

UNIVERSITY PROPOSAL SAMPLES

Appalachian State University: The Institution and Physics Department

Appalachian state University (ASU) is a mid-sized regional state university serving approximately 15,000 students representing every section of North Carolina, as well as other states and nations. Originally a teacher's college, ASU broadened its mission to include the liberal arts, and in 1971, became a part of the University of North Carolina system. ASU now offers 96 undergraduate and 78 graduate majors and has consistently placed as one of the top 15 schools of its kind in the southeast, as ranked by *US News and World Report* and other agencies. ASU's primary mission is one of quality instruction, seeking to promote the intellectual, personal, and cultural development of its students. Appalachian's Reich College of Education host the state's largest Teaching Fellows program and has graduated approximately 20 percent of the state's public school teachers and personnel. The university has a strong commitment to the sciences. Construction of a new building for the physics and chemistry departments was completed in May 1998. Since that date, the computer science department has joined the facility.

The Physics Department was established in 1963 with the introduction of the BS in teaching. The department grew rapidly to include a BA and BS in Applied Physics. In 1988, the MS in Applied Physics was added. In the early 1980's the addition of a research observatory established the Astronomy program at ASU, thus creating the Physics and Astronomy Department. At present, there are 13 full-time faculty, 6 staff, and 9 graduate students. There are approximately 50 undergraduate physics majors and 60 pre-engineering majors in the department. Between 2003 and 2005, 37 undergraduate students earned either a BA or BS in Physics and 10 graduate students received their MS in Applied Physics.

The Physics and Astronomy Department offers introductory courses for non-science majors (1101-2) and science majors (1103-4, 1150-1). Intermediate courses include intermediate physics (2010-20), modern physics (3210-1), observational astronomy (2001-2), intermediate lab (2210), electronics (2700, 3000), thermal physics (3230), environmental physics (3140), meteorology (3533) and medical physics (4820). Upper level courses include classical mechanics (3010), electromagnetic theory (3020), astrophysics (3100, 3200), advanced electronics (3630, 3730, 4635, 4735), quantum mechanics (4640), optics (4620), and senior seminar (4210). Students may also choose to pursue departmental honors. Students are encouraged to engage in experimental research with faculty members. Current research opportunities that are available include: atomic and molecular physics, applied electrostatics, scanning probe microscopy, nanotribology, computational physics in fluid/sediment transport, stellar spectroscopy, eclipsing binary stars, and the use of Appalachian's Dark Sky Observatory.

ASU and the National Institute of Standards and Technology

Our students are strongly encouraged to broaden their scientific study through research opportunities outside the university. A summer internship at the National Institute of Standards and Technology provides just such an opportunity for ASU students. The quality and variety of programs in the numerous labs to which they will be exposed during the summer at NIST will be invaluable in encouraging students' scientific interests.

As a result of their work at ASU, these students will bring to NIST a strong liberal arts background including a strong foundation in science, a high level of enthusiasm and motivation and an excellent ability to learn. Their summer experience will in turn benefit ASU as they students bring back to the university both knowledge and enthusiasm to share with other future science professionals. Our students present colloquia at the university every fall after they return from NIST. They also present their summer research at regional and national conferences. The work accomplished during their summer research experience is often quite impressive.

The Funding Request

Students nominated:

Elvis Presley
Tom Selleck
Angelina Jolie

Appalachian State University requests the funding of five students for the Summer Undergraduate Research Fellowship program at NIST during the summer of 2005. These students are All of the students have excellent academic backgrounds, and all of these students except for ... are physics majors. The physics majors have either committed to or are strongly considering attending graduate school in physics or related fields.

??? is an excellent physics student, and he plans to go to graduate school in engineering after graduation. His areas of interest at NIST are either physics or manufacturing engineering. He hopes to have a career in auto engineering. ??? is an honors student and a teaching fellow. He is a very gifted student who also works as a tutor in physics and mathematics. He is highly motivated and ambitious, and would make an excellent addition to a physics research lab. ??? has many interesting hobbies that have led to hands on experience in computer programming (fortran), computer construction, and electrical wiring. This experience would enable him jump right in to a research lab. He is especially interested in working in the optics and laser research going on at NIST, and plans to pursue a Ph.D. in these fields after graduation. ??? served in the military for several years before coming back to college for a physics degree. He is highly self motivated and has a well-developed work ethic in addition to practical experience thanks to his military background. He plans to go on for a Ph.D. in physics, and is especially interested in the atomic physics research at NIST. ??? is a math major with physics minor who is planning on a graduate degree in applied math or physics. She has expressed a willingness to work in any available lab, but is especially interested in a modeling or computational project that will utilize her math background.

These students will work on research projects at NIST for 11 weeks and will be involved in independent research and research seminars at ASU following this summer period. As with every previous year, the students will also be asked to present their summer research at state and national conferences. These students were selected for their personal qualities and high level of ability as well as interests in physics, math, chemistry and engineering.

During the past ten years, the Department of Physics and Astronomy at Appalachian State University has been successful in placing students in the SURF program each summer. These students have been uniformly enthusiastic about their experiences and have gone on to graduate school and jobs to pursue their interest in research that was so well fostered at NIST.

SAMPLE UNIVERSITY PROPOSAL

I am forwarding for consideration a complete packet for undergraduate student **XXX**, Department of Computer Science; **XXX**, Department of Physics; and **XXX** and **XXX**, Department of Chemistry, for the SURF summer fellowship program.

The College of William and Mary, one of the nation's premier state-assisted liberal arts universities, believes that excellence in teaching is the key to unlocking intellectual and personal possibilities for students. Dedicated to this philosophy and committed to limited enrollment, the College provides high-quality undergraduate, graduate and professional education that prepares students to make significant contributions to the Commonwealth of Virginia and the nation. William and Mary ranks first among American public universities in terms of commitment to undergraduate teaching, according to *U.S. News and World Report*. It is also the highest ranked small public university in the country.

Computer Science Department

Computer Science at the College of William and Mary is a collegial and active research department, offering B.S., M.S., and Ph.D. degrees. It emphasizes both strong scholarship and high quality teaching. Its research strengths are in the areas of computer systems, scientific computing, performance modeling, and algorithms. The department is equipped with a state-of-the-art computing environment for experimental research and education.

The Undergraduate Program

Computer science is the study of algorithms and data structures for representing and processing information using computers. Additionally, computer science examines the logical organization of computers themselves. Questions, which arise, include the following. Given the enormous difficulty of writing large programs, what kinds of computer languages can be easily specified, easily understood, and yet mechanically translated? What are the most advantageous ways of distributing computing loads over a collection of distributed processors? Are some functions inherently harder to compute than others? Do functions exist which cannot be computed? How is knowledge best represented in a computer?

Research

The Computer Science Department provides a strong research program with faculty actively engaged in research in the following areas: algorithms, artificial intelligence, computer systems, high performance computing, modeling and simulation, programming languages, scientific computing, and scientific visualization. It also offers multidisciplinary research opportunities in Computational Science and Computational Operations Research. Some faculty and students participate in joining research activities with two nearby national research facilities: the NASA Langley Research Center (NASA LaRC) and the Thomas Jefferson National Accelerator Facility (Jefferson Lab).

Physics Department

The department consists of thirty members on the instructional faculty, together with approximately fifteen additional physicists in purely research positions. The research areas in the department include atomic, molecular, and optical physics, computational physics, condensed matter physics, nuclear and particle physics, and plasma and non-linear physics. Related research areas include accelerator physics (in cooperation with Jefferson Lab and material characterization (in cooperation with NASA-Langley Research Center). The department offers a

wide range of undergraduate and graduate courses of instruction. It also has strong links with the interdisciplinary Applied Science Department and Computational Science Cluster.

The Undergraduate Physics program at the College of William and Mary offers a wide variety of courses and encourages faculty-student interaction. Seniors are required to do a research project with a faculty member, to write the results in article form and to give a presentation on their work. Qualified seniors may choose to do a research project leading to a degree with Honors in Physics. We have an active chapter of the Society of Physics Students.

Chemistry Department

The rigorous undergraduate program of the Department is built upon a foundation of conscientious teaching. The chemistry curriculum begins with the development of general principles of chemistry and then utilizes and elaborates these principles within courses in organic, physical, inorganic, and analytical chemistry taken in the second and third years. The last two semesters serve as a capstone involving both advanced course work (selected on the basis of interest) and research. Students with strong backgrounds in chemistry from secondary schools may begin their study at an advanced level.

A number of concentrators earn credit through research engaged under the guidance of a department faculty member. Normally this work begins during the second semester of the junior year and extends through the senior year, with many students taking advantage of opportunities to work during the interim summer period as well.

A seminar program featuring scientists from other colleges/universities, industry, and Government agencies complement the academic program.

The Chemistry program is approved by the Committee on Professional Training of the American Chemical Society, and therefore graduates may be designated as having an ACS Certified degree in Chemistry. The student-run Chemistry Club is affiliated with the American Chemical Society. Since 1979 the College has graduated the highest number of ACS certified students in Virginia. The requirements for a concentration in Chemistry allow room for a wide variety of electives to attain a broad liberal arts education or other educational goals. Chemistry concentrators enjoy a wide range of career options upon graduation. Many go directly into professional chemistry as employees of private industry, governmental agencies, or educational institutions. Others go on to medical school, dental school, graduate school in chemistry, biochemistry, chemical engineering, materials science, law, or business. Departmental alumni include university professors, research scientists, physicians, lawyers, dentists, executives, directors of research, secondary school teachers, and administrators.



February 7, 2006

Ms. Anita Sweigert
National Institute of Standards and Technology
100 Bureau Drive, Stop 8400
Gaithersburg, MD 20899-8400

Dear Ms. Sweigert:

Santa Monica College (SMC) is a very large, urban public community college, located on the West Side of Los Angeles. The college currently enrolls more than 30,000 students each semester. Our students reside in communities throughout the greater Los Angeles area, one of the largest, most culturally diverse, and most densely populated urban areas in the United States.

Santa Monica College enjoys a reputation as one of the premier community colleges in California and, perhaps, in the nation. According to a recent survey, more than 65% of SMC's full-time students indicated that their goal was to transfer to a four year institution and they are succeeding in their quest: for the ninth straight year, SMC leads all California community colleges in the total number of transfer to the University of California (UC) system and the University of Southern California (USC). The college also leads in the number of transfers of the African American, Latino, and disabled students to these institutions. Significantly, each group is represented in the transferring population in about the same proportions in the student body.

SMC students who have been tracked after leaving SMC are generally very successful. They are respected by their employers, and maintain their grade point averages, and frequently have a higher rate of entry into graduate and professional schools than so-called "native students" who begin their college careers at the UC or CSU. In fact, students transferring in the sciences and mathematics are especially widely reported to outshine their "native" competitors in their upper division work at UCLA and UC Berkeley, our two largest transfer institutions, even though "native" students are initially screened for a much higher level of entry qualifications.

The success of SMC students is also directly attributable to the teaching philosophy of the college commits considerable effort to assisting all faculty in their development as teachers. This commitment is critical as the students continue to become more diverse in their skills, knowledge, and learning styles.

The faculty and staff of SMC's Physical Science Department are an extremely diverse and talented group of people. Fourteen out of eighteen full-time faculty members have doctorates from some of the best research universities in the world. These credentials are combined with a zeal and zest for teaching that translates into student success. Their commitment to turning out tomorrow's researchers and scientists is extremely high. Please refer to the brief biographies of our Physical Science Department faculty, which are attached to this narrative.

The Physical Science Department at SMC consists of three programs: a chemistry program, a physics program, and a small engineering program. All of the courses in the Physical Science Department strive to illustrate the "Scientific Method" to our students. We continually try to place our particular specialties into the larger context so that our students might see connections where they previously saw none.

SMC also emphasizes student-teacher contact. Students have direct contact with full professors, not graduate students, in laboratory experiments and discussions groups, in office hours and as readers of their papers. In fact, our students write more analytical papers than their UC counterparts. SMC also offers extensive laboratory experience for our lower division science undergraduates. For example, SMC chemistry and physics majors are required to participate in a small group original research project.

The Physical Science Department provides an extremely rigorous two-year program of university-level chemistry and physics. Our courses transfer to four-year institutions for students with majors such as anthropology, astronomy, biology, chemistry, engineering, geography, geology, physics, pre-med, pre-vet, pre-dental, nursing, etc. Recently, one of our graduates went on to become a Rhodes Scholar.

The Physical Science Department has been very innovative in adapting new technologies to our educational mission. Physical Science was the lead department in establishing "Virtual Office Hours" at the college. This is a program that uses the World Wide Web as a medium for communication between students and faculty. One of our faculty members was the principal author of this project. VOH is now widely used throughout the entire college. Our physics laboratories are entirely microcomputer based and equipped giving the physics instructors the capability of simulating phenomena that previously could only be discussed.

The college's Life and Physical Science Department faculty are also fortunate to have a new science building equipped with state-of-the-art laboratories at their disposal. The new building is the "gateway" to the 21st Century of science education and SMC's science faculty intend to be its leaders. Providing our students with hands-on research experiences through the SURF program will further help prepare our students to pursue advanced degrees in research-based sciences. The SURF internship program will greatly enhance their transferability, and make them more competitive in their post-secondary and graduate level endeavors.

The students who have been SURF participants the last two summers are typical of the incredible student population here at Santa Monica College. I am confident you will find our pool of students as competitive as last years. They too will be an asset to your programs and, together with the faculty at SMC; we are looking forward to working with NIST again this year.

Students Nominated:

Elvis Presley
Tom Selleck
Angelina Jolie
Brad Pitt