

SPECTRUM



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

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ENJOY THE

HOLIDAYS

Spectrum will resume publication on Friday, Jan. 12.

Fall Commencement activities set for December 15-16

By Heather McElrath

Virginia Tech will send approximately 1,000 fresh graduates out into the world the weekend of December 15-16.

The Graduate School Commencement exercises are scheduled for 2:30 p.m. December 15 in Cassell Coliseum with Marion Ehrich as the guest speaker. Alumni Distinguished Professor Art Buikema of the biology department will speak at the undergraduate ceremony at 10 a.m. December 16 in Cassell Coliseum.

Buikema earned his Ph.D. in 1970 from the University of Kansas and has been teaching at Virginia Tech since 1971, and has received many awards during his tenure at Virginia Tech. His most recent award was this September when he was given the Outstanding Biology Teacher of the Year Award for his context-based learning strategy of teaching. He also received the 2000 XCaliber Award for Course Development Using Technology.

The Graduate Commencement speaker, Ehrich, is a professor of biomedical sciences and pathobiology at the Virginia-Maryland

Regional College of Veterinary Medicine and is also co-director of the Laboratory for Neurotoxicity Studies. The lab is involved with research dealing with neurotoxicity and neuropathology associated with exposure to drugs and chemicals.

Ehrich came to Virginia Tech in 1976 as a research associate in the Anaerobe Laboratory. She became part of the Vet Med School in 1980, when she also first became a diplomate of the American Board of Toxicology and became affiliated with the college's Toxicology Diagnostic Laboratory.

A total of 836 graduate students received their degrees this fall/winter—663 master's degrees, 23 doctors of education, and 150 Ph.D.'s. Of that number, 357 are expected to participate in the Graduate Commencement ceremony—244 master's degree recipients, 16 doctors of education, and 97 Ph.D. degree recipients.

A reception for master's, certificate-of-advanced-graduate-study recipients, and doctoral candidates and their guests will be held in the ambulatory of Cassell Coliseum immediately following the ceremony.



Winter Commencement exercises for this academic year are scheduled for the weekend of December 15-16. (J. McCormick)

Digital library will offer easier access

By Lynn Nystrom

Imagine a one-stop shopping center for higher education. A place where you plug in your desired subject matter, possibly research literature on solar energy, and a digital library overwhelms you with reading material.

The convenience that this on-line library could offer to graduate students, especially part-time students who are not conveniently located near a university campus, is exactly what the 45-year old executive needs. With the powerful needs today for continuing education, especially in the technological arena, time is a critical component. Full-time executives who take an on-line course, or travel to a satellite university campus, do not have easy access to a college library.

Virginia Tech is one of a number of universities working to solve this problem

for the executive in graduate school.

Saifur Rahman, director of Virginia Tech's Alexandria Research Institute (ARI), recently received a \$605,000 grant from the National Science Foundation (NSF) to work with the Institute of Electrical and Electronic Engineers (IEEE), the American Society for Engineering Education (ASEE), and Iowa State University on an 18-month project to develop a Digital Library Network for Engineering and Technology (DLNET).

Rahman, also a professor of electrical and computer engineering, and his colleagues will create a network of digital libraries linking educational and research materials of university faculty members. They will also provide a platform for individual and institutional content developers (from private industry and professional associations) to post new materials.

Rahman's focus is on the collections aspect of the National Science, Mathematics, Engineering, and Technology Education Digital Library (NSDL) project for NSF. Ultimately, the work will produce a host platform for editorial content. New content will be easily posted using standardized templates that the group designs. A process will be established for electronic review and validation of new materials. And a portal will be provided, allowing the contents to be both posted and accessed.

This portal, designed to meet the needs of new users, will provide the gateway to education and research materials published by universities and professional associations in the various engineering disciplines including the IEEE. It will also provide the means to contribute new and relevant material efficiently and

(See DIGITAL on 2)

University accepts Gator Bowl bid

By Bryan Johnston

The Virginia Tech athletics department has announced that the Hokie football team has accepted a bid to play in the Toyota Gator Bowl. The Hokies will face Clemson on Jan. 1, 2001 at Alltel Stadium in Jacksonville. Kick-off is set for 12:30 p.m., and the game will be shown on NBC.

"We're really excited about our opportunity to go to the Gator Bowl and play a really good Clemson football team," said Virginia Tech Head Football Coach Frank Beamer. "I'm proud of the fact that there are only six other teams who have gone to eight straight bowls and I'm proud of the fact that it's a New Year's Day bowl. This is a chance for us to be a top-five team and that'd be quite an accomplishment for this team considering all of the injuries we've had this year."

(See GATOR BOWL on 4)

Space station to test Tech researcher's work

By Lynn Nystrom

The first phase of the International Space Station (ISS), the most complex engineering project in the history of mankind, was launched some two years ago. The United States and its 15 partners have embarked on what may turn out to be the most difficult and expensive engineering project in history—building a small city in space.

Under design for 15 years, NASA's International Space Station will take at least five years and \$50 billion to complete. When finished, it will cover an area nearly as large as two football fields, end-to-end.

As experimentation takes place on the

ISS, one prominent goal is to develop the next generation of smart spacecraft, able to make decisions and solve problems without human intervention. Included in these experiments are several designed by Virginia Tech mechanical engineering faculty member Don Leo and graduate research assistant Mark McEver.

Leo worked as a member of an Air Force research team that tackled this problem, and he is also a member of Virginia Tech's Center for Intelligent Material Systems and Structures. With McEver, now a doctoral candidate at Duke University, they developed specific mathematical formulas to reduce vibrations on a spacecraft, and these formulas will function

without programming by humans. Hence, the technology is considered "smart."

Launching a spacecraft subjects it to vibrations. The most severe oscillations are felt at the cones at the top of the rocket. And even though they may not be catastrophic to the craft itself, these vibrations can damage the vehicle's instrumentation during its orbit, Leo said. This problem has plagued NASA to varying degrees during its space program.

Leo's work on this specific concern began in 1997 when he spent a summer working on a program with the Air Force Office of Scientific Research (AFOSR). Leo and Air Force

(See SPACE on 4)

Provost Search Committee Holds Open Forum

The Provost Search Committee will hold an open forum for the campus community on Wednesday, Jan. 17, to report on the search process and to provide an opportunity for comment. The forum will be in the Donaldson Brown auditorium at 4 p.m.

ACTIVITIES

EVENTS

Friday, 8

Exams Begin.

Women's Network Luncheon, noon-1 p.m., El Guadalupe. Call Dianna Benton, 1-2375.

Saturday, 9

Women's Basketball, 2 p.m., Cassell Coliseum: RU.

University Chamber Music, 8 p.m., Squires Recital Salon: The Art of Bach.

Sunday, 10

University Chamber Music, 3 p.m., Squires Recital Salon: The Art of Bach.

Tuesday, 12

Faculty Senate, 7 p.m., 32 Pamplin.

DBHCC Lunch, 11:30 a.m.-1:30 p.m., Holiday Buffet: Call 1-5632 for reservations.

Wednesday, 13

"With Good Reason," 7 p.m., WVTF: Topic TBA

Thursday, 14

Exams End.

Staff Senate Reunion, noon, 1810 Litton Reaves.

Friday, 15

Salary and Wage Paydate.

Graduate Commencement, 2:30 p.m., Cassell Coliseum.

International Graduation Reception, 11 a.m. Cranwell Center.

Philosophy Conference, (Through 12-16): Call 1-8472 for information.

Saturday, 16

Fall Commencement, 10 a.m., Cassell Coliseum.

DBHCC Lunch, 11:30 a.m.-2 p.m., Graduation Luncheon: Call 1-5632 for reservations.

Center for Interdisciplinary Studies Conference (Through 10-17): Call 1-8472 for information.

Monday, 18

Women's Basketball, 7 p.m.: At Clemson.

Men's Basketball, 7 p.m., Cassell Coliseum: East Tennessee State.

Wednesday, 20

"With Good Reason," 7 p.m., WVTF: Topic TBA

Men's Basketball, 7:30 p.m.: At Mt. St. Mary's.

Thursday, 21

Staff Senate, noon, 1810 Litton-Reaves.

Women's Basketball, 7:35 p.m.: Old Dominion.

Friday, 22

State Offices Close at Noon.

Saturday, 23

Men's Basketball, 2 p.m.: At UT Chattanooga.

Monday, 25

Christmas Holiday for Faculty and Staff.

Tuesday, 26

Christmas Holiday for Faculty and Staff.

Wednesday, 27

"With Good Reason," 7 p.m., WVTF: Topic TBA

Thursday, 28

Women's Basketball, 7:30 p.m., Cassell Coliseum: UNC Asheville.

Friday, 29

Salary and Wage Paydate.

Women's Basketball, 5:30 or 7:30 p.m., Cassell Coliseum: Maine or Marshall.

Saturday, 30

Men's Basketball, 2 p.m., Cassell Coliseum: High Point.

JANUARY

Monday, 1

New Years Holiday for Faculty and Staff.

Tuesday, 2

New Years Holiday for Faculty and Staff.

Wednesday, 3

"With Good Reason," 7 p.m., WVTF: Topic TBA

Women's Basketball, 7 p.m., Cassell Coliseum: Notre Dame.

Men's Basketball, 7:30 p.m.: At St. John's.

Saturday, 6

Men's Basketball, 2 p.m., Cassell Coliseum: vs. Villanova.

Sunday, 7

Women's Basketball, 4 p.m., Cassell Coliseum: Miami.

Monday, 8

International-Student Orientation Begins: Call 1-6527 for information.

Tuesday, 9

ULD Training Program, 9 a.m.-4 p.m., DBHCC rooms D, E: 1-7627 to register.

Wednesday, 10

CEUT Winter Workshop, (Through 1-11): Call 1-4254 to register.

"With Good Reason," 7 p.m., WVTF: Topic TBA.

Men's Basketball, 7 p.m., Cassell Coliseum: Miami.

Friday, 12

Lee-Jackson Day Holiday for Staff.

BULLETINS

CEUT holds winter workshop

CEUT's annual winter workshop will take place in Torgersen Hall January 10-11. The focus is academic integrity at Virginia Tech, and the intended audience includes members of the faculty, academic and student-affairs administrators, and student leaders. Texas A&M University's William Kibler will be the conference speaker. The workshop will include review of the honor system at Virginia Tech, discussion of case studies on academic integrity, and mini-workshops on encouraging academic integrity among Tech students and faculty members. To register, visit the CEUT web site at CEUT.vt.edu, send an e-mail to CEUT@vt.edu, or call 1-4254.

Student representatives sought for BOV

Applications are being solicited for the position of student representative to the Board of Visitors for 2001-02. Two positions will be open: one for an undergraduate and one for a graduate student. Faculty and staff members are urged to announce these positions to students who might be interested in applying. An information meeting will be held on Wednesday,

Jan. 17 in 110 Burruss at 4 p.m. Application materials and selection procedures are available in the Office of the Vice President for Student Affairs, 112 Burruss, and in the Student Activities Office, 319 Squires. Applications are also available on the Student Affairs home page at <http://www.vpsa.vt.edu/bovrep>. The application deadline is 5 p.m., January 22.

Philosophy conference to honor Grene

"Between History and Philosophy: In Honor of Marjorie Grene's 90th Birthday" will be held December 15-16 in 113 McBryde, beginning at 9:30 a.m. Saturday and at 9 a.m. Sunday. Grene is a renowned philosopher and author, as well as the subject of a volume in the series *Life of The Living Philosopher*. The conference will include presentations on a variety of topics Grene has worked with in the past, and she will conclude the event by offering response and criticism. This event is free and open to the public. For information, contact Mordechai Feingold at 1-8472, or visit web site <http://www.phil.vt.edu/events/grene90.htm>.

Diversity Summit registration available

The Division of Student Affairs and the Office of the Vice President for Multicultural Affairs will hold the Fourth Annual Diversity Summit on Monday, Jan. 15 from 5-8 p.m. in Owens Banquet Hall. Initiated three years ago on Martin Luther King Jr.'s birthday, this event provides an opportunity to reflect on the university's progress toward becoming a more inclusive and welcoming community. This year, in response to suggestions from last year's participants, people can register as a community/group/organization or as an individual. To register, contact Barbara Pendergrass at bpender@vt.edu.

International-Student Orientation January 8

International-Student Orientation activities for the spring semester will be held Monday, Jan. 8 through Friday, Jan. 19. A mandatory orientation session will be held Saturday, Jan. 13 from 9 a.m.-noon in Squires Brush Mountain Room. Most other activities will be held in Cranwell International Center. Contact 1-6527, or visit www.uusa.vt.edu/cranwell for information.

Reminder to Employees about Leave and Holidays

Annual Leave

Any annual leave earned between Dec. 25, 2000 and Jan. 9, 2001 is part of leave-year 2000. Employees who are approaching their maximum carry-over should work with their supervisor to schedule time off soon to avoid losing those hours. The 2000 leave year is from Jan. 10, 2000 to Jan. 9, 2001.

Virginia Sickness and Disability Program (VSDP)

There may be a number of employees under the Virginia Sickness and Disability Program who have personal and

family leave remaining. These hours will not carry over into leave-year 2001. The cut-off date is January 10, at which time the new allocations for family and personal leave, sick leave and school leave for the new leave year will be effective.

Upcoming Holiday Schedule

This year the holidays are a half day Friday, Dec. 22; and full days Monday, Dec. 25; Tuesday, Dec. 26; and Monday and Tuesday, Jan. 1 and 2, 2001. Employees and supervisors should consider these additional days when scheduling and managing leave.

DIGITAL

Continued from 1

quickly.

Rahman's goal is to facilitate the life-long learning of engineering faculty members, practicing engineers, and technical professionals through digital libraries. Ultimately, DLNET can be extended to include materials published by commercial publishing houses.

More information will be available at www.dlnet.vt.edu, currently under construction. This is the first digital-library project in engineering at Virginia Tech. NSF is spending \$15 million this year on digital-library grants. In fiscal year 2001, the budgeted amount increases to \$25 million.

EMPLOYMENT

CLASSIFIED POSITIONS

The following classified positions are currently available. More details of these positions, specific application procedures and position-closing dates may be found on the Personnel Services web site at <http://www.ps.vt.edu>. Available positions are also listed on the Job Line, a 24-hour recorded message service. For information on all job listings, call 1-5300. Some of the following positions include state benefits. Positions with numbers beginning with a "W" are hourly and do not include state benefits. Individuals with disabilities desiring assistance or accommodation in the application process should call by the application deadline. Closing date for advertised positions is 1 p.m. Monday. An EO/AA employer committed to diversity.

FULL TIME

Academic Certification Specialist, 000044R, Pay Band 3, University Registrar.
Accounting Associate, 000160H, Pay Band 3, RDP/Business Services.
Administrative Assistant, 002811R, Pay Band 3, Executive Vice President.
Administrative Associate, 006519L, Pay Band 3, University Development.
Administrative Associate, 007701L, Pay Band 3, University Development.
Administrative Associate, 002202L, Pay Band 3, University Development.
Admissions Plans/Clearances Team Member, 001534R, Pay Band 3, Graduate School.
Animal Care Supervisor, 006998J, Pay Band 4, Veterinary Teaching Hospital.
Animal Care Technician, 002281T, Pay Band 3, Biology.
Animal Care Technician, 002617M, Pay Band 2, Veterinary Teaching Hospital.
Animal Care Technician, 007617M, Pay Band 2, Veterinary Medicine Experiment Station.
Applications Analyst, 002725L, Pay Band 6, AIS.
Assistant Manager, 006522H, Pay Band 3, RDP/Dietrick Express.
Automotive Technician, 000603R, Pay Band 3, Motor Pool.
Banquet Manager (Food Operations Manager Assistant), 001118G, Pay Band 3, DBHCC.
Business Development Director, 007568T, Pay Band 5, ECE/MPRRG.
Center for Alternative Media Assistant, 002197F, Pay Band 2, University Libraries/(CAM).
Computer Operations Technician Senior, 001054L, Pay Band 3, Test Scoring.

Computer Systems Engineer, 006991J, Pay Band 5, RGS.
Computer Systems Engineer, 007691T, Pay Band 5, ESM.
Computer Systems Engineer, 001894T, Pay Band 5, CS.
Data Warehouse Architect, 006930L, Pay Band 5, ISC.
Database/Application Development Specialist, 007230R, Pay Band 5, RGS.
Development Associate for Student Calling Program, 007628L, Pay Band 3, University Development.
Director, Gift Accounting/Constituent Record Management, 001540L, Pay Band 5, University Development.
Dishwash, 002947H, Pay Band 1, RDP/Shultz Dining Center.
Editor, Virginia Tech Magazine, 000654L, Pay Band 5, University Relations/Outreach Communications.
Editor/Communications Coordinator, 007681G, Pay Band 5, OIRD.
Electrician, 007565G, Pay Band 3, Physical Plant.
Electronics Technician, 007656J, Pay Band 4, VTTI.
Enrollment Services Specialist, 001311R, Pay Band 3, Graduate School.
Executive Chef, 000266H, Pay Band 4, RDP/Shultz Dining Center.
Executive Secretary Senior, 007696R, Pay Band 3, University Special Initiatives Office.
Extension Coordinator, Field Services Support, 005596M, Pay Band 5, VCE.
Fiscal Coordinator, 002424M, Pay Band 3, Biochemistry.
Fiscal Technician, 007697R, Pay Band 3, CTR.
Four full-time food-service positions available.
Honor System Operations Manager, 007648R, Pay Band 3, Undergraduate Honor System—Provost.
Housekeeping Worker, P002005C, Pay Band 1, Physical Plant.
Housekeeping Worker, 001631G, Pay Band 1, DBHCC.
Housekeeping Worker Senior, 002745H, Pay Band 1, RDP.
Housekeeping Worker Senior, 006926H, Pay Band 1, RDP.
Human Resource Specialist, 002499R, Pay Band 4, Personnel Services.
Interpreter for Deaf, 007472J, Pay Band 3, Dean of Students.
Lab Specialist, 001972M, Pay Band 3, CVM/MDL—Academic Affairs.
Mail Clerk, 006959R, Pay Band 2, Undergraduate Admissions.
Medical Technologist, 002596J, Pay Band 4, Veterinary Teaching Hospital.
Office Assistant, 007677T, Pay Band 2, VBI.
Office Manager/Administrative Assistant, 000089T, Pay Band 3, ChemE.
Operating Systems Analyst, 000871L, Pay Band 5, Computing Center.
Photocopy Assistant, 001738F, Pay Band 2, Library.
Public Relations Specialist, 007685T, Pay Band 4, ME.
Return to Work Coordinator, 007695R, Pay Band 5, Personnel Services.
Security Lead Guard (Parking Enforcement Off.), W020119G, Pay Band 1, Parking Services.
Smart Road/Travel Shenandoah Dispatcher Supervisor, 007698R, Pay Band 3, VTTI.
Software Developer, 007690T, Pay Band 5, ESM.
Soil Analyst/Spectroscopist, 006636M, Pay Band 4, CSES.
Sous Chef, 000940H, Pay Band 3, RDP/Southgate Bake Shop.
Special Projects/Utilities Crew, 000216H, Pay Band 1, RDP.
Systems Analyst, 007343L, Pay Band 6, ISC.
Web/Office Assistant, 003132T, Pay Band 3, Biology.

PART TIME
Administrative Assistant, W023180A, Pay Band 2, CNS.
Admissions Plans/Clearances Team Member, 001248R, Pay Band 2, Graduate School.
Animal Care Tech B, W022914J, Pay Band 2, CVM.
Animal Care Technician A, W022675M, Pay Band 1, Veterinary Teaching Hospital.
Animal Care Technician A, W022563M, Pay Band 1, Veterinary Teaching Hospital.
Animal Care Technician A, W022155J, Pay Band 1, Veterinary Teaching Hospital.
Animal Care Technician B, W020556M, Pay Band 2, College of Veterinary Medicine.
Application Processor, W022876R, Pay Band 3, Undergraduate Admissions.
Assistant to College Alumni Coordinator, W023173L, Pay Band 2, CVM.
Audiovisual Technician, W023110T, Pay Band 2, Registrar.
Banquet/Setup (Foa-b), W022143G, Pay Band 1, DBHCC.
Bus Driver, W023140R, Pay Band 1, Motor Pool.
Computer Network Support Tech, W023174G, Pay Band 4, Police.
Data Entry Operator, W022875R, Pay Band 2, Undergraduate Admissions.
Delivery Driver, W022337A, Pay Band 1, Printing Services.
Enrollment Services Assistant, W023172F, Pay Band 3, Business.
Fiscal Assistant, W023128M, Pay Band 2, Animal/Poultry Sciences.
Flight Instructor, W023153R, Pay Band 4, Airport.
Three part-time food-service positions available.

Housekeeping Worker, W022490H, Pay Band 1, RDP.
Housekeeping Worker, W020214J, Pay Band 1, Health Center.
Housekeeping Worker, W020574G, Pay Band 1, DBHCC.
ILL Assistant, W023177F, Pay Band 2, University Libraries/ILL.
Laboratory Technician Senior, W020627T, Pay Band 2, Chemistry.
Office Services Assistant, W020838M, Pay Band 2, Veterinary Teaching Hospital.
Office Services Specialist, W023146M, Pay Band 2, Agricultural Education.
Overnight ICU Vet Technician, W022218M, Pay Band 2, Veterinary Teaching Hospital.
Postal Assistant/Sorter, W023181A, Pay Band 2, University Mail Services.
Radiologic Technologist, W022412M, Pay Band 3, Veterinary Teaching Hospital.
Radiologic Technologist, W022238J, Pay Band 3, Health Center.
Security Guard, W020470G, Pay Band 2, Police.
Security Guard, W0204704G, Pay Band 1, Police.
Storekeeper, W022291J, Pay Band 2, Veterinary Teaching Hospital.
Switchboard Operator, W022101A, Pay Band 2, CNS.
OFF CAMPUS
4-h Program Assistant, 006652M, Pay Band 3, VCE—Culpeper.
Announcer of Classical Music, 001702L, Pay Band 3, WVTF.
Enrollment Program Assistant, 002091J, Pay Band 3, Northern Virginia Center.
Radio Announcer, W020800L, Pay Band 3, University Relations/WVTF Radio.
Radio Reporter/News Anchor, 007689L, Pay Band 4, University Relations/WVTF Radio.
Television Systems Engineer, 007106R, Pay Band 4, Virginia Tech Roanoke Center.
Underwriting Account Executive, 001963L, Pay Band 3, WVTF.

FACULTY POSITIONS

NON-INSTRUCTIONAL
VCE. Extension Agent, Agriculture/Natural Resources, Environmental Horticulture (re-advertisement). #FA759, Stafford Co. Contact: Steve Umberger, 122 Hutcheson (0437). Review begins December 21.
Virginia Cooperative Extension. Extension Agent, Agriculture/Natural Resources, Commercial Horticulture (re-advertisement). #FA676, Southampton Co. Contact: Steve Umberger, 122 Hutcheson (0437). Review begins December 21.
Center for Academic Enrichment/Excellence. Director. Contact: David Ford, 330 Burruss (0132). Review begins January 5.



VIRGINIA POLYTECHNIC INSTITUTE
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Tech faculty, staff members set international-education standards

By Jeanne M. Garon

As Virginia Tech expands its global reach and continues to assimilate hundreds of new international students and faculty members at its campuses each year, Tech's English Language Institute (ELI) and its collaborators are poised to support and enhance the university's international efforts.

In invited presentations at the annual Region VIII Conference of NAFSA, the Association of International Educators, ELI and Cranwell International Center staff members led an eight-member team from Tech which helped set standards for international education. The team, which included Courtney Stewart, a graduate student in curriculum and instruction, and Lee Drowne of Undergraduate Admissions presented in Richmond on November 15-18.

"It is no surprise that Tech's ELI and Cranwell International Center and their partners are helping their counterparts at peer institutes raise the bar on working with international students and faculty members," Interim Provost Jim Bohland said. "Tech is home to more than

1,400 international students and almost 200 international faculty members representing more than 90 different countries. ELI and Cranwell have played important roles in orienting international members of our community while enabling them to enrich our campus by participating more fully in it than they might otherwise."

ELI staff members Kieran Hilu and Josie Cochran presented "Explicit Study Skills Instruction in an Intensive English Program." Cranwell International Center Director Kim Beisecker teamed with Cranwell staff member David Deshler, Drowne, and ELI staff member Aniseh Ghadari for a forum on "Justifying, Implementing, and Evaluating a Multifaceted Support Program for Newly Matriculated International Students." "Implementing and Evaluating an IEP Conversation Partner/Volunteer Program" was the subject of presentations by Stewart and ELI Director Judy Snoko.

Organized in 1992 under the Division of

Continuing Education, the ELI offers individuals the opportunity to meet personal, academic, and professional goals through intensive English language study at Virginia Tech. ELI serves international students and faculty members with every aspect of their participation in university life, from matriculating to bettering their listening, speaking, socializing, reading, writing, cultural literacy, and technical literacy skills. The Cranwell Center has, since 1985, provided Tech's international community with programs and services, a network of resources and referrals, and a variety of educational, professional, and social functions.

The National Association of Foreign Student Advisors, now called NAFSA: Association of International Educators, promotes the exchange of students and scholars to and from the U.S., sets and upholds standards of good practice, and provides professional education and training that strengthen institutional programs and services related to international educational exchange.

CVC WINNER

IN OTHER NEWS



Karen Roberto

Karen Roberto, director of the Center for Gerontology, has won a Robert Tuckwiller limited-edition print donated by the Alumni Association. Her name was drawn from those who submitted Commonwealth of Virginia Campaign pledge cards to Gloria Smith through November 27. Prizes remaining include a weekend night plus breakfast for two at the Hotel Roanoke.

To receive CVC materials, contact Smith at 1-7810 or ggsmith@vt.edu.

New buckyballs have fused pentagons

By Susan Trulove

Virginia Tech chemists and colleagues at several institutions reported in the November 23 issue of *Nature* that they have created a family of fullerene molecules that break the sacrosanct isolated-pentagon rule ("A stable non-classical metallo-fullerene family").

Since the carbon clusters known as fullerenes, or buckyballs, were discovered in 1985, the only stable structure has consisted of even numbers of carbon atoms linking to form pentagons isolated from each other by hexagons to form a spherical cage. Now, a team of researchers has created a fullerene with pentagons that share one side—looking like an angular figure eight.

Virginia Tech Chemistry Professor Harry C. Dorn said the new molecule is possible because of an earlier discovery by the university's researchers, reported in *Nature* last year (Sept. 2, 1999). The chemists discovered a way to put four metal atoms inside a fullerene of 80 carbon atoms (C₈₀), creating endohedral metallo-fullerenes (metal inside buckyballs). The new structure has only 68 carbon atoms, which are stabilized by the three metal atoms.

The three metal atoms have a nitrogen atom core. "It is truly remarkable that a cage of only 68 carbon atoms can encapsulate a molecu-

lar cluster of four atoms," Dorn said.

"The filled C₈₀ nanosphere has become an important material in nanotechnology devices being developed at the university," Dorn said. "Now, the linked pentagons will help us understand defects in fullerenes and nanotubes," explains Dorn. "The metal atoms stabilize the defect. Our study of this new family of materials will help us understand where and when defects occur." He said the new molecule can also be used as new nano-material building blocks that incorporate a variety of other lanthanide metals, such as holmium, gadolinium, and erbium.

The Virginia Tech researchers discovered that they had created the rule-breaking metallo-fullerene when they conducted a detailed study of the same mixtures that yielded the first metallo-fullerenes.

In the spring of 1999, having already discovered that nitrogen will allow metal atoms to be inserted into fullerenes, post-doctoral fellow Steve Stevenson (now at Luna Innovations) noticed an unexplained peak in the mass spectrometry of the metallo-fullerenes and isolated it for NMR analysis by Virginia Tech graduate Roy Bible (now at Searle). NMR indicated the new structure, but that one source wasn't proof

enough for publication. So Virginia Tech undergraduate student Greg Rice and Emory and Henry College visiting scholar Jim Duchamp were able to make about a half of a milligram of the material.

"We tried to get a crystal structure, but that hasn't worked yet," says Dorn. "So we contacted Patrick Fowler of the University of Exeter, who did a theoretical study. He used computer modeling to determine that of 6,332 ways to assemble fullerenes, only 11 structures agreed with our data, and only one structure was stable."

Once the structure had been identified, the experimentalists could prove they could isolate the new fullerene they had created, recreate it, and change it. The first C₆₈ cage contained scandium, which is used because it is easy to track with an NMR. The Virginia Tech researchers created a family of C₆₈ endohedral metallo-fullerenes by inserting other metals. They are now able to create large, pure quantities of C₆₈ with rare-earth atom clusters.

Authors of the article in *Nature* (A stable non-classical metallo-fullerene family) are Stevenson, Fowler, T. Heine of the Università di Bologna, Duchamp, Rice, Virginia Tech analytical chemists Tom Glass and Kim Harich, Elizabeth Hajdu and Bible at Searle, and Dorn.

ICSRC assists state school divisions with technology management

By Beth Bottom

Virginia Tech's Institute for Connecting Science Research to the Classroom (ICSRC) is reaching out to school leaders across the state to help them better manage technology in their schools. The Technology Management for School Leaders (TMSL) training series focuses on helping school administrators develop a knowledge base concerning instructional technology-related issues that extend student learning and support state and national technology standards.

Since September, the ICSRC, coordinated through Virginia Tech's College of Human Resources and Education, has conducted TMSL professional-development sessions for 136 school leaders in Virginia School Superintendents Regions 1, 2, 6, and 8. Participants in these sessions include school-board members, superintendents, technology directors, curriculum directors, finance officers,

principals, teachers and special-education teachers. The ICSRC teamed with Longwood College's Institute for Teaching through Technology and Innovative Practices to conduct a series of five two-day workshops.

"The training sessions were very well received by the local school leaders," said ICSRC Associate Director John Wenrich. "This is an area where they really wanted to gain a better understanding of how to manage technology within the school building."

The TMSL professional development uses a problem-based inquiry method that draws upon real-life scenarios to generate discussion among school leaders.

"By using the unique TMSL scenario approach, the school leaders were able to interact in appropriate discussions without implicating possible problems found locally in divisions," Wenrich said.

These scenarios help the participants in the

training to focus on technology needs peculiar to their school division. Particular emphasis is on using appropriate, discipline-specific technologies to improve student achievement; developing acceptable-use policies, finding connectivity solutions, developing hardware distribution and migration strategies, using cost/benefits analysis in growing LAN (Local Area Network) and WAN (Wide Area Network), and formulating evaluative questions for selecting school management packages, hardware, software and network solutions.

"In most schools today, technology is approached as a doctor approaches a heart-attack patient. The doctor repairs the heart, then tells the patient how to avoid another heart attack," said ICSRC Director Joy Colbert. "The smart way to approach the situation is for the patient to live a lifestyle that will avoid a heart attack. This should be the approach to technology in the schools. Develop strategies for preventive problem-

solving."

ICSRC has now completed initial TMSL professional development for school leaders in selected districts. The information provided to them, including a comprehensive TMSL training manual, will enable them to conduct further technology-management training in their schools and reach an even broader range of education professionals who work with technology.

In addition to the information provided by ICSRC during these on-site workshops, school leaders can augment what they have learned about technology management by referring to a continuously updated web site containing a series of eight interactive modules. Information fundamental to making cost-effective, instructionally sound decisions related to instructional technologies is made available by ICSRC on line at www.tmsl.org.

Initial TMSL program development was sponsored by Bell Atlantic.

GATOR BOWL

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Virginia Tech finished the regular season 10-1 while the Tigers finished 9-2. Tech and Clemson met a year ago at Blacksburg with the Hokies winning, 31-11. This will be the 28th meeting between the two schools. Clemson leads the series, 17-9-1.

This marks the third trip for the Hokies to the Gator Bowl. Tech is 0-2 in the Gator Bowl. Tech fell to Tennessee, 45-23, in the 1994 Gator Bowl, which was played in Gainesville, Fla. The Hokies fell to North Carolina, 42-3, in the Gator Bowl following the 1997 season.

"We're very proud to be playing in the Gator Bowl," said Virginia Tech quarterback Michael Vick. "They wanted us and we're glad to get the invite. It's going to be a great game between two great teams and we're looking to put on a great show."

Tickets orders may be placed by stopping by the Cassell Coliseum Ticket Office or by calling 1-800-VATECH4. Tickets for both the general public and Tech students are \$40.

SPACE

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Research Laboratory (AFRL), colleagues investigated ways to reduce vibrations of space structures and noise control for payload fairings—the shrouds on the top of the rockets that protect the payloads during the first few minutes of launch. He returned the following

summer to continue working on this effort.

In 1998, the Air Force decided to enhance its research efforts in this area, putting together two teams to work on an experiment called MACE II—Middeck Active Control Experiment Reflight. MACE II is a hardware/software package that will independently learn to control vibration-reduction technologies to

suppress unwanted motion. If MACE II software can control deliberately induced vibrations, typical to spacecraft systems, then it will be an important contribution in the eventual design of self-reliant spacecraft able to "think" through and solve problems without human intervention.

"Our role," Leo said, "was to develop control algorithms that could be tested in orbit. We focused on the development of algorithms that were autonomous. No ground personnel would interact with the decision-making process once the craft left the launching pad."

The creation of MACE II follows MACE I, software that was used to test spacecraft while they were still on the ground. MACE II now eliminates the ground program, and consequently, the additional costs of testing on the ground.

Leo said the algorithms he and McEver developed will be some of the first experiments tested on the international space station. The space station's construction site is 250 miles above Earth, and nearly 1 million pounds of prefabricated building material will have to be hauled up by rockets.

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