

VIRGINIA TECH

# College of Science

## Annual Report

LAY NAM CHANG, DEAN

2009-2010

# 2009-2010 ANNUAL REPORT

LAY NAM CHANG, DEAN

## INTRODUCTION

Faculty, staff and students in the College of Science continued to make impressive contributions to the university's missions of learning, discovery, and engagement. The economic crisis has continued to limit growth in many areas, but the college has dealt with reduction targets without compromising our primary goals and objectives.

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 Learning, Discovery, and Engagement. Alumni Relations, Development, Communications, and Diversity reports are then detailed. Individual achievements are noted in the Spotlights section with the final section of the report updating the college's Scorecard for 2009-10.

## STRATEGIC INITIATIVES

### INSTITUTE FOR ADVANCED STUDY

The Institute for Advanced Study (IAS) served as the site for cluster committee meetings and research gatherings for faculty members associated with established clusters—nanoscience, computational science, infectious diseases, developmental science, and complex systems. The IAS continues to promote collaboration by faculty to plan and submit interdisciplinary grant proposals.

### DEPARTMENT REVIEWS

Three departments—Chemistry, Economics, and Psychology—will conduct internal and external reviews in the coming two years. Psychology will host external reviewers during October 2010. Chemistry and Economics will begin their internal reviews during 2010-11 with anticipated visits from external reviewers during fall 2012.

### PRE-INTELLECTUAL PROPERTY AND PATENT LAW

The College of Science's Pre-Intellectual Property and Patent Law program entered a new developmental phase this year, adding a course in "Law, Science, and Technology: The Quest for Sustainability," taught by Dean Rod Smolla, Professor Sean Seymore, and Professor Joshua Fairfield, all from the Washington and Lee School of Law. Michelle Mayberry, a partner in Latimer, Mayberry and Matthews IP Law, LLP, taught "Technology, Law, and Society" in fall 2009. Kimbley Muller, Senior Counsel of Shell Oil Company taught "Introduction to Intellectual Property and Patent Law" in spring 2010.

## VIRGINIA TECH CARILION SCHOOL OF MEDICINE AND RESEARCH INSTITUTE

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 Research Institute. Located in Roanoke, the school of medicine recently recruited its first class of students which will begin on August 2. Virginia Tech faculty members continued to work with Carilion Clinic faculty members on collaborative research proposals with the intention of serving as research mentors for medical students.

Michael Friedlander, Ph.D., was recruited from Baylor University to serve as Executive Director of the Virginia Tech Carilion Research Institute. Friedlander, a world renowned neuroscientist, was also appointed Professor of Biological Sciences. He has recruited several additional investigators who will join VTCRI during the coming year.

## CAPITAL PROJECTS

Two major building projects, approved by the General Assembly, have been delayed due to economic issues. The Davidson Hall Renovation will provide new teaching and research laboratories and is now projected to be completed in 2012. The Science Research Laboratory 1 has been delayed and a completion date is still pending.

## CHANGES

Jack W. Finney, Associate Dean for Administrative and Faculty Affairs, accepted a position with the Office of the Senior Vice President and Provost; as of July 1, he is the Associate Provost for Faculty Affairs.

Robert Jones, Department Head, Biological Sciences, will become Dean of the Eberly College of Arts and Sciences at West Virginia University. Brenda Winkel, Professor of Biological Sciences, is the new Department Head.

Joe Merola, Department Chair, Chemistry, will return to the faculty as Professor of Chemistry. James Tanko, Professor of Chemistry, is the new Department Chair.

Judy Taylor, Development Associate, accepted a position in the Office of the Senior Vice President and Provost. She began her position as Administrative Assistant in March 2010.

Rhonda Hawley, Administrative Assistant, accepted a position in the Department of Sociology. She began as Administrative Assistant in the Center for Race and Social Policy Research in November 2009.

Gary Kinder joined the college staff as Coordinator of Transfer Student Programming.

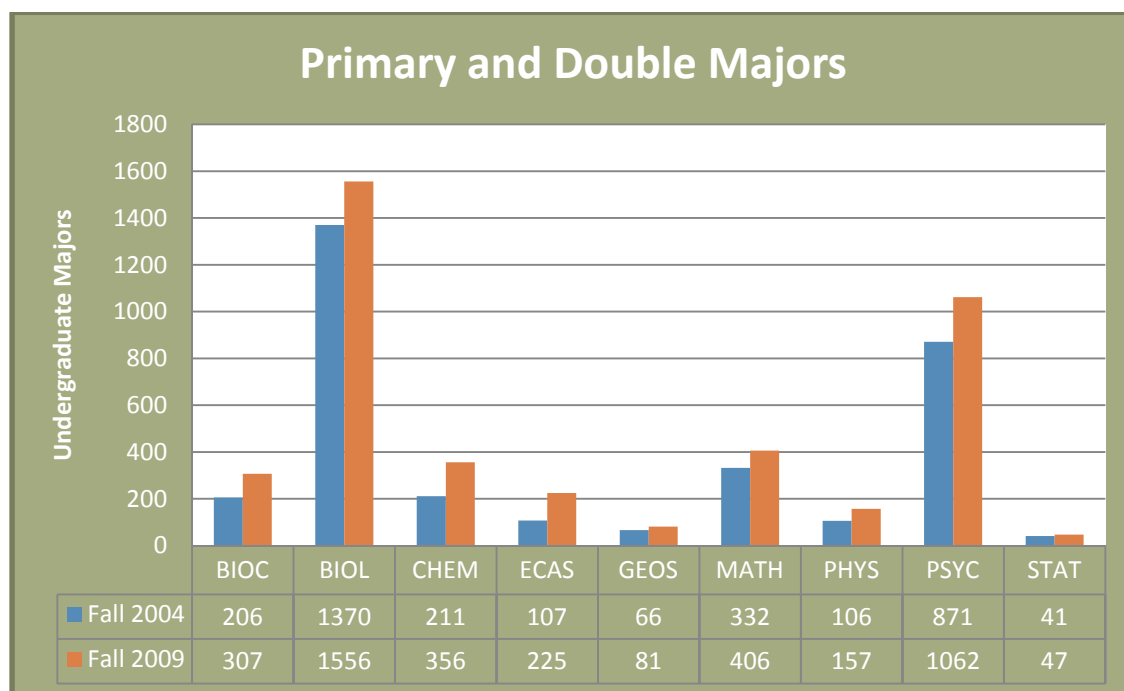
Anna-Marion Bieri joined the college staff as Coordinator of the Science and Law Program.

Shreya Mahajan joined the college staff as Coordinator of the Science Education Program.

## LEARNING – UNDERGRADUATE PROGRAMS

University-wide demand for undergraduate course offerings in the College of Science (COS) continues on a long-term upward trend. This academic year, the COS delivered 231,144 student credit hours (SCH), an increase of 10% from the 2008-2009 academic year. A steep increase is projected for next year as the COS will have around 80 more first-year students in its majors compared to last year. Furthermore, the freshman engineering class will increase by more than 400 students this year. These additional students will enroll in 1,600 SCH Physics, 1,600 SCH Chemistry, and 4,000 SCH in Math during their freshman year alone. These students will continue to enroll in COS courses as both required and elective courses as majors in specific engineering programs. The COS has worked with the Provost's Office and the University Registrar to provide the instructors and space for additional sections of these classes and labs for the 2010-2011 academic year. However, long-term quality instruction in mathematics and the physical sciences will require additional faculty and teaching assistant positions.

Likewise, the number of undergraduates in COS majors continues to grow, especially in the life sciences. During the 2009-2010 academic year, the Department of Biological Sciences had 1,556 undergraduate majors and the Department of Psychology had 1,062 undergraduate majors, ranking these as the two largest undergraduate degree-granting programs on campus. With unrestricted enrollments and a relatively flat number of faculty, student:faculty ratios in these programs are double-to-triple SCHEV recommendations. Furthermore, increasing demand for COS courses by other life science programs (CALS and CNRE) has compounded the challenges. Consequently, sections of upper division undergraduate courses in biological sciences and chemistry have grown larger and larger. For example, in fall 2009, enrollment in *CHEM 3615/4615: Physical Chemistry* was 343 students, an increase of 70% from 2004. Only 12% of these students were chemistry majors. Due to the increase in class size, instructors have been forced to abandon problem-based assessment for multiple-choice scan-tron exams. Similar trends exist in biological sciences where 3000/4000 level courses have progressed from sections of 25 or 30 students to well over 100. The courses have defaulted to freshman-style lecture-based classes rather than the writing- and discussion-based courses that they used to be.



Although increasing enrollments in the life sciences and engineering presents significant challenges, the COS is committed to providing innovative and effective undergraduate programs for STEM (science, technology, engineering and math) students. Undergraduate training in STEM must be student-centered, interdisciplinary, and projected toward emerging areas of greatest promise in science. During the 2009-2010 academic year, the COS has made significant progress toward this vision as described below. However, successful implementation will require strategic planning and cooperation with the university administration so that new programs can be developed that strengthen the core science and math curricula rather than competing for a continually shrinking pot of state resources.

## STUDENT-CENTERED LEARNING IN THE COS

### AWARD WINNING TEACHING AND ADVISING IN THE COS

As in previous years, COS faculty members, staff and programs were recognized for excellence in undergraduate education and advising:

#### *WINE AWARD FOR OUTSTANDING TEACHING*



*Patricia Amateis  
Chemistry*

- The Department of Chemistry was recognized as an Exemplary Department for its incorporation of research in to the undergraduate curriculum. In addition, several individuals were recognized for their accomplishments: Dr. Patricia Amateis (Wine Award for Outstanding Teaching), Dr. Gordon Yee (College of Science Certificate of Teaching Excellence and Alan F. Clifford Service Award), Dr. Maggie Bump (Viers Teaching Award) and Anna Hawthorne (Harold McNair Staff Service Award).

#### *COS CERTIFICATE OF TEACHING EXCELLENCE*



*Gordon Yee  
Chemistry*

#### *DIGGS TEACHING SCHOLAR AND ALUMNI AWARD FOR EXCELLENCE IN TEACHING*



*Barbara Bekken  
Geosciences*

- Dr. Barbara Bekken, Department of Geosciences, received both the Edward S. Diggs Teaching Award and the Alumni Award for Excellence in Teaching. The Earth Sustainability program, which Dr. Bekken leads, was also recognized as an Exemplary Department.

#### *COS CERTIFICATE OF TEACHING EXCELLENCE*



*Leo Piilonen  
Physics*

- Dr. Leo Piilonen, Department of Physics, received a COS Certificate of Teaching Excellence.

### **TWO NEW FIRST-YEAR EXPERIENCES (FYE) TO BE OFFERED BY THE COS**

Virginia Tech's reaccreditation by the Southern Association of Colleges and Schools (SACS) provided the COS with the opportunity to improve academic advising for its students. As part of the reaccreditation process, a Virginia Tech committee chaired by Dr. Robert Jones, head of biological sciences, developed a Quality Enhancement Plan (QEP) to provide a first-year experience (FYE) for incoming undergraduates that trained students in problem-solving, inquiry, and integration. As these skills are central to the practice of science, the COS became fully engaged in the QEP and successfully competed for two of the five grants awarded campus-wide to fund pilot FYE programs. Dr. Jack Evans from biological sciences will lead an FYE for over 500 freshman life sciences students in the COS and College of Agriculture and Life Sciences. This program will introduce freshmen to the range of majors and career options available in the life sciences.

The COS will also offer an FYE to all 160 of its incoming transfer students. Transfer students bring college credit, primarily from community colleges, and typically enroll with sophomore or junior standing. Many have completed their Curriculum for Liberal Education requirements. They strive to spend about two years at Virginia Tech fulfilling major degree requirements, gaining meaningful extracurricular experiences, and making concrete career plans. Transfer students in the College of Science must take a higher load of upper division math and science courses per semester than a student who entered the major as a freshman. These students require strategic academic planning from day one to navigate the hierarchy of prerequisites in their major and to accommodate their lab and ViEWS requirements in two to three years. The COS FYE "Zip-line to success" program will address the unique academic and developmental needs of transfer students. Gary Kinder, has joined the COS dean's staff as the Coordinator for Transfer Student Programs. Mr. Kinder will lead the students in a two-credit seminar course during the fall semester. He is also an academic advisor in the Department of Economics. During the 2009-2010 academic year, COS Career Coordinator Debbie Wilson piloted a transfer student seminar for 15 students per semester. Our data indicate that these students had higher GPAs and were more engaged with university life than students not in the program.

### **SCALE-UP CLASSES ARE BUILT IN COS AND CNRE**

The COS partnered with the College of Natural Resources and Environment (CNRE) to build two SCALE-UP classrooms at Virginia Tech. SCALE-UP (student-centered active learning environments for undergraduate programs) describe a structure and pedagogy for active learning. In SCALE-UP, students sit at round tables of nine, and work in teams of three with each team using a computer that can be projected on screens around the room. The rest of the wall space is covered by white-boards where student teams can hash out their ideas. In science classes, students achieve course-learning outcomes



***SCALE-UP Classroom***

by solving problems and creating projects. The instructor serves as a resource and coach. In addition to learning the specific discipline, students gain transferrable skills in teamwork, problem solving, information literacy, and communication. SCALE-UP classrooms in Derring Hall and Cheatham Hall will accommodate 54 and 27 students respectively. These classroom renovations were funded by federal stimulus funds earmarked for classroom renovations and matches from the colleges. A group of faculty across campus met during the spring 2010 semester to share their ideas for student-centered learning and plan for teaching in SCALE-UP. SCALE-UP courses planned for the 2010-2011 academic year include: *Geoscience Fundamentals* taught by Dr. Barbara Bekken; *Genes, Mind and Culture* taught by Dr. Robin Panneton; *Cell and Molecular Biology* taught by Dr. Jill Sible; and the *Transfer Student Seminar* taught by Gary Kinder.

### **COS GOES ON-LINE**

During the 2009-2010, the COS also made strides in the virtual classroom. Distance-learning offerings were expanded from 136 SCH (04-05) to 253 SCH (09-10). Many of these on-line courses were offered in the summer so that students could take science courses while engaged in experiential learning and/or employment anywhere in the world. Among the new offerings were *Principles of Biology* (BIOL 1105/1106; Fall 2009/Spring 2010) taught by Drs. Art Buikema and Mike Rosenzweig, *Cell and Molecular Biology* (BIOL 2104; Summer II 2010) taught by Dr. Richard Walker, and *Ecology* (BIOL 2804; Summer II) also taught by Dr. Art Buikema. Development of these on-line courses was supported by grants from IDDL. Dr. Jennifer Sliko, from the Department of Geosciences, was also funded by IDDL to develop an on-line course in *Physical Geology* (GEOS 1004), which she will offer fall 2010.

### **UNDERGRADUATES IN THE COS ARE INVENTING THE FUTURE**

According to the 2009-2010 scorecard, 57% of undergraduates graduating from the COS participated in undergraduate research for credit. Although this is a 50% increase from last year, the actual number of COS undergraduates participating in undergraduate research is likely even higher as many serve as volunteers or paid researchers and do not receive academic credit.

Among our most successful undergraduate researchers was Isaac Nardi, a biological sciences major who worked with Dr. Daniela Cimini and co-authored papers published in *PNAS* and *PLoS ONE*. Isaac and Alexa Karatsikis, who worked with Dr. Joe Falkinham, were named ACC Undergraduate Research Scholars. Brittany Gianetti, a biological sciences major working with Dr. Steve Melville was awarded a Barry M. Goldwater Scholarship.

Kelly Daly, a chemistry major, received the James Lewis Howe Award presented by the American Chemical Society. Martha Blakely, a chemistry/biochemistry/math major and member of the VT women's tennis team, received the Skelton Award for Academic Excellence in Athletics.

In the Department of Geosciences, several undergraduates received awards: the Sigma Gamma Epsilon W. A. Tarr Award and the GSA/Subaru of America Minority Student Scholarship to Keith DePew, the ACC Undergraduate Research Award to William Nachlas, and the Anadarki Petroleum/SEG Fellowship to Joshua Hoover.

Three undergraduate teams from the Department of Mathematics participated in COMAP's International Mathematical Contest in Modeling, earning rankings of Meritorious, Honorable and Successful.

Justin Waugh, a physics major, was the 2010 COS Outstanding Senior. Siddharth Venkat, also a physics major, won a Sigma Xi Research Award and co-authored an article in *Physical Review*. The Virginia Tech chapter of the Society of Physics Students was named an outstanding chapter for 2008-2009. In collaboration with Washington and Lee

University, the Physics Department held the first Undergraduate Research Symposium supported by the department, COS, NSF, DOE and HHMI.

In the Department of Psychology, Taylor Berens, Rose Nevill, Sheri Pegram, Philip Randall and Jonathan Waldron received research awards.

### INTERDISCIPLINARY PROGRAMS IN THE COS

The minor in Actuarial Science, offered through the Department of Statistics, continues to grow and improve. Currently, 24 undergraduates are enrolled in the minor which has added course work in regression and SAS to the curriculum.

The program in intellectual property and patent law reached several milestones during the 2009-2010 academic year. In addition to courses in *Science, Technology and Society* taught by Michele Mayberry (New River Valley IP Law) and *Introduction to Intellectual Property and Patent law* taught by alumnus Kimbley Muller (Shell Oil), the COS partnered with the Washington and Lee School of Law to offer a third course. *"The Quest for Sustainability"* was taught by three faculty and several third-year law students from Washington and Lee. Prof. Sean Seymore, Prof. Joshua Fairfield, and Dean Rodney Smolla led Virginia Tech undergraduates from the COS and College of Engineering in discussions ranging from the patentability of chemical compounds, to internet law, to the First Amendment.

The program was also boosted by the receipt of a \$1.4 million grant from the Howard Hughes Medical Institute to develop a program in "Scieneering," which includes new interdisciplinary minors in *biomedical engineering* and *science, engineering and law*. Anna-Marion Bieri, an IP attorney who trained in an interdisciplinary program at the Max Planck Institute, has been hired as the Coordinator for the Science and Law Programs in the COS. Ms. Bieri will support program faculty, advise students, and offer her own course in international intellectual property law beginning fall 2010.



*UNDERGRADUATE STUDENT HONORS AND AWARDS*

**2010 VT UNDERGRADUATE  
MAN OF THE YEAR**



*SHASHANK SHARMA  
BIOLOGICAL SCIENCES*

**COLLEGE OF SCIENCE  
OUTSTANDING SENIOR**



*JUSTIN WAUGH  
PHYSICS  
AND ELECTRICAL ENGINEERING*

**BARRY M. GOLDWATER  
SCHOLARSHIP FOR 2010-11**



*BRITTANY GIANETTI  
BIOLOGICAL SCIENCES*

**2010 SKELTON AWARD FOR  
ACADEMIC EXCELLENCE IN  
ATHLETICS**



*MARTHA BLAKELY  
CHEMISTRY*

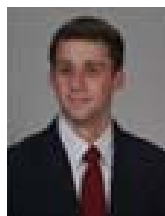
**2010 ACC UNDERGRADUATE RESEARCH SCHOLARS**



*DAVID JIANG, BIOC  
ADVISOR: JAKE TU*



*ALEXA KARATSIKIS, BIOL  
ADVISOR: JOE FALKINHAM*



*ISAAC NARDI, BIOL  
ADVISOR: DANIELA CIMINI*



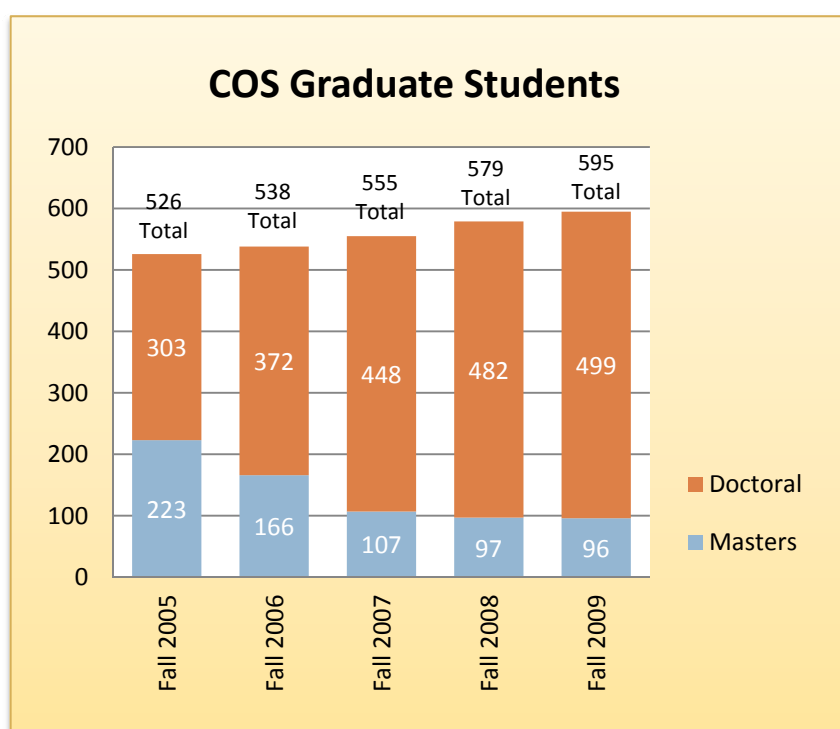
*WILLIAM NACHLAS, GEOS  
ADVISOR: ROBERT TRACY*

## LEARNING – GRADUATE PROGRAMS

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:

- Developing and supporting interdisciplinary graduate research and training programs
- Increasing the successful recruitment of top quality graduate student prospects
- Supporting a steady growth of M.S. and Ph.D. students
- Enhancing graduate and professional degree value through national and international partnerships, joint degrees and interdisciplinary programs
- Enhancing the quality of graduate training and increasing external support for graduate training

Following university goals in graduate education, all departments are working to increase the number and quality of Ph.D. students. In fall 2009, there were 595 graduate students enrolled in the College of Science. Of these, 499 were Ph.D. students and 96 were M.S. students. There has been a remarkable 88% growth in the number of doctoral students from 2003 when 256 Ph.D. students were enrolled in the College of Science. The college has far surpassed the expectations set by the PhD2010 program to grow the number of Ph.D. students in the college by 120 by 2010, increasing our 2003 enrollment by 95%.



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.

- 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.
- 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. The 2005 IGERT for “Exploring Interfaces through Graduate Education and Research” (EIGER) 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. This year, the “Multi-Scale Transport in Environmental and Physiological Systems” (multiSTEPS) was approved for funding. Jeffrey Kuhn (Biological Sciences) is a co-PI on this proposal. In addition, three IGERT proposals involving co-PIs from the College of Science have been invited to submit full proposals to NSF during the upcoming fiscal year. Each IGERT program sponsors 40 graduate student fellowships over a five-year period.

Faculty in the College of Science lead 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) ([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) ([www.molplantsci.org.vt.edu/INDEX.HTM](http://www.molplantsci.org.vt.edu/INDEX.HTM)) involves 20 participating faculty from seven departments - this coming year marks the fifth year of an aggressive recruiting effort at regional schools, followed by students rotating through labs before a decision is made on a major advisor; and (3) The Graduate Program in Cell and Developmental Biology (CDB) ([www.biol.vt.edu/research/cdb/index.html](http://www.biol.vt.edu/research/cdb/index.html)) includes 11 participating faculty. Fifteen students have been recruited, 14 are currently active. Following the model of the Microbiology program, students in the CDB rotate among faculty mentors before being accepted into a particular lab.



*MPS Mini-symposium: Reza Sohrabi, winner of best graduate student poster award, with advisor, Dorothea Tholl*

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) ([www.molplantsci.org.vt.edu/INDEX.HTM](http://www.molplantsci.org.vt.edu/INDEX.HTM)) involves 20 participating faculty from seven departments - this coming year marks the fifth year of an aggressive recruiting effort at regional schools, followed by students rotating through labs before a decision is made on a major advisor; and (3) The Graduate

Program in Cell and Developmental Biology (CDB) ([www.biol.vt.edu/research/cdb/index.html](http://www.biol.vt.edu/research/cdb/index.html)) includes 11 participating faculty. Fifteen students have been recruited, 14 are currently active. 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 three four-year ICTAS Graduate Scholarships per year to recruit the best and brightest graduate students to Virginia Tech. There are now nine ICTAS Graduate Scholars in the College of Science and three more will join the cohort in fall 2010.

- 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 annual on-campus Preview Weekend for prospective graduate students February 19-20, 2010. The date was chosen to coincide with the Graduate School Preview Weekend and students participate in various activities at the Graduate School and in the department. The departmental sessions include a poster session organized by all research groups and attended by faculty and current graduate students, along with meetings with



*Poster Session at the Physics Preview Weekend*

faculty and lab tours, and a social evening with current students. Fifty percent of the prospective graduate students attending this event accepted offers to join the department this coming fall.

- 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: Southeast Section of Geological Society of America, Society of Exploration Geophysicists and the American Geophysical Union. In addition, the departmental website continues to use a web-based pre-application form to reach potential applicants and to match their research interests with potential faculty advisors.

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

- Biological Sciences entered the sixth 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.
- Geosciences initiated a new graduate student orientation program in August that includes a presentation of expectations of graduate students, scientific culture and ethics, and career paths for graduate students.
- 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 7th Annual Research Day on February, 20 2010. This program, directed by and for graduate students, is modeled after professional conferences with poster sessions, presentations, and a plenary talk. An abstract book was published on the web, and over 125 people attended the meeting, including several from the Biological Sciences Alumni Advisory Board. Geosciences held its 16th annual Geosciences Student Research Symposium in March 2010. This is a two-day event organized by graduate students where the students present 15-minute talks in a format similar to that found in a professional meeting. An abstract volume is published as well.

- Physics launched a new initiative in FY10, consisting of three career-building events for all students, with a specific focus on careers outside the traditional academic track. As the program matures, they anticipate three to four alumni visits per year, interspersed with events focused on 'soft skills,' resume preparation, expectations for graduate school, and other relevant skills.
- Statistics has a very active consulting center with faculty from the entire campus visiting the Laboratory of Interdisciplinary Statistical Research (LISA) throughout the year. All students are trained in consulting via coursework and practical experience; each M.S. student must work in LISA for at least one semester for a minimum of five hours per week.



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

- Statistics' Corporate Partners Program, which includes companies such as BD, Capital One, DuPont, GE, JR Research, Lilly, Minitab, Pratt & Whitney, RJ Reynolds, and SAS, sponsor student recruitment activities and scholarships. The Corporate Partners, and other companies, visit Statistics regularly and the students are among their top choices for recruiting new hires and interns.
- Psychology's internship component involves 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 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. Geosciences had endowed graduate scholarships totaling \$129,076 in FY10. The College of Science's alumni advisory group, the Roundtable, established the Make-a-Difference Scholarship for Graduate Study in the College of Science. Four awards totaling \$10,000 are awarded each year to graduate students who will make a significant difference to the College of Science and the world outside the university.

*GRADUATE STUDENT HONORS AND AWARDS*

**2010 OUTSTANDING DOCTORAL STUDENT**

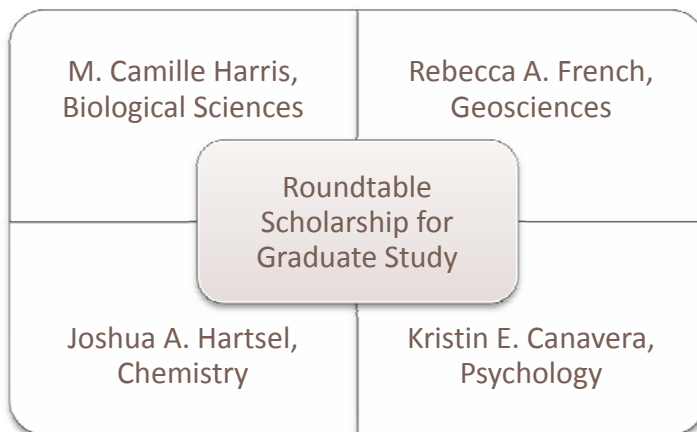


*M. Camille Harris  
Biological Sciences*

**2010 OUTSTANDING MASTER'S STUDENT**



*John D. Welsh  
Biological Sciences*



**WILLIAM PRESTON SOCIETY THESIS  
AWARD IN LIFE SCIENCES**



*Karen Drahos  
Biological Sciences*

**AMERICAN PSYCHOLOGICAL  
FOUNDATION KOPPITZ  
GRADUATE STUDENT  
FELLOWSHIP**



*Brenda Salley  
Psychology*

**FULBRIGHT SCHOLARSHIP IN  
BOTSWANA**

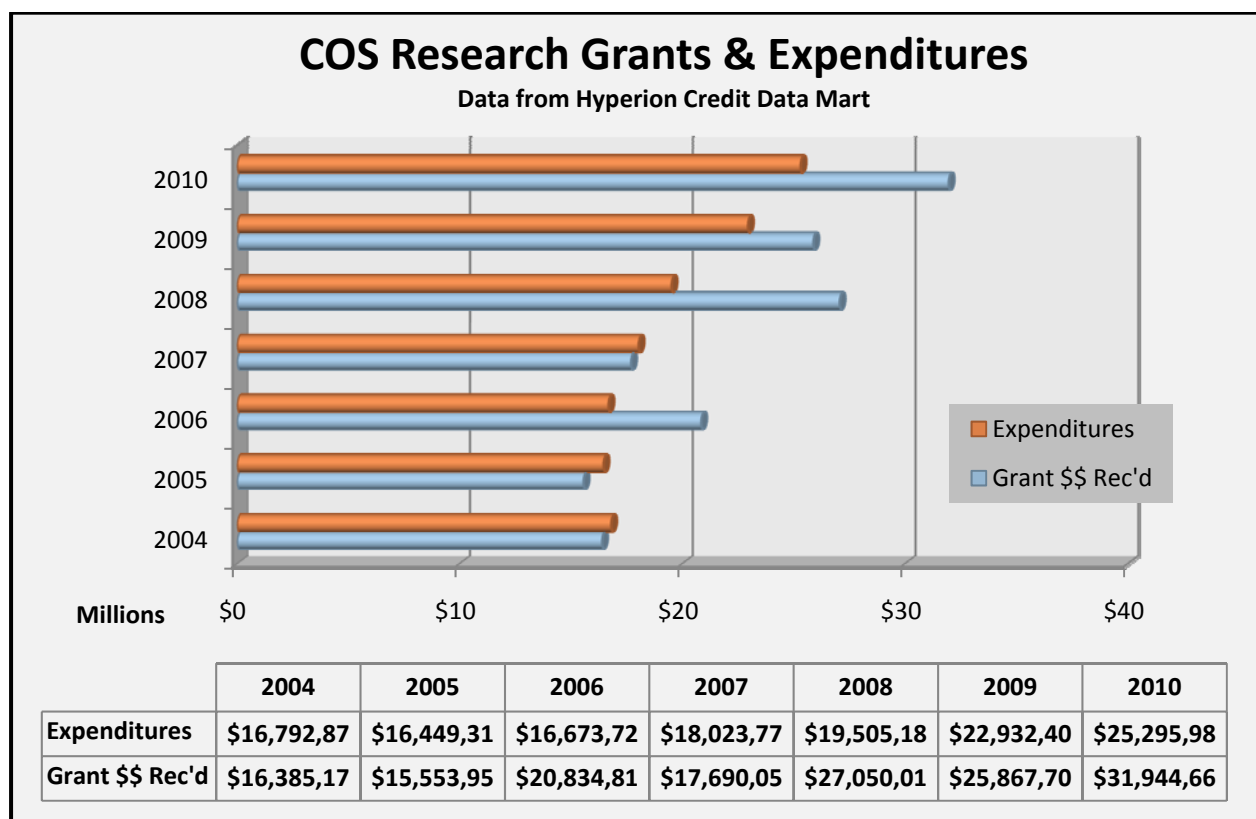


*Bonnie Fairbanks  
Biological Sciences*

## DISCOVERY

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 or “clusters” for achieving world-class excellence in discovery. The college has expanded cluster initiatives to include energy and the environment, integrated studies of earth systems, neuroscience, data analytics and visualization and pattern recognition. These new clusters strengthen previous initiatives in nanoscience, computational science, infectious diseases, and developmental science across the lifespan. These areas of research also provide a basis for incorporating and developing innovative technologies and promote the understanding of complex systems that power the progress in all areas of discovery. Through cluster hiring, the College of Science is helping to establish an interdisciplinary research environment that will place Virginia Tech at the forefront of the premier universities in the country recognized for its research and scholarship.

The College of Science achieved a record-high growth in research awards totaling \$31.94M in FY10, a 23.5% increase from FY09. There was a record-high growth in first quarter awards that totaled \$13.0M, largely due to stimulus funds from the American Recovery and Reinvestment Act of 2009. It is noteworthy that since the College of Science was formed in 2003, the research awards have almost doubled. During this period, the average amount per award has grown from \$80,715 to \$120,093. The number of funded awards, 266, remained similar to FY09, 264. Research expenditures continue to show a steady increase to \$25.3M, an increase of 10.3% from FY09 and increase of 50.6% since FY04.



Departments continue on upward trajectories reflecting, in large part, the impact of the cluster hires. In FY10, for example, Statistics achieved its highest total for research awards, doubling its research funding from FY09. Biological Sciences recorded a record-high of \$7.014M, a 68% increase from FY09. Physics showed another strong 36% increase from FY09. In FY10, the Chemistry Department obtained \$12.32M in new awards, thus continuing a level of awards of greater than \$10M/annum first seen in FY08. When placed on an award per faculty basis, Chemistry ranks among the top research departments on campus.

Faculty members are the key to achieving these goals. Scholarship is a critical indicator of the college's success. Among the notable research awards in FY10:

- Eileen Andersen (Psychology) received a \$1,061,240 grant from the Edward Via College of Osteopathic Medicine
- Daniela Cimini (Biological Sciences) received a \$943,737 award from the NSF
- Dr. Rick Jensen (Biological Sciences) was awarded \$879,365 as a co-PI on a major NIH project
- Carla Finkelstein (Biological Sciences) received a \$1,081,348 NSF CAREER Award
- Giti Khodaparast (Physics) received a \$550,000 NSF CAREER Award
- Patrick Huber (Physics) received a \$600,000 Early Career Research Award from the DOE. Huber was one of only 69 awardees from a pool of approximately 1,750 applicants from universities and national labs.
- Christopher Lawrence (Biological Sciences and VBI) received a \$990,000 grant from the NSF
- Robert B. Moore and Herve Marand (Chemistry) received a \$510,000 MRI grant from the NSF
- Theresa Reineke (Chemistry) received a \$2.39M NIH Director's New Innovator Award which recognizes "investigators of exceptional creativity who propose bold and highly innovative new research approaches."
- Dorothea Tholl (Biological Sciences) received a \$538,000 NSF grant
- Lizette Zietsman (Mathematics) received a \$600,000 award from the Air Force Office of Scientific Research

Looking ahead, Daniela Cimini (Biological Sciences) will be a co-recipient of a \$1,050,000 HFSP (Human Frontier Science Program) award in November 2010. HFSP is a prestigious international funding organization that "supports novel, innovative and interdisciplinary basic research focused on the complex mechanisms of living organisms."



## FACULTY AWARDS AND HONORS

- Ross Angel (Geosciences) was announced as the 2011 Dana Medalist of the Mineralogical Society of America.



Virginia's Outstanding Scientist 2010  
L to R: Mrs. Bodnar, Gov. McDonnell,  
Dr. Bodnar, Pres. Steger



Ross Angel, Geosciences

- Robert Bodnar (Geosciences) was inducted as Fellow of the Geological Society of America; named Virginia's Outstanding Scientist 2010 by the Governor of Virginia; received Honorary Doctorate in Geological Sciences from the University of Napoli Federico II, Naples, Italy.

**2010 DIRAC MEDAL FOR  
OUTSTANDING  
COMPUTATIONAL CHEMIST  
UNDER AGE OF 40**



Daniel Crawford  
Chemistry

- John Burns (Mathematics) was nominated for the W.T. and Idalia Reid Prize.
- Daniel Crawford (Chemistry) has been selected to receive the 2010 Dirac Medal for the outstanding computational chemist in the world under the age of 40.
- Patricia Dove (Geosciences) was inducted as Fellow of the Geochemical Society and European Association of Geochemistry.
- Scott King (Geosciences) received an Alexander von Humboldt Fellowship (Preistraeger).
- Tim Long (Chemistry) received the 2010 Alumni Award for Excellence in Research.

**2010 ALUMNI AWARD  
FOR EXCELLENCE IN  
RESEARCH**



Tim Long  
Chemistry

- James E. McGrath, Robert B. Moore, S. Richard Turner, and Thomas C. Ward (Chemistry) have been elected Fellows of the ACS Polymer Division. The honor recognizes their contributions to the diverse research frontiers of synthetic and physical polymer chemistry, and to education within the university setting and through countless short courses spanning over thirty years.
- Judy S. Riffle (Chemistry) has been elected a Fellow of the ACS Polymeric Materials Science and Engineering (PMSE) division. The honor recognizes her contributions to polymer chemistry, which have led to new materials for heart transplants, arterial grafts, and contact lenses.

**2010 CAMILLE DREYFUS  
TEACHER-SCHOLAR  
AWARD**



*Edward Valeev  
Chemistry*

- Madeline Schreiber (Geosciences) was elected Fellow of the Geological Society of America.
- Edward Valeev (Chemistry) is one of just 14 professors nationwide to receive the 2010 Camille Dreyfus Teacher-Scholar Award.
- Shuhai Xiao (Geosciences) received the 2010 Alumni Award for Excellence in Research. Additionally, he has been named a Guggenheim Fellow.

**2010 ALUMNI AWARD  
FOR EXCELLENCE IN  
RESEARCH  
AND  
GUGGENHEIM FELLOW**



*Shuhai Xiao  
Geosciences*

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

- **High-Performance Computing:** Khidir Hilu (Biological Sciences), Eric de Sturler (Mathematics) and Scott King (Geosciences) were co-PIs on Wu Feng's (Computational Science) successful NSF MRI-R<sup>2</sup> grant: "Acquisition of a Heterogeneous Supercomputing Instrument for Transformative Interdisciplinary Research." The HPC advisory group in the College of Science, led by Leo Piilonen (Physics), is exploring connections and usage of the Open Science Grid (OSG) and Teragrid (TG). Such discussions are timely as the NSF TG usage is exploding and the new TG machines are not large enough to meet the demand. However, funding for TG runs out at the end of 2011 and proposals for Cloud Computing are now being solicited. Virginia Tech can take a lead role in such discussions, leveraging the proximity to NSF with the NCR facility and its link to the lambda rail.
- **Neuroscience:** Seong Ki Mun (Physics) is leading a university-wide initiative in the field of neuroscience. A comprehensive, multidisciplinary approach to human neuro-performance is being developed involving imaging, bioinformatics, nanotechnology, and supercomputing. Imaging reveals the structural and functional health of the nervous system and enables us to observe many pathways of neurological activities. Bioinformatics shows the proteins, genes, and networks which govern the actions of all living cells. Nanotechnology will be the basis for advanced bio-implants which will be able to monitor performance, sense problems, and take corrective actions. Supercomputing ties all of these elements together and gives us the analytical power to find the right answers in a giant heap of data.
- **Nanomedicine:** Harry Dorn (Chemistry) has developed a new area of fullerene chemistry that may be the backbone for development of molecular semiconductors and quantum computing applications. Dorn has figured out how to put atoms inside the 80-atom "bucky ball" molecule, resulting in a new, more sensitive MRI material and a vehicle to deliver radioactive atoms for applications in nuclear medicine. This work complements Theresa Reineke's and Judy Riffle's (Chemistry) research to develop novel technologies that will enable personalized medicine at the nanoscale.

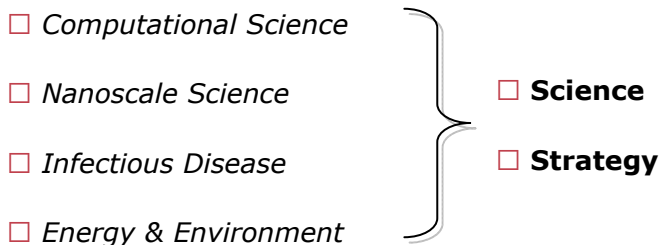
- **Innate Immunity:** Liwu Li (Biological Sciences) leads a research program on inflammation that focuses on system network analyses of human inflammatory processes using biological, chemical, computational, and structural approaches. Participating faculties across the campus include Biological Sciences 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.
- **Sustainable Energy:** 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 (Chemistry) are working on various aspects of fuel cell technology and Karen Brewer (Chemistry) is working on hydrogen production using sunlight and water. Vicki Soghomonian (Physics) is developing new materials for energy storage.
- **Nuclear Energy:** GEM\*STAR project proposes to develop new technologies for nuclear energy, based on an accelerator-assisted molten salt reactor design. If successful, a GEM\*STAR reactor will be able to burn unenriched uranium or spent fuel from conventional reactors, thus alleviating nuclear waste and proliferation concerns. The GEM\*STAR group, led by Bruce Vogelaar (Physics) and Mark Pierson (Mechanical Engineering), has received seed funds from central university sources and the college; its corporate partner, ADNA, is pursuing venture capital. Most recently, the initiative has received valuable support through a partnership with Jefferson Lab. In response to President Obama's multibillion-dollar push into energy research, Jefferson Lab has identified accelerator-driven sub-critical nuclear reactors as one of its three strategic thrusts in this area, the key asset being Jefferson Lab's expertise in accelerator technology. As part of this thrust, GEM\*STAR has attracted considerable interest at Jefferson Lab. Through various channels, GEM\*STAR has been brought to the attention of high-ranking government officials. There is a significant opportunity here to influence the energy policies and solutions of the U.S.



## INSTITUTE FOR ADVANCED STUDY

The Institute for Advanced Study (IAS), established by the College of Science, is an initiative to foster an interdisciplinary research community. The IAS engages faculty and students at all levels to identify emerging opportunities at the frontier of science, to develop teams, and to catalyze new research activities.

The IAS leads scientific approaches to formalize observations, develop strategic plans, and produce position papers that identify solutions to society's most critical long-term needs, including the research and cluster areas identified in the College of Science's strategic plan:



Senior Research Fellows bring leadership in these areas. Our Fellows are selected based on their vision and ability to lead teams addressing major concerns to a society need. Our founding Senior Fellows are:

- Richard Blankenbecler, Professor Emeritus, Stanford, is collaborating with Jim Robertson (Veterinary Medicine) to answer the question: *“Can radiation be used to protect the body from cancer?”*
- Seong Ki Mun, Professor of Physics and Former Director, ISIS, Georgetown University, asks: *“How can neuroscience improve memory and retention, to mitigate negative conditions such as stress and sleep deprivation?”*

The IAS also supports visiting fellows, seminars, workshops and lectures. In 2009-2010, the IAS supported a range of activities:

- The IAS supports the Developmental Science Colloquium Series. Developmental Science Across the Lifespan is a research cluster that involves faculty in Human Development and Psychology (<http://www.psyc.vt.edu/dsi/faculty.html>). The goal of DSI is to facilitate innovative, cross-disciplinary research activities, including scholarly publications, external research funding, and graduate student and post-doctoral training, in the human developmental sciences.



- The IAS sponsored a public lecture presented by Anatoly Dritschilo, MD, Professor of Oncology and Radiation Medicine, Georgetown University School of Medicine on *“New Directions in Radiation Therapy of Prostate Cancers.”*
- THE IAS provided the venue for a gathering of VT Interdisciplinary Scholars in the Life Sciences convened by Timothy Long, Professor of Chemistry, Associate Director of the Fralin Life Science Institute and co-recipient of the 2010 Alumni Award for Excellence in Research. The group included Rafael Davalos (Biomedical Engineering), Erin Dolan (Biochemistry), Kevin Edgar (Wood

Science and Forest Products), Roseanne Foti (Psychology), XJ Meng (Biomedical Science), Padma Rajagopalan (Chemical Engineering), Theresa Reineke (Chemistry), Brett Tyler (VBI), Brenda Winkel (Biological Sciences), and Doris Zallen (Science and Technology in Society). This group developed a white paper on “Graduate Education and Research for Emerging Frontiers in the Life Sciences: Interdisciplinary Graduate Research for Accelerating Discovery (iGRAD)” that was presented at the Interdisciplinary Summit on Graduate Education in July 2010.

- The IAS co-sponsored the international Molecular Quantum Mechanics Conference organized by Daniel Crawford, Professor of Chemistry and recipient of 2010 Dirac Medal which recognizes an outstanding computational chemist in the world under the age of 40.



Activities are being organized for the upcoming 2010-2011 academic year:

- The College of Science Cluster Committee (Eric de Sturler, Golde Holtzman, Giti Khodaparast, Michal Kowalewski, John Morris, Ignacio Moore, Angela Scarpa, and Nic Tideman) will meet regularly at the IAS throughout 2010-2011 to oversee hiring in the areas of Energy and the Environment, Integrated Earth Systems, Neuroscience, Infectious Diseases, Visualization & Pattern Recognition-Data Analytics. Each of these cluster areas was developed from proposals submitted to the committee by the eight departments in the college and each department is engaged in one or more of these areas.
- The IAS will host a public lecture by W. David Schwaderer, a Google Tech Scholar. Schwaderer is a veteran Silicon Valley executive and entrepreneur. He is presently acting as the Symantec Technology Network Editor-In-Chief where he oversees data and network security technical article development and a monthly newsletter distributed to 100,000 global readers. David has authored six commercial software programs and ten technical books. His soon-to-be-published eleventh book is titled “Innovation Survival - Concept, Courage and Change.”
- Shuhai Xiao, Professor of Geosciences and co-recipient of the 2010 Alumni Award for Excellence in Research, will be supported by the IAS to develop a NSF PIRE proposal involving “US-China Partnership in Studies of Critical Transitions in the History of Life.” Xiao has established a network of collaborations with Chinese geologists and paleontologists from the Nanjing Institute

of Geology and Paleontology, Chinese Academy of Sciences; Chinese Academy of Geological Sciences; Northwest University; China University of Geosciences, as well as ties with Russia, Australia, India, Canada, and Namibia.

- The IAS will support the development of a *Center for Inflammation* by Liwu Li, Professor of Biological Sciences. The mission of the center is to define and intervene in the complex cellular signaling network controlling the host inflammatory responses under acute and chronic pathological conditions. The long-term mission is to find effective targets and cures for devastating human inflammatory diseases such as sepsis, cardiovascular diseases, and neurological diseases.

## ENGAGEMENT

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.

## ECONOMIC VITALITY

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.

- Oxford Diffraction Ltd. (ODL), now part of Agilent Inc., installed a new state-of-the-art xray diffractometer, "SuperNova," worth \$500,000 in the Virginia Tech Crystallography Laboratory. The laboratory has been the North American reference site for ODL since 2002 and ODL moved its corporate North American Headquarters to the CRC in 2006. The VT-ODL partnership has leveraged new instruments and upgrades from ODL worth \$2.2M with full service and warranty contracts and cash sponsorship totaling an additional \$100,000 per annum.
- The Department of Statistics continued the very successful Corporate Partners program and added one new member bringing the total to ten members. (Becton Dickenson, Capital One, DuPont, Eli Lilly and Company, General Electric, J.P. Research, Minitab, Pratt and Whitney, R.J. Reynolds, SAS).
- In 2009-10, Biological Sciences' new public-private partnership to advance biotech in the Mid-Atlantic region (VT BioSPIRE) developed formal relationships with four corporate partners.

- Randy Heflin (Physics) serves as a member of the Scientific Advisory Board of Techulon, Inc. Techulon is a private technology transfer initiative providing start-up support and venture capital to support commercialization of intellectual property.
- John Simonetti (Physics) has begun a collaboration with a corporate partner, *Science Applications International Corporation (SAIC)*. SAIC is supporting Simonetti's graduate student, Sean Cutchin, to work on radio transient signals.

## INTERNATIONAL EDUCATION AND RESEARCH

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 International Travel Grant Supplement (ITGS) program helped support 19 faculty in the College of Science to travel and give presentations in Brazil, Canada, China, France, Hungary, Italy, Mexico, South Africa, South Korea, Spain, Turkey, and the United Kingdom.

- Biological Sciences offers study abroad courses in tropical America, the South Pacific, Europe, and Antarctica taught by Drs. Ignacio Moore, Lisa Belden, Khidir Hilu, Lori Blanc, and Jerry Via.
- Khidir Hilu (Biological Sciences) is part of NISA, an international committee that is advising Iraq on strategies to rebuild its higher education system. He recently took part in a visit to Iraq as part of a six-member academic group that included faculty members from Michigan State University and the University of Idaho. The week-long trip was sponsored by the Department of Defense task force for business and stability operations in Iraq. The group visited the University of Baghdad, University of Kufa, and American University of Iraq in Sulaimaniyah and met with university presidents, college deans, government ministers, and U.S. Embassy officials.
- Robert Bodnar (Geosciences) co-led a short course on *Fluids in the Earth* in Naples, Italy, on November 9-10, 2009. The course was attended by 11 students from Italy and the United Kingdom. Below is a photo of course participants and lecturers, taken during a mid-course field trip to visit the volcanic island of Procida, and with the Vesuvius volcano in the background:



- Michal Kowalewski (Geosciences) was awarded a grant from the International Small Grants Program to establish an international research-training program on “Geobiology of Recent Environmental Changes in Aquatic Ecosystems” in collaboration with Sandor Mulsow of the Universidad Austral, Chile.
- Physics is increasing its national and international visibility by hosting a series of conferences, symposia, and workshops. The NSF-funded *Summer School on Mathematical String Theory 2010* brings five speakers and 35 young mathematicians and physicists to campus, to study advanced mathematics related to string theory. The planning was completed for an international symposium on *Complex Driven Systems: From Statistical Physics to the Life Sciences*, scheduled for October 1-3, 2010. Twenty-four speakers from six countries will converge on Virginia Tech. Planning is in full swing for the *15th International Conference on Narrow Gap Semiconductors and Systems*, to be held here in July 2011. This conference takes place every two years and rotates between Europe, Asia, and the U.S. It will attract leading scientists and engineers in this field to Virginia Tech.
- Tetsuro Mizutani (Physics) is part of a team of U.S. physicists, including faculty from the University of Virginia, Vanderbilt, and Virginia Tech, visiting the Hue University (Vietnam) in June 2010. He will be teaching a course on quantum mechanics to 25 selected students from Hue University.
- Fulbright grants have promoted faculty research on an international level in France (Thomas Burbey, Geosciences), Canada (Robin Panneton, Psychology), and Turkey (Asim Esen, Biological Sciences).

#### FULBRIGHT GRANT RECIPIENTS



Thomas Burbey  
Geosciences



Robin Panneton  
Psychology



Asim Esen  
Biological Sciences

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

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.

- Activities for the Science Outreach Program (SOuP, <http://www.socm.vt.edu/>) led by Mike Rosenzweig (Biological Sciences) in collaboration with Llyn Sharp (Geosciences) included:



- Partnerships with PIs on three NSF-funded grants providing educational components to research projects.
  - Served 4,823 teachers and students directly in fall 2008 through spring 2009 via outreach programs and kit loans.
  - Presentations to educational and research professionals in the region on management of stormwater and freshwater resources in Virginia.
  - Partnered with the Town of Blacksburg to develop a new nature center in the historic Price House. New exhibits were created and the center has been opened for public use.
  - Completed a two-day workshop serving 45 teachers at the Virginia Tech Southwest Regional Center in Abingdon.
  - Published a paper on outreach: J. Carlson, M.S. Rosenzweig, and L. Sharp. 2009. "Elements for the Development of VT-STEM Outreach." *Journal of Virginia Science Education* 3:2. pp 19-33.
  - Brought Biological Sciences' activities to 105 Blacksburg and Auburn High School students and teachers and 60 children, parents, and teachers at Gilbert Linkous Elementary School through the Biology and Environmental Science classes. In addition to K-12 tours, on-campus tours were available for visiting parents, alumni, and teachers who brought students interested in applying to Virginia Tech.
  - Rosenzweig and Sharp each finished a three-year term as co-coordinators of the VT-STEM initiative. This statewide leadership role involves the main campus and all Virginia Tech geographic centers. Sharp worked closely with VT-STEM on the *Governor's Conference on STEM Education in Virginia*, attended by 230 educators and decision-makers. [[www.stem.vt.edu](http://www.stem.vt.edu)]
- The Massey Herbarium is directed by Khidir Hilu with Tom Wieboldt (Biological Sciences) as Curator. Work has continued on the Digital Atlas of the Virginia Flora ([http://www.biol.vt.edu/digital\\_atlas/](http://www.biol.vt.edu/digital_atlas/)).
- Requests for plant identification totaled 578 specimens from Extension personnel and for various research purposes. Four loans comprising 125 plant, fungal, and lichen specimens were made to researchers at other institutions. At present, about 1,111 vascular plant specimens are out on loan to 17 institutions. Fourteen loans comprising 1,313 specimens were borrowed from other institutions for research purposes; six of these loans totaling 411 specimens were returned.



- The Museum of Geosciences provides special programs and exhibits to public school children, community organizations and the general public. There were over 8,000 visitors to the Museum of Geosciences during 2009-10. Programs served almost 1,500 K-12 students and teachers. There were 43 loans of teaching materials and equipment from the ERC, used by educators mostly from the local area.
- The Virginia Tech Regional Mathematics Contest, in its 31<sup>st</sup> year, continued to grow, with participation by 503 students from 85 colleges. The contest is no longer just regional (participants from Oregon and California) or even national (The University of Prince Edward Island competed). The annual number of participants has more than doubled over the last ten years.
- College of Science faculty serve as science fair judges in the Intel International Science and Engineering Fair, Blue Ridge Highlands Regional Science Fair, and the Southwest Virginia Governor's School Science Fair.

## COMMUNITY AND STUDENT ENGAGEMENT

The College of Science serves the local community through many outreach efforts. Undergraduate and graduate students have opportunities to engage in service-learning and civic activities. These opportunities amplify student learning and build professional skills to strengthen student academic careers and professional development.

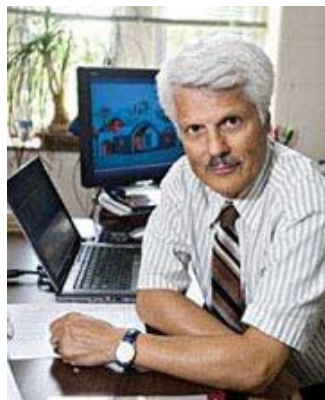
- Graduate students from the Department of Biological Sciences volunteered their time to act as judges for the 7th Annual Science Fair at Gilbert Linkous Elementary School in Blacksburg. They also shared their knowledge with the nearly 70 students from grades K through 5.
- Oil and gas as well as precious and base metal companies continue to recruit in the Department of Geosciences, including Exxon Mobil, BP, Cabot Oil and Gas, Chevron, Conoco Phillips, Hess, Stillwater Mining, Riotinto Mining, Baker Hughes, and Schlumberger.
- The activities of the Laboratory for Interdisciplinary Statistical Analysis (LISA) in the Department of Statistics continue to grow to improve statistical literacy across campus. The statistical consultants of LISA, mostly graduate students, provide assistance with experimental design, data analysis, interpretation of results and statistical software to university faculty, staff and fellow graduate students on academic research projects. LISA also offered five different courses last semester as well as a short course program that is well attended by graduate students and faculty. A walk-in service was initiated to help with short projects. In the past year, LISA served 243 clients.
- The student-run Physics Outreach Team celebrates its 15<sup>th</sup> anniversary this year. This group of energized undergraduates takes its hands-on physics demonstrations to local and regional schools to excite the students about science and to support the physics teachers. The College of Science, the College of Engineering, and now also the School of Education frequently invite the team to participate in outreach and recruitment events.



- The Psychological Services Center and Child Study Center, which provides graduate training clinics for doctoral psychology students, and the Autism Clinic provided psychological assessment and treatment services to over 200 local community residents.
- Jean Heremans and Vicki Soghomonian (Physics) are developing a collaboration with Salem High Schools on cross-departmental, as well as scientific, outreach to high school students. They are also building an outreach pipeline to the Southwest Virginia Higher Education Center in Abingdon, VA. These activities are part of a partnership with the VT-STEM group and a MRSEC/STC proposal initiative to create a Center for Design and Delivery of Macromolecular Therapeutics.

### *OUTREACH AWARD*

Djavad Salehi-Isfahani (Economics) received the 2010 College of Science Outreach Excellence Award. He has worked with the Middle East Youth Initiative combining elements of research, outreach and policy advice. The initiative aims to address the fact that countries of the Middle East share high unemployment rates among their youth and extremely long waiting times for permanent jobs, despite huge differences in economic prosperity. He was also invited as participant in the Doha Summit, Young People and Employment in the Arab World, Doha, QATAR. This was the first meeting of Silatech, an organization launched with a \$100 million grant from the government of Qatar to promote youth education and employment in the Arab World through research and training.



**Djavad Salehi-Isfahani,  
Professor of Economics,  
was awarded the  
2010 College of Science  
Outreach Excellence Award**

## ALUMNI RELATIONS

The College of Science (COS) Alumni Relations office is committed to serving the 25,000+ college alumni and continually strives to strengthen the bond between our alumni, the college, and the university. Our college and departmental programs, alumni events, and participation in numerous alumni and student related activities, serve as a backdrop to generate interest and engage our alumni with the COS faculty, administration, students, friends, and other alumni of the college. The Alumni Relations office works to build long lasting relationships by interacting with our current undergraduate and graduate students, specifically the COS student-based Dean's Leadership Council. The College of Science Alumni Relations office upholds the mission of the university – learning, discovery, and engagement through our college alumni involvement, as well as our representation and involvement with the Virginia Tech (VT) Alumni Association.

### ALUMNI RELATIONS ACTIVITIES, EVENTS, AND INVOLVEMENT:

#### July 2009

- Virginia Tech New Student Orientation – July 14, 2009
- Department of Chemistry Polymer Symposium – July 16 – 18, 2009

#### August 2009

- Department of Statistics 60th Anniversary Dinner, Washington DC – August 2, 2009

#### September 2009

- College of Science Football Tailgate, VT vs Nebraska – September 19, 2009
- Fall Reunion Gift Bags for returning alumni – Fall 2009

#### October 2009

- Fall Focus Career Fair – October 1, 2009
- “New Directions in Radiation Therapy of Prostate Cancers” Lecture by Anatoly Dritschilo – October 1, 2009
- Department of Biological Sciences Board Meeting – October 10, 2009
- BioTechnology Industry Organization Town Hall and Southwest Virginia Life Sciences Forum – October 13, 2009
- Hahn Hall North Dedication Luncheon – October 16, 2009
- Hahn Hall North Building Dedication – October 16, 2009
- Marshall T. Hahn Reception and Dinner – October 16, 2009
- College of Science Fall Roundtable Meeting – October 16 – 18, 2009
- Department of Chemistry Alumni Board Meeting – October 23, 2009
- Department of Geosciences Museum Mineral Show – October 24, 2009
- College of Science Homecoming – October 29, 2009
- VT Alumni Association Board Meeting – October 30 – 31, 2009



*Vernal Branch at COS Homecoming  
October 29, 2009*

**November 2009**

- Department of Geosciences Alumni - Faculty Dinner – November 7, 2009

**December 2009**

- College of Science Commencement Breakfast – December 18, 2009
- Holiday Coffee for the Roundtable Alumni Advisory Board – December 2009

**February 2010**

- Connections Career Fair – February 9, 2010
- Virginia Tech Grad Fair – February 17, 2010



*COS Fall 2009 Commencement Breakfast*

**March 2010**

- Directions Career Fair – March 2, 2010
- Department of Physics – Royce Zia's Retirement Dinner – March 4, 2010
- Black Alumni Open House – March 19, 2010

**April 2010**

- Department of Physics Award Ceremony – April 9, 2010
- College of Science Spring Roundtable Meeting – April 15 - 18, 2010
- College of Science Spring Scholarship Celebration – April 17, 2010
- Department of Geosciences Spring Dinner Banquet – April 22, 2010
- VT Alumni Association Board Meeting – April 23 – 24, 2010
- Department of Chemistry Alumni Reunion – April 30, 2010



*Spring 2010 Roundtable Tour of Integrated Life Sciences Building*

**May 2010**

- College of Science Commencement Reception – May 14, 2010
- College of Science Departmental Commencement Ceremonies – May 15, 2010
- Old Guard College of Science Breakfast – May 20, 2010

**ALUMNI RELATIONS ACTIVITIES AND INVOLVEMENT IN PLANNING FOR 2010 - 2011**

- VT Alumni Association's Summer Around the Drillfield – July 22 – 24, 2010
- Caldwell March – Part IV – September 2010
- COS Donor Recognition Celebration – fall 2010
- Fall Focus Career Fair and Reception – October 6, 2010
- College of Science Homecoming – October 9, 2010
- College of Science Fall Roundtable Meeting – October 29 – 31, 2010
- College of Science Pre-Game Hospitality Tents – November 4, 2010

- Department of Geosciences Alumni Dinner – November 2010
- College of Science Commencement Breakfast – December 17, 2010
- Directions Career Fair – spring 2011
- “Fun with Physics” – spring 2011
- VT Grad Fair – spring 2011
- Department of Biological Sciences Alumni Advisory Board – spring 2011
- College of Science Spring Roundtable Meeting – April 2011
- College of Science Scholarship Celebration – April 2011
- Department of Physics Awards Ceremony – April 2011
- College of Science Commencement Reception – May 13, 2011
- College of Science Commencement Departmental Ceremonies – May 14, 2011
- Old Guard College of Science Breakfast – May 26, 2011
- Local, regional, and national Development/Alumni events – Dates TBD

Each year the VT Alumni Association honors recent alumni from each academic college who have graduated in the past ten years. The College of Science selected Dr. David M. Williams (Psychology '04) as our 2009–2010 College of Science Outstanding Recent Alumnus. Dr. Williams is a 2004 graduate of Virginia Tech’s clinical science program, and is now an assistant professor in the Department of Community Health and the Institute for Community Health Promotion at Brown University. Dr. Williams’ focus, from his earliest days as a graduate student, has been critical analyses and applications of theory to disease prevention and health promotion. Specifically, Dr. Williams has been able to integrate social cognitive theory, learning theories, and behavioral economics in order to develop new approaches to initiating and maintaining health behaviors, particularly physical activity and exercise.

The year 2010/2011 will be an exciting time for the Alumni Relations office as we work closely with the COS Development office to continue the momentum of the university’s \$1 billion fundraising campaign, after its completion, by hosting a series of regional events for our alumni. In conjunction with the Office of Development, Alumni Relations will work to bring additional focus to our donors, recognizing them and acknowledging their support. A Donor Recognition Celebration is being planned in fall 2010 to recognize our donors and assist them in engaging with their scholarship student(s). In addition, the Alumni Relations office seeks to broaden our focus to gain more involvement with our recent alumni, establishing a Recent Alumni Network to engage this sector of our graduates. The office will also strive to find additional ways to thoroughly connect with our current undergraduate and graduate students during their tenure on campus.



*The stage party at the dedication of Hahn Hall North in October 2009.*

*Dr. and Mrs. Hahn are to the left of the easel.*

## DEVELOPMENT

The College of Science Development Office is committed to its mission of engaging alumni and friends of the college and its departments through personal and professional involvement, both on and off campus, and through private and corporate giving. It is with deep gratitude that we thank all those who supported the college this year. Our success would not be possible without the generous philanthropy of our alumni and friends who share our vision and are steadfastly committed to moving the college forward.

In October 2007, Virginia Tech announced the national, public phase of its \$1 billion fundraising campaign; the campaign is scheduled to conclude on December 31, 2010. The campaign goal for the College of Science is \$62 million. To date, the college has secured over \$86.6 million in outright gifts and pledged commitments of support from generous alumni and donors and, at the close of this fiscal year, had achieved nearly 140 percent of its campaign goal.

The college began the fiscal year with a campaign fundraising total of \$82.4 million and completed the fiscal year with a fundraising total of \$86.6 million. This represents an increase of more than \$4.2 million. Significant gifts were designated to several endowments supporting undergraduate scholarships, graduate fellowships, and faculty positions. Notable leadership gifts were made to the Institute for Advanced Study in the College of Science and the newly-established College of Science Roundtable Endowed Dean's Chair. The college participated in regional campaign events located in Richmond, San Diego, Los Angeles, Philadelphia, Dallas, and Houston.

The Development Office experienced significant changes in staffing during this fiscal year. Jenny Orzolek was appointed as the director of development in June 2009, leaving the associate director of development position vacant. A search is currently underway to fill the associate director of development position. Rhonda Hawley resigned from her position as the assistant to the director of development in November 2009 and Judy Taylor resigned from her position as development associate in March 2010. Both positions remain vacant at this time.

### CORPORATE AND FOUNDATION RELATIONS

Even with the ups and downs of the economic indices and spotlight on new governmental policies, corporate and foundation interactions remained strong with the college. The number of corporate visits increased from FY09 continuing an open dialogue about educational needs even though hiring decreased. Corporate and private foundation research projects for FY2010 rose by 6% while, nationally, corporations were seen building \$932B in cash and short-term investments and foundation assets eroded by 17%. However, we do see positive movement in the near future nationally. The major economic indices are at or near levels seen before September 2008. Corporations anticipate significant college student hiring needs next year. Major private foundations are welcoming proposals that were closed in 2009. In all, the College of Science corporate and foundation ties remain strong even during a tumultuous economy. The support of our alumni and friends were key contributors in a positive year for the College of Science. We thank our alumni and friends as they continue to be our biggest champions in making the right connections for corporate and foundation philanthropy, research, recruiting and taking advantage of corporate matching programs.

### HIGHLIGHTS OF CORPORATE AND FOUNDATION PHILANTHROPIC ACTIVITIES

Gifts-in-kind such as analytical instruments and modeling software have kept our analytical skills first rate. The VTX Crystallography Laboratory continues to be the Beta site for X-ray crystallography instruments by Oxford Diffraction (now a part of Agilent Technologies). PPD continued supporting our mass spectrometry facilities to allow hands-on exposure to undergraduate students. Other mass spectrometry instruments donated by Merck

and Johnson & Johnson's Depuy also added valuable additions to our laboratories. Geoscience exploration is an especially expensive undertaking. Halliburton's Landmark Graphics Software will allow our geoscientists to model valuable underground resources imbedded in seismic data donations.

Fellowships, scholarships, and research support provide much needed financial support to highly talented students and provide hands-on experiences to address societal issues. These funds prove valuable in many ways to the students, university, and community. We would like to thank Avon Products Foundation, Bayer Foundation, Becton Dickinson & Company, BP Corporation North America, ConocoPhillips, Dow Chemical Foundation, Eastman Chemical Company, KRATON Polymers, Kuraray Co., Procter & Gamble, Science Applications International Corporation, Solvay Advanced Polymers, and Toray Industries for your major gift support.

Events to open communication remain key in developing joint projects, teaching professionalism, and debating critical topics. Chevron-Phillips Seminars sponsored seven nationally recognized speakers in Polymer Chemistry. The Department of Geosciences held the 15<sup>th</sup> annual Geosciences Student Research Symposium made possible in part by contributions from BP, ConocoPhillips, Greenware, Noble Energy, Schnabel, and select local sponsors. Corporate partners programs continue for the Biological Sciences, Chemistry, and Statistics departments. The Department of Biological Sciences continues to strengthen and adapt VT BioSPIRE. The Department of Chemistry began planning for the October 2010 MII Review. The Department of Statistics continues its relationships with BD Diagnostics, CapitalOne, Eli Lilly, GE Research, JP Research, Minitab, Pratt & Whitney, and SAS.

Matching Gifts must not be forgotten. These programs allow alumni and corporations to speak as one to address issues expeditiously. Likewise, the unrestricted matching gifts to the college and its departments provide the flexibility to act swiftly. While we are unable to thank each contributor individually, we would like to thank you all for making these contributions available. These unrestricted gifts are the seeds of innovation.

## COMMUNICATIONS

This year's college 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. Emphasis was placed on developing print and electronic communications in three of the college's focus areas: nanoscience, cell biology, and human development.

Special attention this year was given to cross-promoting stories among various media for greater impact. All news releases contained links to the College of Science web page, other related stories online, and COS Spotlights on the university's homepage. This was the second year that Google Analytics was used to track effectiveness of these efforts.

### PUBLICATIONS

The fall 2009 and spring 2010 issues of the College of Science Magazine featured faculty, staff, and student accomplishments along with updates on some of the most notable research projects underway in the college. Both issues also contained human-interest features about several of the college's most notable donors to coincide with its campaign.

Analysis shows a tremendous growth in the number of people visiting the magazine online. Total unique page views (UPVs) for the online versions during 2009-2010 were 2,812, up from 345 last year.



The top magazine content items by UPVs included features on research by James McGrath and Michael Hochella, the intellectual property law program, and statistics alumnus and donor Jean Gibbons.

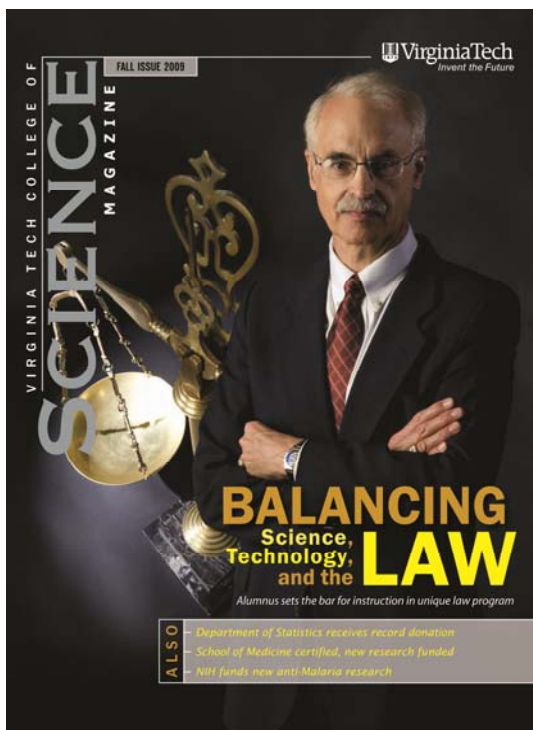
In addition, users were spending a significant amount of time reading the content of the magazine articles online. For example, the average time spent on the IP Law story was 4:38, compared to the average time on the COS site as a whole, which was 1:13.

Current and past issues of the magazine can be found on the College of Science website at: <http://www.science.vt.edu/news/magazine/index.html>.

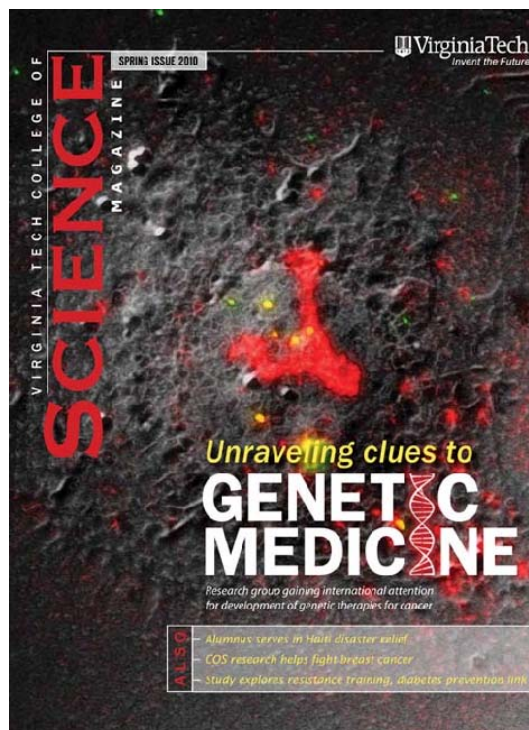
Currently, the college is exploring ways to keep the magazine as a semi-annual publication, while at the same time, reduce printing costs.

In addition, an article about the research of Shuhai Xiao, professor of geosciences, was featured in the Virginia Tech Research Magazine.

FALL ISSUE 2009



SPRING ISSUE 2010



## ELECTRONIC COMMUNICATIONS

Research programs of four faculty members from the college were featured in the Virginia Tech Spotlight on the university's homepage:

- Assistant Professor of Biological Sciences Carla Finkelstein (2,977 UPVs)  
<http://www.vt.edu/spotlight/innovation/2010-04-05-breast-cancer/research.html>
- University Distinguished Professor of Chemistry James McGrath (2,643 UPVs)  
<http://www.vt.edu/spotlight/achievement/2009-10-26-mcgrath/2009-10-26-mcgrath.html>

- Associate Professor of Chemistry Theresa Reineke (2,552 UPVs)  
<http://www.vt.edu/spotlight/innovation/2010-02-22-reineke/genetic-medicine.html>
- Professor of Psychology Kirby Deater-Deckard (Stats not yet available)  
<http://www.vt.edu/spotlight/innovation/2010-06-07-parents/working-memory.html>

College of Science online news stories with the highest UPVs were: Robert Bodnar Named Virginia Outstanding Scientist (1,387 UPVs) (<http://www.vtnews.vt.edu/story.php?relyear=2010&itemno=65>) and Study Shows Link between Parenting Skills and Working Memory (1,314 UPVs) (<http://www.vtnews.vt.edu/story.php?relyear=2009&itemno=937>).

Traffic to the college web site doubled this year with UPVs jumping from 63,206 to 123,997. The press release archive, the magazine index, and the McGrath story were in the top 50 content items on the site in terms of UPVs.

More than 600 visits to the college's web site were directed there from the University Relations news page, where COS news releases are archived. This was almost double last year's number of 344. These numbers are a good indication that cross promoting is an effective means of driving traffic to the site. Some of the other top traffic sources were: the university's home page, financial aid, and admissions pages; Google; and the departments of mathematics, economics, biological sciences, and physics.

Total UPVs to the college's news page were down from 333 last year to 270. However, UPVs for the "Newsmakers" section of the college's news site drew 274 UPVs this year, up from virtually none the year before. "Newsmakers" lists faculty, staff, and students from the college who are cited in various media outlets outside the university. This was the first year the "Newsmakers" section was cross promoted in college news releases and the magazine.

## MEDIA RELATIONS

College of Science faculty, staff and students appeared in hundreds of regional, national, and international media outlets during the year. Below are some of the most notable citations.

- Djavad Salehi-Isfahani (Economics) and his expertise on Iranian politics and economics were quoted in *Reuters News Service* about Iran's underperforming economy.
- Duncan Porter (Biological Sciences) was quoted in at least 190 news media around the world on biology books published by Bob Jones University Press that teach creationism.
- Dana Hawley (Biological Sciences) was featured in *Scientific American* on the spread of communicable diseases among birds.
- Karen Brewer (Chemistry) was cited in a news story on *FoxBusiness News.com* about Theralase Technologies announced results of its pre-trial studies of light-activated cancer therapy that Brewer and her research team developed. Nine other outlets picked up the story.
- Martin Chapman (Geosciences) was quoted by the *Richmond Times-Dispatch* in a story on the earthquake in Haiti.
- Theresa Reineke (Chemistry) and her genetic drug research were picked up by the *Associated Press* and ran in at least 20 news outlets.
- Kirby Deater-Deckard (Psychology) and his research on parenting and working memory were featured in *Examiner.com* and ran in at least 10 other news outlets.

- Scott Geller (Psychology) was quoted in the *New York Times* about his workshop on residential energy efficiency.
- John Phillips (Biological Sciences) was quoted in *U.S. News and World Report* on migratory birds.
- Joseph Falkinham (Biological Sciences) and his research on bacteria lurking in showerheads appeared in more than 200 news outlets, including the *Discovery Channel*.

In addition, 15 personal pitches were made to national media, including in-person meetings with a journalist from the *New York Times* and the editor of the cancer prevention and therapy magazine, *Cure*.

## DIVERSITY

### COS DIVERSITY COMMITTEE

The College of Science Diversity Committee was chaired by Anne McNabb (Biological Sciences) and members were Joe Merola and Judy Riffle (Chemistry); Sheryl Ball (Economics); Madeline Schreiber (Geosciences); Victoria Soghomonian and Chris Thomas (Physics); Julie Dunsmore and Russell Jones (Psychology); Marlow Lemons and Golde Holtzman (Statistics); and Jack Finney (COS and *ex officio* member). This membership reflected the chair's goal of getting more involvement across departments by having dual representation when possible.

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:

- Participated in a wide range of activities promoting diversity at Virginia Tech, including events sponsored by the Office of Equity and Inclusion and AdvanceVT.
- Met with Karen Eley Sanders, Interim Vice President for Diversity and Inclusion, to discuss university initiatives and to coordinate the activities of colleges and administrative units.
- Awarded scholarships to undergraduate majors via the MAOP and McNair programs.

### DIVERSITY HIGHLIGHTS

- The Department of Mathematics hosted its 15<sup>th</sup> Annual Women in Mathematics Career Day.
- Departments in the college are active participants in MAOP, VT PREP, VT-AMP and the McNair Scholars program. Jill Sible (Dean's Office) serves as Co-Principal Investigator of the VT PREP program. Jack Finney (Dean's Office) serves on the McNair Advisory Board.
- Nancy Ross (Dean's Office) served as College Liaison for *AdvanceVT*. She met with all candidates for faculty positions during their campus visits and hosted several gatherings for women faculty members.



15<sup>th</sup> Annual Women in Mathematics Career Day

- Beate Schmittmann (Physics) and Roseanne Foti (Psychology) served as *AdvanceVT* Professors and Nancy Ross and Jack Finney served on the *AdvanceVT* Leadership Team.
- Jack Finney chaired the *AdvanceVT* Department Climate Committee, and Joe Merola (Chemistry) and Carla Finkelstein (Biological Sciences) served as committee members. The committee provided several workshops and presentations to the university community.
- Two faculty members in Mathematics are active in programs designed to enhance higher education in Africa.
- The Department of Psychology supports a chapter of the Association of Black Psychologists, which has strong undergraduate and graduate participation.
- The “Ladies of Robeson” in the Department of Physics 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.
- Several faculty from the college participated in events designed to promote multiculturalism and diversity, including the January Advancing Diversity conference, the Fourth Annual Multicultural Luncheon, and Cranwell Center activities.
- Biological Sciences hosted an annual international luncheon for faculty, staff, and students.
- Judy Riffle (Chemistry) spearheaded the establishment of Virginia Tech’s participation in the Virginia/Nebraska Alliance for Minority Participation.
- Joe Merola (Chemistry) served on the VA/NC Alliance for Minority Participation Advisory Board.

## *DIVERSITY AWARD*



**JUDY RIFFLE**  
**PROFESSOR OF CHEMISTRY**

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**2010 COLLEGE OF SCIENCE**  
**DIVERSITY AWARD**

*STAFF AWARD*



**2010 PRESIDENT'S AWARD FOR  
EXCELLENCE**

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**JACOB WALLER  
BIOLOGICAL SCIENCES**

"Mr. Waller's work has been exceptional from the beginning and he has become irreplaceable," said Ignacio Moore, associate professor of biological sciences. "He performs beyond expectations at every facet of his job and is always willing to help people with a problem. There are too few people that are willing to drop everything to help others, and Mr. Waller is one of those people."

## SPOTLIGHTS

<b>PATRICIA AMATEIS</b> <b>CHEMISTRY</b> <hr/> <b>William E. Wine Award for Outstanding Teaching</b>	<b>BARBARA K. BEKKEN</b> <b>GEOSCIENCES</b> <hr/> <b>2010 Diggs Teaching Scholar Award</b> ***** <b>Alumni Award for Excellence in Teaching</b> ***** <b>Exemplary Department Award for Earth Sustainability Project</b>	<b>TIMOTHY LONG</b> <b>CHEMISTRY</b> <hr/> <b>2010 Alumni Award for Excellence in Research</b>
<b>JUDY RIFFLE</b> <b>CHEMISTRY</b> <hr/> <b>2010 COS Diversity Award</b> ***** <b>Fellow of ACS Polymeric Materials</b>		<b>SHUHAI XIAO</b> <b>GEOSCIENCES</b> <hr/> <b>2010 Alumni Award for Excellence in Research</b> ***** <b>Guggenheim Fellowship</b>
<b>THERESA REINEKE</b> <b>CHEMISTRY</b> <hr/> <b>2009 NIH Director's New Innovator Award</b>	<b>DJAVAD SALEHI-ISFAHANI</b> <b>ECONOMICS</b> <hr/> <b>2010 COS Outreach Award</b> ***** <b>Non-resident Senior Fellow, Global Economy and Development Program, The Brookings Institution</b>	<b>LEO PIILONEN</b> <b>PHYSICS</b> <hr/> <b>COS Certificate of Teaching Excellence</b>
<b>PATRICK HUBER</b> <b>PHYSICS</b> <hr/> <b>DOE Early Career Research Award</b>		<b>GORDON YEE</b> <b>CHEMISTRY</b> <hr/> <b>COS Certificate of Teaching Excellence</b>
<b>CARLA FINKIELSTEIN</b> <b>BIOLOGICAL SCIENCES</b> <hr/> <b>NSF CAREER Award</b>	<b>ROBERT BODNAR</b> <b>GEOSCIENCES</b> <hr/> <b>Virginia's 2010 Outstanding Scientist</b> ***** <b>Fellow, Geological Society of America</b> ***** <b>Honorary Doctorate from Univ. of Napoli Federico II, Naples, Italy</b>	<b>GITI KHODAPARAST</b> <b>PHYSICS</b> <hr/> <b>NSF CAREER Award</b>
<b>ROSS ANGEL</b> <b>GEOSCIENCES</b> <hr/> <b>2011 Dana Medal from Mineralogical Society of America</b>		<b>LEE COOPER</b> <b>PSYCHOLOGY</b> <hr/> <b>Elected President of The Blue Ridge Academy of Clinical Psychologists (BRACP)</b>
<b>DEPT OF CHEMISTRY</b> <hr/> <b>Exemplary Department Award</b>	<b>PATRICIA DOVE</b> <b>GEOSCIENCES</b> <hr/> <b>Fellow of Geochemical Society &amp; European Assn of Geochemistry Science and Engineering division (PMSE)</b>	<b>EDWARD VALEEV</b> <b>CHEMISTRY</b> <hr/> <b>2010 Camille Dreyfus Teacher Scholar Award</b>
<b>MADLINE SCHREIBER</b> <b>GEOSCIENCES</b> <hr/> <b>Fellow of Geological Society of America</b>		<b>SCOTT KING</b> <b>GEOSCIENCES</b> <hr/> <b>Alexander von Humboldt Fellowship (Preistraeger)</b>

**SCORECARD**

Virginia Tech - Office of the Senior Vice President and Provost  
College Level Scorecard - College of Science

Note on Trend Arrows: Color of arrow indicates 3 year trend. Green is up, Yellow is level or mixed and red is down. Direction of arrow indicates year to year change.

Measure	University Scorecard Measures			Final College Performance 2009		Preliminary College Performance 2010		College Comment on 2010 Performance
	Metric Definition and Information Sources	University Target Performance	Weblinks to Data Sources	Performance	Comment on Trends	Performance	Comment on Trends	
Learning	Number of graduating undergraduates who participated in research experiences.	75% of graduating undergraduates.	Research Experiences <a href="#">IRE</a>	380 45% in 2008-09	College increased back to 2006-07 levels in 2008-09.	531 57% in 2009-10	Up 176 (60%) graduating undergraduates from Fall 2008	COS continues to promote research experiences for majors.
	Minority student enrollment	From Plan - Increase by 50% by 2012.	Minority Student Enrollment <a href="#">IRE</a>	674 Undergraduate 54 Graduate 728 Total in Fall 2008	Up 158 undergraduates (30%) from 516 in Fall 2008.	720 Undergraduate 53 Graduate 773 Total in Fall 2009	Up 150 undergraduates (28%) from 570 in Fall 2007.	Involvement in MAOP, McNair, and other programs may be part of the growth in our minority enrollment.
	Minority students entering the freshman class.	Continuous increase tied to plan goal of 50% increase in minority enrollment	Minority Freshman <a href="#">IRE</a>	166 in Fall 2008	Up 64 students (53%) from 102 in Fall 2008.	185 in Fall 2009	Up 56 students (43%) from 129 in Fall 2007.	Strong science programs attract students who choose science majors.
	PhD and EdDs Awarded	From SCHEV 2B Projection - 366 Annually	Doctorates Awarded <a href="#">IRE</a>	68 in 2008-09	Three year trend is up slightly.	48 in 2009-10	48 in 2009-10	Decrease due to usual variation in degree completion. Number of doctoral students increasing.
	Graduate enrollment profile - masters, doctoral, and professional	From SCHEV 2B Projection	Graduate Enrollment <a href="#">IRE</a>	97 Masters 482 Doctoral 579 Total in Fall 2008	Decrease in masters (-9%) and increase in doctoral (+8%) enrollments	96 Masters 499 Doctoral 595 Total in Fall 2009	96 Masters 499 Doctoral 595 Total in Fall 2009	COS plans were to decrease masters and increase doctoral students, which we have accomplished.
	Total expenditures in grants and contracts by research domain.	As reported by Office of the Vice President for Research	Research Statistics <a href="#">OWPR</a>	\$23.6M College \$28.7M All Faculty in FY2009	Three year average growth is up 7.0% in college expense and 6.7% among all faculty.	\$26.1M College \$30.3M All Faculty in FY2010	\$26.1M College \$30.3M All Faculty in FY2010	Cluster hiring has resulted in increased submission of research proposals.
	Count and average value of sponsored awards	3% Growth in Number of Awards. 5% Annual Growth in Average Dollar Value of Awards	Sponsored Awards <a href="#">IRE</a>	283 Awards \$93,830 Avg Value in 2008-09	Number of awards has increased by 28% over the three year period. Average value of awards is mixed but up over the three years.	276 Awards \$116,860 Avg Value in 2009-10	276 Awards \$116,860 Avg Value in 2009-10	Larger grant awards have compensated for small decrease in number. Predict additional growth in 2010-11.
	Faculty arts and humanities awards, fellowships and memberships.	13 Awards from AAU List and other select prestigious awards	Faculty Awards <a href="#">IRE</a>	2 Awards in 2008-09	One Fulbright Award and One Sloan Fellowship	3 Awards in 2009-10	3 Awards in 2009-10	Faculty members are highly competitive for national & international awards. Plan to increase nominations.
	Number of post-doctoral appointments reported to National Science Foundation	Increase by 78% to 203 total positions by 2012.	Postdoctoral Associates <a href="#">IRE</a>	49 in Fall 2008	Data not reported at college level	56 in Fall 2009	56 in Fall 2009	Growth in research funding = growth in postdoctoral associates
	Annual number of new licenses and start-ups	Licenses to 31 and Patents to 41 Annually per IPS projections Start-ups to be determined.	Licenses, Patents and Start-ups <a href="#">IRE</a>		Data not reported at college level			
Engagement	Number of graduating undergraduates who have participated in a study abroad experience or foreign language course	From Plan - Double the 2005 level in Study Abroad. Level participation in foreign language courses.	Study Abroad, Foreign Language <a href="#">IRE</a>	For Lang. 195 (23%) Study Abroad 76 (9%) in 2008-09	Three year trend in foreign language study is down. Trend in study abroad is down from 07-08 but up from 02 in 06-07.	For Lang. 244 (26%) Study Abroad 101 (11%) in 2009-10	Three year trend shows an overall increase in participation in both foreign languages and study abroad courses. NOTE: In 08-10, data relies more on a "study abroad" course attribute in Banner that's maintained by colleges.	Given the economic realities, it is notable that more of our students have pursued study abroad.
	Undergraduate participation in service learning and experiential programs. (Also in Learning)	25% Increase from 2006-06 Levels	Experiential and Service Learning <a href="#">IRE</a>	Serv. Learn 129 Exp. Learn 463 in 2008-09	Service learning up from 07-08. Experiential learning is down.	Serv. Learn 222 Exp. Learn 2,766 in 2009-10	The three year trend shows growth in both service learning and experiential learning. NOTE: In 08-10, data relies more on a "service learning" and an "experiential learning" course attribute in Banner that's maintained by colleges.	COS prides itself on courses that incorporate experiential learning and we also value service learning opportunities.
Foundation	Diversity of the faculty	Increased gender and racial ethnic diversity in the faculty.	Faculty and Staff Profiles <a href="#">IRE</a>	Increase in both racial and gender (+3) representation.	The college added a net of 3 filled faculty positions from Fall 2007 to Fall 2008. There were increases in both racial (+4) and gender (+3) representation.	Increase in racial and gender diversity.	The college added a net of 7 filled faculty positions from Fall 2008 to Fall 2009. There were increases in both racial (+3) and gender (+1) representation.	COS has active programs to increase faculty diversity, incl. meeting with search committees and interviewing all candidates who come to campus.