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 educational 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 effectively.

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 EverBank Field in Jacksonville, kick-off set for 12:30 p.m., and broadcast on NBC.

“We’re really excited about our oppurtunity 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’s definitely an accomplishment for this team considering all of the injuries we’ve had this year.”

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 two years ago, and this year the United States and its 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 a mathematical engineering tools 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
SPECTRUM  FRIDAY, DECEMBER 8, 2000

ACTIVITIES

Friday, 8
Exams Begin.
Women’s Network Luncheon, noon-1 p.m., El Gualalupe.
Call Diana 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 Reception, 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 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 11-1): 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 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 7-6527, 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/or organization 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.anaa.vt.edu/cranwell for information.

DIGITAL
Reminder to Employees about Leave and Holidays

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.

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.

Throughout the spring semester, the Student Affairs Office will hold the Student Representative for 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, January 17, at 110 Burruss.

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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.
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 NAFLSA, 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 Dwayne of Undergraduate Admissions presented in its entirety at the conference.

“In no surprise that Tech’s ELI and Cranwell International Center and their partners are shaping the international education landscape,” Prist Provoz Jim Bohland said. “Tech is home to more than 1,400 international students and almost 200 international faculty members representing more than 90 countries. ELI and Cranwell have played important roles in attracting international members of our community while enabling them to enrich our campus by participating more fully in them they might otherwise.”

ELI staff members Kieran Hlu and Josie Cochran presented “Explicit Study Skills Instruction in an Intensive English Program.” Cranwell International Center Director Kim Beisecle teamed with Cranwell staff member David Newley, and ELI staff member Anish Ghadari for a forum on “Justifying, Implementing, and Evaluating a Multifaceted Support Program for Newly Matriculated International Students.”

The National Association of Foreign Student Advisors, now called NAFLSA: Association of International Educators, is a nonprofit organization that strengthens institutional programs and services related to international educational exchange.
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 so-called 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 molecular 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 a half of a milligram of the material.

“We tried to get a crystal structure, but that wasn’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, reeve 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 University of Exeter, and Bolognia 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 Roy Collier. 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 website containing a series of eight interactive modules. Information fundamental to making cost-effective, instructionally sound decisions related to instructional technologies is available by ICSRC on line at www.tmsl.org.

Initial TMSL program development was sponsored by Bell Atlantic.

GATOR BOWL

Continued from 1

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

Continued from 1

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—Mid-Deck 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.