

**ENERGY &  
ENVIRONMENT**

**DEVELOPMENTAL  
SCIENCE**

**COMPUTATIONAL  
SCIENCE**

**NANOSCIENCE**

**College of Science  
Annual Report  
2007-2008**

**Lay Nam Chang  
Dean**

**INFECTIOUS  
DISEASES**

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## INTRODUCTION

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The College of Science concluded the 2007-08 academic year successfully, despite weathering a budget reduction. The college taught a record number of students and secured an exceptional amount of external funding to support research.

This annual report documents many accomplishments and contributions of our faculty, students, and staff to the university's goals. We summarize our activities by the domains of Discovery, Learning, and Engagement. Individual achievements are noted in the Spotlights section. Alumni Relations, Development, Communication, and Diversity reports are then detailed, with the final section of the report updating the college's Scorecard for 2007-08.

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## STRATEGIC INITIATIVES

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### CLUSTER HIRING

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The College's cluster committee coordinated a limited number of faculty searches during 2007-08. Six tenure-track or tenured faculty members were recruited; four of the six are women. The college also recruited a research scientist as part of the faculty hiring. Each faculty member joining us in August 2008 will contribute to the college's efforts to promote interdisciplinary research efforts in targeted areas.

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### INSTITUTE FOR ADVANCED STUDY

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The Institute for Advanced Study at Virginia Tech, established by the College of Science, was the site for cluster committee meetings and events to promote communication and collaboration with faculty members associated with specific clusters.

The Institute encourages research groups to meet, form teams and plan for collaborative grant proposals. A proposal was submitted to the NSF for a Physics Frontier Center. A team of College of Science researchers has formed to investigate complex systems. The Developmental Sciences research group held regular meetings and sponsored a colloquium series. Faculty members associated with the Energy and Environment initiative were active participants in the Deans' Forum on Energy and the Environment. The third annual Structural Biology Symposium was held in March 2008.

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### DEPARTMENT REVIEWS

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The Department of Geosciences completed an internal and external review during 2007-08. The Department of Physics completed the internal review and will host the external review committee in September 2008. Three departments—Chemistry, Economics, and Psychology—will conduct internal and external reviews during 2008-09.



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### INTELLECTUAL PROPERTY PRE LAW

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The College of Science is continuing to support an opportunity for undergraduate students in science and technology to become acquainted with and prepare for a career in intellectual properties (IP) law. This support involves a special agreement with University of Richmond Law School and a couple of courses offered on campus to acquaint students with the IP law field. The courses offered by faculty of the University of Richmond Law School follows the format of a law course. Two courses were offered this spring.

IBM has expressed interest in the program and has committed to providing guest speakers during the academic year and summer internship opportunities.

We are acquainting incoming students of this opportunity as they visit campus and participate in summer orientation. We are planning to organize a student-led IP Club and to work toward an IP pre-law curriculum as the program expands.

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### LEADERSHIP IN THE UNIVERSITY INSTITUTES

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The College of Science is actively involved in ICTAS, IBPHS, and ISCE. Faculty hiring in the college included faculty members who will contribute to IBPHS initiatives (Infectious Diseases and, via the Developmental Science Initiative, Food, Nutrition, and Health). The college has been equally active with the Institute for Critical Technology and Applied Science (ICTAS). Planning continued for the development of nanoscience and technology programs that promote active collaborations with faculty members at several Virginia universities. The planning committee is exploring a full range of degree and research programs, along with administrative structures that will maximize success. ISCE, the newest institute, provided grant funding for several COS faculty members whose research contributes to ISCE's focus on policy and research related to science and technology impacts on society.

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### VIRGINIA TECH CARILION SCHOOL OF MEDICINE

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The College of Science, along with several other colleges at Virginia Tech, is a collaborating partner in the development of the Virginia Tech Carilion School of Medicine and the Virginia Tech Carilion Research Institute. Located in Roanoke, the school of medicine and research institute will feature an innovative case-based curriculum that emphasizes evidence-based clinical practice and research training and experiences. Virginia Tech faculty members will serve as research mentors in a wide range of relevant research areas for the medical students. Faculty members from the college are involved with curriculum and faculty affairs committees that are working on the submission of documents for accreditation by the Liaison Committee on Medical Education.

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### CAPITAL PROJECTS






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Two major building projects were approved by the General Assembly – Davidson Hall Renovation and Science Research Laboratory 1. Chemistry faculty members will participate in the planning process for the renovation of Davidson Hall and Geosciences faculty members will participate in planning for SRL1. A major donation was received for SRL1.



CHANGES 2007-08

FACULTY AND STAFF MEMBERS IN THE COLLEGE CHOOSE NEW OPPORTUNITIES AND EMBRACE NEW CHALLENGES

-  Joe Cowles, Professor of Biological Sciences, served as the Associate Dean for Curriculum, Instruction, and Advising this year. He will retire in August 2008.
-  Jill Sible, Associate Professor of Biological Sciences, has accepted the position of Associate Dean for Curriculum, Instruction, and Advising, and will join the dean's staff in August 2008.
-  Robert Tracy, Professor and Chair of the Department of Geosciences, will return to the full-time faculty in August 2008. Ken Eriksson, Professor of Geosciences, will serve as Interim Department Head during the 2008-09 academic year.
-  Rhonda Hawley accepted the position of Administrative Assistant to the Director of Development for the College.
-  Matt Banks accepted a new position at George Washington University, which began in May 2008. Matt was highly successful during his years as Director of Development for the college.

SEVEN FACULTY MEMBERS WILL JOIN THE COLLEGE OF SCIENCE IN AUGUST 2008

<i>Department</i>	<i>Name</i>	<i>Research Specialization</i>
<b>New Faculty Hired in 2007-08</b>		
<b>Biological Sciences</b>	Birgit Scharf	Microbiology
<b>Chemistry</b>	Theresa Reineke	Polymers
<b>Economics</b>	Byron Tsang	Macroeconomics
<b>Mathematics</b>	Pengtao Yue	Complex Fluids
<b>Psychology</b>	Susan Williams White	Autism Spectrum Disorders
<b>Statistics</b>	Leanna House	Biostatistics
<b>New Faculty Hired in 2006-07 (arriving August 2008)</b>		
<b>Physics</b>	Patrick Huber	Computation Science



## DISCOVERY

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The College of Science fully embraces the intrinsic value of research and creative scholarship. In the context of “discovery,” cutting-edge research and innovative and creative scholarship not only provide the domains of learning and engagement with a sense of direction, but also foster collaborative learning that motivates engagement with the broader community. Since its inception, the College of Science has been a leader in launching a set of integrative initiatives for achieving world-class excellence in discovery. In FY08, the college started an initiative in the domain of energy and the environment, building on previous initiatives in nanoscience, computational science, infectious diseases, and developmental science across the lifespan. These initiatives provide a basis for innovative technologies and understanding complex systems that power the progress in all areas of discovery. The College of Science is creating an interdisciplinary research environment that is unique among top-tier research universities and establishing Virginia Tech as one of the premier universities in the country recognized for its research and scholarship.

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## EXCEPTIONAL FACULTY

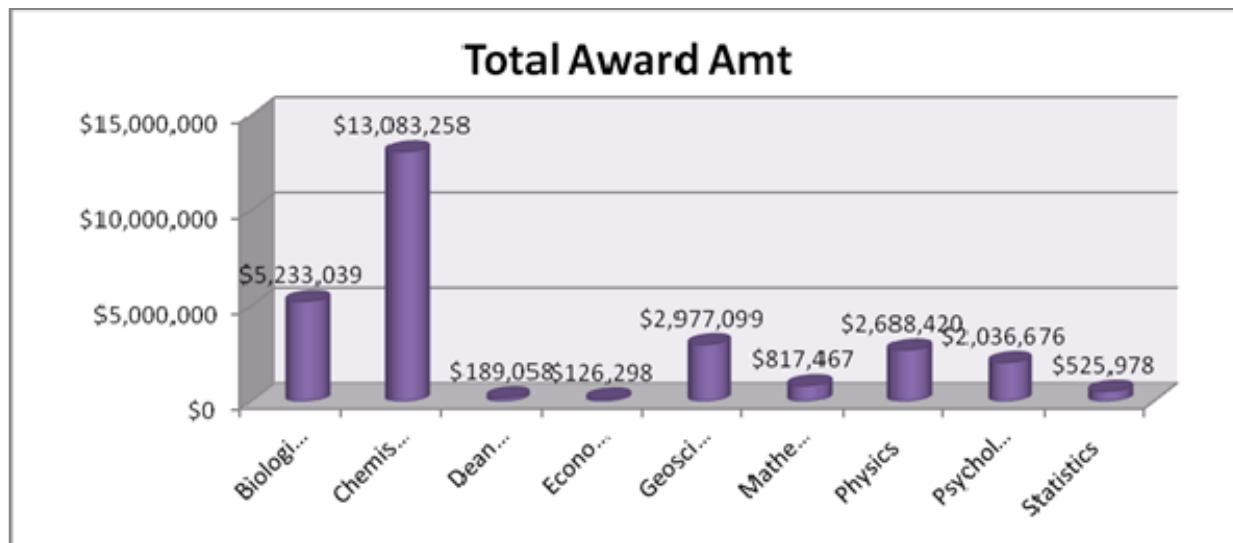
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Faculty members are the key to achieving these goals. In FY08, faculty from the College of Science published over 931 books, book chapters, and articles in peer-reviewed journals, gave 803 invited seminars and presentations at professional meetings. The number of patents filed by faculty in the College of Science has shown a remarkable increase to 45 by chemistry alone. Our faculty are recognized by many prestigious awards and honors. Serkan Gugercin (mathematics), Jean Heremans (physics), Ignacio Moore (biological sciences), Iulia Lazar (biological sciences and VBI), Theresa Reineke (chemistry), and Diego Troya (chemistry) hold NSF CAREER awards and Jeffrey Kuhn (biological sciences) holds a Burroughs Wellcome Fund award. Robert Bodnar (geosciences) was awarded the Silver Medal of the Society of Economic Geologists. Kirby Deater-Deckard (psychology) was appointed to Fellow status in the Association for Psychological Science. Patricia Dove (geosciences) was inducted as a Fellow to the American Geophysical Union. Michael Hochella, Jr. (geosciences) was named a Fellow in the American Association for the Advancement of Science (AAAS). David Kingston (chemistry) was awarded the Ernest Guenther Award in the Chemistry of Natural Products. Jim McGrath (chemistry) was awarded the 2007 American Chemical Society Award in Polymer Chemistry and Interfaces in Science Career Award. Dr. Robin Panneton (psychology) received a Fulbright Research Chair at the Centre for Research in Language, Mind, and Brain at McGill University, Montreal. Theresa Reineke (chemistry) was awarded a 2007 Alfred P. Sloan Fellowship. Nancy Ross (geosciences) was elected Vice President of the Mineralogical Society of America. Diego Troya (chemistry) received a prestigious Cottrell Scholar Award. Edward Valeev (chemistry) received the 2007 Wiley International Journal of Quantum Chemistry Young Investigator Award. Shuhai Xiao (geosciences) was inducted as a Fellow to the Paleontological Society.



RESEARCH FUNDING

Research funding in the College of Science rose to an all-time high in FY08 with 258 awards being funded for a total of \$27.8M, compared with \$18.7M in FY07 – a 48% increase in growth. There has been a 17% growth in research awards over the past three years and a 10% growth since 2003 when the College of Science was formed. The Departments of Chemistry and Geosciences doubled their research funding in FY08 from FY07, and the Department of Physics showed a 36% increase. The total for research expenditures in FY08 was \$20.8M, compared to \$19.3M in FY07. The number of awards continues to show a steady increase, from 232 in FY07 and to 258 in FY08.



Notable research awards in FY08 include a \$2.04M award to Karen Brewer (chemistry) from Prosper Financial Inc. to study the development of photocatalysts for the reduction of water to hydrogen. Christopher Lawrence (biological sciences and VBI) and Hirohito Kita of the Mayo Medical School received a \$2.54M grant from NIH to study the pathogenesis of chronic rhinosinusitis. Jeff Walters (biological sciences) and co-PI Carola Haas (fisheries and wildlife sciences) received a \$2.09M grant from the U.S. Dept. of Defense to study the population biology of endangered species at Eglin Air Force Base. Richard Winett (psychology) received a \$1.45M award from the National Cancer Institute to study cancer prevention. Harry Gibson (chemistry) received a \$1.14M award to study ionic liquids in electroactive devices from the US Army Research Office. John Hole (geosciences) received an \$842K grant from NSF to study seismic imaging of tectonically active areas. Twelve faculty from biological sciences, chemistry, physics, psychology, and statistics participated in a Research Grant Writing Institute sponsored by Office of the Vice President for Research, College of Science, and the Graduate School.

COLLABORATIVE AND INTERDISCIPLINARY RESEARCH

The College of Science continues to explore and foster new opportunities for collaborative and interdisciplinary research:

- The College of Science, in conjunction with the VT National Capital Region, has formed a complementary partnership with Georgetown University Medical

Center to establish a joint program for drug discovery and development. The program brings together experts from both universities in disciplines ranging from medicine to chemistry to technology. Projects underway involve using naturally-occurring products against malaria (David Kingston, chemistry); investigating the use of fatty acids to fight microorganisms that cause disease (Richard Gandour, chemistry, and Joe Falkinham, biological sciences); and exploring causes of Alzheimer's disease (Paul Carlier, chemistry).

- In energy-related research, Randy Heflin's (physics) research contributes to the development of novel, non-silicon based solar cells. In chemistry, Jim McGrath, Bob Moore, and Lou Madsen are working on various aspects of fuel cell technology and Karen Brewer is working on hydrogen production using sunlight and water. Vicki Soghomonian (physics) may be approaching a breakthrough in the development of new materials for energy storage. John Hole and Chet Weiss (geosciences) are using seismic and electromagnetic data in *resource (petroleum, mining, groundwater)* exploration and characterization. Lastly, Bruce Vogelaar (physics) is leading an initiative to develop a new nuclear reactor design. If successful, this design would solve many serious problems, such as proliferation of weapons-grade fuel and waste disposal.
- The Kimballton Underground Research Facility (KURF) now houses three experiments, involving five institutions: Duke, NCSU, NIST, UNC and Virginia Tech. Four additional experiments, led by Princeton, Fermilab, Virginia Tech, and the University of Maryland, are in the planning stages.
- The Laboratory for Interdisciplinary Statistical Analysis (LISA) is part of the Department of Statistics. The statistical consultants of LISA provide assistance with experimental design, data analysis, interpretation of results and statistical software to University faculty, staff and graduate students on academic research projects. The laboratory is jointly funded by the Graduate School, the Provost's Office, the Office of Research, and the College of Science with support from the seven additional colleges.
- Harry Dorn (chemistry) has received funding from the Commonwealth Technology Fund with matching funds from the College of Science and ICTAS to establish a Radiolabelled Carbonaceous Nanomaterials Center (RCNC) in collaboration with Virginia Commonwealth University. This center will prepare new diagnostic and therapeutic radiolabelled metallofullerenes that will open new vistas in medical research.
- Michael Hochella (geosciences) leads a Virginia Tech team as part of a consortium of nine schools competing for a multi-million dollar grant to study to form a national Center for the Environmental Implications of Nanotechnology (CEIN). Total funding for the project is \$14 million over five years with an opportunity to renew for another five. Virginia Tech's portion of the grant is \$1.75 million.
- Scott King and Ying Zhou (geosciences) have built a new computational cluster to study the Earth and planetary interiors. The High-Performance Earth Simulation System (HESS) consists of 96 Dell 1950 servers and is 1,000 times more powerful than a typical home PC. Scott King's research on Mars will be tested by gravity and topographic data from the MESSENGER (Mercury Surface, Space Environment, Geochemistry, and Ranging) mission of NASA.

## COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

- Liwu Li (biological sciences) leads a research and graduate program on inflammation that focuses on system network analyses of human inflammatory processes using biological, chemical, computational, and structural approaches. Participating faculties across the campus include Biological Sciences and Chemistry, Virginia Tech-Wake Forest School of Biomedical Engineering, Human Nutrition and Health, Biomedical Sciences and Pathobiology, as well as the Virginia Bioinformatics Institute. With close ties with neighboring medical schools such as Wake Forest, Georgetown, Virginia College of Osteopathic Medicine, as well as the Carilion Clinic, research groups are performing translational investigations unraveling system networks underlying numerous human inflammatory diseases.
- Tim Long (chemistry) leads a Multi-University Research Initiative (MURI) grant from the Army Research Office involving scientists from Virginia Tech, the University of Pennsylvania, Pennsylvania State University, and Drexel University. This award, worth potentially \$7.5M, is to develop electro-mechanical devices and high-performance membranes using ionic liquids.
- Judy Riffle (chemistry) is the lead PI on the NSF Materials Science and Engineering Center (MRSEC) proposal on "Design and Delivery of Macromolecular Therapeutics." It is a \$14M, six-year project that teams Virginia Tech (lead institution) with the University of Nebraska Medical Center. It teams Virginia Tech's strength in polymeric materials and experience with biomaterials with UNMC's strength in drug delivery and mechanisms of interactions of delivery vehicles with mammalian cells. This proposal is one of only 18 (out of >100 submissions) that have been selected to go forward into the final stage of review.
- Bruce Vogelaar (physics) led a research group comprising four universities (VT, Duke, NCSU, and UNC) in a proposal to NSF for a \$16.6M Physics Frontier Center for "Neutrino Science and Technology." While ultimately not successful, this effort demonstrates the increasing competitiveness of faculty in the college for such large center grants and strengthens the interactions between researchers at these universities.
- Complex systems and, specifically, networks are becoming a topic of growing interest at Virginia Tech. Networks – i.e., dynamic webs of interacting agents – are at the core of many biological, engineering, and social processes, structures, and problems. Beate Schmittmann (physics) has organized a strong Virginia Tech team to investigate complex systems, balancing science and engineering, experimental efforts and modeling/computation, research, education, knowledge transfer, outreach, and diversity. If the team's proposal is selected by the university, the team will submit a proposal to the NSF for a Science and Technology Center.

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### CONFERENCES ON CAMPUS

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The College of Science continues to support research conferences that attract participants from all over the world. Such conferences are one of the college's strategies for facilitating collaboration within and across departments, as well as promoting connections to researchers from other universities.





## COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

- Daniel Crawford, Diego Troya and Edward Valeev (chemistry) hosted the 2007 meeting of the Southeastern Theoretical Chemistry Association on campus. Although SETCA has existed since 1970, this was the first year the meeting had been held in the Commonwealth of Virginia.
- The Physics Department, supported by the Sowers Fund, the College of Science, the Research Division, and NSF, hosted an International Symposium on "Complexity in Materials far from Equilibrium" on May 14-16, 2008. Twenty-four speakers from different institutions across the US, Canada, Denmark, France, Germany, and Korea discussed dynamical phenomena in glasses, colloids, granular matter, superconductors, and biological systems.
- Faculty members from the Departments of Psychology and Human Development continue the very successful Developmental Science Colloquium in order to learn about each other's work and to build a partnership that will allow faculty in these areas to be competitive for post-doctoral fellowships and external grants in the area of developmental studies.
- The third annual conference on structural biology, held on March 28, 2008, was hosted by Virginia Tech's Crystallography Lab, with leadership from biological sciences, geosciences and chemistry faculty Drs. Ross Angel (chair), Daniel Capelluto, Carla Finkielstein, Florian Schubot, Carla Slebodnick and Nancy Vogelaar. Cosponsored by four departments and four corporations, this event drew 147 registrants.

### LEARNING – GRADUATE

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The achievements of the graduate students in the College of Science bring prestige to the departments and thus to the college and university as a whole. The College of Science is committed to:

1. Expanding graduate enrollments, with the goal of increasing the number of Ph.D. students.
2. Enhancing graduate and professional degree value through national and international partnerships, joint degrees and interdisciplinary programs.
3. Enhancing recruitment of top quality graduate student prospects.
4. Enhancing the quality of graduate training and increasing external support for graduate training.

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#### EXPANDING GRADUATE ENROLLMENTS

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Following university goals in graduate education, all departments are working to increase the number and quality of Ph.D. students. In Fall 2007, there were 555 graduate students enrolled in the College of Science. Of these, 448 were Ph.D. students, a 20% increase from Fall 2006. There has been a remarkable 75% growth in the number of doctoral students from 2003 when 256 Ph.D. students were enrolled in the College of Science. The college has exceeded the goal of the PhD2010 program to grow the number of Ph.D. students in the college by 120 by 2010.



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ENHANCING GRADUATE AND PROFESSIONAL DEGREE VALUE

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The College of Science is striving to enhance graduate and professional degrees through university programs, national and international partnerships, and joint degrees:

- A new interdisciplinary degree with Georgetown University, *Master of Science Degree in Biomedical Technology Development and Management*, has been approved by the State Council of Higher Education for Virginia and the first students will enter the program in Fall 2008. This program addresses a significant shift emerging in the way pharmaceutical and biotechnology innovations evolve that emphasizes multi-disciplinary research and training.
- Eric de Sturler (mathematics) has started the development of joint Ph.D. programs with TU Berlin, the Czech Academy of Sciences, and Charles University in Prague. Two of these initiatives have progressed to a signed Memorandum of Understanding.
- Judy Riffle (chemistry) is director of the Macromolecular Science and Engineering graduate degree (MACR) which is a university-based degree program spanning multiple departments and colleges to emphasize fundamental and emerging technological areas in the field of macromolecular science and engineering.
- Biological Sciences entered the fifth year of the "preparing the future professoriate" project. Graduate students who wish to build a strong resume in teaching and in preparation for academic careers can participate in a graduate school certificate program that includes a course in pedagogy or teaching at the college level, and an opportunity to teach a lecture course in the department under the mentorship of a faculty member.

The College of Science is a leader in developing interdisciplinary graduate degree programs. Such programs span traditional departmental boundaries and allow students enrolled in a program to study with faculty from many departments and colleges.

- Faculty from biological sciences are key members of the interdisciplinary Ph.D. program in *Genetics, Bioinformatics, and Computational Biology (GBCB)*. This exciting program of study encompasses applications of molecular biology, genomics, mathematics, statistics and computer science to all areas of the life sciences.
- Biological Sciences is also involved in the *Molecular Cell Biology and Biotechnology (MCBB)* option to provide training in broad fundamentals that can be then applied to particular disciplines. On successful completion of the core curriculum in *MCBB*, students will be able to apply concepts of molecular cell biology directly to their own field of interest and research.
- Faculty from the college have also been very successful in developing Integrative Graduate Education and Research Training (IGERT) grants funded by the NSF. The competition for these five-year programs is intense with only a handful of programs selected from several hundred applications. Judy Riffle (chemistry) led one of the first IGERT programs awarded in 2001 for "Macromolecular Science and Engineering" (<http://www.macro.vt.edu/IGERT/>). Tim Long (chemistry) is co-director of an IGERT awarded in 2003 that trains students in "Macromolecular Interfaces with Life Sciences" or *MILES*



(<http://www.chem.vt.edu/milesigert/>). The latest IGERT was awarded in July 2005 for "Exploring Interfaces through Graduate Education and Research," or *EIGER*. This program enables graduate students to pursue research of the interface science and engineering in natural systems, and the behavioral interfaces within scientific and engineering teams. *EIGER* is led by Michael Hochella (geosciences) with participation from biological sciences, physics, and psychology. Each of the IGERT programs sponsors 40 graduate student fellowships over a five-year period.

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### ENHANCING RECRUITMENT

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Faculty in the College of Science led novel recruitment efforts to increase the quality, diversity, and reputation of research programs.

- Biological Sciences faculty maintained leadership in three university-wide graduate recruiting programs: (1) The Interdepartmental Microbiology Graduate Program (IMGP) ([http://www.biol.vt.edu/vtmicro/g\\_study.html](http://www.biol.vt.edu/vtmicro/g_study.html)) includes over 40 faculty participants from across the university. Students who apply and are recruited spend their first semester rotating through laboratories before the decision is made on a major advisor; (2) The Graduate Program in Molecular Plant Sciences (MPS) (<http://www.molplantsci.org.vt.edu/INDEX.HTM>) involves 20 participating faculty from seven departments; this coming year marks the fourth year of an aggressive recruiting effort at regional schools, followed by students rotating through labs before a decision is made on a major advisor; (3) The Graduate Program in Cell and Developmental Biology (CDB) (<http://www.biol.vt.edu/research/cdb/index.html>) is a new program initiated in AY 2007. It includes 11 participating faculty. Following the model of the Microbiology program, students in the CDB rotate among faculty mentors before being accepted into a particular lab.
- The college and departments support fellowships, such as ICTAS scholarships, to recruit the best and brightest graduate students to Virginia Tech.
- Departments host "open days" and other such events to showcase the quality of their graduate programs and to help recruit the best students. Physics held its second on-campus Preview Weekend for prospective graduate students in February. The date was chosen to coincide with the Graduate School Preview Weekend in order to give our visitors a full picture of graduate student life at Virginia Tech. Psychology also had interviews this same weekend.
- Departments also target professional meetings to recruit the best and brightest graduate students. Faculty members in the Department of Geosciences, for example, set up special student recruiting and information booths at the following professional meetings: Geological Society of America (Denver), Southeast Section of Geological Society of America (Charlotte), Society of Exploration Geophysicists (San Antonio) and the American Geophysical Union (San Francisco).

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### ENHANCING THE QUALITY OF GRADUATE TRAINING

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Departments in The College of Science are committed to enhancing the quality of graduate training:





Marshaun Glover, doctoral student in psychology, presents his research at the Fall 2007 Deans' Forum on Health, Food, & Nutrition

An important aspect of graduate training is to have students present their research results during "research days" and other such events. Biological Sciences presented their 5th Annual Research Day in February 2008. This program, directed by and for graduate students, is modeled after professional conferences with poster sessions, presentations, and a plenary talk. Geosciences held its 13th annual Geosciences Student Research Symposium in March 2008.

- In Statistics, "research teams" comprised of faculty and graduate students are organized and work on common research problems or centered on research grants. Teams typically meet weekly or bi-weekly to keep members apprised of recent developments, to provide accountability for timely progress, and to share common expertise.
- The Department of Psychology implemented a two-semester team-taught research methods sequence to enhance graduate students' expertise in research and study design.

Connections external to academe are important in graduate training and build on successes in corporate sponsorships and internships for graduate programs.

- Graduate programs in geosciences, physics, and statistics benefit from corporate affiliations. Statistics, through its Corporate Partners program, places interns with Eli Lilly, DuPont, Minitab, General Electric, Kraft, Pratt and Whitney, and SAS. Geosciences benefits from long-term relations with petroleum companies and endowments from loyal alumni.
- Psychology's required internship component relies on strong and abiding relations with institutions such as the Devereux Institute in Pennsylvania. Such internships place students in competitive positions for appointments after graduation.
- There are also opportunities for some graduate students to complete parts of their training at off-campus sites such as Oak Ridge National Laboratories, Georgetown University, the Howard Hughes Medical Institute, and USGS. The National Capital Region (NCR) will provide new opportunities for graduate students by accommodating some of the off-campus training opportunities mentioned above.

Endowments provided by loyal alumni are also providing scholarships that enhance the graduate programs in the college. The College of Science's alumni advisory group, the Roundtable, established the Make-a-Difference Scholarship for Graduate Study in the College of Science. Awards are awarded to graduate students who will make a significant difference to the College of Science and the world outside the university.

GRADUATE STUDENT AWARDS

College of Science  
Outstanding Graduate Students

**Outstanding Doctoral Student**



**Bing Shen, Geosciences**  
Advisor: Shuhai Xiao



**Outstanding Master's Student**



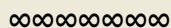
**Kathryn Harry, Biological Sciences**  
Advisor: Stephen Melville

Graduate School Awards

**2008 Graduate Teaching Excellence  
Commendation Award**



**Elise Drake**  
Psychology



**2008 Dissertation  
Commendation Award**



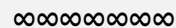
**Bing Shen**  
Geosciences

Dean's Roundtable  
Scholarships

**"Make a Difference"  
Scholarship Award for  
Graduate Study**



**Kwang-Hyung Kim**  
Biological Sciences



**Scholarship Awards for  
Graduate Study**



L to R: **Matthew Jarrett** (Psyc)  
**Laura Freeman** (Stat)  
**Will Alexander** (Chem)

Graduate Student Award Nominees



**Jiajia Dong**  
Physics



**Elise Drake**  
Psychology



**Melissa Ramirez**  
Biological Sciences



**Sharlene Williams**  
Chemistry

**Luise Meyer-Schutzmeister  
Memorial Award**

*presented by  
Association for Women  
in Science*



**Juliette Mammei**  
Physics



## LEARNING - UNDERGRADUATE

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Faculty in the College of Science have a number of responsibilities, including enabling students to master the science required for a university degree. The College has an increasingly larger role in providing undergraduate instruction at Virginia Tech, especially in lower level courses. For example, in 2003, the College taught 53% of the students enrolled in freshman classes. Four years later, this number had increased to 58% while the total enrollment in freshman courses was flat. As a result, the teaching responsibility to the freshman students has increased 10.8% in four years while the number of freshman students taught by the remainder of the colleges decreased 14.3%. In addition, the Biological Sciences Department, which has the largest number of majors in the university at 1,425, and the Psychology Department with over 900 majors are still growing rapidly. The increasing number of undergraduate classes and laboratories has been particularly challenging for the college because the number of tenure-track faculty has barely increased. The additional teaching has been provided mostly by part-time faculty members and graduate teaching assistants. The University administration has been essential in providing the resources to employ the extra teaching personnel.

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### USE OF TECHNOLOGY

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The Math Emporium, a computer-based, self-paced method of teaching lower-level mathematics has been expanded to include Math 1535-1536. With this expansion, seven math courses have been converted to this method of delivery. Over 8000 students take their math courses in the Emporium each year using software developed by the Department of Mathematics. The Emporium has been in operation since 2000, and it continues to receive inquiry and study from other universities and research groups.

Dr. Susan Hagen, who teaches Math 4644, incorporates materials in her course on the use of technology to support mathematical learning by individuals with disabilities.

Dr. Sheryl Ball of the Economics Department requires her students to bring laptop computers to class to participate in active learning exercises. The student response is very positive and the technology is very flexible.

Professor Djavad Salehi has incorporated various new technologies into his large section of Principle of Economics. He uses a web-based software package for homework assignments and encourages students to interact with each other while conducting online experiments. In addition, he gains real-time feedback from students using tablet computers and "clickers." These innovative methods greatly improve classroom management and encourage student feedback in large classes.

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### NEW COURSE DEVELOPMENT

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The Math Department has launched a new undergraduate seminar on mathematical modeling. The seminar is designed to improve interactions among faculty, students and corporations on problems involving mathematical modeling research.



Dr. Suqin Ge has revised her Macroeconomic Theory course to include assignments from magazines and academic journals to better connect classroom theory to real world situations.

Dr. Reinhard Laubenbacher, along with certain colleagues of the Math Department, has gained support of an NSF grant to offer a Research Experience for Undergraduates (REU) which focuses on Modeling and Systems Biology. This is a nationally competitive summer program and attracts the best students in the nation.

Drs. Don Rimstidt and Madeline Schreiber offered a new course in Geosciences this year—Careers in Geosciences—to introduce students to the fundamentals of career planning in the geosciences. Geosciences also invited a number of recruiters to campus to educate their students about career options in their field of study.

Dr. Barbara Bekken, geosciences, along with other colleagues around campus, has completed the final phase of a two-year curriculum—Earth Sustainability—which allows students to complete their university liberal education requirement. A third cohort of students will begin the curriculum this fall which has the capacity for up to 180 students.

The Physics Department is attempting to gain NSF support for an REU site. This would enable them to attract some of the best undergraduates to Virginia Tech during the summer. The department already is active in research outreach by hosting seven summer interns this summer.

The Department of Mathematics has added an early field experience to its Math Education program as part of continuing the development of this program.

The Physics Department has added a suite of 4000-level topical elective courses to its undergraduate curriculum and is planning to add more elective courses.

The Chemistry Department offered a new 4000-level course, Green Chemistry, this spring. The course is focused on the principles of atom economy in the design of chemical processes.

Dr. Nahum Arav is beginning a major overhaul of the Astronomy course offered by the Physics Department. The revised course is expected to attract more undergraduates.

The Math Department has adopted a new method to evaluate student readiness for calculus. The assessment program, ALEKS, is a sophisticated diagnostic tool that has improved calculus success rates at other universities. The program also detects areas of calculus in which the students are most deficient to enable them to focus their study.

To better prepare undergraduates for upper division courses, the Physics Department has initiated a new sophomore course—Basic Tools of Physics.

The Geosciences Department has developed a new undergraduate Mission Statement. In addition, they have developed five learning outcomes that they plan to assess annually.

The Department of Biological Sciences also is renewing its effort to develop an effective means to assess student learning.



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### COLLEGE OF SCIENCE INVOLVEMENT IN THE DOMINICAN REPUBLIC

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The College of Science has been actively involved in establishment and continued enhancement of an education abroad program in the Dominican Republic. The program is housed at the Caribbean Center for Education and Research at the Center for Sustainable Development with the Punta Cana Group at Punta Cana, Dominican Republic. Dr. Jerry Via, Assistant Dean, launched the program and has served as director for the past three years.

To date, the program involves students spending the spring semester in the Dominican Republic and VT faculty members traveling there to present an intensive two-week course in their academic specialty. This past semester, the courses offered included: Developing Spanish Language Skills, Latin American Culture and Civilization, Medical Geography, Tropical Ornithology, Globalization Sociology, and Introduction to Theater with emphasis on Caribbean Theater.

A fall semester program will be initiated this fall with 14 students primarily from Biological Sciences and the College of Natural Resources. The students will take 18 hours of credit with each course taught in an intensive two-week format. The fall courses will include World Forestry, Field Entomology, Ecological Physiology, Water Resources Management, and Developing Spanish Language Skills.

The Center provides an excellent opportunity for students and faculty to study aspects of tropical biology, marine ecology, human disease, and sustainable development. Hopefully, the program will introduce new opportunities for research collaboration with faculty from various departments as well as the Dominican Republic.

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### EXPANDING INTEREST IN IP LAW

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The College of Science is continuing to support an opportunity for undergraduate students in science and technology to become acquainted with and prepare for a career in intellectual properties (IP) law. This support involves a special agreement with University of Richmond Law School and a couple of courses offered on campus to acquaint students with the IP law field. The course offered by faculty of the University of Richmond Law School follows the format of a law course. Two courses were offered this spring.

IBM has expressed interest in the program and has committed to providing guest speakers during the academic year and summer intern opportunities.

We are acquainting incoming students of this opportunity as they visit campus and participate in summer orientation. We are planning to organize a student-led IP Club and to work toward an IP pre-law curriculum as the program expands.

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### ADDING OUR EXPERTISE TO OMAN

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Dr. Jerry Via, Assistant Dean, represented the College of Science as part of a team traveling to Oman to assist a group of companies working to plan and establish a new university in the country. Currently, only about 7% of those who graduate from high school have the opportunity to attend college, mostly because of lack of facilities. The proposed university will focus on science and technology and is seeking the experience and expertise of Virginia Tech in developing the new institution. The planning phase of the project is expected to last two years, and the COS will continue to be part of this effort.





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## UNDERGRADUATE RESEARCH

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Almost the entire Physics faculty serves as mentors to undergraduates working on research projects. As a result, 43 undergraduates were involved in research this year, and about a dozen are continuing their research projects during the summer.

Chemistry had 16 undergraduate participants in their Undergraduate Research Program last summer and 21 undergraduates who made presentations during their Spring Undergraduate Symposium.

More than 270 undergraduates in Psychology were enrolled in field study and undergraduate research courses.

Dr. Alan Esker (chemistry) published two papers this year that included undergraduates as coauthors. He has three additional papers submitted for publication that also include undergraduate coauthors.

Faculty in the Biological Sciences Department provided research mentoring for 118 undergraduates this year.

Seventeen faculty members in Chemistry served as research mentors to 67 undergraduate students this year.

Nine Geosciences faculty members mentored students in the McNair, MAOP and VTPREP programs.

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## OUTREACH

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The Virginia Tech Regional Mathematics Contest has completed its 29<sup>th</sup> year and is drawing universities from outside of the region, including Princeton University this year. Sixty-seven colleges were represented by 397 contestants in this year's competition.

The Mathematics Department also was host to the Women in Mathematics Career Day at Virginia Tech. This annual event is in its 13<sup>th</sup> year and was attended by 250 students from 19 middle and elementary schools.

Madeline Schreiber and Llyn Sharp head a program—Summer Training Academy for Rising Students (VT-STARs)—that is designed to increase the interest in science among low income and under-represented youth.

The Psychological Services Center and Child Study Center served more than 100 local community residents this year and received a "Champions" award from the Virginia Department of Rehabilitative Services.

The Biological Sciences Department has initiated a new program, Virginia Tech Biological Sciences Strategic Partners in Research and Education (VT BioSPIRE) to enhance the recruitment of under-represented undergraduate students into the biological sciences. This is a joint effort between partnering corporations and the department.



## COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

The Mathematics Department continues to reach out to the public schools through in-service public school contributions and support of Math Awareness Month.

The Geology Museum welcomed approximately 5000 visitors this year and is planning to build an exciting new and expanded museum.

Llyn Sharp, geosciences, and Mike Rosenzweig, biological sciences, are co-coordinators of the VT-STEM initiative involving Science Outreach. This is part of an overall statewide program with extensive outreach effort to students and teachers in our region, using outreach programs, educational kits and teacher workshops.

Diane Walker-Green continues to add her talents and energy to encourage students interested in physics to enroll at VT. She has hosted several Physics Open Houses and Hokie Focus events and visited 25 high schools and community colleges this year.

The Geosciences Outreach Program through the leadership of Llyn Sharp continues to offer workshops and partner with school districts and other agencies to improve geosciences education in primary and secondary schools.

Drs. Dorothea Tholl and Brenda Winkel, biological sciences, provide lectures and educational support to Partnership for Research and Education in Plants (PREP) a joint effort between scientists and the Virginia Governor's school.



RECOGNITION FOR TEACHING AND ADVISING

*The College of Science takes pride in the talents of its faculty, staff and students. It is not surprising that each year several of them are recognized for their outstanding achievements in teaching and advising.*

**2008 University Alumni Teaching Award**




**Jill Sible**  
Biological Sciences

The university recognized Dr. Jill Sible, Biological Sciences, by awarding her a 2008 University Alumni Teaching Award




The Wine Award for outstanding teaching of first-year students was given to Jeannine Eddleton of the Chemistry Department. She also received a Student's Choice Award

**William E. Wine Award for Excellence in Teaching**



**Jeannine Eddleton**  
Chemistry

*Dr. Carroll B. Shannon Certificates for Excellence in Teaching in the College of Science*



**John Chermak**  
Geosciences

**Lee Cooper**  
Psychology

**Julie Dunsmore**  
Psychology

COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

The following faculty members in the College of Science received **14<sup>th</sup> Annual Students' Choice Awards** for faculty member of the year. These award recipients are selected by VT students. The College received six of the ten awards given this year.



Tsu Chang  
Physics



Kurt Hoffman  
Psychology



George Simmons  
Biological Sciences



Preston Durrill  
Chemistry



Jeannine Eddleton  
Chemistry



Ketan Trivedi  
Chemistry



*Provost's Alumni Advising Award*



*Connie Lowe*

*Connie Lowe's outstanding departmental and university service was recognized with the Provost's Alumni Advising Award. Connie is a member of the Geosciences Department.*



ADP Scott Geller gave the keynote address at the December 2007 university commencement



UDP Michael Hochella gave the keynote address at the December 2007 graduate commencement

UNDERGRADUATE HONORS AND AWARDS

**2008 VT WOMAN  
OF THE YEAR**



**Kaitlyn Hercik**  
Psychology

**2008 COLLEGE OF SCIENCE  
OUTSTANDING SENIOR**

and  
USA Today's All USA College  
Academic First Team



**Christine George**  
Biological Sciences

**2008 VT MAN  
OF THE YEAR**



**Ryan Smith**  
Psychology, Sociology,  
and Political Science

**GOLDWATER SCHOLARS**



**Kevin Finelli**  
Math/Physics



**David Tatum**  
Chemistry/Biochemistry

**2008  
ROUNDTABLE SCHOLAR**



**Megan Wicks**  
Biological Sciences

**Dean's Scholarship  
Rising Senior**



**Karen Pilat  
Biological Sciences**

**Dean's Scholarship  
Rising Juniors**



**Justin Beckett, Biol Sci  
Ryan Stephens, Biochemistry**

**Dean's Scholarship  
Rising Sophomore**



**Charles Baker  
Physics**

Brian Mohns, Chemistry, received a travel grant from the American Chemical Society to attend the Undergraduate Research Symposium in New Orleans.

Andrew Lucas, Biological Sciences and Chemistry, was selected to present results of his undergraduate research at the Annual ACC "Meeting of the Minds" Research Conference in Tallahassee, Florida in April 2008.

Jonathan Conyers, Chemistry, received a substantial Undergraduate Research Scholarship from the Virginia Space Grant Consortium.

Math undergraduates Andrew Dove, Caleb Magruder and Harold Metz were honorable mentions in the COMAP Mathematical Contest in Modeling.

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## ENGAGEMENT

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The College of Science is committed to engaging its intellectual assets to address economic and social needs of communities around the commonwealth, the nation, and the world. Faculty members and students in the College of Science are extensively involved in outreach and service. The involvement ranges from interactions with K-12, to short courses and workshops for students and professionals, to newsletters and media presentations, and to service in professional societies, governmental and non-governmental agencies. Faculty members in the college hold more than 100 editorships or associate editorships on professional journals and many serve on editorial boards. Faculty members also serve on numerous review panels at federal agencies and foundations for grant selection.

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## ECONOMIC VITALITY

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The College of Science connects innovations in the scholarship of learning, discovery, and engagement to the economic well-being of individuals, families, businesses, and communities. Central to this goal are entrepreneurial initiatives advancing technology transfer, intellectual property, and the transfer of knowledge in domestic and international partnerships.



## COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

- In 2007, a new Corporate Partners program called VT BioSPIRE (Virginia Tech Biological Sciences Strategic Partners in Research and Education) was initiated. The goals of the program are to enhance recruitment of underrepresented students into undergraduate biological sciences degree programs, provide opportunities for undergraduate research, and develop stronger relationships between bio-tech based corporations, VT faculty, and VT students, leading to new research and employment opportunities.
- Harry Dorn's (Chemistry) CIT Radiolabelled Carbonaceous Nanomaterials Center (RCNC) will, for the first time, provide encapsulated radionuclides ready for therapeutic applications in only a 2-3 day period. With fruition of this project, a unique radiopharmaceutical facility will be delivered to the Commonwealth of Virginia, providing next generation radiopharmaceuticals to researchers and clinicians. Through the technology and patents to be filed, the RCNC will enhance the growth of new business and technology development in the Commonwealth.
- The *Virginia Tech X-ray Crystallography Research Center* is being moved to a new building at the Corporate Research Center to be near the U.S. corporate headquarters of Oxford Diffraction Ltd. (ODL), now part of Varian Inc. The laboratory has been the North American reference site for ODL since 2002. When ODL moved its corporate headquarters to the CRC in 2006, CRI funding of \$250,000 leveraged new instruments and upgrades from ODL worth \$1.65M with full service and warranty contracts and cash sponsorship totaling an additional \$100,000 per annum.
- The Department of Statistics continues its very successful Corporate Partners program that includes support from Becton Dickinson Diagnostics, Capital One, DuPont, Eli Lilly, General Electric, Kraft, Minitab, Pratt & Whitney and SAS. Minitab, DuPont, RJ Reynolds also provide graduate student support.
- The *Virginia Tech Seismological Observatory (VTSO)* provides technical guidance to utilities and their consultants on issues of earthquake engineering and seismic hazard for sites in the eastern United States. Data from the VTSO seismic network operation is compiled and distributed for hazard assessment and mitigation. VTSO also provides information used by state and federal agencies such as MSHA, as well as mining companies, such as Consolidated Coal, Inc.

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### INTERNATIONAL EDUCATION AND RESEARCH

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The College of Science is committed to fostering communities that value all cultures, languages, lands, and people. International collaborations will include the establishment of research and education centers and the expansion of study abroad.

- The College of Science joined efforts with the College of Veterinary Medicine and the College of Agriculture and Life Sciences to develop of a comprehensive exchange program with the University of Austral in Chile. The program will foster exchange experiences for graduate students and faculty studying at each university.



## COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

- The International Travel Grant Supplement (ITGS) program helped support 26 faculty in the College of Science to travel and give presentations in Australia, China, Columbia, Denmark, France, Greece, Ireland, Italy, Japan, Mali, South Korea and the United Kingdom.
- Drs. Daniel Capelluto and Carla Finkielstein (biological sciences) have participated in student exchange programs with Mahidol University in Thailand and the University of Buenos Aires.
- John Chermak (geosciences) traveled to Guyana with the Tropical Forest Foundation (TFF) to evaluate the potential for Sustainable mining in both the aluminum and gold mining industries. He is active with expanding the relationship of VT and TFF along with the VT Conservation Management Institute.
- Kenneth Eriksson (geosciences) served as an External Assessor, Department of Earth Sciences, Sultan Qaboos University, Oman. He evaluated the undergraduate and graduate programs in the department and made specific recommendations for improvement.
- Dr. Joe Falkinham (biological sciences) served as a member of the Centers for Disease Control External Consultation Group on Nontuberculous Mycobacteria, (NM) which provides consultation to the CDC on how to address epidemiologic, surveillance, and laboratory issues for NM. He is also a member of a university committee to develop strategies for a VT research and education center in India.
- Dr. Harry Gibson (chemistry) was appointed guest professor of Chemistry, Zhejiang University, Hangzhou, China.
- Aris Spanos (economics) taught a month-long intensive 24 hour course to 23 visiting graduate Korean students (Department of Economics, SungKyunkwan University) on Applied Econometrics.
- Dennis Yang (economics) served as Senior Fellow at the Center for China in the World Economy (CCWE) at Tsinghua University in summer 2007. He also served as Senior Advisor to The Conference Board's China Center for Economics and Business.
- The *Virginia Tech Crystallography Research Center* hosted a number of research visits by faculty from across Europe, including the Bayerisches Geoinstitut, Germany, University of Opole, Poland, University of Milan, Italy, University of Padua, Italy, Universitaet Hamburg, Germany, and the University of Durham, England.





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PK-12 EDUCATION IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM)

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This goal is achieved through multi-disciplinary research partnerships, teacher preparation, professional development opportunities for PK-12 educators, and programs connecting PK-12 to STEM undergraduate programs.

- One of the most active K-12 programs in the college is led by Mike Rosenzweig (biological sciences) in collaboration with Llyn Sharp, Outreach Coordinator for Geosciences. They run a Science Outreach program (SOuP) that focuses on K-12 teacher training, and value added to sponsored research proposals (<http://www.socm.vt.edu/>). Llyn is also a trainer for national earth and environmental science programs including GLOBE ([www.globe.gov](http://www.globe.gov)), Project WET ([www.projectwet.org](http://www.projectwet.org)), and Save Our Streams ([www.vasos.org](http://www.vasos.org)).
- Susan Hagen (mathematics) is a member of the management team of the partnership grant Virginia's Middle Mathematics Project. In this capacity Susan contributed to the development of two new courses first taught to in-service teachers during 2007.
- Llyn Sharp has developed a community of K-12 Earth Science teachers in the region who look to the Department for assistance and professional development. K-12 Teachers and other educators borrow hands-on kits of materials to assist them in their teaching. These SOL-referenced kits are developed through grant-funded projects and student service-learning, housed in an Education Resource Center (ERC). Loans of kit materials reached an additional 4100 K-12 students and their teachers during AY08.
- On the national/international level, the Museum of Geosciences is an invited exhibitor at two or three major mineral shows each year: Tucson, Denver, and Detroit. These shows bring in thousands of enthusiasts from all over the nation and the world. The Museum of Geosciences is recognized for the educational value of its exhibits, as well as for showcasing state-of-the-art geosciences research programs at Virginia Tech. Public attendance at each of these shows is >15,000 each year.
- The Massey Herbarium, under leadership of Curator Tom Wieboldt, added 967 specimens to its collection and a number of visitors using the collection, the majority from outside the university community. A pilot data-basing project was completed on 1647 specimens to conform to the protocol used in a national survey of the decline in plant collecting and concordant loss in biodiversity information.
- Chemistry's outreach to K-12 reached around 8,500 students in the past seven semesters and trained over 60 teachers in workshops.
- The Physics Outreach Team organized 28 visits to local and regional K-12 classes/student groups and gave informative and entertaining physics presentations with hands-on demonstrations.
- Drs. Dorothea Tholl and Brenda Winkel (biological sciences) were active in the regional high school educational project *PREP (Partnership for Research and Education in Plants)*, which is a joint project between scientists and the Virginia Governor's school.

- COS faculty organized and participated in a summer program, VT STARS (Summer Training Academy for Rising Students). This is a program for junior high school students from minority and low-income backgrounds who are considered at "high risk" of dropping out of school before they have completed enough education to be successful in the workplace.
- Wayne Patty (mathematics) continued his outreach to in-service public school teachers through the National Science Foundation Local Systemic Change grant Systemic Reform of Mathematics K-5 for Virginia.
- Shuhai Xiao (geosciences) is a PI on a NASA-funded Education and Public Outreach project entitled "*Virginia Fossils, Paleontology, and Exobiology: a 4-H STEM project and kit*". Together with Lynn Sharp, he has developed various brochures, booklets, and podcasts for distribution to regional school teachers.
- The Virginia Tech Regional Mathematics Contest, in its 29<sup>th</sup> year, continued to grow. This year, for the first time, Princeton University was among the 67 colleges represented by 397 contestants.
- The 13<sup>th</sup> annual Women in Mathematics: Career Day at Virginia Tech attracted 250 students from 19 middle and elementary schools. Three alumnae participated in the Career Day activities.

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## STUDENT ENGAGEMENT

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Undergraduate and graduate students have opportunities to engage in service-learning and civic activities. These opportunities will amplify student learning and build professional skills to strengthen student academic careers and professional development.

- The Physics Outreach Team organized a Sunday afternoon of "Fun With Physics" at Virginia Tech's Northern Virginia Center on February 10, 2008. The event drew about 200 people of all ages. The Physics Outreach Team presented dozens of hands-on physics demonstrations and toys, and Prof. John Simonetti introduced the audience to "Life in the Universe." An informal reception rounded out the afternoon. The event was highlighted in the NVC Online News on March 14, 2008.



*The next generation is having "Fun with Physics"*

- Oil and gas as well as precious and base metal companies continue to recruit in the Department of Geosciences. Ten companies visited the department in Fall 2007: Exxon Mobil, BP, Cabot Oil and Gas, Chevron, Conoco Phillips, Hess, Stillwater Mining, Riotinto Mining, Baker Hughes, and Schlumberger.
- The Laboratory for Interdisciplinary Statistical Analysis (LISA) is part of the Department of Statistics. The statistical consultants of LISA provide assistance with experimental design, data analysis, interpretation of results and statistical software to University faculty, staff and graduate students on academic research projects. The laboratory is jointly funded by the Graduate School,

the Provost's Office, the Office of Research, and the College of Science with support from the 7 additional Colleges.

- Undergraduate physics majors took part in an outreach program, conducted by the department, visiting local and regional K-12 classes/student groups and giving informative and entertaining physics presentations and demonstrations. This program was coordinated by James Robertson, a graduating senior in Physics.
- The Psychological Services Center and Child Study Center, graduate training clinics for doctoral psychology students, provided psychological assessment and treatment services to more than 100 community residents.
- The College of Science and College of Engineering co-hosted a workshop on "Explorations in Nanoscale Science and Engineering" for 150 students and parents from the Johns Hopkins Center for Talented Youth. Faculty and graduate students from Physics, Geosciences and Chemistry provided an introduction to nano-materials, nano-devices and nano-based applications for energy, the environment and medicine.

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## OUTREACH AWARDS

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*Llyn Sharp (geosciences) received the 2007 Alumni Award for Outreach Excellence. Llyn was recognized for the variety of her outreach endeavors, from co-directing VT-STEM, organizing events for VT-STARs, coordinating activities of the Geosciences Museum, and for her outreach to the community through activities such as the New River Watershed Roundtable (NRWR).*

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*2007 Alumni Award  
for Outreach  
Excellence*



**Llyn Sharp**  
Geosciences

*COS Outreach  
Excellence Award*



**Angela Scarpa**  
Psychology

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*Angela Scarpa (psychology) received the College of Science Award for Outreach Excellence for her work in developing the Autism Clinic to provide clinical services and training opportunities to families and clinicians in the area.*

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SPOTLIGHTS

<b>2008 University Alumni Teaching Award</b> Jill Sible Biological Sci.	<b>College of Science Outstanding Ph.D. Student</b> Bing Shen Geosciences	<b>College of Science Outstanding Graduating Senior</b> Christine George Biological Sci.	<b>Provost's Alumni Advising Award</b> Connie Lowe Geosciences
<b>2007 Air Force Summer Faculty Fellowship Program (SFFP)</b> Lizette Zietsman Mathematics	<b>Fellow, Paleontological Society</b> Shuhai Xiao Geosciences	<b>Outstanding Graduate Student Teaching Excellence Commendation Award</b> Elise Drake Psychology	<b>Ernest Guenther Award in the Chemistry of Natural Products, American Chemical Society</b> David Kingston Chemistry
<b>2008-09 Barry M. Goldwater Scholarships</b> Kevin Finelli Math/Physics David Tatum Chem/Bioc	<b>College of Science 2008 Outreach Award</b> Angela Scarpa Psychology	<b>2008 Certificate of Teaching Excellence</b> John Chermak Geosciences Julie Dunsmore Psychology Lee Cooper Psychology	<b>Society of Economic Geologists Silver Medal for 2007</b> Robert Bodnar Geosciences
<b>Fellow, American Association for the Advancement of Science</b> Michael Hochella Geosciences	<b>Fulbright Research Chair Award for Fall 2008, McGill University in Montreal, Canada</b> Robin Panneton Psychology	<b>Fellow, Association for Psychological Science</b> Kirby Deater-Deckard Psychology	<b>Wen Zvi and Zagava Freidenberg Award for the Advancement of Science and Education Awarded by Israel Science Foundation</b> Alexander Elgart Mathematics
<b>College of Science Roundtable Make-a-Difference Scholarship for Graduate Study</b> Kwang-Hyung Kim Biological Sci.	<b>Distinguished Service Medal from the Geochemical Society</b> Michael Hochella Geosciences	<b>College of Science Outstanding M.S. Student</b> Kathryn Harry Biological Sci.	<b>Elected Vice President of Mineralogical Society of America</b> Nancy Ross Associate Dean
<b>VT Women's Center 2007 Advancing Women Award</b> Beate Schmittmann Physics	<b>VT 2008 Undergraduate Woman of the Year</b> Kaitlyn Hercik Psychology	<b>VT 2008 Undergraduate Man of the Year</b> Ryan C. Smith Psychology/ PolSci/Soc	<b>ACS Award in Polymer Chemistry</b> Jim McGrath Chemistry
<b>Elected Governor of Mathematical Assn of America's MD/DC/VA Section</b> Ezra "Bud" Brown Mathematics	<b>2008 Wine Award for Excellence in Teaching</b> Jeannine Eddleton Chemistry	<b>2008 College of Science Diversity Award</b> Claudia Brodtkin Chemistry	<b>Fellow, American Geophysical Union</b> Patricia Dove Geosciences
<b>Outstanding Junior Investigator Award from the US Department of Energy</b> Jonathan Link Physics	<b>2007 NSF Early Career Award</b> Serkan Gugercin Mathematics	<b>2007 Cottrell Scholar Award</b> Diego Troya Chemistry	<b>2007 Alumni Award for Outreach Excellence</b> Lyn Sharp Geosciences

## ALUMNI RELATIONS

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As Director of Alumni Relations for the College of Science (COS), Robin H. Jackson oversees the programming and administrative functions for this office. Amy C. Self assists the Alumni Relations office in her position as Administrative and Fiscal Support Specialist for both Alumni and Development. As of June 2008, there are over 25,000 College of Science alumni, including our international alumni. The majority of the alumni base (11,331) live in the Commonwealth of Virginia.

The mission of the alumni relations office is to serve as the primary linkage to our alumni and to promote the welfare of the college by cultivating a mutually beneficial relationship between the college and its family of alumni and students. This is achieved primarily by planning, implementing, and promoting college and departmental events, both locally, regionally, and nationally whereby our alumni can interact with the College of Science faculty, administration, students, and friends of the college. In addition, the alumni relations team from the College of Science represents the college and assists the Virginia Tech (VT) Alumni Association at various VT Alumni Association meetings and events throughout the course of the year.

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### SUMMARY OF ALUMNI RELATIONS ACTIVITIES, EVENTS, AND INVOLVEMENT

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#### *July 2007*

- ♦ VaBiotechnology Association and Virginia Tech Community Luncheon – July 16, 2007

#### *August 2007*

- ♦ Board of Visitor's College of Science Presentation "Breakthroughs on Demand" – August 27, 2007

#### *September 2007*

- ♦ College of Science Pregame Tailgate Tent – September 1, 2007
- ♦ Fall Focus Career Fair and Reception – September 21, 2007

#### *October 2007*

- ♦ VaBiotechnology Association and Virginia Tech Community Luncheon – October 2, 2007
- ♦ Geosciences 100<sup>th</sup> Anniversary Reunion – October 5-6, 2007
- ♦ Geosciences EIGER Board Meeting – October 8, 2007
- ♦ Fall College of Science Roundtable Meeting – October 19-20, 2007
- ♦ College of Science Campaign Kickoff Showcase – October 20, 2007
- ♦ College of Science Pregame Tailgate Tent – October 25, 2007
- ♦ VT BioSPHERES Luncheon – October 29, 2007

## COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

### *November 2007*

- ♦ College of Science Homecoming – November 10, 2007
- ♦ Department of Biological Sciences Board Meeting – November 10, 2007
- ♦ Department of Mathematics Career Day – November 15, 2007



### *December 2007*

- ♦ College of Science Commencement Breakfast – December 14, 2007



### *January 2008*

- ♦ College of Science Orange Bowl Brunch, Miami FL – January 4, 2008

### *February 2008*

- ♦ "Fun With Physics", Northern Virginia Center – February 10, 2008
- ♦ Directions Career Fair – February 15, 2008

### *March 2008*

- ♦ Department of Physics Alumni Reception, New Orleans LA - March 12, 2008

### *April 2008*

- ♦ College of Science Spring Roundtable Meeting – April 4-6, 2008
- ♦ Department of Physics Awards Luncheon and Ceremony - April 4, 2008
- ♦ College of Science Spring Scholarship Banquet – April 5, 2008



*May 2008*

- ♦ College of Science Commencement Reception – May 9, 2008
- ♦ College of Science Departmental Commencement Ceremonies – May 10, 2008
- ♦ Old Guard College of Science Breakfast – May 15, 2008



**Spring Commencement Reception**

*June 2008*

- ♦ Summer Around the Drillfield, Energy and the Environment, with focus on the College of Science – June 26-28, 2008



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**ALUMNI RELATIONS ACTIVITIES AND INVOLVEMENT IN PLANNING FOR 2008 – 2009**

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- Local, regional, and national Development/Alumni events – Dates TBD
- College of Science Pre-Game Hospitality Tents (2)– fall 2008
- Fall Focus Career Fair – September 2008
- College of Science Homecoming – September 6, 2008
- Department of Biological Sciences Alumni Advisory Board – September 6, 2008
- Fall Roundtable Meeting – October 24-25, 2008
- Department of Geosciences Alumni Dinner – November 8, 2008
- College of Science Commencement Breakfast – December 2008
- Directions Career Fair – February 2009
- College of Science Spring Roundtable Meeting – April 17-19, 2009
- College of Science Scholarship Banquet – April 18, 2009
- Commencement Reception – May 2009
- College of Science Commencement Departmental Ceremonies – May 2009
- Old Guard Breakfast – May 2009
- Department of Biological Sciences Alumni Advisory Board – spring 2009

## DEVELOPMENT

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The College of Science Alumni Relations and Development offices continue their mission of connecting alumni to the college and its departments through personal and professional involvement both on and off campus and through private and corporate giving.

The college began the fiscal year with a campaign fundraising total of \$39.6 million and completed the fiscal year with a fundraising total of \$55.7 million. This represents an increase of more than \$16 million and the most successful campaign year ever for development in the college. Significant gifts were designated to several endowments supporting undergraduate scholarships, graduate fellowships, and faculty positions, as well as the Institute for Advanced Study in the college. Notable leadership gifts were made to the college's Statistics and Geosciences departments.

The college continues a vigorous implementation of its campaign plan—soliciting leadership prospects, discovering new major and leadership gift prospects, and planning special events in conjunction with its campaign steering committee with the purpose of introducing new donors to the campaign and college.

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### SUMMARY OF DEVELOPMENT ACTIVITIES AND INITIATIVES

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- In October 2007, Virginia Tech announced the national, public phase of its \$1 billion fund-raising campaign. The campaign is currently scheduled to conclude on December 31, 2010. The college exceeded its original campaign goal of \$55 million in March 2008 and agreed to a new campaign goal of \$62 million in April 2008.
- The college secured over \$16 million pledged commitments of support from generous alumni and donors and, as of the end of this fiscal year, the college was at nearly 90 percent of its new campaign goal of \$62 million.
- The college participated in regional campaign events located in Atlanta, Hampton Roads, Tampa, Naples, and Charlotte.
- The development office increased the prospect pool of the college by more than 60 percent to over 800 major gift prospects.
- Rhonda Hawley was hired in August 2007 as the assistant to the director of development.
- Matt Banks resigned from his position as director of development for the college in May 2008.
- The development office in the college managed all its activity within its operating and development budgets for the fiscal year.
- Several departments in the college worked with the college's development staff and the Office of Annual Giving to coordinate solicitations made in departmental publications and on their websites. The number of donors that made a gift to the college through annual giving (direct mail, phonathon, web) increased by 18 percent this fiscal year and the total dollars raised for the college through the efforts of annual giving increased by 67 percent.





## COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

- The college's corporate partners programs continue to be a strong attraction for external engagement, feedback, and strategic direction for Chemistry, Statistics and the Biological Sciences. The Department of Chemistry Macromolecular and Interfaces Institute (MII) Review was attended by 22 companies interested in cutting edge polymeric discoveries and techniques. The Department of Statistics relationships with BD Diagnostics, CapitalOne, DuPont, Eli Lilly, GE, Minitab, Pratt & Whitney, and SAS have been very successful in creating research, philanthropy, and employment opportunities. The Department of Biological Sciences hosted its 1st Annual VT BioSPIRE Partners Day and 5th Annual Research Day with supporters such as Human Genome Sciences, Merck, Novozymes Biologicals, PPD, Pfizer, and Revivicor.
- Through the generosity of and collaboration with Oxford Diffraction (now a part of Varian), PPD, and Invitrogen, our world-class visualization capabilities are leading Virginia in discoveries ranging from classical crystallography for novel geological formations to protein structure of infectious agents and therapeutics.
- The Department of Geosciences continues to be recognized and supported for its top status in geology and geophysics by BP, Chevron, and ConocoPhillips. These fellowships and in-kind donations provide the tools to attract top intellectual talent and provide hands-on curriculum.
- The college continues to foster corporate partnerships through sponsoring and attending events targeted toward life sciences, technology development, energy, and nanotechnology. Also, the college has been working on ways to leverage its equipment and expertise to further build economic development.



## COMMUNICATIONS

The communications goal for the 2007-08 year was to increase awareness of the college among identified target audiences. The college's communications plan included utilizing specific tools in the areas of publications, electronic communications, and media relations to enhance awareness of the renowned learning, discovery and engagement being carried out within the college and the university.

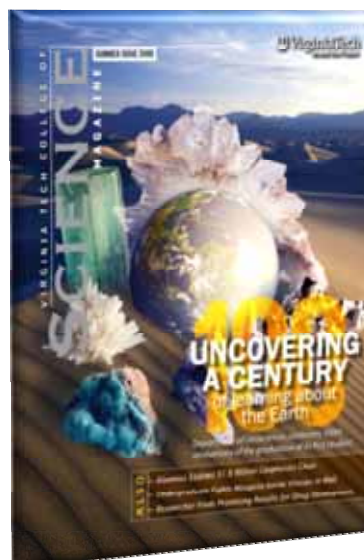
### PUBLICATIONS

Two issues of the College of Science Magazine featured faculty, staff, and student accomplishments. These magazines can be found on the College of Science website at: <http://www.science.vt.edu/news/magazine/index.html>



**Fall 2007**

*featuring VT Alum  
Mary Blackwood*



**Summer 2008**

*featuring Geosciences  
100<sup>th</sup> Anniversary*

Articles about the college's international research in neutrino physics and Michael Hochella's nano applications in the area of environmental toxins were featured in Virginia Tech's Research Magazine.

A prototype was assembled for a series of brochures/fact sheets about each department in the college. This concept will be further developed in the coming year.

Communications Manager Catherine Doss and Virginia Tech writer Albert Raboteau developed and presented a workshop called, "**Keeping the Story in Sight: Writing Well in an Academic Environment**" at the spring meeting of the College Communicators Association of Virginia.

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## ELECTRONIC COMMUNICATIONS

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Under the leadership of Associate Dean Jack Finney and Office Technology Coordinator Carolyn Furrow, and with assistance from the university's web development group, the College of Science designed and implemented a new website: <http://www.science.vt.edu>.

The college was one of the first units to utilize the new Content Management System for web development. In the process, the college changed its web address to [www.science.vt.edu](http://www.science.vt.edu) to help brand the word "science" into the URL.

Among the many features of the new site are a page that lists where the college and its faculty have been cited in the media ([www.science.vt.edu/news/news-newsmakers.html](http://www.science.vt.edu/news/news-newsmakers.html)) and a mechanism for faculty and staff to report honors, awards, and other news for publication (<https://survey.vt.edu/survey/entry.jsp?id=1168284325690>).

Three faculty members from the college were featured in the Spotlight on the university's homepage:

- Martha Ann Bell (psychology) and her research in childhood cognition ([http://www.vt.edu/spotlight/innovation/2007-12-24\\_cognition/2007-12-24\\_cognition.html](http://www.vt.edu/spotlight/innovation/2007-12-24_cognition/2007-12-24_cognition.html))
- Raju Raghavan, Bruce Vogelaar, and Jonathan Link (physics) and their international neutrino research ([http://www.vt.edu/spotlight/innovation/2008-03-24\\_neutrinos/2008-03-24\\_neutrinos.html](http://www.vt.edu/spotlight/innovation/2008-03-24_neutrinos/2008-03-24_neutrinos.html))
- Michael Hochella (geosciences) and his studying the behavior of toxins in the earth using nanotechnology ([http://www.vt.edu/spotlight/achievement/2008-03-03\\_hochella/2008-03-03\\_hochella.html](http://www.vt.edu/spotlight/achievement/2008-03-03_hochella/2008-03-03_hochella.html))

Two donors to the college were featured on the university's Campaign for Virginia Tech website:

- Mary Nolen Blackwood
- William Presley

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## MEDIA RELATIONS

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In addition to dozens of media hits that cited one or more of the college's departments in local, state, and national news outlets, several hits were particularly noteworthy:

- Erin Kraal (geosciences) and her research about the topography of Mars were featured in the New York Times, Reuters, Science Magazine and National Geographic.
- Recent graduate Christine George was named in USA Today as a member of the All-USA College Academic Team.
- Scott King (geosciences) was cited in Science Magazine.
- The research of John Simonetti (physics) and Shuhai Xiao (geosciences) was featured in Science Daily.



- Russell Jones (psychology) was quoted in several different articles in the Chronicle of Higher Education about recovery from trauma.

A variety of print and electronic media resources were used to recruit participants for two studies in psychology: childhood phobias and online health training. The latter fulfilled the needed number of participants for the first round of study.

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## DIVERSITY

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### DIVERSITY INITIATIVES

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The College of Science Diversity Committee was chaired by Anne McNabb (biological sciences) and members were Russell Jones (psychology), Bob Rogers (math), Madeline Schreiber (geosciences), Chris Thomas (physics and representing staff), and Jack Finney (COS and ex officio member).

The committee's overall goals are:

- To promote greater diversity among faculty, staff, graduate students, and undergraduate students in COS by promoting active recruiting strategies. This includes providing information to departments and helping develop strategies for recruitment.
- To promote a climate of openness and acceptance for all in COS.

During the past year, the members of the Committee:

- Created an updated Diversity section of the COS web pages, which now includes a link on the main menu.
- Continued communication with the focus area groups--undergraduate pipeline activities, graduate recruitment, and faculty recruitment.
- Awarded the second College of Science Diversity Award to Claudia Brodtkin, undergraduate chemistry lab manager in the Department of Chemistry.
- Met with Dr. Kevin McDonald, Vice President for Multicultural Affairs and Equity, to discuss mutual goals for the departments, college, and university.
- Participated in AdvanceVT workshops and committees.



***Claudia Brodtkin, undergraduate chemistry lab manager in the Department of Chemistry, was awarded the second annual College of Science Diversity Award***

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DIVERSITY HIGHLIGHTS

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- The College of Science will have four women join the faculty in August 2008, which represents 67% of new hires.
- Beate Schmittmann and Roseanne Foti served as AdvanceVT Professors and Nancy Ross and Jack Finney served on the AdvanceVT Leadership Team.
- Victoria Soghomonian led the AdvanceVT Scholars Program, designed to attract talented women faculty to VT.
- Jack Finney chaired the AdvanceVT Department Climate Committee, and Joe Merola and Carla Finkelstein served as committee members. The committee created a Departmental Climate Compendium which will be distributed widely by AdvanceVT.
- The Department of Statistics was chosen to host the 2008 StatFest, a one-day conference aimed at encouraging undergraduate minority students to pursue careers in statistics and graduate studies in statistical sciences.
- Departments in the college are active participants in MEAMP, MAOP, VT PREP, and the McNair Scholars program.
- The Department of Psychology supports a chapter of the Association of Black Psychologists, which has strong undergraduate and graduate participation.
- The "Ladies of Robeson" is an active group of female students and faculty who meet for networking, organize alumni events, and invite visiting speakers. The intent is to promote the success and networking of female students in physics.

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SCORECARD

<b>COLLEGE OF SCIENCE SCORECARD 2007-08 (Updated 7/29/08)</b>		
<b>Measure(s)</b>	<b>College Data</b>	<b>Comments</b>
<b>Number of graduating undergraduates who participated in research experiences.</b>	40.8% (321) of graduating seniors completed an undergraduate research course.	<b>Decreased.</b> Participation in undergraduate research was down from the prior year. However, numerous students in the college are highly involved in research without registering for formal research courses. They may be paid as research assistants or they may enroll in alternative courses such as field study. Involvement of undergraduates in research remains a priority for faculty members in the college. We encourage REU supplements for funded research and participate in a number of programs that feature undergraduate research mentoring. Faculty growth in the college will also yield additional research opportunities for students.
<b>Minority student enrollment</b>	570 undergraduate students from minority racial and ethnic groups were enrolled during 2007-08.	<b>Increased.</b> The total number of undergraduate students from minority racial and ethnic groups increased by 54 this year, a 10.5% increase.  Plans for recruitment include new brochures for high school students and visits to meet with school counselors in high-population areas.

COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

<b>COLLEGE OF SCIENCE SCORECARD 2007-08 (Updated 7/29/08)</b>		
<b>Measure(s)</b>	<b>College Data</b>	<b>Comments</b>
<b>Minority students entering the freshman class.</b>	129 students from the entering freshman class were from minority racial and ethnic groups in 2007-08.	<b>Increased.</b> The number of minority students entering the college increased by 26.5%. Plans include recruitment trips to high-population areas to meet with school counselors.
<b>PhD and EdDs Awarded</b>	51 PhDs were awarded in the college in 2007-08.	<b>Stable.</b> Slight increase from 2006-07.
<b>Graduate enrollment profile - masters, doctoral, and professional</b>	107 masters students 448 doctoral students	<b>Increased.</b> Doctoral students increased by 20% over the previous year.  Growing our doctoral programs continues to be a primary goal; additional graduate teaching assistantships, research assistantships and fellowships are necessary for sustained growth.
<b>Total expenditures in grants and contracts for research. (NSF Expenditures)</b>	\$20.8M	<b>Increased.</b> Steady increases over the past 4 years. The next few years should show a larger increase in grant expenditures based on large increase in research awards for 2007-08.

COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

<b>COLLEGE OF SCIENCE SCORECARD 2007-08 (Updated 7/29/08)</b>		
<b>Measure(s)</b>	<b>College Data</b>	<b>Comments</b>
<b>Count and average value of sponsored awards</b>	258 awards in FY2008 Average amt = \$107,752	<b>Increased.</b> 48% growth in total amount of awards, with increases in number and average amount.  Larger proposals are encouraged and supported by the dean's office.
<b>Faculty arts and humanities awards, fellowships and memberships.</b>	Patricia Dove, Fellow, American Geophysical Union  Michael Hochella, Fellow, American Association for the Advancement of Science  Kirby Deater-Deckard, Fellow, Association for Psychological Science  Diego Troya, Cottrell Scholar Award  Robin Panneton, Fulbright Research Chair  Shuhai Xiao, Fellow, Paleontological Society.	<b>Stable.</b> COS will promote the nomination of faculty members for appropriate national awards by working with the college's Honorifics Committee.
<b>Annual number of new licenses, start-ups and patents</b>	COS data not available	



COLLEGE OF SCIENCE ANNUAL REPORT 2007-2008

<b>COLLEGE OF SCIENCE SCORECARD 2007-08 (Updated 7/29/08)</b>		
<b>Measure(s)</b>	<b>College Data</b>	<b>Comments</b>
<b>Number of graduating undergraduates who have participated in a study abroad experience or foreign language course</b>	238 students (30.2%) graduated with at least one foreign language/literatures course or studied abroad.	<b>Increased.</b> The percentage of students involved with foreign language courses or study abroad has increased.  New initiatives with international colleagues and universities (e.g., Punta Cana, Oman) have been developed by the College of Science.
<b>Undergraduate participation in service learning and experiential programs. (Also in Learning)</b>	677 undergraduates participated in service learning or experiential learning courses.	<b>Decreased.</b> The number of students decreased, with the decrease occurring in the service learning courses. The college will investigate the number of service learning courses available to its majors during 2008-09.

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<b>COLLEGE OF SCIENCE SCORECARD 2007-08 (Updated 7/29/08)</b>		
<b>Measure(s)</b>	<b>College Data</b>	<b>Comments</b>
<b>Diversity of the faculty</b>	<p>ETHNICITY (Tenured/Tenure-Track)</p> <p>1 American Indian/Alaskan Native (&lt;1%)            21 Asian/Pacific Islander (10.5%)            3 Black (1.5%)            156 Caucasian (77.6%)            1 Hispanic (&lt;1%)            19 Non-resident alien (9.5%)</p> <p>GENDER</p> <p>Tenured/Tenure-Track Faculty            166 male (83%), 35 female (17%)            Non-Tenure-Track Instructional Faculty            19 male (43%), 25 female (57%)            AP Faculty            3 male (75%), 1 female (25%)            Research Faculty            44 male (71%), 18 female (29%)</p>	<p><b>Increased.</b> An Associate Dean from COS and a representative from the Office of Equal Opportunity met with every search committee to discuss enhancing pools of candidates and identifying shortlists that include diverse candidates. Faculty searches yielded four new women faculty members and two Asian/Pacific Islanders.</p> <p>We will continue to meet with search committees and facilitate the successful recruitment of diverse faculty members.</p>

Data tables related to each Scorecard measure are available at <http://www.irpa.vt.edu/> by clicking on Strategic Plan Shared Performance Measures (link at bottom of the webpage). Data retrieved for this report: July 29, 2008