LIVE OUT YOUR LOVE OF SCIENCE
Since its founding in 1865, the College of Science has built upon Notre Dame’s world-renowned intellectual resources, while building up the campus’s state-of-the-art infrastructure, the $70 million Jordan Hall of Science serving as the most recent example.

What hasn’t changed—and never will—is the University’s unwavering commitment to its Catholic character and the college’s mission to prepare tomorrow’s scientific leaders to think big, while also inspiring them to make a difference and to share their knowledge and discoveries in ways that encourage collaboration, advance learning, and contribute to the common good.

Call it what you will—a love of science, the Fighting Irish spirit, or both—but you see it in classrooms and laboratories, and in opportunities such as NDConnect, which brings the nation’s best science undergraduates to Notre Dame for a nanoscience research competition.

You see it in local learning centers and health fairs where our faculty and students volunteer their time and talents to tutor children and screen adults.

You see it in countries around the world when our students choose to spend a semester studying abroad or a summer applying their skills in service to others.

Most of all, you see it in our eyes. This profound sense of unity of purpose is what sets us apart, and it’s what distinguishes the tens of thousands of young men and women who have entered the College of Science as promising students and have graduated as even more promising scientists.

Science is who we are. Service is what we do. Join us.

A community of innovators working in collaboration for the common good.

Do more with a degree from the College of Science at the University of Notre Dame.

Learn more at science.nd.edu.
Find your passion.
Research in the Department of Applied and Computational Mathematics and Statistics is highly interdisciplinary. Students are involved in faculty research which utilizes mathematics and statistics to create models for wound healing, develop a clinical prognostic test for breast cancer metastasis, simulate vertebrate limb development, and study important clues about blood clot formation and the spread of infection.

Through courses such as Mathematical and Computational Modeling in Biology and Physics, students learn how to formulate models and apply computational methods to real-world problems. In the Advanced Scientific Computing course, students gain the fundamental understanding necessary for using high-performance computing in science and engineering.
DEPARTMENT OF BIOLOGICAL SCIENCES

Majors: Biological Sciences, Environmental Sciences

Advancing human and environmental health through research, education, and outreach.

The Department of Biological Sciences is a recognized leader for its research in global health, biomedical sciences, and environmental change. Students and faculty use the most cutting-edge approaches—genomics, advanced imaging, and mathematical modeling—to study biological phenomena, including:

- Anatomy and Physiology
- Cancer
- Cell Biology
- Development and Regeneration
- Ecology and Environmental Biology
- Epidemiology and Population Biology
- Evolutionary Biology
- Genetics and Genomics
- Microbiology and Immunology
- Infectious Diseases
- Neuroscience and Behavior
- Entomology and Vector-borne Diseases

The department’s more than 50 laboratories and research programs receive more than $17 million of outside funding annually, primarily from the National Institutes of Health and the National Science Foundation. Students also take advantage of unique training experiences afforded them by the University’s many innovative interdisciplinary research centers and institutes, such as the Eck Institute for Global Health, the Center for Rare and Neglected Diseases, the Environmental Change Initiative, and the Harper Cancer Research Institute.

Environmental Sciences

Explore a world of knowledge about the planet on which we live. The Environmental Sciences major exposes students to a scientific view of our environment from biological, chemical, and geological perspectives. It places particular emphasis on understanding interactions between human societies and the environment from social, ethical, economic, anthropological, and governmental points of view.
The Jordan Hall of Science contains an array of specialized equipment rarely found on a college campus. One example is the Bruker 400-MHz Nuclear Magnetic Resonance (NMR) Spectrometer, which features a robotic sampler for the automated handling of samples. One of the finest NMR facilities of its type, Notre Dame's spectrometer allows undergraduates to study molecules at the atomic level.
Where the best of the best in mathematics go to get even better. Seminar for Undergraduate Mathematical Research (SUMR) is a two-year enrichment of the Mathematics Honors Program. SUMR provides support and direction to the University’s most skilled sophomore-level mathematics students and prepares these elite students for work at the nation’s top graduate programs in the mathematical sciences—Pure or Applied Mathematics, Statistics, Economics, Physics, Mechanical or Electrical Engineering, or Finance. Each of SUMR’s first 70 graduates (1990–2006) who pursued graduate education in one of the mathematical sciences gained admittance, with funding, to one of the top 45 graduate programs in the United States; 52 were admitted to a Top 25 program.
DEPARTMENT OF PHYSICS

Majors: Physics, Physics-in-Medicine

Answering nature’s most fundamental questions.

You know their names—Galileo, Newton, Einstein, and Hawking. They, and scientists like them, explained gravity. They discovered radio waves, X-rays, radioactivity, electromagnetism, superconductivity, and the structure of the atom. And they invented radar, transistors, computers, lasers, MRI’s, electron microscopes, nuclear power, and the Internet. They are physicists. And at the College of Science, you will learn to think like them; you will take a giant step toward knowing what they knew. What might you explain, discover, or invent? Find out.

The Department of Physics offers more than simply an education in physics; it offers a training ground for the mind, a first-class education in the art and science of problem solving.

Undergraduates work with world-class faculty in the University’s excellent facilities, as well as in research facilities around the globe, including those in Japan and South America, at the Fermi and Argonne national laboratories in Illinois, and at the European Organization for Nuclear Research (CERN). Notre Dame is also part of an international consortium that funded and manages the Large Binocular Telescope (LBT) in Arizona. With two 8.4-meter diameter mirrors, the LBT is the world’s most powerful telescope and one of its most advanced. Cutting-edge research—research that is truly collaborative, interdisciplinary, and international in scope—is carried out in astrophysics, nuclear physics, elementary particle physics, condensed matter, biophysics, and atomic physics.

Physics majors choose between four concentrations:

- Advanced Physics
- Applied Physics
- Astrophysics
- Computing

With the research opportunities of a large university coupled with the environment of a smaller, private university, the Department of Physics offers a variety of programs to accommodate the academic and professional interests of its students.

1st new nuclear accelerator funded by the NSF since the 1980s

Nuclear Accelerator

Understanding how the universe works

The first new accelerator for low-energy nuclear physics in the United States since the 1980s was installed at Notre Dame in 2013. The $3.5 million nuclear accelerator includes a 10-ton tank installed vertically in the center of Nieuwland Science Hall and provides beams to the newly designed St. George Recoil Separator at Notre Dame.

The accelerator simulates nuclear reactions that take place in stars and other stellar environments.

In addition to the new accelerator, which will produce heavy ion beams, two other accelerators will continue to operate in Nieuwland Science Hall, providing mostly proton and alpha beams to several experimental setups.

The equipment, developed at Notre Dame, is a model for other separators now being built.

Notre Dame’s nuclear physics program is one of the largest nuclear physics programs in the world. More than 100 user groups from nearly 30 countries visit the Nuclear Structure Lab regularly to conduct experiments.
Established in 1961, Preprofessional Studies positions students for career opportunities in a variety of health professions—medicine, dentistry, veterinary, physical therapy, psychiatry, pharmacy, and more—by providing undergraduates with an education in the best liberal traditions of scientific thought and analysis. The first thing you will learn? You are not alone in your pursuits. The Center for Health Sciences Advising helps you understand what medical schools are looking for and how to navigate your undergraduate career and make a successful application to the school of your choice. It can also answer the questions that every medical student needs to know: What is the best major for medical school? Do you need to conduct research for medical school? Do you need clinical experience? Do you need to do service? Can you study abroad and still prepare for medical school or other education in the health professions? The Center—and its website, preprofessional.nd.edu—can answer these questions and any others you might have.

For over 100 years, Notre Dame has been recognized as an accredited institution for premedical studies. Thanks both to an undergraduate education that emphasizes research, clinical experiences, and interdisciplinary thinking and to the work of the Center for Health Sciences Advising, the average Notre Dame applicant has a Medical College Admission Test (MCAT) score significantly above the national average, and over the last decade between 75 and 85 percent of all Notre Dame applicants to M.D. or D.O. programs have been accepted. In fact, one out of every 100 students matriculating into medical school in the nation is a Notre Dame graduate.

The education you need. The answers you want.
Yes, you can major in brain science. And it’s not just biology any more. When you investigate the nervous system you can explore more than you might expect—psychology to philosophy, medicine to mathematics, and chemistry to computers. In fact, the neuroscience and behavior major is a unique collaboration between Notre Dame’s Department of Biological Sciences and Department of Psychology.

The field is expanding rapidly because of new tools and technology, from electron microscopes and brain imaging to genetics and genomics. You can study the basic biology of the brain; how the nervous system works to produce cognition and emotion; how the structures process information. You can learn how the system evolved; how an individual’s brain and the environment impact each other; how to repair or enhance the system involving both physical and mental illnesses. You can concentrate your study at the level of the molecule and cell or explore the relationship between consciousness and the human brain.

With all those choices, you can customize a program to fit your goals. A degree in neuroscience and behavior can prepare you for medical school, dental school, veterinary school, and graduate school in other disciplines such as clinical psychology. You’ll also be very well prepared for graduate studies in neuroscience, biological sciences, or diverse fields in psychology.

You’ll be on the leading edge of a growing, young field that is unlocking the mysteries of mind and brain with new technologies and discoveries. You’ll be collaborating with a wide range of experts and conducting research that contributes to understanding how we think and why we think. That’s worth thinking about.
College Sequence: Majors:

The science of business, computing, and education.

The College Sequence's interdisciplinary programs are designed to help you obtain a strong science background while simultaneously preparing you for professions in health care, business, computing, or education.

**Science–Business**
The Science–Business major is an individualized course of study that incorporates basic business courses along with the four basic areas of science: biology, chemistry, physics, and mathematics. The major prepares students to pursue health care professional education—such as medical or dental school, physical therapy, or pharmacy school—or to enter an MBA program, or the scientific business market immediately upon graduation.

**Science–Computing**
The Science–Computing major is an individualized course of study that incorporates courses along with the four basic areas of science—biology, chemistry, physics, and mathematics. The major provides students with working knowledge of various computer languages and experience using current computer technology, as well as the opportunity to focus in an area of science of particular interest. Graduates enter the scientific computing job market immediately upon graduation.

**Science–Education**
The Science–Education major is an individualized course of study that incorporates courses from the four basic areas of science—biology, chemistry, physics, and mathematics—along with education courses that most states require for certification to teach secondary school.

**Bachelor of Science/Master of Business Administration**
The dual degree is a demanding, five-year program that offers highly motivated and scholastically superior undergraduates in the College of Science the opportunity to simultaneously earn a Bachelor of Science and an MBA.
Three minors that can play a major role in contributing to your career prospects.

**Actuarial Science**
The business of statistics. The minor in actuarial science is a new course of study tailored to the needs of students interested in actuarial careers, especially those in business. The minor provides instruction in probability, statistics, financial mathematics, accountancy, corporate financial management, macroeconomic analysis, investment theory, the principles of microeconomics, and econometrics.

**Energy Studies**
The interdisciplinary minor in energy studies equips students for a future in which energy efficiency and sustainable energy will be increasingly vital. It offers separate technical and non-technical tracks for students with different interests. The minor surveys the fundamental aspects of energy infrastructure and resources as well as examines the political, societal, and business ramifications of that infrastructure and its place in a world of depleting fossil resources and changing climates. Classes are taught by staff from the College of Science, the College of Engineering, the College of Arts and Letters, the Mendoza College of Business, and the School of Architecture.

**Sustainability**
One of the greatest challenges humankind will face in the 21st century is that of forging a new relationship with the natural world. Both through formal courses and independent study, the minor in sustainability takes a multidisciplinary approach to examining the theories, principles, and practices of sustainability, preparing students to meet the challenge of satisfying current human needs while preserving natural capital for future generations.
Participation in research is the best way to understand the true nature of science and the scientific process, for it deepens and broadens a student’s knowledge and experience in their chosen field, while also developing problem-solving skills that are so highly sought after by potential employers.

The possibilities for undergraduate research in the College of Science are considerable. A diversity of faculty interests combined with the University’s vast resources allow for unsurpassed undergraduate research opportunities. In particular, the College of Science has established relationships with MD Anderson Cancer Center, Cold Spring Harbor Laboratory, and the Indiana Clinical and Translational Sciences Institute to provide competitive, summer research opportunities for selected students. The programs are aimed at successful and highly motivated students, most of whom are intent on pursuing a graduate degree in the sciences.

In addition to the hundreds of research opportunities across the country and some even around the world, the University has established several fellowships and programs which provide a stipend for undergraduate research including the First Year Research Ignition Fellowship, the Naughton Fellowship, the NDnano Undergraduate Research Fellowship, the Da Vinci Grant Program, the Undergraduate Research Opportunity Program (UROP), and the Summer Undergraduate Research Fellowship (SURF).

SURF is a full-time, 9-10 week summer research fellowship program for College of Science students. Fellowship recipients receive mentoring from College of Science faculty as well as a $4,000 stipend and $500 for supplies. The Clare Boothe Luce Foundation, Indiana University School of Medicine–South Bend, and other entities support SURF.

And as the University endeavors to do something that’s never been done—to establish itself as a preeminent research university with a distinctive Catholic character that seeks the truth for its own sake, as well as to benefit the common good—it’s only the beginning.

Scientia

Latin for “knowledge,” Scientia is a student-run, online journal of scientific research that encourages high-quality undergraduate research, provides a forum through which students can gain essential writing and reviewing skills, and contributes to the advancement and cohesiveness of Notre Dame’s scientific community. A print version is published once a year.

scientia.nd.edu

Scientia

Undergraduate journal of scientific research

Vol 5 Spring 2014

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scientia.nd.edu
Gain exposure to international academics, research, and cultural engagement.

The University of Notre Dame is committed to providing you with opportunities to enlarge your understanding and vision beyond the borders not only of this campus, but also of this country. In fact, Notre Dame President Emeritus Rev. Edward “Monk” Malloy, C.S.C., said it best when he stated, “Our campus is in South Bend, Indiana; our classroom is the world.” The percentage of Notre Dame undergraduate students who study abroad is consistently among the highest in the nation.

glynnhonors.nd.edu

studyabroad.international.nd.edu

Study Abroad Opportunities

Alcoy, Spain
Amman, Jordan
Angers, France
Athens, Greece
Beijing, China
Berlin, Germany
Bologna, Italy
Dakar, Senegal
Dublin, Ireland
Fremantle, Australia
Genoa, Switzerland
Heidelberg, Germany
Hong Kong, China
Jerusalem, Israel
Kampala, Uganda
London, U.K.
Nagoya, Japan
Norwich, U.K.
Oxford, U.K.
Paris, France
Perth, Australia
Puebla, Mexico
Rome, Italy
Russia Programs
Salvador da Bahia, Brazil
Santiago, Chile
São Paulo, Brazil
Seoul, South Korea
Shanghai, China
Singapore, Rep. of Singapore
St. Andrews, U.K.
Tokyo, Japan
Toledo, Spain

Summer Programs

China
Dublin
India
Jerusalem
London, U.K.
Taipei
Toledo
Uganda
The Career Center offers you unsurpassed personalized support through every step of your career development. Services include individual career counseling, self-assessments, workshops, on- and off-campus career fairs, internship and job searches, interview preparation, résumé and cover letter writing, and networking.

CAREER CENTER

You know where you want to go. The Career Center helps you get there.

The University of Notre Dame is ranked #10 on PayScale’s new “College Salary Report,” a list of salaries of graduates from hundreds of colleges and universities.

Over 9,194 registered employers in the Career Center’s Go IRISH job database

$8.3 billion endowment which enables hundreds of scholarships and grants for students, as well as laboratory and building renovations, endowed faculty positions, and the general operating budget.

About 80% of Notre Dame students are admitted into medical school, about twice the national average.

TOP EMPLOYERS OF SCIENCE MAJORS
Accenture
Abercrombie & Fitch
Allscripts
Deloitte
EPIC Systems
Hewlett Packard
PwC
U.S. Navy

TOP SERVICE PLACEMENTS OF SCIENCE MAJORS
Alliance for Catholic Education
Peace Corps
Teach for America

96% of students graduate on time, which is among the top 3 graduation rates in the nation.

20,000 Internships are accessible through the Notre Dame Career Center website.

Why Notre Dame?

Notre Dame ranks in the TOP 10 for monetary value of a college degree.

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With the most advanced science and educational teaching instrumentation of any university in the nation, the College of Science’s $70 million Jordan Hall is setting the standard for undergraduate education and research in the 21st century. Jordan Hall features two 250-seat lecture halls, 40 state-of-the-art laboratories, a Nuclear Magnetic Resonance Spectrometer, a 136-seat Digital Visualization Theater that allows for a high-resolution, 360-degree visual learning experience, a museum of biodiversity with an extensive collection of amphibians, fishes, birds, mammals and insects that have been collected over the last century, an observatory, greenhouses, and unique common areas that offer undergraduates unprecedented opportunity for collaboration.

The Digital Visualization Theater
Light years ahead of any theater you’ve ever seen.

Boasting the Sony SRX-510, one of the newest projection systems available today, as well as a JBL 9,000-watt 5.1 Dolby surround sound system and ten computers for the real-time rendering of 3D objects, Jordan Hall’s 136-seat hexagonal Digital Visualization Theater (DVT) offers instructors the ability to immerse students in high-resolution, high-fidelity images projected on a 50-foot-diameter dome. Take a tour inside 3D models of complex molecules, DNA, or cancer cells; view the internal structure of the human body as revealed by CT or MRI medical imaging technologies; or fly to the edge of the observable universe.

The Jordan Hall of Science Greenhouse
Have a theory? Grow for it!

Jordan Hall’s greenhouse facility consists of a support lab and four, 210-square-foot greenhouses, each with a computer-controlled environmental system that allows for a vast array of experiments.

The Krizmanich Telescope
The sky’s the limit.

Sitting atop the third floor, the Jordan Hall Observatory features a number of small telescopes as well as a research-class, computer-controlled telescope with a full suite of modern instrumentation, all contained in its own dome. The telescope can be remotely controlled via the Internet and is capable of viewing astronomical objects in several distinct wavelengths of light.
In 1885, Notre Dame became the first college in the United States to install electric lighting. In 1893—10 years before the Wright brothers’ first flight—Notre Dame Professor Albert Zahm presented “Stability of Aeroplanes and Flying Machines” at the First International Aeronautics Congress. Based on research he conducted at the University’s Science Hall in the 1880s, Zahm proposed the first modern method for launching airplanes and manually controlling them in flight by using rotating wing parts to balance the aircraft laterally and a double tail to control pitching and side-to-side movement.

Whether adopting new technologies or contributing to scientific breakthroughs, Notre Dame’s College of Science has been and remains at the forefront of scientific knowledge.

In 1899, Notre Dame Professor Jerome Green became the first American to transmit a wireless message. In 1913, legendary Fighting Irish football player and coach Knute Rockne—a professor in the College of Science—applied his scientific knowledge to master the physics of throwing a football, popularizing the forward pass and forever changing the game. Today, the Notre Dame Radiation Laboratory is home to the largest concentration of radiation chemists in the world.

In 1973, NOA granted Notre Dame researchers with invasive species grant. Genomics and bioinformatics major publishes findings that could improve fuel cell efficiency.

Biochemistry and bioinformatics major develops new method for diagnosing and analyzing genetic disease.

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