physics research continues at a furious pace. From ultrafast lasers to quantum computers, from new materials to propel the green energy revolution to the study of nature's fundamental constituents, physics serves as an intellectual destination for the passionately curious.

In recent decades, physics has undergone spectacular development, with major discoveries across its various sub-fields. Some of these discoveries have enabled technological progress, propelling the revolution in computing and inspiring entirely new industries in medical diagnostics. Other discoveries are more fundamental, offering deeper insights into the workings of nature and opening new physical vistas for exploration and application.

Physics is an integral scientific component of the liberal arts environment. Our mission is to enhance the goals and ideals of the university by making lasting contributions at the forefront of human understanding and by communicating the excitement of scientific discovery to our fellow citizens. Physics is one of the broadest and most active fields of science. Its goal is to understand the behavior of matter and energy on every level, from the origins of the universe in the Big Bang to the interior of atoms in your computer screen. Great mysteries remain and fundamental physics research continues at a furious pace.

Some of the questions now being pursued by physicists at the University of Michigan include: Can practical quantum computers be built? How would they outperform today's digital computers? What is causing the expansion of the universe to accelerate, and will it continue to do so forever? How does the mechanical stretchiness of proteins like DNA affect their biological function? In all these areas of research and more, faculty members are assisted by undergraduate students who, in addition to learning about physics in class, are doing physics in the lab.

An undergraduate degree in physics gives students a rich understanding of how the world works and prepares them for continued study in graduate or professional school, or for careers in industry, medicine, business, public service, private consulting, and teaching. Currently ranked 13th in the nation, Michigan Physics seeks to become the country's premier department of physics. In order to achieve this goal, we must establish a secure base of funding that allows us to excel in the areas of physics we practice, to provide an incisive and enriching education for our students by recruiting the best faculty and students to our programs, and to ensure a nurturing environment for the professional advancement of our faculty and staff.

SATURDAY MORNING PHYSICS

Each Saturday, this popular program draws adults and children from around southeast Michigan to learn about the mysteries and wonders of physics. Our faculty, researchers, and graduate students present topics ranging from black holes, the accelerating universe, quantum information, nuclear magnetism, exoplanets, and even the Physics of Halloween. The talks, which we design to be accessible to the general public, include multimedia demonstrations, hands-on experiments, and audience participation to make the mornings a lively give-and-take between professor and audience. An endowment of \$1M would allow programming for the academic year to continue in perpetuity. It costs \$25,000 to produce one semester of programming, which includes professional recordings of the sessions that are shared online.

POST-DOCTORAL FELLOWSHIP

Post-doctoral fellows play a crucial role in the success of our research endeavors. In addition to supporting our faculty, these positions provide opportunities for recent Ph.D. graduates to continue to refine their skills and interests as they prepare to launch their own research careers. Post-doctoral fellows play a vital role in our faculty's research endeavors. Our ability to recruit and retain top-notch scientists depends on our ability to support these fellows. An endowed gift of \$1.5M in support of this important priority enables exciting discoveries that advance our understanding of the natural world and enable the development of the cutting-edge technologies of the future.



Navy Captain Josh Cassada, Ph.D., International Space Station astronaut, and physicist, joined Saturday Morning Physics live from the International Space Station on January 14, 2023. Cassada and the rest of NASA's Crew-5 lived and worked aboard—and, at times, on the outside of—the ISS for 157 days between October 2022 and March 2023.

Six hundred SMP fans joined live, with 1000+ patrons tuning in for the live simulcast as Dr. Cassada took questions from audience members ages three and up. Cassada was also joined by U.S. Marine pilot Colonel Nicole Aunapu Mann to present a live demonstration of the conservation of angular momentum with rotating astronauts that was sure to be the basis of future physics homework problems.

DEPARTMENT STRATEGIC FUND

Expendable, undesignated gifts of all sizes are extraordinarily important to the continuing success and growth of the department. Contributions to the strategic fund make it possible to meet unexpected needs such as funding for new faculty research, curriculum development, the purchase or repair of major instruments used in our research and teaching labs, and our student groups.

In 2023, graduate students in the department helped to form the Willie Hobbs Moore chapter of the National Society for Black Physicists (NSBP) at U-M. In 2024, the department hosted the Conference for Undergraduate Women in Physics (CUWiP). NSBP and the CUWiP conference are just two of many examples of how gifts support our efforts to advance diversity in STEM.

UNDERGRADUATE RESEARCH OPPORTUNITY FUND

Gifts to support summer fellowships will enable undergraduate students to perform research at premier institutions around the world. Research opportunities for a 10-week summer research assistantship exist in locations such as Chile, Japan, and the European Laboratory for Particle Physics (CERN). These fellowships allow students to spend a summer performing cutting-edge research as well as participating in cultural exchanges. An endowed contribution of \$100,000 will provide \$5,000 of funding per student.



“Learning how Physics developed historically has been one of my favorite parts of my time at Michigan. In particular, knowing the story of that development has helped me to contextualize the work that I do in research, and knowing that I can be a small piece of the continuation of that development is a source of motivation for my continued work.”

**–Evan C., LSA
undergraduate student**



COMMUNITY OUTREACH AND ENGAGEMENT

Michigan Physics is dedicated to broadening STEM education access for students from diverse backgrounds. Our faculty, staff, undergraduate and graduate students visit schools across southeast Michigan to enrich and supplement their existing STEM curriculum through exciting physics demonstrations and interactive events for young learners. These activities also connect pre-college students with university mentors, demystifying STEM subjects and showcasing the possibilities within these fields. This interaction encourages students to envision themselves in STEM careers, fostering a diverse, forward-thinking workforce for the future.

The global challenges we face today highlight the urgent need for strong STEM education. By investing in Michigan Physics, donors empower us to spark curiosity and critical thinking in young minds, ultimately contributing to the community and world at large as these students become tomorrow's innovators.

Donor contributions make a significant impact, enabling us to acquire experimental materials, cover travel expenses, and create new programs that align with the latest in STEM education. Donor support helps us bring science to life for students, showing them practical applications of physics through engaging activities, and reinforcing the material they learn in school. Your gift today can fuel the change necessary for a more inclusive and inspiring STEM educational landscape.

WAYS TO FUND YOUR GIFT

Your partnership connects the college's rich past to a boundless and bright future. You can change lives with gifts of cash, pledges, or appreciated securities, and create a meaningful legacy through your bequest, trusts, gift annuities, and other planned gifts. Your generosity makes an impact on what's next, for a better tomorrow.

for what's next ▶

Look to Michigan

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