Michael McGinnis
New director of modeling and simulation at ODU
Brilliant theories proven by research — mysteries of the past unlocked by bold exploration, patient laboratory analysis and archival study — problems of communication, equity and investment solved by the ingenious use of technology and training — these are the vital subjects of this issue of Quest. Good research leads to discovery and the dedicated professors featured in these pages have solved some important mysteries and used their discoveries to improve the world. Like Sherlock Holmes, they modestly declare their findings "elementary." Like Watson, I am always amazed at the inspiring work of Old Dominion's faculty and students.

The world of research is one of discovery preceded by years of study, deduction, induction, theories, proofs and tests. The articles in this issue of Quest describe a series of "Eureka" moments, the result of some not-so-elementary work!

Dr. Osama Kandil explains his internationally recognized research which will enable the prediction and mitigation of the sonic boom created by high speed aircraft. His work could lead to the development of small passenger aircraft able to fly coast to coast in 2.5 hours.

Dr. Dennis Darby was a chief scientist for the 2005 Healy-Oden Trans-Arctic Expedition, a 10-week crossing of the Arctic Circle involving 80 researchers from nine countries and two ice breakers. The data and samples of ice and ocean floor will offer valuable information helping us understand recent global warming and weather patterns during the past 100,000 years in the Northern Hemisphere. The literary critic Northrup Frye was evidently wrong when he said that the only guide to predicting the future was the rear view mirror. Ice samples and ocean core are more reliable!

Three articles are devoted to the application of research to teaching. The teamwork of Drs. Donald Davis, Debra Major and Janis Sanchez-Hucles along with Norfolk State's Dean of Sciences and Technology, Dr. Sandra DeLoach, has led to a pilot program to retain women and minority students in university computer science programs. The attraction of women to and their success in the information technology sector are important issues in America today. This field can be revitalized by the participation of these populations.

Dr. Rita DeBate realizes that dental hygienists and dentists may be the first health care providers to observe the physical and oral effects of anorexia nervosa and bulimia nervosa in patients. Their early intervention could play a vital role in saving lives. However, few dentists and dental hygienists have the training required to approach and assist patients with eating disorders. Dr. DeBate created a web-based secondary prevention tool kit with referral resources and patient-specific care instructions. We think of dentists as smile savers but they are also lifesavers! This project ensures their success.

No teacher will be left behind thanks to Dr. Steve Tonelson’s Commonwealth Special Education Endorsement Program (CSEEPP), which provides classes by distance learning to all conditionally licensed special education teachers in Virginia for only $100 per course. Teachers study while remaining in their schools doing essential work with special education students. The program has provided some 800 fully licensed special education teachers for Virginia. Dr. Tonelson’s fine work was recognized this fall with the Christa McAuliffe prize awarded to the top two education programs in the country by the American Association of State Colleges and Universities.

Dr. Annette Finley-Croswhite became Detective Finley-Croswhite when her interest was piqued by a few sentences in a Paris travel guide about a 1937 unsolved murder in the subway. With her colleague, Dr. Gayle Brunelle who teaches at California State University Fullerton, she produced a major article, "Murder in the Metro" and a manuscript titled, "Laetitia Toureaux and the Cagoule: Murder, Gender, and Fascism in 1937 France." Lessons from the past may enlighten us, make our subway rides safer and perhaps even inspire the next new novel or opera!

Dr. John Doukas writes about the efficiency of our financial markets. He examines explanations for the performance of value versus growth stocks. His research provides evidence that differences in opinion among investors may actually create pricing disparities. He then posits this as an explanation for some of the differences in prices, disparities and other market phenomena. Dr. Doukas provides a new key to understanding the financial markets which could lead to greater wealth for the wise investor and better understanding for the economist!

Greater wealth, improved health and knowledge, faster travel, better prediction of weather and a gripping murder mystery to boot ... is this not a big agenda for a slim review? "Elementary," they say! "Amazing," say E!

Dr. Roseann Runte
President
SONIC BOOM PREDICTION, FOCUSING AND MITIGATION ..........4
CHARTING HISTORY TO PREDICT THE FUTURE .................8
NO TEACHER LEFT BEHIND ........................................13
DENTAL HEALTH PROFESSIONALS AND SECONDARY PREVENTION OF EATING DISORDERS .............16
MURDER IN THE METRO .............................................19
VMASC EXECUTIVE DIRECTOR .......................................24
COUNT ME IN ..........................................................26
DIVERGENT OPINIONS AND VALUE STOCK PERFORMANCE .....32

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QUEST • WINTER 2006
SONIC
Can we travel from Norfolk to Los Angeles in two and a half hours? The answer is yes, if aircraft are allowed to fly over land at speeds near Mach 2, which is twice the speed of sound.

Why then are present day commercial aircraft not flying at supersonic speeds over the continental United States? The problem is the sonic boom originating from the aircraft, propagating to the ground and producing typical noise signals close to 160 decibels of sound pressure. (For comparison’s purpose, a rock band can produce about 100 decibels.) The now-retired Concorde aircraft could produce a ground noise level of 135 decibels when it flew at Mach 2.

This is a harmful noise to human ears on the ground. What is needed are new aircraft designs to limit the ground noise from sonic boom to no more than 115 decibels, which is a limit imposed by the Federal Aviation Administration. To accomplish the reconfiguration of wings and other parts of aircraft that is needed to lessen sonic boom, aeronautical engineers usually find that computational and physical simulation computer codes are a cheaper means of initial research and development than are field measurements during actual flights.

A goal today of commercial aviation, with the assistance of the governments of several countries, is the development of a small, commercial airliner that can fly over land at speeds similar to those reached by the Concorde. The French-British Concorde, of course, was generally allowed to fly at supersonic speeds only over oceans because of dangers posed by its sonic boom. The next generation commercial supersonic craft must be able to fly over land as well as water at speeds close to Mach 2 (about 1,500 miles per hour) in order to tap the full demand for super-quick flights. In the research and development of a new supersonic commercial plane, computational codes are needed to predict (1) ground sonic-boom noise from various aircraft designs, (2) the occasional magnification of sonic boom called “focusing” that can happen during rapid acceleration, turns or other maneuvers, and (3) design elements for sonic-boom mitigation to meet the FAA standards of 115 decibels.
A feasibility study for small, commercial supersonic craft was ordered in 2000 by the Federal Defense Advanced Research Projects Agency (DARPA) and National Aeronautics and Space Administration (NASA) Langley Research Center. Planning contracts were given to the Boeing Co., Lockheed Martin Corp. and Northrop Grumman Corp. Colleagues at the Frank Batten College of Engineering and Technology and I joined the development process by teaming up with the Virginia consulting firm of Eagle Aeronautics. We subcontracted with Lockheed Martin and Northrop Grumman and later with the NASA Langley Research Center and Northrop Grumman.

Computer Code for Predicting Sonic Boom

My research team at ODU has painstakingly developed a computer code that, indeed, does offer a very economical way to research the prediction and mitigation of ground sonic-boom noise. After initial, successful applications of our code for predicting sonic-boom ground noise of simple supersonic wings (American Institute of Aeronautics and Astronautics Conference, Breckenridge, Colo., June 17-19, 2002), we were given the opportunity to apply the code to a complex configuration of a real aircraft. By the beginning of 2003, Northrop Grumman was conducting field measurements in California on a modified F-5E aircraft. We received data from these measurements relative to our code in August 2003 and October 2004, and our biggest prediction success came in December 2004. The results showed we had successfully predicted the sonic-boom ground signature of the modified F-5E aircraft used in the Shaped Sonic Boom Experiment (SSBE) Program by Northrop Grumman. This means that the predicted computational and simulation results of our computer code were in excellent agreement with the field-measured data. Our graphic demonstrations show the predicted shock system of the modified F-5E aircraft as well as the excellent comparison of the predicted results using our computer code with those of the field-measured data. This work was reported at the Annual AIAA 34th Aerospace Science Meeting and Exhibition in Reno, Nev., Jan. 9-12, 2005.

Addressing the Superboom Problem

The next issue of this work is accurate prediction of the sonic-boom focusing, which is called “superboom.” The superboom develops when an aircraft changes its speed, turns or maneuvers. With superboom conditions, the ground noise of sonic boom is magnified up to 2-3 times the original sonic-boom noise, which could propagate to the ground and severely harm human ears, as well as structures.

For modeling the superboom problem, certain nonlinear equations should be computationally solved. In late 2003, our ODU research team was asked to come up with a prediction method and a computer program regarding superboom. French engineers from Airbus and the University of Paris were ahead of us in the superboom prediction capability. But, by late December 2004, we at ODU had developed four computational schemes and the associated computer codes (in comparison with one computational scheme and one code for the French group) to simulate this problem. The results of these computer codes have shown successful prediction, and the results of the different computer codes have been in good agreement with each other. Moreover, we produced animation movies for more understanding of the physics of the superboom development. This work was reported at the International Sonic Boom Conference held at Penn State University July 21-22, 2005. Members of the French group were there, and their leader, Dr. Francois Couloulvat, congratulated me for the accomplishments. The work was also presented Aug. 15-17, 2005, at the AIAA Atmospheric Flight Mechanics Conference in San Francisco. We have developed a related graphic demonstration of predicted superboom at ground level that is three times the intensity of regular sonic-boom noise.

Turning Theory into Actual Mitigation

For sonic boom mitigation, ODU engineers produced a study, reported at the AIAA Aerosciences Conference in Hilton Head in May 2003, investigating the effect of increasing the wing dihedral angle—the angle between the left wing and right wing—on the ground sonic-boom noise. The investigation was carried out on our computers utilizing our computer code. Reductions of the sonic-boom ground noise ranged from 12 percent to 14 percent. Northrop Grumman has shown another sonic-boom ground reduction of 25 percent by reshaping the lower surface of the nose portion of the F-5E aircraft. Northrop Grumman engineers used actual field tests in their research.

Research and development work conducted by our team will continue with funding from the NASA Langley Research Center to develop computational codes for design analysis with minimum human interference. The codes would be highly accurate and efficient with the use of our computer clusters in the Engineering and Computational Sciences Building. The capabilities will include prediction of both sonic-boom and superboom ground noise and mitigation of these signals through aircraft configuration redesign. The contributions of ODU engineers could help make possible the production of a “quiet” supersonic commercial aircraft that is capable of flying from coast to coast in the United States in two and a half hours.
Osama A. Kandil, Old Dominion University professor and Eminent Scholar, was the founding chair of the Department of Aerospace Engineering in 1993 and he led the department until 2002. He is an expert in computational and theoretical fluid dynamics and aerodynamics, and subsonic, transonic and supersonic flows. Government agencies and the military have awarded him more than $4 million in research grants and he has authored more than 170 refereed journal and conference proceedings papers. He is an American Institute of Aeronautics and Astronautics associate fellow and the recipient in January 2005 of a NASA “Turning Goals into Reality” award for outstanding contributions to sonic boom research. Oktay Baysal, dean of ODU’s Frank Batten College of Engineering and Technology, said: “The university’s aerospace engineering department has contributed to the numerous achievements of NASA Langley Research Center. Osama Kandil’s accomplishments in sonic boom research are testimonials to the success of our recent emphasis on computational engineering as a peer to theory and experiment in bringing solutions to real engineering problems.”
Charting History to Predict the Future

BY JIM RAPER

“If our carbon dioxide has brought on global warming, it may be too late to do much … because it takes half a century to remove what we have added to the atmosphere. But at least we could prepare for what is to come. Norfolk, for example, really needs to know if the Arctic ice melt is going to make the oceans rise.”

—Dennis Darby
Satellite photos recorded an unusual melt-back of the Arctic Ocean ice cap during the summer of 2005, giving credence to dire warnings issued by some scientists about human-generated global warming. But comprehensive information about the ice cap exists only for the last three decades or so, making it difficult for anyone to say with certainty how much of the melting can be blamed on greenhouse gas buildup and how much is caused by climate patterns that have existed for tens of thousands of years.

"Understanding the climate system at the Arctic is so important to us, and we, as scientists, have two choices," explains Dennis Darby, professor of ocean, earth and atmospheric sciences at Old Dominion University. "We can watch for a few more decades or more, to see what happens, and we probably will not like what happens. Or we can go back in time to try to create a climate history to better predict the future for the Arctic."

For Darby, going back in time means collecting physical evidence such as sediment cores from the bottom of the Arctic Ocean or sediment embedded in modern sea ice. Like police detectives searching for fingerprints and footprints, he and colleagues hope to bring convincing evidence to bear on the global warming debate.

"If our carbon dioxide has brought on global warming, it may be too late to do much about the situation we are in, because it takes half a century to remove what we have added to the atmosphere," Darby says. "But at least we could prepare for what is to come. Norfolk, for example, really needs to know if the Arctic ice melt is going to make the oceans rise."

Darby was interviewed in October 2005, a few days after he returned from the historic, 10-week Healy-Oden Trans-Arctic (HOTRAX) Expedition, which he helped to organize and supervise.
Expedition Gathers International Experts

More than 80 scientists and researchers from nine countries collected the richest trove ever of geologic samples and oceanographic data from the Arctic during the expedition. They also endured icy conditions and bitterly cold winds that explain why so little research has been done in the region. More is known today about the nature and origins of the surface of the moon than about the floor of the Arctic Ocean.

A marine geologist and Arctic specialist, Darby is an expert at “reading” ocean sediment samples and other geophysical data in order to gather clues about the climate patterns or cycles that a particular zone has experienced through the ages. He has perfected an iron oxide “fingerprinting” system that can establish where a grain of sand originated. Because wind currents, ocean currents and ice drift are indicators of climate change, the travels of a grain of sand can provide valuable information to scientists who are trying to develop climate histories.

Darby’s expertise was recognized by his roles as chief scientist of the HOTRAX Leg 1 in the western Arctic off Alaska in June and co-chief scientist of the Leg 2 traverse of the central and eastern Arctic in August and September. HOTRAX was sponsored by the National Science Foundation, the U.S. Coast Guard and the governments of Norway and Sweden.

The expedition included a 47-member science team and 95 men and women of the U.S. Coast Guard who were aboard the USCGC Healy. As the nation’s largest icebreaker and the one with the best accommodations for researchers, the Healy served as mobile headquarters for Leg 1 and Leg 2. Its skipper was Capt. Dan Oliver, who has more than 15 years of Arctic experience. Also during Leg 2, the Swedish icebreaker Oden, with 22 crew members and 47 scientists, journalists and technicians, rendezvoused with the Healy, two weeks before the vessels reached the North Pole.

Thick ice across the central Arctic required that the two icebreakers work together to clear the way. After more than three weeks together, they parted when the Oden went south to the Norwegian island territory of Svalbard and the Healy veered into the Fram Strait, east of Greenland, for its last week of coring. The expedition ended when the Healy arrived in Tromso, Norway, on Sept. 30.

The Healy’s crossing of the Arctic Ocean was only the second ever by a surface vessel, and when the two ships made their way to the North Pole on Sept. 12 they set a record for latest-in-the-year visit by surface vessels. (Most previous visits to the North Pole had been in the warmest weeks of the summer, when ice is thinnest.)

Darby was responsible for coring operations on the Healy, and was joined during Leg 1 by two other members of the ODU oceanography faculty, Greg Cutter, professor, and Jens Bischof, research professor and lecturer, as well as by graduate student Steven Marshall. For Leg 2, Darby’s sedimentology crew included ODU oceanography graduate student John Rand and Paula Zimmerman.

At a typical coring site, a 6,000-pound piston corer and smaller multi-corer were lowered 1-2 miles below the surface to obtain core samples from the ocean floor. The multi-corer gathered several cores at a time that reveal sediment layers of the first 12 inches or so of the ocean bottom. A piston corer obtained a single cylindrical sample at a time, each 4 inches in diameter and revealing sediment layers as far down as about 60 feet. Altogether, the Healy collected about 1,500 feet of sediment core during HOTRAX, more than any coring expedition ever in the central Arctic Ocean. Some of the cores come from areas of the Arctic that have rarely been visited by researchers and where existing cores are no longer than 10 feet.

Because the core samples are temperature sensitive—freezing or heating could compromise the data that scientists glean from the sediment layer—the samples were stored in a climate-controlled container lashed to the deck of the Healy. At the conclusion of the expedition, the 25,000-pound container was off-loaded and taken to the University of Stockholm, which served as the post-expedition research coordination center.

Just a few days into October, as the Healy was returning to the United States, it encountered a fierce storm in the North Atlantic that ripped a portion of a crane from the cutter’s bow. “I had a recurring nightmare about losing our container to such a wave in the Norwegian Sea. We were supposed to run into 25- to 30-foot seas during the crossing into Tromso, but the storm moved south, away from us,” Darby says. “Then I learned about the storm from the Healy’s skipper. If our container had still been on the bow...”

Clockwise, from top left: (1) D. Perovich (CRREL) with ice thickness electromagnetic measuring device. (2) D. Gaona (USCG) and D. Darby (ODU) struggle with large pipe wrenches to remove collar from core barrel that bent when it hit rocks on the sea floor. Paula Zimmerman, ODU graduate student, watches. (3) D. Darby and crew member remove core liner from core barrel. (4) L. Polyak (Ohio State University) and D. Darby examine split core segment onboard Healy. (5) Large dropstone from iceberg found about 4 meters below the sea floor in a HOTRAX core. (6) D. Darby gets a closer look with hand lens. (7) J. Bischof and D. Darby (both ODU) unwrap plastic core liner before cutting multi-core tube cores in Healy science lab. (8) D. Darby and J. Bischof cut plastic liner for multicorer. P. Kalk, core tech, in background. D. Darby examines sand from a core under a microscope in Healy’s science lab. Photos by B. Erikson, S. Marshall and M. Jakobsen.
Analyzing the Data

With the end of the shipboard expedition came the beginning of two or three years of research that Darby and other scientists must accomplish to wrap up HOTRAX. In addition to sediment records, their reports will focus on Arctic Ocean bottom mapping, water currents, deep-water exchanges between the two distinct basins of the ocean, glacial ice erosion on ridges as deep as 3,000 feet, and underway profiling of sea-ice thickness. Information gathered from the icebreakers will elaborate and expand upon data received regularly from satellites and sensor buoys. Satellite monitoring can show changes in the surface area of the ice cap, but only from on-site tests and observations can the thickness and physical properties of the ice be fully assessed.

Darby says he and colleagues will try to create a paleoclimate record for the Arctic. Sedimentation rates vary, but a bottom sample only a few inches deep can take researchers back more than a thousand years. "We hope to end up with a pan-Arctic record of climate change over the last 60,000 to 100,000 years and perhaps older," he says. "This record will provide sufficient detail to be used to better understand the interaction of the two halves of the Arctic Ocean in climate change and their relationship with the rest of the world's oceans. This is critical to our understanding of how sudden changes in climate occur."

The Arctic climate is particularly interesting and important because of its effect on more temperate zones. Perhaps the most often heard example is glacial melting and water expansion due to warming, causing all oceans to rise. But the relationship is much more complex than that, Darby says. The fluctuating atmospheric pressure changes of the Arctic Oscillation seems to cause warming in parts of the Northern Hemisphere during one of its phases, then flip-flops to an opposing phase. In one phase, it causes more ice and low salinity water to be exported from the Arctic through Fram Strait. This causes cooling in Scandinavia, which could spread throughout the Northern Hemisphere. Also, research has shown that the Arctic is a critical "heat sink" for the entire Earth, and a diminishing ice cover means more heat will be absorbed by the ice-free ocean in the summer, lessening the Arctic's ability to absorb heat and prevent runaway global warming. "If the Arctic diminishes in its role as a heat sink," Darby says, "global warming will accelerate far beyond predictions based on models."

Early Signs Support Melting Scenario

Much of the anecdotal evidence that Darby collected during Leg 2 supports a significant melting scenario. "The first thing we found that was a surprise was the degree of melting. We had deep meltponds as far north as 74 degrees, and the ice was very weak as far north as 82 degrees. Even north of there we found patches of rotten ice due to more than normal melting."

Nevertheless, there also were days when global warming seemed far-fetched. During Leg 1, the Healy became stuck in ice and was trapped for four frigid days before heroes of its crew managed to free it. After leaving the North Pole, the two icebreakers ran into ice so thick (about 12 feet and with pressure ridges more than double that depth) that progress almost stopped and there was talk of "wintering over," Darby says.

More routine icebreaking, of ice only 3 feet or 4 feet thick, hardly slows down the 420-foot Healy. In thicker ice, however, the vessel must back up occasionally and return for a bow ram. "You get used to the ramming after awhile," Darby says. "It really is amazing how the Healy can back up two ship's lengths, and then its 30,000-horsepower engines accelerate its 19,000 tons to 7 knots in less than 10 seconds."

How did he know so much about the cutter's ramming capability? "I was allowed to drive it once in 3- to 6-foot ice for three hours straight. I averaged 6.5 knots for the three hours. Not bad for a novice."

Michele Darby, an ODU eminent scholar and graduate program director for the Gene W. Hirshfeld School of Dental Hygiene, says her husband always picks remote, adventurous places to conduct research. "If it's not the jungles of Colombia in South America, it's the Arctic. After over 35 years together, I'm used to it. But, one of these future Arctic trips, I would love to tag along. I could help with the dental health needs of the crew, because that is the most common medical emergency on these expeditions."
Some children spend their school years racing to catch up with the learning bus as it speeds past their mental and emotional doorsteps. Ensuring no child from this stratum is left behind has resulted in the molding of a new breed of educator who can better address special needs while steering clear of legal and political potholes along the way.

Through a grant from the Virginia Department of Education, Old Dominion University’s Commonwealth Special Education Endorsement Program (CSEEP) allows those special educators teaching on a conditional license in Virginia’s public and private schools to enroll in a distance learning program for just $100 per class. "Teachers stay in place, teaching, while becoming significantly more effective," said Stephen Tonelson, a university professor and grant director based in the university’s Lions Child Study Center. "It overcomes geographic and financial barriers while providing the same coursework, knowledge and skills obtained in traditional programs."

Since its inception in 1998, the program has resulted in approximately 800 fully licensed special education teachers in Virginia schools, who before had worked with limited knowledge of special needs under provisional/conditional licenses. "Virginia’s students with disabilities are experiencing better academic and nonacademic outcomes as a result of the licensure practices of the Commonwealth Special Education Endorsement Program," said Thomas Elliott, assistant superintendent of teacher education and professional licensure for the state Department of Education. "I believe that this program is one of the most beneficial investments in children that the Virginia Department of Education has made."

Thanks to TELETECHNET, Old Dominion’s pioneering distance learning network, the classes are delivered to some 40 sites throughout the Commonwealth. Providing this flexibility and financial support is allowing experienced teachers to continue to improve their skills and opening the door to additional higher education training for younger teachers, who may be parents with little time for travel to the main campus.

Preparing Special Education Teachers for Classroom and Legal Issues

BY LISA SUHAY
A report compiled by the CSEEP team, based on a follow-up survey of teachers who had gone through the program, was conducted in summer 2003. The findings were extremely gratifying, Tonelson said. The data indicated the following: that more than 88 percent of the respondents were fully licensed and teaching in their specialty areas; that CSEEP helped them to obtain full licensure; and that the coursework increased their ability to provide effective classroom instruction. The vast majority of respondents expressed a high level of satisfaction with the mentoring component, and perhaps most important, nearly all of those polled (90 percent) indicated that completing the licensure program through CSEEP increased the likelihood they would remain in the field of special education.

Jennifer Smith, 32, mother of two and a Churchland Elementary School special education teacher, is twice graduated from Old Dominion – first taking traditional, on-campus courses to become a kindergarten through 12th grade teacher, and more recently as a special education teacher via CSEEP. She was named Teacher of the Year for 2005 by the Southeastern Cooperative Education Programs (SECEP). Smith mainly teaches autistic children at Churchland Elementary in Chesapeake for SECEP. Autism is a neurological disorder affecting one in 250 children nationwide.

During a telephone interview, with background sounds provided by her 3-year-old son, Gaven, and her 11-year-old daughter, McKenzi, it was easy to understand why this teacher chose distance learning to further her craft.
"It was close to home and I didn’t have to fight tunnel traffic. What could be better?" said Smith, who took all her special education classes via TELETECHNET at the Virginia Beach Higher Education Center. “Under the circumstances, I don’t see how I could have done the courses without the distance learning option.” Smith taught for two and a half years with a temporary license before entering the program.

Smith offers her students more than lessons in math, reading, science and social science. She helps them to recognize signs of emotional frustration before they have a meltdown, and she also does behavior modification and teaches social graces. For example, she will carefully explain why it’s not appropriate to call someone fat or to point out a blemish on a seventh-grader’s nose. And it’s working, she says. "I end up taking my students into other classrooms with typical peers so they can see how they behave, and now I find my students behaving much more politely than the rest of the population!"

By continuing her education, Smith found not only the added tools she needed for aiding her six students, who have difficulties interacting with the mainstream school population on emotional and social levels, but also ways to keep herself out of legal difficulties. The federal government’s No Child Left Behind policies have spawned a host of legal minutia and teacher accountability issues in the field of special education.

"Legal aspects are now such a huge part of teaching special education and I never knew it," Smith said. "I learned how to assess students, their needs and weaknesses, but knowing what you are responsible for, legally, is a huge part of this job. You can really get yourself and your school into a mass of trouble if you aren’t up on it." Now that she has been prepared for the challenges inherent in the system and equipped with sharper tools of her trade, Smith says she feels more secure in her work.

Smith admits that even with the convenience of distance learning in her own backyard, the choice to take the courses and become fully licensed was a strain. "The most stressed-out part of my life was when I was taking classes at night, teaching by day and having a family life."

Her advice to those who have the temporary license, but who may be unsure about making the commitment for full certification, is this: "It does get easier and you become a better teacher.

"This is a chance to be part of something big in the life of a child with special needs," Smith concluded. "It was worth it. It was really worth it all."

Lions Child Study Center team members supervising the CSEEP distance learning program include (front, left) Jane Hager and Cheryl Baker; (middle row) Ann Maydosz and Kim Hughes; and (back row) Robert Gable and Stephen Tonelson
“Individuals with eating disorders have the highest mortality rate among any groups afflicted with mental illness. Twenty percent of the people who suffer from eating disorders will die prematurely from complications related to their disorder, including suicide and heart problems.”

—Rita DiGiacchino Debate
A dentist has a female patient with a history of dental erosion, dry mouth and cracks on the sides of her mouth. Ten of the patient’s teeth have required crowns due to extensive erosion. The dentist provides competent treatment within his specialty, but neither he nor the hygienist who works with him detects the larger problem behind the patient’s oral manifestations. She suffers from bulimia nervosa. Her frequent vomiting is causing her tooth erosion.

This is a compression of several case studies I have compiled in my recent research, and the facts support these general findings. Few dentists and dental hygienists are prepared to intervene with patients to accomplish secondary prevention of eating disorders – actions taken which result in early detection and early treatment.

The oral health problems associated with eating disorders are well-documented in professional journals. Dental problems resulting from anorexia nervosa and bulimia nervosa can occur as early as six months following the onset of disordered eating behaviors, such as caloric restriction and vomiting. Given that dentists and dental hygienists may be the first health care providers to see the physical and oral effects of anorexia nervosa and bulimia nervosa, they can play a vital role in helping these patients begin the process of overcoming their eating disorders.

Individuals with eating disorders have the highest mortality rate among any groups afflicted with mental illness. Twenty percent of the people who suffer from eating disorders will die prematurely from complications related to their disorder, including suicide and heart problems. Failure by the dental care provider to identify these oral manifestations may lead to serious systemic problems and irreversible damage to the oral cavity, in addition to reducing the likelihood of early treatment and case management.
Early Diagnosis, Treatment Are Keys to Recovery

Early diagnosis, referral and treatment significantly increase the chance of recovery for people with eating disorders. In spite of this, only one in 10 receives treatment. The number of individuals who are referred to care is influenced by the secondary prevention efforts of various health practitioners who are skilled in detecting the physical and oral manifestations resulting from harmful eating behaviors. Examination of the mouth, face and general appearance of the patient by the dentist or dental hygienist is a crucial first step in the secondary prevention of eating disorders and associated systemic conditions, such as intestinal problems, swollen glands, abnormal heart function and kidney complications.

Secondary prevention consists of early identification, referral and treatment of those who exhibit signs and symptoms of eating disorders. However, identifying these disorders can be difficult. Many people frequently hide or deny their behaviors.

Supported by a research grant I received from the National Institute of Dental and Craniofacial Research, of the National Institutes of Health, I assessed the readiness and capacity among dentists and dental hygienists pertaining to secondary prevention of disordered eating. Data were collected from 207 dentists and 369 hygienists practicing in the United States.

Generally speaking, the majority of both dentists and dental hygienists were observed to be in a “low state of readiness” with regard to secondary prevention of eating disorders. Fewer than 33 percent of dentists and 43 percent of dental hygienists currently assess patients for disordered eating, and only 42 percent of dentists and 44 percent of hygienists prescribe specific home dental-care instructions. Fewer than 21 percent of dentists and 20 percent of hygienists currently arrange a more frequent recall program for patients with oral manifestations of disordered eating, while fewer than 20 percent of dentists and 17 percent of dental hygienists refer these patients for treatment. Only 13 percent of the dentists and 7.3 percent of the hygienists who were surveyed reported communicating with their patients’ primary care provider.

My findings indicate that although both dentists and dental hygienists report having observed oral manifestations of disordered eating behaviors, most of them are not referring their patients for help.

Following up on my findings, I conducted a series of focus groups with dentists and dental hygienists in order to identify the barriers to approaching patients and providing referrals. Similar responses emerged from both. The qualitative data from the focus groups indicate that both dentists and hygienists believe their primary role in oral health care is to connect oral manifestations with possible systemic health issues. The majority of dentists and hygienists do agree, however, that the identification of oral manifestations of eating disorders is important due to the severe health conditions associated with these disorders. However, when asked why they do not currently engage in patient approach and referral, they gave one or more of the following reasons: lack of knowledge regarding types of eating disorders and oral manifestations, uneasiness about approaching the patients, lack of resources for patient referral and lack of practice protocol for secondary prevention delivery.

Dentists and dental hygienists told me that it would be very helpful to have a user-friendly “tool kit” they could employ as a reference and resource guide.

Based upon these findings, I was awarded a grant from Old Dominion University’s Office of Research to develop a Web-based secondary prevention tool kit for dentists and hygienists. In collaboration with Ravi Mukkamala and Ajay Gupta from the University’s computer science department, I have devised easy-to-navigate materials to educate dentists and dental hygienists in how to approach patients suspected of having eating disorders. Included are referral resources and patient-specific dental care instructions for those who engage in disordered eating behaviors.

As this is being written, I am testing the Web-based tool kit. Once revisions are made and the final version becomes available, it is my hope that the tool kit will help dentists and dental hygienists gain the knowledge and confidence they need to play a critical role in the secondary prevention of eating disorders. My ultimate goal is to integrate oral health care with mental health services, thus getting help to a greater number of people suffering from mental disorders.
In the 16th of May, 1937, at around 6 p.m., a striking, 29-year-old Italian woman wearing a finely tailored green suit, white hat and gloves left a suburban Paris bal musette, or dance hall, and walked quickly toward a bus stop. Approximately 24 minutes later, she stepped off the bus and entered a metro station where she boarded a first-class car bound for central Paris. The train departed at 6:26 p.m., and 45 seconds later arrived at the Porte Dorée station where six passengers entered the first-class car and beheld a shocking sight. In front of their eyes, the woman in the green suit fell forward out of her seat, revealing a 9-inch dagger buried in her neck.
Metro authorities immediately summoned the Paris police and emergency personnel, but Laetitia Toureaux died before she ever reached the Saint-Antoine Hospital and without ever naming her assailant. The judicial section of the Paris police force, known as the Sûreté Nationale, immediately launched an inquiry into the murder. Over the next 12 months they interviewed more than 800 people who either knew Toureaux or who had been at the dance hall, bus stop or subway platform with her on the day of her death. The police never found a single witness to the crime, however, and eventually shelved the investigation. To this day, the murder of Laetitia Toureaux remains officially unsolved, a seemingly "perfect crime."

The paradox of Toureaux’s murder is that by mid-January of 1938 the Paris police and even the journalists, who were just as determined to solve the mystery of her death, had little doubt about who had killed her. The murder was connected to the assassinations of three prominent figures: the Russian economist Dimitri Navachine, stabbed to death in the Bois-de-Boulogne on Jan. 26, 1937; and the Italian antifascist exiles Carlo and Nello Rosselli, gunned down on a road in Normandy on June 9, 1937. Police eventually traced all three assassination cases to an extreme right-wing organization called the Comité Secret d’Action Révolutionnaire (CSAR) and popularly dubbed the “Cagoule,” or “hooded ones,” because of their penchant for donning hoods when they needed to hide their identities. The Cagoule favored violence and planned a paramilitary coup to oust the socialist “Popular Front” government of the late 1930s before installing a military-style dictatorship in preparation for the return of the French monarchy. CSAR leadership included former army and naval officers, engineers, doctors and industrialists, many of whom belonged to some of the most distinguished families in France. The organization was well-funded by the heads of major companies like Michelin, L’Oréal and Lesieur Oil and had some support within the French armed forces. The Cagoule had no true ideology but espoused a vehement nationalist, anti-communist, anti-socialist, antidemocratic and anti-Semitic stance. During the period 1936-37, the Cagoule committed a number of serious crimes that included two bombings in Paris, at least seven murders and the destruction of several airplanes bound for anti-Franco forces in Spain. They incited public riots and on more than one occasion attempted the assassination of the socialist leader and Popular Front prime minister, Léon Blum. In Paris, members of the Cagoule also formed militias, amassed huge stockpiles of weapons, trained terrorists, built underground prisons, sought support from Mussolini and ran guns in Belgium, Switzerland and Italy. Cagoulard cells also existed in the French provinces.

The French police exposed the CSAR on the night of Nov. 15, 1937. Several of those arrested claimed knowledge of Toureaux’s murder and provided testimony about her assassination. Additional circumstantial evidence also pointed to her involvement with the Cagoule. Apparently, she was murdered because she had infiltrated the Cagoule as an undercover agent. When the Cagoulard leadership discovered her betrayal, they had her executed. But if the police suspected this, why was Laetitia Toureaux’s murder never solved?

The CSAR was a clandestine operation with a strict code of secrecy. Its right-wing orientation arose out of hostility toward the Socialist government of Léon Blum during a time of rising unemployment, massive labor unrest and gen-
eral post-World War I malaise. Its leader, Eugène Deloncle, boasted that by 1937, 12,000 men in Paris had joined the Cagoulard and 120,000 belonged to the organization in the provinces. At most, the Cagoulard probably consisted of fewer than 200 known affiliates who had some sense of the true Cagoulard structure and mission, and anywhere from a few hundred to several thousand who were tied to the CSAR through other organizations or associations. Most believed they had joined an auto-defense organization meant to spring into action in the event of a communist uprising, a misconception the Cagoulard’s leaders actively fostered. Recruits joined seven-man cells linked by vertical ties to units, battalions, regiments, brigades and divisions. There were no horizontal ties in the organizational structure, however, so that no relationship existed between cells. In the end, the police arrested only 71 members of the Cagoulard in 1937-38. Those imprisoned were eventually released in 1939 when France mobilized for war. The case against the CSAR did not come to trial until 1948. By then many of those charged were distinguished war veterans. Most had found important places in the Vichy regime and/or ended the war as part of the French Resistance. Few were punished for their prewar crimes, and in the rush for postwar reconciliation in France, the murder of Laetitia Toureaux was largely forgotten.

The Cagoule leadership were simply too important to punish for the death of an Italian immigrant of questionable reputation. A case in point involves the late French President François Mitterand, who never belonged to the Cagoulard, and developed close ties in his youth to many in its ranks. His sister had a prewar love affair with one of the most notorious of the Cagoulards, Jean-Marie Bouvyer, a man who participated in the murder of the Rosselli brothers, worked for the Vichy commission that deported some 300,000 French Jews to Auschwitz and lived comfortably after the war in Paraguay. Bouvyer’s mother, a German collaborator, was the godmother to Mitterand’s own son, and Mitterand’s brother married a niece of Eugène Deloncle, the Cagoulard’s mastermind. Mitterand steadfastly refused to discuss his Cagoulard ties during his long presidency; but he clearly knew of the Cagoulard’s prewar crimes and chose to ignore them. Laetitia Toureaux’s story, therefore, forms part of the larger French refusal to come to terms with the pre-World War II era when many French sympathized with extreme right-wing politics, fascism and anti-Semitism. Indeed, it can be argued that Vichy France was the fulfillment of right-wing agendas.

By retracing Toureaux’s life and death in a historical monograph, we intend not only to tell a good story and solve a murder, but also juxtapose the worlds of working-class immigrant culture and upper-class French society in order to craft a portrait of French politics and culture in the 1930s. Toureaux’s story thus becomes the lens through which we view French society during a turbulent time when many in France flirted dangerously close with fascism.

Who Was Laetitia Toureaux?

The morning after the murder, “Le Crime du Métro” made sizzling front-page copy in all the papers as Parisians awoke to the shocking news that a beautiful young woman was brutally killed on a subway train. Paris was abuzz with curiosity about the crime and its victim. The doctor who performed the autopsy on Toureaux’s body theorized that the blow that killed her had severed her jugular vein so perfectly that only a professional assassin could have done it. But what did this clue indicate about Toureaux’s background and lifestyle?

In the weeks that followed her demise, the Parisian newspapers and scandal sheets sensationalized the murder and its investigation, little by little uncovering the details of Toureaux’s unconventional life and offering hypotheses on her untimely death. In the first few days after the murder, the journalists and the Parisian public viewed Toureaux as an innocent, an ingénue perhaps, but a respectable, recently widowed immigrant who was a victim of cruel fate. Five days after the murder, however, public opinion turned against her. Exposed as an ambitious social climber with a taste for money and adventure, her marriage to the late Jules Toureaux was revealed to be a clandestine relationship. His criminalized bourgeoisie family only learned of the union on his deathbed and unsurprisingly severed all legal ties with his working-class wife. Toureaux’s lifestyle also had been unsavory, for like many Italians living in France, she frequented bals musicaux, often located in the most sordid neighborhoods of Paris where pimps and prostitutes solicited customers. Toureaux lived a mysterious and exciting life and was known to acquaintances by another name, “Yolande.” The police learned that she had sexual encounters with men in hotels and public parks, but they never uncovered any evidence that she charged for sex. Faithful to her husband during their six-year secret marriage, she took a series of lovers from her milieu after his death in 1934.

Even more intriguing, Toureaux not only worked in a
Laetitia Toureaux loved to dance, and as a dancer she met many young army officers who were attracted to right-wing politics. It appears that sometime in 1936, Laetitia, now known as “Yolande” and working for the police to infiltrate illegal, right-wing political groups, became the lover of Jeantet, the Cagoule’s arms smuggling expert. Jeantet ran a garage near Montmartre and commanded a fleet of cars he used to smuggle arms from Geneva to Paris. By the spring of 1937, the Cagoule began to suspect Toureaux of deceit and set a trap for her. News of an upcoming arms run was leaked to her, but when the car was stopped at the Swiss border, it was empty. The ruse cost Toureaux her life. The Cagoule leadership met on May 10, 1937, and determined her fate. In all probability, the group’s most notorious assassin, Jean Filliol, was ordered to kill her. Filliol proceeded to pull off the perfect crime and fled to Spain before World War II broke out. He finished his life a rich man near San Sebastian.

Why Tell Laetitia Toureaux’s Story Now?

Laetitia Toureaux’s story is both timely and compelling. A 500-page summary of the investigation compiled by the police a few months after her death paints a fascinating picture of one woman’s struggle to achieve bourgeois respectability in a world that denied upward mobility to people of her sex, class and ethnicity. Her murder is also intertwined with the history of French fascism. The Cagoule leaders were not street thugs but highly educated nationalists who used terrorism, particularly the bombing of two sites in the wealthy 16th district of Paris – ironically, on Sept. 11, 1937 – as a means of sending a message to the French public. On this particular 9/11, they hoped to fool the public into believing that a communist putsch was imminent and thereby hasten the fall of the Third Republic. Historians, however, seldom give more than summary attention to the Cagoule’s prewar aims. Ultimately the Cagoule failed to bring about regime change and install an ultraconservative state. Even so, their use of violence as a means of promoting disorder in 1937 has never been fully examined. A reassessment of the CSAR could aid understanding of France’s fall in 1940. At the very least, such a study provides insight into how terrorist cells operate, incite fear, and as Americans know only too well, change history.
In 1997 Annette Finley-Croswhite, associate professor and dean of graduate studies in the College of Arts and Letters, happened onto two or three sentences in a Paris travel guide about a 1937 unsolved murder in the capital city's subway. That reading would lead to an eight-year project that is now drawing to an end. Finley-Croswhite and fellow researcher Gayle Brunelle, whom she had met in graduate school at Emory University and who now teaches at California State University, Fullerton, agreed that the story was too good to pass up. Although both are French historians whose specialty is the 16th century, they “retooled” themselves to write about this fascinating piece of history from the 20th century. They published a major article in the journal French Cultural Studies, “Murder in the Metro,” and have spoken about it at several conferences. After years of research, they have produced a manuscript, titled “Laetitia Toureaux and the Cagoule: Murder, Gender, and Fascism in 1937 France.” The subject of the scholarly work remains highly controversial, and many people in France would prefer that the story be forgotten. As dedicated historians and researchers, however, Finley-Croswhite and Brunelle couldn’t let that happen.

And in the end, what do we make of Laetitia Toureaux, the woman who gives us access to those violent times? Reconstructing her life was no easy task. The files concerning her murder were sealed by the French government for 101 years and are not due to be released until 2038. We acquired legal derogations and gained access to many of these files but only after signing documents in which we promised never to compromise the names of leading French families. In many instances, files we sought vanished “without explanation.” A five-year search finally turned up the police archives that we were repeatedly told did not exist. More than one French archivist warned us not to pursue this research.

In 1997 we set out to find Toureaux’s grave. There in the stillness of a cemetery on the outskirts of Paris, we vowed to this woman to tell her story. Laetitia “Yolande” Toureaux was no heroine, but she embodied many of the complexities of interwar French society. In 2002 the lease expired on her grave plot, and her body was exhumed and cremated. In some sense, we believe, the publication of our book will reanimate and validate her existence.

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To this day, the murder of Laetitia Toureaux remains officially unsolved, a seemingly “perfect crime.”

—Annette Finley-Croswhite
The fortuitous happened during the summer of 2005 when Col. Michael McGinnis, 51, began phasing out his Army career at the same time that Old Dominion University’s Virginia Modeling, Analysis and Simulation Center (VMASC) began looking for a new executive director.

As head of the Department of Systems Engineering at the U.S. Military Academy and, before that, as director of the Army Training and Doctrine Command (TRADOC) Analysis Center in Monterey, Calif., McGinnis has been a key figure in Army modeling and simulation projects. So when he learned about the VMASC job last summer, he eagerly sought the opportunity to begin his private sector career at one of the nation’s most prestigious modeling and simulation facilities, he said. He accepted the job in November, and he will come to VMASC in June after he has completed the academic year at West Point and retired from the Army.

“When I retire, I will have spent half of a 29-year military career leading high-technology, cutting-edge organizations doing modeling and simulation,” he said. “This is a very good fit for me.”

ODU President Roseann Runte agreed. “Col. McGinnis has broad experience in research, teaching and academic leadership. He has been an effective team and program builder. He is a highly reputed engineer in the fields of modeling, simulation, analysis and visualization,” she said.

“We are proud of the accomplishments of VMASC, the fine work of Bowen Loftin and Roland Mielke, and all look forward to welcoming Dr. McGinnis to this burgeoning research center, so vital to the economic development of this region,” the president added.

Loftin resigned as VMASC executive director in May 2005 to become a vice president of his alma mater, Texas A&M University. Mielke, the VMASC technical director and professor of electrical and computer engineering, is interim executive director.

McGinnis said Mielke telephoned him in November to welcome him. “He updated me on a number of ongoing initiatives, including personnel recruitment, funding and development of new partnerships with industry and government. To his credit, Roland has kept VMASC on course and continues to remain committed, as I am, to maintaining a cohesive, high-performing organization.”

Since 1997, when it was founded, VMASC has been an integral part of a Hampton Roads modeling, simulation and visualization cluster of industry, government and academic entities focused on military and commercial applications. Many of the applications involve training, experimentation and decision making under realistic simulated conditions. Others involve testing of strategies and equipment. In partnership with economic development organizations, VMASC is a catalyst for $500 million per year in regional economic activity.

McGinnis has been the systems engineering department head at West Point for the last six years, and during that time has been a regular member of official U.S. delegations to international symposia involving computer simulations. In 2002-03 he directed a task force for the secretary of the Army that used modeling and analysis to revamp the way the Army builds its combat brigades.

As director in 1997-99 of the Army Training and Doctrine Command (TRADOC) Analysis Center in Monterey, Calif., McGinnis built a reimbursable research program and gained an international reputation in advanced computer simulation. He gave a keynote speech on “Emerging
R.I. McGinnis, a West Point engineering professor who has been involved in various research projects, has been chosen to head the Virginia Modeling, Analysis and Simulation Center (VMASC). He will lead the center from ODU’s Virginia Modeling and Simulation Technology (VMST) programs, which have been expanding rapidly in recent years.

VMASC has received numerous grants to develop modeling and simulation technologies. The center has been involved in projects such as the Joint Modeling and Simulation Working Group (JMSWG), which is focused on improving the interoperability of modeling and simulation systems. The center has also been working on projects related to homeland security, such as developing models to simulate natural disasters and terrorist attacks.

McGinnis will be in charge of managing the $11.6 million building that will be built near the current headquarters by fall 2007. The building will house the center’s research and administrative staff, as well as its affiliated university faculty members.

VMASC has been working closely with the U.S. military, particularly the U.S. Army and Navy, on various modeling and simulation projects. The center is currently involved in projects related to the Joint Battle Command-Global (JBC-G) and the Joint War Fighting Center (JWFC), both of which are located in Virginia.

Looking ahead, McGinnis stated, “We must find ways to challenge our students that require them to apply what they have learned in the classroom about humanities, sciences, mathematics and engineering to solving mushy, complex, real-world problems. These problems exist today and are what ODU graduates will encounter throughout their professional careers.”
Information technology (IT) was experiencing a troubling workforce trend in 2002. The representation of women and African Americans in IT was on the downswing. The Information Technology Association of America reported that the percentage of women in the overall IT workforce fell from 41 percent in 1996 to 34.9 percent in 2002. For African Americans, the percentage fell from 9.1 percent to 8.2 percent during the same period. For women, who made up about 47 percent of the United States workforce at the time, and for African Americans, who made up about 11 percent of the workforce, the figures indicated that they were not getting their share of jobs in this emerging and potentially lucrative field. Furthermore, their prospects were becoming bleaker, not better.

What was causing this trend? And could anything be done to reverse it? These were the questions four faculty members at Old Dominion University set out to answer in 2003 with a National Science Foundation-funded (NSF) project, “Climate for Opportunity and Inclusion: Improving the Recruitment, Retention and Advancement of Women and Minorities in IT.” Co-principal investigators for the grant were three Department of Psychology faculty members — Debra A. Major, professor; Donald D. Davis, associate professor, and Janis V. Sanchez-Hucles, professor — as well as Joan E. Mann, associate professor of information technology and decision sciences in the College of Business and Public Administration. They surveyed more than 900 IT professionals from 10 large and small companies across the country; 36 percent of the respondents are women and 30 percent are ethnic minorities. Findings of the ODU researchers provided the basis for a short list of recommendations that they wrote and shared with executives and managers of the 10 participating companies. The researchers’ bottom line was simple and direct: an IT employer who wants to hire and retain more women and African Americans should take unambiguous action to create a workplace environment that accommodates diversity and promotes equal opportunity. Moreover, supervisors should be trained to create and maintain supportive relationships with those who report to them as well as to create supportive work environments. The researchers performed “interventions” in the participating workplaces that were measurably successful. The effectiveness of their efforts was not lost on the NSF, which gave the team a follow-up grant to put their ideas to work in university computer science programs both at ODU and at Norfolk State University. Sandra J. DeLoatch, dean of NSU’s School of Science and Technology, joined Davis, Major and Sanchez-Hucles as co-principal investigators of the latest grant, which is titled, “Creating an Inclusive Learning Environment: Enhancing Retention of Women and Minorities in Computer Science,” or INSITE for short. Stephen Tonelson, ODU professor of early childhood, speech-pathology and special education, serves as an evaluator on the project. In the fall of 2005, the researchers and computer science faculty from ODU and NSU created and implemented an innovative curriculum for beginning computer science majors. One goal of the curriculum is to reduce the number of students, particularly females and minorities, who are “weed out” of CS by introductory programming courses.

In the following, Davis, Major, Sanchez-Hucles and DeLoatch answer questions about their work.
Step I: Counteracting A Sense of “Tokenism”

QUEST: Professor Major, you led the first project concerning recruitment and retention of women and minorities in the information technology workplace. What did you find was suppressing the numbers of women and minorities working in the field? Did women have the same frustrations as minorities?

MAJOR: The underlying premise of our research was that women and minorities may be underrepresented in the IT field because they have more negative work experiences in the IT work environment than white males. When we compared men’s and women’s experiences in the IT work environment, we were surprised to find many similarities. For instance, men and women reported similar levels of belonging, participation, supervisor and co-worker support and job satisfaction. However, women differed from men in three important ways: they reported receiving less fair treatment, having less influence in the work environment, and having less commitment to a career in IT. In part, women’s lower career commitment is explained by the unfairness and lack of influence they experience.

The most important thing we learned with respect to minorities is that there is no single ethnic minority experience in the IT workplace. Members of different ethnic groups have different experiences. For example, members of Asian, Asian Indian, and Hispanic groups generally reported experiences that were at least as positive as the experiences of whites. African Americans and Native Americans, on the other hand, consistently had more negative experiences than other groups in the IT work environment and were more likely to feel the effects of “tokenism.”

It’s important to note that while we detected general trends for women and members of ethnic minority groups, experiences varied a great deal between companies as well.
SANCHEZ-HUCLES: We believe that one of the major reasons that ethnic groups may experience the IT workplace differently is that members of certain minority groups are more likely to be “tokens” than members of other minority groups. Though specific definitions of tokenism vary, most definitions focus on the idea of underrepresentation of a minority group in a particular work setting. Members of this token group then must contend with significant restrictions on their access to advantaged positions on the basis of their group membership.

Our research defined token status as a member of a racial group having no other individuals of his or her ethnic group in the work area. We found that African Americans and Native Americans were more likely to be tokens in their work areas and, in accord with the experiences of tokens, they were less likely than Caucasians, Hispanic Americans, and Asian Americans to believe that the work environment provided equal opportunity. It is interesting to note that even though we found a higher number of African Americans in IT than Asian Americans, the African Americans were more likely to be “the only one” in their workgroup and thereby experience token status.

Individuals identified as tokens showed no differences from their co-workers in their overall relationships with supervisors and in receiving specific work-related assistance. However, tokens reported significantly less emotional support from their co-workers and felt less satisfied with the non-work or social aspects of the work environment.

Our results suggest that organizational strategies focused on recruiting and retaining a diverse IT workforce may be more effective if they concentrate on ensuring a “critical mass” of ethnic group members rather than on recruiting and retaining individual members of underrepresented groups. With a critical mass of individuals, we believe that underrepresented groups will be less likely to feel isolated from the social and emotional support of the work environment and may come to view their work environments as more equitable.

MAJOR: Many companies we worked with routinely conduct their own surveys, and they were excited to see outside confirmation of their own findings. Although we cannot identify the companies that participated in our research, several of them are household names and devote extensive resources to creating positive work environments. Other companies had never raised questions about diversity and were interested to learn what their employees thought. All of our interventions began with comprehensive survey feedback and benchmarking information. Companies were able to see how they compared to other companies.

We assisted each partner organization in identifying the most critical areas for improvement. Specific interventions were driven by specific needs. For instance, following our feedback, one organization began having weekly meetings to provide greater opportunities for information sharing and input in an effort to increase the influence of IT professionals. This same organization also made the process for gaining access to training opportunities more public and transparent in an effort to increase fairness. Another organization implemented a telework policy, a technical career path, and a new system for assigning “on-call” time in order to improve fairness and equal access to opportunities.

DAVIS: One of the important scientific contributions of our research with IT organizations is demonstration of the effectiveness of empirically based, organization change practices. We showed how organization data could be used to change organization practices to enhance the work experiences of women and minorities in IT. We continue to use that practice in INSITE.
Step 2: Changing The Classroom Climate

QUEST: Professor Davis, you are the principal investigator for the second grant. Explain how your research segued from the IT workplace to the computer science classroom. Is representation of women and African Americans in CS programs as low as in the IT workforce?

DAVIS: The short answer is yes. In many ways, the computer science classroom mirrors the computer science workplace. We believed that some of the factors we found that were important to satisfaction, commitment and retention in the workplace would be important in educational settings as well. We also realized that differences between the two settings would require us to adapt what we had learned to make it fit in the university. We were eager to extend what we had learned about the workplace so we began to scout for funding to support this research. Also at this time, the National Science Foundation had announced that it was interested in testing implementations of the more fundamental research they had previously funded. So the timing was right—our interests and NSF’s interests converged.

Women and African Americans face the same challenges that all students face in IT, especially computer science. It requires a strong background in mathematics and is hard work. Without intending to do so, however, academic departments in the sciences and engineering, such as computer science, can also create learning environments that make learning more difficult, particularly for women and African Americans. For example, individual performance is emphasized over collaboration, and applications tend to emphasize abstract mathematical or engineering applications, rather than focus on solving real problems or helping others, which tend to be more interesting to women and minority students.

Moreover, as Dr. Sanchez-Hucles noted, women and minorities are often tokens in their department due to their low representation. This can create a sense of disconnection and isolation. This feeling is likely to be amplified when there are too few women and African American faculty members who can serve as role models and provide mentoring. Finally, some departments provide "chilly climates" by excluding those who are different, by expecting little of them, or by making them the target of jokes or hostility. Most of the time, however, the exclusion is more benign, yet still harmful. The failure to actively include others, particularly when they are different, is equivalent to excluding and rejecting them. Of course, if one feels excluded, one is more likely to pursue a different major and career. So when departments use their first few courses to "weed out" students, they are disproportionately likely to weed out students who are different. In the sciences and engineering, women and African Americans tend to be those students who are different.

QUEST: What are some of the main facets of your pilot curriculum?

DAVIS: Our pilot curriculum has two main parts. One part focuses on the manner in which students learn programming. We are testing an innovative approach that reduces isolation and increases collaboration, called "pair programming." In pair programming, students work together to write and debug programs. Research at other universities and in industry has found that this method increases program quality and satisfaction with the programming experience. Students who have practiced this method report greater commitment to computer science as a major.

The second part of our curriculum includes a class that is required of all new computer science majors. This class provides a realistic preview of work as a computer science professional, with candid discussion of advantages and disadvantages. Role models from industry and the university provide guest lectures and describe the daily work of a computer science professional. Students are also taught how to seek help, deal with stress, seek out role models and mentors, work collaboratively, and deal with difficult professors and classmates. This curriculum is simultaneously being implemented at ODU and Norfolk State.
QUEST: Is it true that if universities can help female students and at-risk minority students get through their first few computer science courses—over the hump, so to speak—they often thrive as juniors and seniors in the program?

DAVIS: Yes, in fact, this is true of all CS students. If all CS students can complete their first three required classes, they are very likely to graduate. At both ODU and NSU, half or more of computer science majors quit their study of CS after taking the first two classes. This dropout rate increases further when the third class is taken. If our project is successful, we expect that all CS majors, not only women and African Americans, will be retained at a higher rate. Because high dropout rates are common in many computer science departments, our results, if positive, should be useful to many departments throughout the country. In fact, as part of our grant, we will convene a national meeting in 2008 that will pull together researchers and employers concerned with this problem around the country, to disseminate all of our findings as broadly as possible.

QUEST: Dean DeLoatch, are there specific innovations of the pilot computer science curriculum that are different for NSU, which is a traditionally African American university, than for ODU?

DELOATCH: There are no distinctions in the curricula at the two institutions that are racially motivated. NSU is piloting the use of laboratory sessions to complement programming lectures for the first time this fall. This practice has been in place at ODU for a number of years. Programming laboratories at NSU are scheduled for one two-hour session per week, while those at ODU meet one hour each week. We allocated more time so that students will have a greater opportunity to “practice” their programming skills.

Another distinction in the innovations is in the use of pair programming. At NSU we will permit students to complete programming assignments with a partner in the laboratory sessions as well as for programming assignments that are completed outside of class time. I believe ODU has elected to use pair programming in laboratory sessions only.

In essence, we are employing innovations that are likely to have a positive impact on the academic performance of minorities and women in computer science. Moreover, we expect these innovations to positively impact all students, regardless of their ethnic backgrounds.
IT Stereotypes Hinder Women’s and Minorities’ Interest

QUEST: Professor Sanchez-Hucles, you said at a seminar sponsored by your grant that there are cultural and societal expectations that make it harder for young women to get an early start in computer science. Can you elaborate? How can we change these expectations so that females are more comfortable studying and working in the field?  

SANCHEZ-HUCLES: There are multiple barriers for women and some ethnic minorities that delay or prohibit their entrance into computer science. Teachers and parents may say that math and science are only for boys, or for Caucasian and Asian individuals. They may imply that certain people are gifted or passionate in these areas of math, science and computers, and that, for everyone else, interest and hard work will never be enough to succeed. The IT field is portrayed as one that supports individualistic working styles and competition, which suits many males but often makes women and minorities uncomfortable, as Dr. Davis mentioned. Recreational and informal computer activities tend to encourage young men more than young women to experience the “fun” of computer science. Unfortunately, some talented young women and ethnic minorities shy away from the “geek” stereotype. They believe the field is populated by the socially inept. They also are turned off by portrayals of IT as requiring long work hours with little or no accommodation for families.

In addition, many women and ethnic minorities look for career options that they believe to be socially meaningful and will foster opportunities for interaction and collaboration. They believe this is more possible in fields such as medicine or law. Finally, many young women and non-Asian minorities know no one who works in this field. They have no ready access to positive information about IT or to potential mentors.

We should debunk the “geek” stereotype and get the word to young women and ethnic minorities that they do not have to be obsessive about computers or forfeit a social life or family life in order to succeed in computer science. We should begin to recruit underrepresented groups much earlier, such as in elementary school, and build supportive environments so that young women and minorities do not see computer science as a club for white males.

QUEST: What role did computer science faculty members at ODU and NSU have in designing the first-year curriculum you are implementing? What role will these faculty members have in assessing the program you have put into place?

DAVIS: They have been involved in all aspects of the INSITE project. Computer science faculty and members of the research team have met together regularly since the project began in 2004 to learn from one another and shape the planned changes. Computer science faculty members have shaped the manner in which the research team’s ideas were adapted to fit the computer science curriculum. They have also influenced creation of the new course and all of the measurement instruments and evaluation procedures. The different professional backgrounds of INSITE participants—psychology, computer science and education—have led to interesting discussions and learning during our working together. We’ve had to learn about one another’s academic worlds. We’re still learning this.

INSITE grant participants from the ODU computer science department faculty are Chair Kurt Maly, Janet Brunelle, Jay Morris and Dennis Ray. Participating from the NSU computer science department faculty are Chair George Harrison, Jonathan Graham and Aurelia Williams. Graduate research assistants from ODU are Katherine Selgrade, Shannon Mickey, Heather Downey and Katherine Fodchuk, and from NSU, Nikki Jackson and Winton Jones.
hose who believe that capital markets—that is, markets for stocks and bonds—operate efficiently and asset prices fully reflect all publicly available information are engaged in an ongoing debate about the exact interpretation of the “value premium” with those who reject this view. Value premium refers to the superior returns generated by the purchase of value stocks relative to growth, or glamour, stocks. Rationalists, the group believing in market efficiency, argue that because value stocks are fundamentally riskier than growth stocks, the value premium is compensation for bearing risk. Behavioralists, the group arguing that market asset prices don’t reflect all publicly available information, however, claim that value stocks produce higher returns mostly because investors consistently overestimate the future earnings of growth stocks relative to value stocks. The essence of this argument is that investors are excessively pessimistic about value stocks because they tie their earnings expectations to past earnings. That is, investors make systematic errors in predicting future growth in earnings for value stocks, and investors’ excessive pessimism about these stocks causes the superior performance of value stocks relative to growth stocks. This behavioral explanation of the value premium is known as the “extrapolation” or “errors-in-expectations” explanation, and many researchers support it.

Recently, some fellow researchers and I, using U.S. analyst earnings forecasts as a proxy for the market’s expectations of future earnings, provided evidence against the errors-in-expectations view. Therefore, the observed abnormal return of value stocks on earnings announcement days is obviously not caused by surprise in the level of earnings but by some different mechanism. This mechanism of disagreement about future payoffs of company stocks, the focus of our recent work, provides an alternative explanation for the “value premium” puzzle. Investors’ Divergent Opinions Affect Risk Level

In our article, published in the Journal of Finance (2002), we argued that previous researchers of both schools of thought (rationalists and behavioralists) have overlooked investor differences of opinion as a possible source of risk that could explain the value premium anomaly. While disagreement among investors is widely recognized as the main source of stock trading, it has been overlooked as a potential explanation of the “value premium” puzzle.

The concept of heterogeneous beliefs dates back to F.H. Knight’s (1921) work, but was ignored in rational and behavior asset pricing models. These models invariably assume that investor beliefs are homogeneous and, on the average, do not matter when it comes to the determination of asset prices. A few exceptions to this notion exist and our work builds on the very old concept of “Knightian uncertainty” rather than risk. According to Knight, the true measure of risk is “uncertainty,” not risk that the finance profession conveniently measures as the departure from the average (i.e., deviation from the mean). Conventional finance theorists also tend to believe that the mean of the stock return distribution is bell-shaped and well-known a priori! When you drop this set of convenient and unrealistic assumptions, you can easily arrive at a positive relationship between stock returns and investor disagreement. This is also consistent with Knight’s measure of risk, simply because as uncertainty about the future payoffs of stock returns increases, so does the disagreement among investors. Investor disagreement, then, emerges as a source of risk, nonfundamental, that warrants compensation. That is, greater disagreement among investors about the future performance of a stock acts as a source of risk, arising from uncertainty that deters investors from purchasing the stock unless they get compensated with a premium.
Uncertainty Drives Rates of Return Higher

Hence, in this framework, we argue that the superior future performance of certain stocks arises because not all investors possess completely accurate beliefs about what is likely to happen. Heterogeneous expectations among investors matter in asset pricing, because the opportunity set, or the future return payoffs of stocks, is partly unknown. When investors don’t know what the real chances are of certain stock return payoffs, they tend to have different subjective opinions of the future prospects of stocks. When uncertainty about the future prospects of a stock is high, subjective beliefs will diverge, causing investors to demand high rates of return to invest in the stock.

An alternative view is that the higher returns for stocks exposed to greater disagreement among investors arise because, in imperfect capital markets, capital market equilibrium requires determining the asset prices and also the identity of investors trading in each asset at the same time.

Dispersion of opinion, then, may represent a unique source of risk, and its impact on prices should be compounded by the degree of disagreement. To examine this issue, we used dispersion in analysts’ earnings forecasts as a proxy for investors’ heterogeneous beliefs. We proposed that value stocks have greater exposure to dispersion in forecasts and, therefore, should earn a higher return than growth stocks with lower exposure.

Our results are consistent with the investor disagreement explanation for the return differences between value and growth stocks. We found that value stocks have greater exposure to dispersion in forecasts and, therefore, should earn a higher return than growth stocks with lower exposure.

We obtained similar results when we compared the extreme portfolios of stocks ranked by size. Small-capitalization stocks, those representing smaller companies, exhibited greater forecast dispersion than stocks of large companies. These results suggest that value stocks and small-cap stocks earn higher returns because there is greater disagreement among investors about the stocks’ future payoffs.

Our tests confirmed that investor disagreement, manifested in the dispersion of analysts’ earnings forecasts, is a risk factor that is priced, together with other risk factors such as size and book-to-market, in the determination of value stock and small-cap stock returns. It is worth emphasizing that the disagreement risk factor plays an important role in affecting stock returns. These results are consistent with the view that investors require higher returns for stocks exposed to greater investor disagreement. For risk-averse investors the implication is obvious: avoid investing in stocks that are subject to heightened disagreement among market participants about their future performance.

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These findings have important implications for corporate financing and investment decisions, investment banking strategies and security design. At the aggregate level, our results also have implications for policy-making decisions. In sum, we cannot continue assuming that economic agents have the same expectations, and when their beliefs tend to diverge from one another they do not matter, on average. Empirical evidence fails to support this view.

The idea of disagreement has the potential to explain several economic and business phenomena. An interesting application of the concept of disagreement is China (treat it as a stock/firm). The low disagreement among world investors/businesses about the future economic prospects of China during the last 10 years has reduced the disagreement premium for China substantially! As a result, China has experienced an unprecedented inflow of foreign direct investment of capital. This, of course, was not the case prior to China’s policy change adopted about 10 years ago. Hence, the required premium to invest in China used to be so high that it prohibited any inflow of foreign capital into the Chinese markets. The result? Poverty. Overall, the reduction of investor disagreement about the future prospects of a stock/country by CEOs/government (policy makers) is essential to economic growth and prosperity.

John A. Doukas is a professor of finance and eminent scholar. This article draws on his work, co-authored with Chan Kim and Chris Pantzalis, which was published in the Financial Analysts Journal, CFA Institute (November/December 2004, Volume 60, Number 6). It received the Graham-Dodd Best Paper Award for 2004.
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