ABOUT THE DEPARTMENT

The Physics Department at Washington College broadly trains students in the discipline through the practices of theory, experimentation, and computation. Our curriculum challenges students to acquire the habits of analytical thought, clear communication, and the skills necessary to apply the content and methods of the physics discipline to solve the most urgent problems our society faces today and will face in the near future. The faculty are committed to offering individualized research experiences, maintaining small class sizes, and developing close mentoring relationships in a highly supportive undergraduate setting. This approach fosters the intellectual growth of students as independent scholars and enhances the careers of our graduates.

OUR APPROACH

The physics major takes a three-pronged approach to studying physics: theory, experimentation, and computational modeling. Our introductory courses build core skills in these areas and apply them throughout the upper-level content areas. Students also have some flexibility in choosing courses to fulfill the major. Upper-level courses include core courses in:

- Classical Mechanics
- Electricity and Magnetism
- Thermal Physics
- Quantum Mechanics
- Electronics
- Advanced Physics Laboratory

In addition, all majors meet one afternoon a week for a physics seminar course in which we study writing within the discipline, presentation skills, job and graduate school applications, and problem-solving, all in a relaxed and informal atmosphere that brings together majors and departmental faculty.

While many students pursue a four-year physics degree, students interested in engineering careers may choose the dual-degree engineering pathway based on our partnership with Columbia University. In the Dual-Degree program, students pursue a physics major for three or four years at Washington College and receive priority in admissions review at Columbia, provided they meet academic performance benchmarks. This program is highly popular with students and provides a way to receive two degrees, one in physics from Washington College and one in engineering from Columbia University, within five years.

SUMMER RESEARCH

Our faculty work with summer research students as part of the John Toll Fellows Program. Recently, students have conducted research in mass spectrometry, nonlinear dynamics, computer modeling, and plasma physics. We’ve had summer research projects culminate in presentations at international scientific meetings.

FACILITIES

- Optics Laboratory
- Griswold Mass Spectrometry Laboratory
- Electronics Lab and Advanced Laboratory
- Plasma Laboratory
- Computing Facilities
- Student Project Space
**WHY PHYSICS AT WASHINGTON COLLEGE?**

1. **We have an active and growing department with four full-time faculty, two lab instructors, and more than 30 physics majors.**
   Faculty research interests are in plasma physics, computational physics, space and planetary science, mass spectrometry, theoretical physics, and optics. Courses are offered in subjects ranging from classical dynamics to electronics to quantum theory.

2. **Studying physics at a liberal arts college can offer distinct advantages over programs at larger institutions.**
   Our students work closely with tenured faculty, developing mentoring relationships in a supportive undergraduate environment. In addition, our students are well rounded, often majoring in a second discipline (recently, physics majors have double majored in computer science, math, theatre, music and history!), playing a varsity sport, or participating in active co-curricular opportunities like Makers Union, Habitat for Humanity, or the Student Government Association.

3. **Our alumni have experienced high degrees of career success in both science and non-science fields.**
   Many obtain advanced degrees in physics or engineering, while other alumni are employed in other areas, including computer and technology fields, education, law, and business. Some of our recent alumni are pursuing careers in such diverse fields as theoretical physics, astronomy, nuclear engineering, computer engineering, computer science, material science, medical physics, chemical physics, automation engineering, and fire protection engineering.

4. **Bachelor of Science in Physics with a Bachelor of Science in Engineering**
   Students pursuing the Physics/Engineering Dual-Degree Combined Plan Program receive a degree in physics from Washington College and a degree in an engineering discipline from Columbia University. Students must complete the physics curriculum through the third year, as well as the College’s distribution and writing requirements. The Senior Capstone Experience requirement is waived for students in the Dual-Degree Combined Plan. As an affiliated institution, Washington College applicants who meet Columbia University’s admissions requirements receive priority in admissions review at Columbia.

5. **Science Internships**
   Students often take part in summer physics and engineering internships, both on and off campus. Working with an advisor, many of these internships can be turned into academic credit in physics.

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**ASTRONOMY IN THE FIELD**

The wondrous night sky starts to reveal its mysteries in a collaboration among the College’s Department of Physics, River and Field Campus, and Digital Media Services. Led by Karl Kehm, chair of the Department of Physics and a physics and environmental science and studies professor, and Brian Palmer, director of Digital Media Services, students in Kehm’s beginning-level astronomy class are introduced to astrophotography.

The students and teachers spend several hours shooting the night sky at the College’s River and Field Campus (RAFC), using cameras and gear provided by Digital Media Services. Then, they learn how to use Camera Raw and Photoshop to process their images and get a closer look at the objects of their class’s study.

The class surveys the universe, starting with Earth and moving through space and time to galactic clusters, supernovae, and black holes. Processing their images, students find galaxies, meteors, and star clusters while tweaking color, contrast, clarity, and other options to create scientifically publishable photos—what Kehm calls “an honest portrayal of the sky”—as well as versions that push into art photography.

“What I like most about the lab is the way it inspires the students,” he says. “There’s something about that pursuit of the aesthetic and the immersion under the starry sky that activates imagination and gets students excited about the subject. And even after doing this for many, many years, I’m still in awe every time I go out.”