

PHYSICS Surveys will be closed June 6th at noon.

Orientation - Things you **SHOULD** know...

- ✓ **Check your VT email several times a day from this day until you graduate. Not reading an email is not an excuse for not responding to a request or a deadline.**
- ✓ Please do **NOT** change your physics lecture, lab and seminar. You are in a special section. After we complete our one on one session.
- ✓ You need 120 hours to graduate and you must have an in major and overall GPA of 2.00.
- ✓ Each year as engineering students struggle with their physics class, they will start a rumor that the physics department is not accredited. This happens at **ALL** universities that have an engineering program. There's no accreditation for physics. Accreditation for specific programs is limited to those that have professional exams/certification associated with them, like nursing, engineering, and accounting

The difference between a double major and a dual degree....

Double Major-

- You must complete the requirements for both majors within the same term.
- **You will receive a diploma for your primary major (degree) and a double major certificate for your secondary major (double major).**

Second Degree-

- You must complete the requirements for both majors.
- You must complete an additional 30 credits over the minimum required for your first degree.
- You may complete the second degree in a later term.
- **You will receive a separate diploma for each degree.**

Other things to remember.....

Per admissions: The Virginia Tech Engineering program is extremely competitive. There is no guarantee that a transfer seat in the program would be available. The earliest opportunity you will have to compete for a seat in the College of Engineering would be your sophomore year.

We also offer a 5-year Bachelor/Master's program in physics. If you have a 3.5 overall GPA in your junior year you can enroll in this program.

I completed both surveys I have **TRIED** to avoid late evening classes on Friday whenever possible so that if you are going home for the weekend you will be able to leave mid-day. Surveys give us a reason to look at your schedule that is computer generated.

If you decide to move your schedule around to get into the same class at a different time you **MUST** first drop the one that you have on your schedule in order to add a different section. Please keep in mind that you are now 1 in 30,000+ students. You may not get the seat you wanted and someone else gets the seat that you gave up, you will **NOT** be force added in a class. You may or may not be able to get the class that you need which could cause you to get behind and spend an additional year at VT.

If you opt to buy your physics text from amazon.com etc., please be sure that you textbook includes a master physics code (4th Edition) when purchasing your textbook for PHYS 2305 & PHYS 2306.

If you have been diagnosed with any type of learning disability and you need additional time when taking test or you have testing anxiety, please contact...

Services for Students with Disabilities

<http://www.ssd.vt.edu/>

(540) 231-0858

Do **NOT** wait until you have completed several weeks of classes, failed exams and you are spiraling downward academically before you contact SSD.

Student Lounge/Homework Room - 310 Robeson

Why Physics???

Physicists and engineers have a different mindset!

Physicists generally discover, document, or explain new physical phenomena.

Engineers generally make use of such phenomena.

Physics trains you to always ask why, to take a concept back to first principles, and to not just accept something without understanding where it comes from. You want to know why.

Physics helps us to **understand how the world around us works**, from can openers, light bulbs and cell phones to muscles, lungs and brains; from paints, piccolos and pirouettes to cameras, cars and cathedrals; from earthquakes, tsunamis and hurricanes to quarks, DNA and black holes.

Physicists are problem solvers. Their analytical skills make them versatile and adaptable so they work in interesting places.

Physics helps you to help others. Doctors that don't understand physics can be dangerous. Medicine without physics technology would be barbaric. Schools without qualified physics teachers cut their students off from a host of well-respected, well-paying careers.

Students who study physics do better on SAT, MCAT and GRE tests. **Physics majors do better on MCATs than bio or chem majors.**

Physics is challenging.

This is one aspect that scares off many students. But it is precisely **one of the most important reasons why you should study physics!**

College physics courses are challenging, because they require you to master the many concepts and skills that make training in physics so valuable in such a wide range of careers.

You can find physicists in industrial and government labs, on college campuses, in the astronaut corps, and consulting on TV shows. In addition, many physics grads work at newspapers and magazines, in government, and even on Wall Street—places where their ability to think analytically is a great asset.

Area Hotels

Please remember to book a year in advance when booking a room for major events. (e.g. beginning of school, end of school, parents weekend, spring break, fall break, football games and graduation)

- The Inn, Virginia Tech Campus (540)231-8000 **(On campus)**
- Hyatt (540) 552-7500 **(.3 miles from my office on campus)**
- Residence Inn (540) 315-7112 **(.3 miles from my office on campus)**
- Hilton Garden Inn, Blacksburg, Virginia (540)552-5636 **(.5 miles from my office on campus)**
- Comfort Suites University, Blacksburg, Virginia (540)552-5636 **(2 miles from campus)**
- Courtyard Marriott, Blacksburg, VA (540) 552-5222 **(6 miles from campus)**
- Holiday Inn at New River Valley Mall, Christiansburg, VA (540)639-4578 **(7.5 miles from campus)**
- Fairfield Inn & Suites by Marriott, Christiansburg, VA (540)381-9597
- Best Western Radford Inn, Radford, Virginia (540)639-3000
- Comfort Inn, Radford, Virginia (540)639-4800
- Comfort Inn, Blacksburg, Virginia (540)951-1500
- Hampton Inn, Christiansburg/Blacksburg, Virginia (540)381-5874
- Holiday Inn Express Hotel and Suites, Christiansburg, Virginia (540)382-6500
- The Hotel Roanoke & Conference Center, Roanoke, Virginia (540)985-5900
- Microtel Inn & Suites, Christiansburg, Virginia (540)381-0500
- Quality Inn, Christiansburg, Virginia (540)382-2055
- Ramada Limited, Blacksburg, Virginia (540)951-1330
- Red Carpet Inn, Blacksburg, Virginia (540)552-4011
- Super 8 Motel East, Christiansburg, Virginia (540)382-7421
- Super 8 Motel West, Christiansburg, Virginia (540)382-5813
- Super 8 Motel, Radford, Virginia (540)731-9355

Bed & Breakfast

- Main Street Inn (540) 552-6246 www.mainstreetinnblacksburg.com
- Collegiate Inn (540) 951-0200 www.ciblacksborg.com

Blacksburg Transit (BT)

Blacksburg Transit provides public transportation to the citizens of Blacksburg, Virginia Tech faculty, staff, and students, and partnering communities within the New River Valley and has been named one of the 10 best small transit systems in North America. Virginia Tech students, faculty, and staff make up 95 percent of the ridership of Blacksburg Transit.

The bus system is tailored to fit the needs of Virginia Tech students and the university community. Riding Blacksburg Transit is fare-free for Virginia Tech students. Virginia Tech students also have unlimited access to all Blacksburg Transit routes.

For more information visit call Blacksburg Transit 540-961-1185 or visit their website.

Virginia Breeze

The **Virginia Breeze** offers daily trips from Blacksburg to Washington D.C. The daily route includes several stops in the New River Valley, Shenandoah Valley and Northern Virginia.

For more information visit the Virginia Breeze website, Facebook, or call 1-877-462-6342.

Blacksburg-Roanoke Smart Way Shuttle

The **Smart Way shuttle** provides service between the Roanoke Valley and the Virginia Tech campus for \$4 each way.

Smart Way monthly passes are available to Virginia Tech students and employees at a discount of 25 percent off the normal price.

For those returning on a Sunday to the Roanoke Regional Airport, a special transfer is available which allows passengers to travel back on the Roanoke/Blacksburg Airport Shuttle for \$4 (regularly priced at \$30). Passengers must get a transfer ticket from the Smart Way driver when travelling to the airport. For updates, schedules, and more information, visit the website call 1-800-388-7005.

Amtrak Train Service

Amtrak's closest station to Virginia Tech is in Roanoke, VA. To get there from campus you can use the Smart Way bus (smartwaybus.com). For more information about Amtrak visit: www.amtrak.com



Home Ride -- Provides weekend and holiday bus service from Radford University, Virginia Tech, James Madison University, and the University of Virginia to Northern Virginia, Richmond, Hampton, Harrisonburg, and Charlottesville.

Home Ride of Virginia
620 North Main Street Suite 304
Blacksburg, VA 24060

(540) 953-2266
(800) 553-6644

College Transit

<http://www.collegetransit.com/>



For over twenty years, CollegeTransit has provided holiday transportation for college students. We proudly serve the students of James Madison and Virginia Tech for the major school holidays including Thanksgiving, Winter and Spring Breaks. We leave directly from each University campus and drop students off at locations in PA, NJ and NY. For specific drop-off and pick-up locations, please see our Locations page.

Our goal is to provide value to students and parents by combining a convenient travel option with an affordable cost. Our prices are often less than what a family would spend on gas, tolls, hotels or airfare - not to mention their travel time to bring their student home. In short, CollegeTransit was created to make getting home for the holidays one less thing to worry about.

Trips are posted in the summer for Thanksgiving, September for Winter Break and December for Spring Break..

"With everything else parents and students deal with going into their first year at college, having CollegeTransit available to bring our daughter home from JMU was a godsend." - JMU parent from CT

"We love using CollegeTransit from Virginia Tech to return home to NJ. I am happy to have my sleep deprived student on a big comfy bus, mostly sleeping, and not being frustrated by the traffic jams on 81! Pick up in PA or NJ is easy!" - Virginia Tech parent from Central New Jersey

Can I balance work and social time?



College is time for preparing for your future and you should make great memories and have a good time, but you **MUST** have balance. You should practice good time management and be a serious student. **ALWAYS** remember why you are here. (Just in case you don't know, it is to get an education.)

For every one **credit hour** in which you enroll, you will spend approximately two to three **hours** outside of class **studying**. Therefore, to help determine the course load most appropriate for you, use the formula: 3 **credit hours** (1 course) = 3 **hours** in class **per week** = 6-9 **hours study time per week**. I recommend that students take between 14 & 16 credits per semester.

168 hours in a week

-16 hours in class per week

-48 hours outside of class per week

-56 hours a week – Sleeping 8 hours a night

-35 hours a week – Meals, Showers & Laundry

13 hours for socializing

168 hours in a week

-14 hours in class per week

-42 hours outside of class per week

-56 hours a week – Sleeping 8 hours a night

-35 hours a week – Meals, Showers & Laundry

21 hours for socializing

Start your time management the first week of classes by...

- ✓ Entering your schedule by day by time.
- ✓ Enter time for breakfast, lunch, dinner & laundry.
- ✓ When you receive your syllabus from each class, enter exams, quizzes and homework dates and times. This will determine which nights should be dedicated to which subjects. **ALWAYS** start your assignments early enough that you can attend office hours and help sessions if you get stuck on a problem.
- ✓ The times between classes are good times to review your notes for that day and it frees up additional time in the evening.
- ✓ Don't waste time!!!!
- ✓ If you decide to spend some time socializing that was previously scheduled for studying you will still need to get the studying in!
- ✓ Don't fall behind because you can't always catch up. Dropping a class will result in summer school or extending your time to graduation.

Things to add to your calendar from your syllabus....

- ✓ Offices hours
- ✓ Additional help sessions
- ✓ Exam dates and times
- ✓ Homework due dates – **ALWAYS** start your homework prior to offices hours before the due date so if you have questions there is time to get help.

15 hours

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	Shower/Breakfast		Shower/Breakfast		Shower/Breakfast		
9AM	PHYS 2305 9:05 AM-9:55 AM	Shower/Breakfast	PHYS 2305 9:05 AM-9:55 AM	Shower/Breakfast	PHYS 2305 9:05 AM-9:55 AM		
10AM	ENGL 1105 10:10 AM - 11:00AM	PSCI 1014 9:30 AM - 10:45 AM	ENGL 1105 10:10 AM - 11:00AM	PSCI 1014 9:30 AM - 10:45 AM	ENGL 1105 10:10 AM - 11:00AM		
11AM							
	MATH 1225 11:15 AM - 12:05 PM		MATH 1225 11:15 AM - 12:05 PM	MATH 1225 11:00 AM - 11:50 AM	MATH 1225 11:15 AM - 12:05 PM		
12PM							
1PM	Lunch & Break	Lunch & Break	Lunch & Break	Lunch & Break	Lunch & Break		
2PM							
	PHYS 2305 Lab 2:30 PM - 4:20 PM	PHYS 2325 02:00 PM-3:15 PM		PHYS 2305 02:00 PM-3:15 PM Add'l Problem Solving			
3PM							
4PM							
5PM							
6PM	Dinner & Break	Dinner & Break	Dinner & Break	Dinner & Break			
8PM							
9PM							
10PM							Green blocks Study Review Notes Do Homework ADD more blocks as needed
11PM							

Building a Resume

Why have a resume? The purpose of a resume is to sell yourself and your best qualities related to the position you are applying for. There are many reasons that you may need a resume while you're in college, including applying for a job, attending a job fair, applying for scholarships, applying to graduate school, applying to REU programs, requesting letters of recommendation, applying for leadership roles (service fraternities, honor societies), applying for internships or coops.

Start keeping track of your accomplishments now so you'll be ready to build your resume when you need to!

Education: universities, community colleges, professional schools (only freshman should include high school education unless it is particularly relevant)

School	City	State	Dates Attended	Graduation Date	Degree Earned

Publications, Poster Presentations, Conferences:

Title	Date	Research Supervisor	Location

Experience: employment, research experience, REUs, coops, internships, teaching/learning assistant positions

Company/Organization	Position/Title	Dates of Employment	Responsibilities

Honors and Scholarships: College of Science scholarships, Physics department scholarships, academic awards and scholarships, Sigma Pi Sigma, Honors program

Name of Award/Scholarship	Date Received	Other Information

Activities: volunteer work, clubs (Astronomy Club, Ladies of Robeson), memberships in organizations (SPS), community outreach positions (Physics Outreach), fraternities/sororities, church positions, leadership roles, band

Club or Organization	Location	Position	Participation Date	Involvement Notes

Stop by Career Services for help starting your resume. You can also bring a draft of your resume to the physics advising office for review!

Cracking the Virginia Tech dining plan code

Select Your Individual Dining Plan - For the next four years, you'll be eating some of the most delicious campus food in the country. How much food? Well, that all depends on how wisely you use your individual dining plan. Flex Plans are designed to provide maximum flexibility (hence the name). They do not provide a fixed number of meals per week like some universities—instead they offer a balance for you to spend like a debit account.

Sometimes you'll go out to dinner, accidentally sleep through breakfast, settle for a bowl of ramen in your room rather than venturing out into the cold or just find yourself unable to get to a dining center, so these plans are not designed to provide all of your meals. But here is a rough approximation based on all-you-care-to-eat meals at D2 at Dietrick Hall:

- Major Flex Plan about 10 meals per week
- Mega Flex Plan about 12 meals per week
- Premium Flex Plan about 14 meals per week

Choosing a Plan - Students who live on campus are required to purchase one of the three Major Dining Plans listed above, which they can only use for their own meals or guests. You cannot, however, use dining plans as a group. You can read more about that in our terms.

If you will be living on campus, your plan will automatically default to Major Flex. However, if you plan on using your plan more, you can upgrade your plan using StarRez.

Going to college is your first step to being on your own, so having a Flex Plan is a perfect way to start learning how to budget your money. Luckily, you can always add Flex Additions later if your budgeting is not so successful at first.

Spring Semester Plans - On-campus and off-campus students with a fall semester dining plan will automatically be assigned and billed for the same dining plan for the spring semester. Students may change their dining plan choice between semesters at StarRez. Off-campus students may cancel their dining plan online prior to the specified deadline.

Using Your Dining Plan - Your Hokie Passport ID card grants you access to many different things, including the gym, Blacksburg Transit, the library and most importantly to us, your dining plan.

Your Hokie Passport is also home to different accounts:

- Flex Dollars: This is the money that comes from purchasing your Flex Plan, required for all on-campus residents. With this account you receive a 50 to 67 percent discount depending on what dining center you're in.
- Dining Dollars: This account is similar to a Flex account in that it works like a debit card system, however, this money only receives a 5 percent discount on the regular cash price. You can also choose how much money you want to invest in this account.
- Hokie Passport Account: An account that allows you to make purchases in on-campus convenience stores, at software distribution, and many other departments and local businesses including on-campus dining centers (but you don't get a discount).

You can also add Flex Additions to your Flex plan in case you run out. Additions receive the same 50 to 67 percent discounts as the initial Flex Dollars.



Our vision is to challenge, support, and inspire undergraduate science students to strive for academic and professional excellence. We will pursue this vision by giving our students opportunities to actively develop skills that are critical to the development of “T-shaped” professionals – with disciplinary depth as well as strength across the skills that the modern workforce demands. We will accomplish this by:

- Helping first-year students successfully transition by providing academic support, skill development, and a sense of belonging to a small community within a large university.
- Providing sophomores, juniors and seniors with opportunities to a) develop leadership and management skills in alignment with employer and graduate school expectations of scientific research and project managers, and b) serve Orion in ways that are integral to enhancing the first year experience.

It is important that applicants have a clear understanding that being a part of Orion is more than just living in the same residence hall with other science majors. Students are required to engage in the community in ways that require a time investment. All Orion first-year students are expected to:

- Enroll in the Successful Starts in Science First Year Experience course series (one course each, fall and spring semesters).
- Fall semester (COS 1015, 1 cr.): This course provides first-year students with a connection to a network of personal, academic, and professional support, as well as exposure to a wide range of opportunities presented by upper-class peers (e.g., study abroad, undergraduate research, internships, professional networking, and service learning through science outreach).
- Spring semester (COS 1016, 1 cr.): First-year students develop collaborative teamwork, interpersonal, and problem-solving skills through participation in the Orion citizen science projects, which are managed and implemented by Orion’s student leaders. In the Peer-to-Peer Project model, first-year students collaborate with second- through fifth-year student leaders in different professional roles on citizen science projects designed to reflect the problem-oriented, peer-run, participatory practices of scientists.
- Participate in community activities that focus on academic and professional development, as well as community-building social and service learning events.
- Participate in a mentoring program in which first-year students share a sophomore mentor with up to six other first-year students in the community. Mentor groups will meet for one hour each week throughout the fall semester.

Please give these requirements careful consideration before applying to Orion, to ensure that this First Year Experience will be a good match for you.

Benefits & Opportunities

- Gain a valuable perspective on college life through peer mentoring.
- Enroll in a First Year Experience course series that promotes academic and professional development through curricular and co-curricular integration.
- Participate in social and professional networking events.
- Participate in citizen science, service learning, and science outreach.
- Have the option to enroll in shared sections of General Chemistry.
- Commit to living and participating within the LLC for one year at a time.

Leadership Opportunities

- First-year students in Orion can apply to return as second-year leaders in the LLC. Student leaders enroll in a Second Year Experience course series focusing on service-based leadership and professional development.
- **Important!** Each year of participation in this LLC builds on previous LLC curricular and co-curricular experience. Therefore, participation in this LLC requires entry at the first year level, with applications to continue in the LLC in each subsequent year.

For additional information, contact Faculty Director, Dr. Lori Blanc, at lblanc@vt.edu.



Student-Centered Active Learning Environment for Undergraduate Programs (SCALE-UP)

The primary goal of the Student-Centered Active Learning Environment for Undergraduate Programs (SCALE-UP) Project is to establish a highly collaborative, hands-on, computer-rich, interactive learning environment for large-enrollment courses.

Educational research indicates that students should collaborate on interesting tasks and be deeply involved with the material they are studying. We promote active learning in a redesigned classroom of 100 students or more. (Of course, smaller classes can also benefit.) We believe the SCALE-UP Project has t

he potential to radically change the way large classes are taught at colleges and universities. The social interactions between students and with their teachers appears to be the "active ingredient" that make the approach work. As more and more instruction is handled virtually via technology, the relationship-building capability of brick and mortar institutions becomes even more important. The pedagogical methods and classroom management techniques we design and disseminate are general enough to be used in a wide variety of classes at many different types of colleges.

Classtime is spent primarily on "tangibles" and "ponderables". Essentially these are hands-on activities, simulations, or interesting questions and problems. There are also some hypothesis-driven labs where students have to write detailed reports. (This example is more sophisticated than most, but shows what the best students are capable of doing.) Students sit in three groups of three students at 6 or 7 foot diameter round tables. Instructors circulate and work with teams and individuals, engaging them in Socratic-like dialogues. Each table has at least three networked laptops. The setting is very much like a banquet hall, with lively interactions nearly all the time. Many other colleges and universities are adopting/adapting the SCALE-UP room design and pedagogy. Engineering schools are especially pleased with the course objectives, which fit in well with the requirements for ABET accreditation.

Materials developed for the course were incorporated into what became the leading introductory physics textbook, used by more than 1/3 of all science, math, and engineering students in the country.

Honors Requirements and Expectations

The Course of Study Planner & GPA

The Course of Study Planner (COSP)

To demonstrate potential to earn an Honors Laureate Diploma, the Honors College expects that students receive approval on their COSP by the end of their first semester in Honors.

GPA

To demonstrate that students can meet the level of academic achievement we expect in Honors, students are required to achieve a 3.60 or better cumulative GPA after two traditional semesters in Honors.

GPA Flex Period

Once students accomplish the above goals, they may enter the GPA Flex Period. The GPA Flex Period is a time in which the Honors College no longer monitors GPA. This gives students the freedom to take academic risks that can become some of their most educational experiences.

Graduation Requirement

Students in the GPA Flex Period must achieve a cumulative 3.30 or better GPA and complete honors diploma requirements. (Students who never receive COSP approval and never enter the GPA Flex Period are required to maintain a 3.60 cumulative GPA after every semester until the planner is approved or upon graduation.)

Honors Diploma Progress

Complete at least thirty honors credits. Elements Two, Three, and Four each require at least six honors credits. Earn honors credit at least once every twelve months and complete the yearly Progress Survey.

Grading Scale

Take courses as A–F unless P/F is the only option.

SCHOLARSHIP OPPORTUNITIES

Honors College offers recruitment, merit, and national scholarship opportunities. Applying for scholarships fosters academic, professional, and personal development, benefiting future applications to jobs, graduate schools, or additional scholarships.

Other opportunities

Virginia Tech's Scholarship Central, through the Office of Scholarships and Financial Aid, makes it easy to apply for other university- and college-level scholarship opportunities managed through that office.

<http://vt.academicworks.com/>

Merit scholarships reward strong academic performance regardless of need.

National Scholarships

Do your research on these!!!!!!

National scholarships recognize students whose leadership and academic achievements are nationally or internationally extraordinary. The Honors College can advise students through the application process, which can be significant yet developmental.

The English-Speaking Union Scholarship

The English-Speaking Union Scholarship is awarded to one junior per state (in this case, Virginia) for summer study in Great Britain. The English-Speaking Union considers the applicant's literary and scholastic ability, physical vigor, character and personality. The amount covers the cost of three weeks of summer study and transportation. Campus deadline is in mid-December. The university can nominate one candidate. Finalists are interviewed in Richmond in early February.

Ford Foundation Fellowships for Minorities include an annual stipend to the student and an institutional allowance in lieu of tuition and fees. Approximately 50 pre-doctoral fellowships are made for research-based doctoral programs in the behavioral and social sciences, humanities, engineering, mathematics, computer science, physical sciences, and biological sciences or interdisciplinary programs consisting of two or more eligible disciplines.

Fulbright US student grant

Fulbright Scholarships are awarded to graduating seniors and graduate students to pursue a research project in their major field at a university in another country (over 70) during a year abroad. The amount includes round-trip transportation, tuition, living expenses, and frequently an accelerated language course. Of particular consideration are language proficiency and careful selection of the site of study for your specific goals. The national deadline is usually the third week in October.

Gates Cambridge Scholarship

The Gates Cambridge Scholarships provide the full cost of studying in Cambridge for one, two, three or in certain exceptional circumstances, four years. The Trust seeks students of exceptional academic achievement and scholarly promise. Students need to demonstrate their ability to make a significant contribution to their discipline. Students apply directly to Cambridge. Their deadline is usually November 1.

Goldwater Scholarship

Goldwater Scholarships award up to \$7,500 per year for tuition, fees, room, board, and books for the junior/senior years to 300 students planning graduate work and a career in science, mathematics, or engineering. The Goldwater Foundation considers scholastic record, research experience, potential in graduate school, and commitment to a research career. The campus deadline is usually before the Thanksgiving break. Contact Christina McIntyre for campus application details.

James Madison Fellowship

James Madison Fellowships provide \$24,000 to support two years of graduate study that lead to a Master's degree in history, political science or related social studies. The applicants must agree to teach secondary school for at least one year for each year of financial assistance. The final deadline is usually early March.

Marshall Scholarship

Marshall Scholarships allot approximately \$40,000 per year (tuition, fees, room board, transportation, books) to 40 seniors for two years of graduate study at any university in the United Kingdom. Marshall Scholars have a distinguished academic record, strong leadership, significant community service, and a focused program of study for graduate school. The campus deadline is early September. The national deadline is very early October. Due to the timing and components of the application, and the specifics of the campus process, students are encouraged to contact Christina McIntyre in early/mid-Spring semester of their Junior year to discuss the application process.

George J. Mitchell Scholarships provide one year of study at any university in Ireland in the student's chosen field. The Mitchell Scholarship was established to educate future American leaders about the island of Ireland. The campus deadline is early September. The national deadline is early October.

National Science Foundation Graduate Research Fellowship Program

The NSF Graduate Research Fellowship Program (GRFP) helps ensure the vitality of the human resource base of science and engineering in the United States and reinforces its diversity. The program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited United States institutions.

Fellows benefit from a three-year annual stipend of \$34,000 along with a \$12,000 cost of education allowance for tuition and fees (paid to the institution), opportunities for international research and professional development, and the freedom to conduct their own research at any accredited U.S. institution of graduate education they choose.

NSF Fellows are anticipated to become knowledge experts who can contribute significantly to research, teaching, and innovations in science and engineering. These individuals are crucial to maintaining and advancing the nation's technological infrastructure and national security as well as contributing to the economic well-being of society at large.

Eligibility

Current undergraduate senior applying for graduate study for the following year or a first or second year graduate student

U.S. citizen, U.S. national or permanent resident

Intend to pursue a research-based Master's or Ph.D. program in a GRFP-supported field

Be enrolled in an eligible program at an accredited United States graduate institution, with a US campus, by the following fall

Have completed no more than twelve months of full-time graduate study (or the equivalent) as of August 1, 2016

Effective as of the 2017 competition (Fall 2016 deadlines), graduate students are limited to only one application to the GRFP, submitted either in the first year or in the second year of graduate school. An exception is provided for first-year graduate students who applied in Fall 2015 to the 2016 GRFP competition; these individuals may apply as second year graduate students in Fall 2016 to the 2017 GRFP competition, if they are otherwise eligible

Candidates are encouraged to work with a faculty mentor and begin the application in early July or August to allow time to develop the application materials. Candidates are encourage to contact [Christina McIntyre](#) for additional guidance.

Rhodes Scholarship

Rhodes Scholarships provide support for tuition, fees, room, board, transportation, books to 32 seniors for two years of graduate study at Oxford University. The Rhodes Foundation looks for seniors with very strong academic records, integrity of character, physical vigor, demonstrated leadership, and extensive public service. Alumni can also apply but must not have reached the age of 24 by October 1 of the application year. Applicants selected to be endorsed by the University will prepare for the national application. For more information about the Rhodes scholarship go to: <http://www.rhodesscholar.org>. Due to the timing and components of the application, and the specifics of the campus process, students are encouraged to contact [Christina McIntyre](#) in early/mid-Spring semester of their Junior year to discuss the application process.

Truman Scholarship

The Harry S. Truman Scholarship recognizes college juniors for demonstrated leadership potential and a commitment to public service. The scholarship, in the amount of \$30,000, applies towards the scholar's graduate education. The purpose of the Truman scholarship is to identify people with potential to become leaders and to provide them the support to help them realize their aspirations.

Eligibility

Full-time student pursuing a bachelor's degree with junior-level academic standing

Be in the top quarter of your school's academic ranking

U.S. citizen (or a U.S. national) or expect to receive citizenship by the date the Scholarship will be awarded. Candidates must have career goals that seek to serve society. The Truman foundation is looking for motivated candidates that will be agents of change in the future. Candidates should have plans to seek advanced graduate or professional study. Strong record of engagement in community service and extracurricular engagement.

Udall Undergraduate Scholarship

The Udall Foundation seeks future leaders across a wide spectrum of environmental fields, including policy, engineering, science, education, urban planning and renewal, business, health, justice, and economics. Additionally, the Foundation seeks future Native American and Alaska Native leaders in Native American health care and tribal public policy. In addition to financial funding up to \$7,000 for academic expenses, the scholarship provides access to the Udall Alumni network and a four-day scholar orientation in Tucson, AZ.

Eligibility

Be a US citizen, US national, or US permanent resident

Be a sophomore or junior-level student pursuing full-time study towards a bachelor's or associate's degree during the academic year of application

Have a college grade-point average of at least a "B" or the equivalent

Scholarships are offered to students in one of the following categories:

Tribal Policy: For American Indians and Alaska Natives working on an array of policy issues in Indian country

Native Health Care: For American Indian and Alaska Natives pursuing health-related **careers**

Environment: For undergraduates interested in conservation and environmental issues

I think I want to go to GRADUATE SCHOOL.

What should I be doing now to prepare??

Freshman Year

- ☐ Visit the advising office in order to ensure that you're on the correct degree path. The advising office is in Robeson 222.
- ☐ Begin making connections with professors and consider who you'd like to do research with. Utilize office hours for academic help and to develop relationships with faculty mentors.
- ☐ Consider participation in extracurricular activities to expand your horizons and diversify your resume. Some great options include Society of Physics Students, Astronomy Club, Physics Outreach, and community service programs (many opportunities can be accessed through VT Engage).
- ☐ Consider participating in undergraduate research (ask your advisor for more information). This can be accomplished by taking part in:
 1. Research with a faculty member in the physics department
 2. Physics Research Experiences for Undergraduates (Physics REUs offered during the summer)
 3. Internships
 4. Co-ops

Sophomore Year

- ☐ Keep your GPA up. Consider that graduate schools look at your cumulative GPA as well as your in-major GPA.
- ☐ Connect with your professors in office hours, in research labs, and during class. You will be asking some of these professors for letters of recommendation when you apply to graduate school.
- ☐ Participate in research (see options above).
- ☐ Get involved in extracurricular activities (see options above).

Junior Year

- ☐ Begin researching graduate schools. Check out the big book of graduate schools in the advising office or do some research online.
- ☐ Prepare to study for and take the appropriate standardized tests. If you want to get a graduate degree in physics, you'll need to take the General GRE and the Subject GRE. Decide how you will study: with a group, on your own, using books, using a prep class. Make sure to give yourself plenty of time to study!
- ☐ Plan to take your **Subject GRE** in the Fall of your Senior year (this exam is only offered **once** per semester). Visit www.ets.org for dates and registration information.
- ☐ Plan to take your **General GRE** by October of your Senior year. There are several dates offered for this exam. Visit www.ets.org for dates and registration information.
- ☐ Begin thinking about who you will ask for letters of recommendation.

Summer before Senior Year

- ☐ Register for your Subject GRE and your General GRE at www.ets.org.
 - ☐ Be sure to request any necessary special accommodations ahead of time.
- ☐ Study for GREs!
- ☐ Begin developing a resume for use when applying to graduate school. Include REU's, internships, coops, research, publications, awards, clubs, leadership roles, community service, conferences attended, poster presentations, and other relevant experiences. Visit Career Services or the physics advising office at Robeson 222 for help with your resume.

Fall of Senior Year

- ☐ Decide which graduate programs you will apply to.
- ☐ **Take Subject GRE** (there is only one offered per semester so be sure to register ahead of time).
- ☐ **Take General GRE.**
- ☐ Write your personal statement. Visit the physics advising office for assistance editing your personal statement.
- ☐ Complete graduate school applications.
- ☐ Request letters of recommendation. Don't wait until the last minute since your professors are very busy! Request letters at least 3-4 weeks in advance. Typically professors will upload these letters online for the graduate schools, so students don't actually see these letters.
- ☐ Contact the registrar's office to request transcripts.
- ☐ Complete application packets and turn in.

Spring of Senior Year

- ☐ Complete any remaining application packets and turn in.
- ☐ You will start receiving acceptance/rejection letters. Be sure to check your spam box for emails from prospective schools.
- ☐ Visit schools of interest. Plan ahead and make appointments with key individuals and prepare appropriate questions based on careful homework.
- ☐ Make sure you have completed your FAFSA form if you want to apply for need-based financial assistance. Financial awards of a "merit" nature will generally be included in your letter of acceptance.
- ☐ Generally, most students accept one of their offers by May 1. By accepting an offer and paying a deposit, you are indicating that you have decided not to accept any other offers. Accepting more than one offer to keep your options open longer is not an ethical strategy.

What are graduate schools looking for? Typically, graduate schools place special importance on your grades in physics courses, your grades over your last 60 credit hours, your GRE Subject Test score, and your ability to do research.

What can I do with a degree in physics?

A physics education provides a unique way of looking at problems that many employers value, a marketable set of skills, and foundational knowledge on which it is easy to build new knowledge as one's career evolves over time. Individuals with a bachelor's degree in physics who get hired into positions with engineering or computer science job titles get paid the same salary as those who earned bachelor's degrees in those fields. A physics degree tells a prospective employer that you are a person who has the background, knowledge and drive to succeed in broad range of scientific or technical fields.

The following **job titles** were obtained from surveys conducted by the **Statistical Research Center of the American Institute of Physics of physics bachelor's recipients**, as reported on <https://www.aip.org/statistics/common-job-titles-physics-bachelors>. **Average salaries** were obtained using various sources including indeed.com, simplyhired.com, and glassdoor.com in 2018.

Engineering

- Systems Engineer (\$91,214)
- Electrical Engineer (\$74,287)
- Design Engineer (\$72,294)
- Mechanical Engineer (\$70,146)
- Project Engineer (\$70,932)
- Optical Engineer (\$91,350)
- Manufacturing Engineer (\$70,622)
- Manufacturing Technician (\$52,000)
- Laser Engineer (\$70,892)
- Associate Engineer (\$71,000)
- Application Engineer (\$83,123)
- Development Engineer (\$80,987)
- Engineering Technician (\$55,825)
- Field Engineer (\$63,751)
- Process Engineer (\$88,382)
- Process Technician (\$49,874)
- Product Engineer (\$69,000)
- Product Manager (\$111,650)
- Research Engineer (\$86,387)
- Test Engineer (\$74,331)
- General Engineer (\$84,603)
- Technical Services Engineer (\$76,224)

Computer

Hardware / Software

- Software Engineer (\$90,374)
- Programmer (\$64,537)
- Web Developer (\$67,097)
- IT Consultant (\$74,720)
- Systems Analyst (\$72,670)
- Technical Support Staff
- Analyst (\$66,565)

Education

- High School Physics Teacher (\$53,909)
- High School Science Teacher (\$49,778)
- Middle School Science Teacher (\$51,186)

Research and Technical

- Research Assistant (\$68,255)
- Research Associate (\$50,131)
- Research Technician (\$38,830)
- Lab Technician (\$37,555)
- Lab Assistant (\$32,480)
- Accelerator Operator
- Physical Sciences Technician (\$45,000)

The following **job titles** are currently held or were previously held by **VT physics alumni**. **Average salaries** were obtained using various sources including indeed.com, simplyhired.com, and glassdoor.com and LinkedIn .

- Account Manager (\$78,678)
- Air Force Officer (\$104,900)
- Analyst (\$66,565)
- Assistant Project Manager (\$86,448)
- Associate (\$95,000)
- Associate Director of Modeling and Informatics Group
- Associate Scientist (\$69,339)
- Associate Technical Director (\$118,378)
- Big Data Scientist (\$100,000+)
- CAD Engineer (\$89,302)
- Census Specialist (\$62,965)
- Computational Patterning (\$110,000)
- Computational Patterning Engineer
- Consulting Systems Engineer (\$145,742)
- Consultant (\$88,305)
- CVA Trader (\$102,000)
- Cyber Risk Consultant (\$128,000)
- Data Analyst (\$62,379)
- Data Scientist (\$118,709)
- Deployment Strategist
- Director of Attraction Operations (\$89,000)
- Editor (\$51,613)
- Electrical Technician (\$53,076)
- Engineer (\$75,867)
- Engineering Manager (\$130,491)
- Engineering Scientist (\$98,802)
- Engineering Technician (\$55,825)
- Fashion Designer (\$57,745)

- Field Engineer (\$63,751)
- Financial Advisor (\$55,471)
- Financial Analyst (\$63,793)
- Financial Software Developer (\$101,006)
- Flight Assurance Engineer
- Flight Assurance Manager
- FTR Analyst/Trader (\$118,653)
- G&C Test Software Engineer
- High School Physics Teacher (\$53,909)
- Independent Consultant (\$87,000)
- Independent Online Media Professional
- Industrial Engineer(\$65,829)
- Information Systems Engineer (\$79,878)
- I&T Alignment Engineer
- JR Systems Engineer (\$63,399)
- Laboratory Technician (\$38,000)
- Law Clerk (\$58,870)
- Lead Communication Systems Engineer
- Legal Assistant (\$45,000)
- Liquid Engine Systems Analyst
- Litigation Support Analyst (\$46,839)
- Litigation Support Specialist (\$56,621)
- Mechanical Design Engineer (\$74,095)
- Member of the Technical Staff (\$94,000)
- Military Officer (\$91,350)
- Modeling and Simulation Team Leader
- Naval Officer (\$90,838)
- Observatory and Education Director
- Operations Analyst (\$56,686)
- Optical Engineer (\$91,350)
- Paralegal (\$48,720)
- Patent Attorney (\$142,608)
- Patent Examiner (\$79,742)
- Physicist (\$113,960)
- PMO Configuration Management Analyst (\$80,352)
- Principal Scientist (\$121,860)
- Product Developer (\$72,478)
- Product Manager (\$111,650)
- Professional Staffer on Education (House of Reps)
- Program Support Geophysicist
- Project Leader/System Engineer
- Project Manager (\$96,425)
- Projects Program Administrator (\$60,000)
- Proposal Coordinator (\$55,742)
- Quantitative Researcher (\$129,501)
- R&D Test Lab Manager
- RF Engineer (\$72,258)
- Research Associate (\$50,131)
- Research Engineer (\$86,387)
- Research Scientist (\$77,238)
- Research Technician (\$38,830)
- RF Engineer (\$72,258)
- SAP Spending Chain Consultant
- Scientist (\$88,753)
- Senior Healthcare Transactions Associate
- Senior Principal Scientist (\$146,950)
- Senior Quality Engineer (\$83,000)
- Senior R&D Engineer (\$101,234)
- Senior Research Analyst (\$72,020)
- Senior Research Scientist (\$98,664)
- Senior Scientific Computing Associate
- Senior Scientist (\$99,675)
- Senior Test Engineer (\$90,881)
- Software Developer (\$86,226)
- Software Engineer (\$90,374)
- Software Systems Engineer (\$90,881)
- Space Intelligence Surveillance and Reconnaissance Systems Analyst
- Spacecraft Project Engineer
- Staff Scientist (\$86,652)
- Strategy Consultant (\$99,874)
- System Analyst (\$72,670)
- Systems Engineer (\$91,214)
- Technical Services
- Test Technician (\$46,451)
- Tier 3 Functional Designer
- Virtual Systems Engineer (\$111,358)

Employers who recently hired 3 or more physics bachelors

- 3M
- Accenture
- Accruent
- Adecco USA
- Aerotek
- Amazon
- American Museum of Natural History
- Apple
- Autoliv
- BAE Systems
- Bain & Company
- Battelle
- Bloomberg LP
- Boeing
- Booz Allen Hamilton
- Broad Institute of MIT & Harvard
- Capital One
- Cerner Corporation
- Cisco Systems
- Deloitte
- Department of Defense
- Deutsche Bank
- Eaton Corporation
- EMC Corporation
- Emerson Process Management
- Epic Systems
- Exelon Corporation
- GE Aviation Systems
- Gemini Observatory
- General Electric
- General Motors
- GlobalFoundries
- Goldman Sachs
- Google
- Guided Discoveries, Inc.
- Halliburton
- Hewlett-Packard
- IBM
- Intel
- InterSystems Corporation
- Jet Propulsion Lab
- John Deere
- Johns Hopkins - Applied Physics Lab
- L-3 Communications
- Lawrence Berkeley National Lab
- Leidos
- Lockheed Martin
- Los Alamos National Laboratory
- Massachusetts General Hospital
- Mevion Medical Systems
- Micron Technology
- Microsoft
- MIT Lincoln Lab
- Museum of Science, Boston
- National Aeronautics and Space Administration (NASA)
- National Institute of Standards and Technology (NIST)
- National Institutes of Health (NIH)
- National Instruments
- NAVAIR
- Naval Surface Warfare Center
- Northrop Grumman
- NYU Langone Radiology at Center for Biomedical Imaging
- Oak Ridge Institute for Science and Education
- Oak Ridge National Lab
- Oliver Wyman
- Pace Analytical Services
- Pacific Northwest National Laboratory
- Raytheon
- Rockwell Collins
- Schneider Electric
- SLAC National Accelerator Lab
- Smithsonian Astrophysical Observatory
- Space Telescope Science Institute (STScI)
- Sylvan Learning Center
- Thor Labs
- Underwriters Laboratories (UL)
- United States Air Force
- United States Army
- United States Marine Corps
- United States Navy
- United States Patent and Trademark Office
- University of California, Berkeley
- University of Chicago
- University of Washington

This is only a portion of the employers who hired recent physics bachelors into technical positions.

<https://www.aip.org/statistics/multiple>

**Alumni Graduate
Programs
2010 - Present**

Academy of Interactive Entertainment
Air Force Institute of Technology
Alabama
Arizona State University
Boston University
CalTech
Clemson
Colorado State
Columbia
Cornell
Duke
Emory
Florida State
George Mason
Georgia Tech
Hampton University
Harvard
Instituto de Astrofísica de Canarias (Spain)
Iowa State
Johns Hopkins
Louisiana State
Marshall
MIT
New Mexico State
North Carolina State
Northwestern

Old Dominion
Parson School of Design
Penn State
Princeton
Rensselaer Polytechnic Institute
Rice University
Rochester Institute of Technology
Ruhr University Bochum
San Diego State
Southern Methodist
SUNY
Syracuse
Tennessee State
Texas A & M
The Ohio State
Towson University
University of Akron
University of Alabama
University of Arizona
University of Bonn
University of British Columbia
University of Buffalo
University of California - Davis
University of California - Irvine
University of California - Los Angeles
University of California - San Diego

University of Colorado Boulder
University of Denver
University of Hawaii - Hilo
University of Illinois at Urbana - Champaign
University of Maryland - Baltimore
University of Maryland - College Park
University of Michigan
University of Minnesota
University of Missouri - Saint Louis
University of North Carolina
University of Oregon
University of Pennsylvania
University of Pittsburgh
University of Rochester
University of South Carolina
University of Southern California
University of Tennessee - Knoxville
University of Texas Austin
University of Toronto
University of Washington - Seattle
University of Wisconsin - Madison
UVA
Vanderbilt
Virginia Commonwealth
Washington State University
William and Mary

Employers of VT Physics Graduates 2010 - Present

ABB	Federal Mogel	Pfizer
Accenture	Gartner	Pisco Sin Fronteras
Agilent Technologies	General Dynamics	Praemittias Group
Agilex	GeoEye Analytics	Praxis Engineering
Amazon	Global Foundries	Qualcomm
American Society of Clinical Oncology	Goldman Sachs	Revware Systems, Inc
American Systems	Google	Ripley Entertainment
AOL	Government Contractors	Rohm and Haas
AstraZenca	Grakon	RTL Electric
Athena Health	Hiossen Dental Implants	SAIC
Attorney Offices	HubStop	School Systems & Community Colleges
AT&T	IBM	SEAKR Engineering
BAE	ING	Semtech
Bank of America	Intel	SimEx-Iwerks Entertainment
Baker Hughes	ITECK	Sky-Skan, Inc
Berkeley Institute for Data Science	ITT	Soft Tech Consulting
BioTork	Jefferson Lab	Sotera Defense Solutions, Inc
Bioware	Johnson Controls	Space Frontier Foundation
Bloomberg	KAIO	SPADAC
Booz Allen Hamilton	KAVLICO - Moorpark, CA	STMicroelectronics
BP	Kennedy Kreiger Institute	Super Evil Megacorp
CACI International	Law Firms	SwiftStack - San Francisco
Capital One	Lawrence Berkeley National Lab	Symetrica
CDL Nuclear Technologies	Living Social	Systems Planning & Analysis, Inc
Certipath	Los Alamos National Lab	Teachers
CISCO	Man-Machine Systems Assessment	Teris
Clerestory Consulting LLC	Merrill Lynch	The Aerospace Coporation
Credigy	Metron	The Climate Corporation
Credit Suisse	Microsoft	The Mitre Corp
Dahlgren Naval Surface Warfare Center	Military	Theta Tech Solutions
Dart Neuroscience LLC	Millennium Pharmaceuticals	T-Mobile
DC Energy	NASA	TRW
Deloitte	National Institutes of Health	United States Patent Office
Delta Products Coporation	Naval Surface Warfare	Universities
DiAmante Industries	NIST	URS Corporation
DLA Piper	Noblis	Various Federal Government Agencies
DLH	Norfolk Naval Shipyard	Verizon
Dupont	North American Lighting	ViaSat
Emergent Space Technologies	Northop Grumman	VITESSE - Camarillo, CA
Engility Corporation	Nuvotronics	Wayfair
EOIR Technologies	Oak Ridge National Lab	Weather Analytics
Epic Technical Services	Palantir Technologies	Wyle
Faculty	Pangborn	
Fedbid	Patent Attorney Office	

RESOURCES FOR VT PHYSICS MAJORS & MINORS

Physics Tutors/ SPS Lounge	Receive tutoring from a Physics graduate student; tutoring can cover any Physics or Math courses for your major – Monday – Thursday – 10am – 8pm	Robeson 310
Private Tutoring	Private tutoring from a Physics graduate student – typically costs \$20-\$30 per hour	Contact Betty Wilkins at bewilki2@vt.edu or visit Robeson 222F
Chemistry Learning Center	Lecture and lab help sessions for CHEM 1035/1045 and 1036/1046	
Writing Center	For help with ENGL 1105/1106 assignments and any other writing assignments	Second floor of Newman Library, call (540)231-5436 to make an appointment
Professor Office Hours	One-on-one help from your professor	See syllabus for specific office hours; if none of these times work in your schedule, email the professor for appt
Student Success Center	Academic support, tutoring, study skills seminars, academic coaching, reading assessment and assistance	<u>Phone</u> : 540-231-5499 110 Femoyer Hall <u>Email</u> : studentsuccess@vt.edu www.studentsuccess.vt.edu
Physics Advising	Assistance with 4-year plan, scheduling classes, planning for summer school, current academic challenges, academic probation, research opportunities, scholarships, planning for graduate school, majors and minors, course withdrawal	visit Robeson 222
5 Year B.S/M.S. in Physics Advising	Assistance planning for a 5 year B.S./M.S. in Physics at VT	Contact Betty Wilkins at bewilki2@vt.edu or visit Robeson 222F
Cook Counseling Center	Individual counseling, group counseling, career counseling, study skills counseling, brief psychotherapy, crisis intervention, medical and psychiatric referral	<u>Phone</u> : 540-231-6557 <u>Main office</u> : McComas Hall, Room 240 <u>Satellite Office</u> : East Eggleston, Rm107 http://www.ucc.vt.edu/
Career & Professional Development	Explore careers/majors, job search, look into graduate/professional school, graduate student job search, health professions advising	<u>Phone</u> : 540-231-6241 Corner of Washington Street and West Campus Drive, 870 Washington St SW www.career.vt.edu
Services for Students with Disabilities (SSD)	Assists students with disabilities, offering assistance with identification and accommodation of disabilities	<u>Phone</u> : 540-231-3788 Lavery Hall, STE 310 <u>Email</u> : ssd@vt.edu www.ssd.vt.edu
Schiffert Health Center	<i>Preventative and curative services, including care for acute illnesses and injuries as well as more chronic conditions</i>	<u>Phone</u> : 540-231-6444 Located in McComas Hall, 895 Washington St, SW www.healthcenter.vt.edu