

Commonwealth Graduate Engineering Program



**Annual Report
Academic Year 2007-2008**

**Operating Plan
Academic Year 2008-2009**

Presented to
State Council of Higher Education for Virginia
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Presented by
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Message from the State Director
James F. Groves



It is with mixed feelings that I write this final CGEP Annual Report introduction as state chair of the program. June 30, 2008, will mark the end of my four years as state chair. These four years have been a good time of new developments for the program and for me professionally. Over these

four years, the program has served the engineering education needs of the Commonwealth in a unique manner, bringing together five public institutions for the dissemination of a broad array of courses in a host of engineering subdisciplines. During my four years as state chair the program has sought to extend upon its standard model of operation by not only continuing to send out courses to working engineers in the field but also by using the installed CGEP infrastructure to more vigorously support learning by graduate students at the five participating institutions, through CGEP's nanotechnology course sharing initiative.

On July 1, Dr. Sharon Caraballo, CGEP Director at George Mason University, will take over as state chair and begin a three year term as program leader. Some years ago, the CGEP Directors confirmed a standard rotation of the state chair position, on a three year term. The position moves in order from VCU, to ODU, VT, UVA, and GMU. Since Sharon began as GMU's CGEP Director just one year ago, the program decided to delay the transition of the leadership role to GMU by one year, to give Sharon time to learn about the program. However, the time has come for me to step aside.

My time as state chair has been a great opportunity for me. It has afforded me numerous opportunities to learn about professional collaboration across institutions. I have enjoyed the opportunity to represent CGEP at a host of state activities. The time as state

chair has also given me the opportunity to guide our five schools through the processes of securing National Science Foundation and Commonwealth of Virginia funds to support our ideas. For each of these opportunities I am grateful. Each has proven to be a tremendous professional growth opportunity.

This year CGEP has continued to focus upon its budding nanotechnology course sharing initiative which began in winter 2007 with the sharing of seven courses. During that initial semester, a total of 116 students enrolled in the shared courses, with 67 of those enrollments being enabled as the result of the course sharing initiative. That means that 49 students took the class in the normal "face-to-face" format where the instructor was physically in the room with them. The remaining 67 students were all "at a distance." Of the 67 distance students, 21 were working engineers. The remainder were graduate students at the other institutions who enrolled in the distance courses. During the fall of 2007, the five schools offered their second semester of shared courses in the program. A total of 52 students took the six available courses, with 17 of those students "at a distance". Five of the 17 distance students were working engineers. In the spring of 2008, CGEP offered their third semester. A total of 87 students enrolled in the available courses, with 49 of those students "at a distance". Of the distance students, eight were working engineers. This fall, the fourth and final semester of initial course sharing will begin.

To date, this course sharing has been supported by monies from both the National Science Foundation and the Commonwealth of Virginia. By the end of January 2009, the National Science Foundation dollars will have been fully spent, and the program will continue forward on the \$145,000 per year allocated by the Commonwealth to CGEP. This upcoming transition to Commonwealth-only support will challenge the course sharing program. As originally envisioned, the full nanotechnology

course sharing initiative would have required \$300,000 per year to function. The General Assembly decided to fund the initiative at half that level. Since then, a small cut has been applied to the program as part of overall belt-tightening within the state system. As a result, the nanotechnology initiative now has \$145,000 available for operation. Thus, in January 2009, the CGEP schools will initiate a scaled-down version of the originally-envisioned program, supported only on Commonwealth of Virginia dollars. Whereas the original vision articulated a plan for the sharing of six courses per semester across the Commonwealth, the available state funds will allow about half that number of courses to be shared, six per academic year.

The sharing of courses through this program has been very beneficial to the CGEP schools and the students served by the program. In several instances, at ODU and UVA, course sharing dollars have been used to create on-line or asynchronous course offerings. This has resulted in the ability of the program to offer such courses as Biomedical Nanotechnology to students sitting at their computers wherever they have high-speed internet service. This year within the initiative, Virginia Tech and UVA have also teamed up to co-teach a course on Nanocarbon Materials. The first half of the course is taught by Professor Harry Dorn at Virginia Tech (an expert in the making of nanoscale carbon) while the second half of the course is taught by Professor Mool Gupta at UVA (an expert in the use of nanoscale carbon for new engineering devices). Finally, the Nanoscale Carbon course has involved students in hands-on learning through laboratory activities hosted at both Virginia Tech and UVA. Early feedback suggests that the enrolled students have embraced this team taught course with gusto!

The nanotechnology program has also highlighted one of the next challenges facing CGEP - the course delivery platform used by the program for the vast majority of its instructional offerings. Nearly all of CGEP's nanotechnology course offerings have been made available using interactive video conferencing (IVC). IVC is the most common mode of course transmission currently employed throughout CGEP. While this technology has made great strides forward in recent years, it does not have all the flexibility desired by students (or administrators) associated with the program.

First, the technology requires students to come to specific receive sites to participate in class. Increasingly CGEP students want to access their course content from anywhere. Many of CGEP's working engineer students travel extensively and are simply unable to return to their local CGEP receive site once or twice each week throughout the semester. Second, the IVC technology requires rooms at both broadcast and receive locations that are equipped to transmit / receive the course broadcasts. In the case of the nanotechnology course sharing program, this has caused several bottlenecks. Most importantly, working engineers want to tap into their education after work. However, CGEP's core course sharing program (outside nanotechnology) already uses all available IVC classrooms at the broadcast universities and the receive sites during that timeframe. Thus, the CGEP schools have made their nanotechnology courses available during the mid-day when classrooms are available. However, delivery of the courses at this time has made them widely inaccessible to working engineers. This disconnect is reflected in the lower than hoped for enrollment of working engineers in the program. In sum, CGEP's technology platform has not allowed it to connect its latest emerging technology course offerings with its students. This has been an important but difficult lesson of the nanotechnology initiative. It underscores CGEP's on-going need to adapt to changing technology and work flows. A more in-depth discussion of the successes and challenges of CGEP's nanotechnology initiative can be found in a paper that I have recently had accepted for this fall's Frontiers in Education conference sponsored by the American Society for Engineering Education (ASEE) and the Institute of Electrical and Electronic Engineers (IEEE).

Increasingly, the ability to deliver courses to the computer desktop will be important to CGEP. At its spring advisory board meeting, CGEP discussed this challenge with its board. The board understood the challenge and recommended that the program begin by identifying a pilot program that would allow CGEP to begin definition of on-line course platforms. Specifically, the board challenged the CGEP Directors to articulate what resources would be necessary at each institution for the development of a robust on-line course delivery solution for CGEP. As discussed at that meeting, there are many different "flavors" of on-

line learning. There are many different hardware and software tools available. There are many different thoughts about how to deliver effective learning on-line in synchronous, blended (synchronous + asynchronous), and fully asynchronous manners. The CGEP Directors will need to meet in the months ahead to discuss how best to coordinate their efforts to take CGEP to its next platform for course delivery.

Finally, as I bring my term as state chair to a close, I have been working with Sharon Caraballo at GMU and Rosalyn Hobson at VCU to update the 1992 CGEP Policies and Procedures manual. Both Sharon and Rosalyn have recently come on-board as CGEP Directors at their respective schools. During their initial start-up, Linda Vahala, Glenda

Scales, and others have spent important amounts of time verbally describing to them how CGEP works. Those discussions have underscored the need of the program to update its out-of-date Policies and Procedures manual. Our goal is to have a complete draft of that manual updated and ready for review in June, by those that attend the CGEP annual conference in Charlottesville.

In closing, let me say that I feel good about turning over the state chair to Sharon Caraballo at GMU. I feel comfortable speaking for all of the other CGEP Directors and saying that we have been impressed with the work ethic and professionalism that Sharon has exhibited over the past year since joining CGEP. Under Sharon's guidance I am confident that CGEP has an exciting future just around the corner.

Expenditures

A comparison of appropriations to expenditures is found in Table 1. The detailed expenditure reports are found in Tables 2 and 3.

Commonwealth Graduate Engineering Program Comparison of Appropriations to Expenditures

Table 1

CGEP Institutions	2007-08				2008-09							
	Appropriations (1)			Total Expenditures	Appropriations (1)				Total Planned Expenditures	% Incr Over fy08 Exp.		
	General Fund	Nongeneral Fund	Total		General Fund	% Incr	Nongeneral Fund	% Incr			Total	% Incr
George Mason University	\$289,614	\$124,120	\$413,734	\$688,568	\$289,614	0%	\$124,120	0%	\$413,734	0%	\$709,400	3.0%
Old Dominion University	\$431,013	\$198,244	\$629,257	\$762,795	\$431,013	0%	\$198,244	0%	\$629,257	0%	\$762,795	0.0%
University of Virginia	\$775,197	\$468,850	\$1,244,047	\$1,960,808	\$770,197	-1%	\$463,850	-1%	\$1,234,047	-1%	\$1,918,960	-2.1%
VA Commonwealth University	\$388,468	\$168,533	\$557,001	\$614,912	\$388,468	0%	\$168,533	0%	\$557,001	0%	\$614,912	0.0%
Virginia Tech	\$869,882	\$436,357	\$1,306,239	\$2,097,718	\$869,882	0%	\$436,357	0%	\$1,306,239	0%	\$2,135,320	1.79%
Southern Virginia Higher Education Center	\$29,050	\$12,450	\$41,500	\$29,050	\$29,050	0%	\$12,450	0%	\$41,500	0%	\$29,050	0.0%
University of Mary Washington	\$80,483	\$36,130	\$116,613	\$119,118	\$80,483	0%	\$36,130	0%	\$116,613	0%	\$128,598	8.0%
Total	\$2,863,707	\$1,444,684	\$4,308,391	\$6,272,967	\$2,858,707	0%	\$1,439,684	0%	\$4,298,391	0%	\$6,299,035	0.4%

NOTES:

1. Based on information item amounts included in Chapter 847.
2. UVA's appropriations include \$150,000 in general funds and \$150,000 in nongeneral funds which are designated for the Nanotechnology Initiative and subsequently distributed to the participating institutions. These appropriations were reduced to \$145,000 for both the general and nongeneral fund as a result of budget cuts in Fall 2007.
3. The National Science Foundation award for the Nanotechnology Initiative was \$600,000. The grant runs from February 1, 2006 – January 31, 2009.

**Commonwealth Graduate Engineering Program
Expenditures 2007-2008**

Table 2

CGEP Expenditures 2007 - 2008

	GMU		ODU		UVA		VCU		VT		SVHEC		UMW	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Personnel Services														
1121 Admin Faculty Salaries	0.3	\$42,432	2.0	\$156,669	7.2	\$767,437	1.5	\$116,687	0.5	\$70,882			0.1	\$12,769
1123 Classified Salaries	0.9	\$34,200	4.0	\$233,147	6.3	\$245,832	1.0	\$55,251	5.0	\$192,619	1.0	\$23,600	0.6	\$33,798
1126 Teaching and Research faculty	3.0	\$376,142			0.7	\$71,292	4.0	\$41,000	9.0	\$816,710				
1142 GTA Wages	1.5	\$60,000	2.0	\$60,133	2.0	\$115,282	5.0	\$90,000	2.0	\$48,162				
Other Personnel Services		\$12,500	3.0	\$61,962		\$26,317		\$27,000		\$42,141				\$1,786
Fringe Benefits		\$139,252		\$134,348		\$327,825		\$82,604		\$356,385				\$3,390
Total Personnel Services	5.7	\$664,526	11.0	\$646,259	16.2	\$1,553,985	11.5	\$412,542	16.5	\$1,526,899	1.0	\$23,600	0.7	\$51,743
Non Personnel Services														
1200 Contractual Services		\$700		\$4,738		\$355,837		\$33,513		\$447,129		\$2,750		\$66,575
1300 Supplies and Materials		\$342		\$76,895		\$20,986		\$450		\$6,500		\$2,700		\$800
1400 Transfer payments		\$23,000						\$116,565		\$58,888				
2200 Equipment		\$0		\$34,903		\$30,000		\$51,842		\$58,300				
Total Non Personnel Services		\$24,042		\$116,536		\$406,823		\$202,370		\$570,817		\$5,450		\$67,375
TOTAL		\$688,568		\$762,795		\$1,960,808		\$614,912		\$2,097,716		\$29,050		\$119,118

**Commonwealth Graduate Engineering Program
Expenditure Plan 2008-2009**

Table 3

CGEP Expenditure Plan 2008 - 2009

	GMU		ODU		UVA		VCU		VT		SVHEC		UMW	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Personnel Services														
1121 Admin Faculty Salaries	0.3	\$43,000	2.0	\$156,669	6.8	\$772,782	1.5	\$116,687	0.5	\$72,964			0.1	\$10,769
1123 Classified Salaries	1.0	\$40,000	4.0	\$233,147	6.3	\$257,278	1.0	\$55,251	5.0	\$198,275	1.0	\$24,500	0.6	\$29,798
1126 Teaching and Research faculty	3.0	\$380,000			0.6	\$72,713	4.0	\$41,000	9.0	\$840,693				
1142 GTA Wages	1.5	\$60,000	2.0	\$60,133	2.0	\$119,535	5.0	\$90,000	2.0	\$49,353				
Other Personnel Services		\$12,500	3.0	\$61,962		\$25,184		\$27,000		\$42,141				\$1,786
Fringe Benefits		\$142,900		\$134,348		\$335,715		\$82,604		\$361,077				\$3,390
Total Personnel Services	5.8	\$678,400	11.0	\$646,259	15.7	\$1,583,207	11.5	\$412,542	16.5	\$1,564,503	1.0	\$24,500	0.7	\$45,743
Non Personnel Services														
1200 Contractual Services		\$2,000		\$4,738		\$204,851		\$33,513		\$447,129		\$2,500		\$66,575
1300 Supplies and Materials		\$3,000		\$76,895		\$100,902		\$450		\$6,500		\$2,050		\$600
1400 Transfer payments		\$26,000						\$116,565		\$58,888				\$15,680
2200 Equipment		\$0		\$34,903		\$30,000		\$51,842		\$58,300				
Total Non Personnel Services		\$31,000		\$116,536		\$335,753		\$202,370		\$570,817		\$4,550		\$82,855
TOTAL		\$709,400		\$762,795		\$1,918,960		\$614,912		\$2,135,320		\$29,050		\$128,598

Enrollments

Enrollment trends for the past five years are depicted in Table 4 below. CGEP Universities are using a variety of delivery methods to meet the needs of our distance learners. CGEP has seen general stability in its course enrollments, with an increase in overall student enrollment numbers.

The primary marketing efforts for CGEP continue to be carried out through our receive site coordinators and human resource directors of corporate and government entities, along with the individual university directors and administrative and technical staff. This is accomplished through open houses, industry college day presentations, videoconference open houses, and the state-wide web site: <http://cgep.virginia.gov>.

Enrollment Trends – Five Years

Table 4

	<u>2003-04</u>	<u>2004-05</u>	<u>2005-06</u>	<u>2006-07</u>	<u>2007-08</u>
GMU	429	411	600	545	461
ODU	3,220	2,508	2,366	2,580	2,765
UVA	617	631	554	585	566
VT	2,345	2,105	2,190	2,387	2,776
VCU	<u>138</u>	<u>126</u>	<u>106</u>	<u>107</u>	<u>128</u>
TOTALS	6,749	5,781	5,816	6,204	6,696

2007-2008 Enrollments by Delivery Method

Table 5

	<u>IVC</u>	<u>CD-Rom</u>	<u>Internet-Based</u>	<u>Total Enrollments</u>
George Mason University	96	0	365	461
Old Dominion University	1,315	1,363	87	2,765
University of Virginia	552	0	14	566
Virginia Tech	2,013	0	763	2,776
Virginia Commonwealth University	128	0	0	128

University Reports

Each director provided a summary annual report and operating plan for their respective institution based upon the mission of each university. These reports will provide a detailed description of CGEP activities at the respective institution.



George Mason University

Sharon Caraballo - Director

Review of Academic Year 2007-2008

George Mason University (Mason) serves as a host institution for the Virginia Commonwealth Graduate Engineering Program (CGEP) at our Fairfax and Prince William campuses. Mason's Volgenau School of Information Technology and Engineering (IT&E) coordinates the regional Northern Virginia program. In addition, Mason offers Masters degree programs in the following disciplines: Civil and Infrastructure Engineering, Computer Engineering, Computer Science, E-Commerce, Electrical Engineering, Information Security and Assurance, Information Systems, Operations Research, Software Engineering, Statistical Science, Systems Engineering, and Telecommunications. Mason also offers Ph.D. degrees in Computer Science, Electrical and Computer Engineering, Information Technology, and, new for 2007-08, Statistical Science, as well as a post-Masters Engineer degree in Information Technology. Engineering courses broadcast by the University of Virginia (UVa), Virginia Tech (VT), and Old Dominion University (ODU), along with support courses broadcast by Virginia Commonwealth University (VCU), provides courses and degree programs not otherwise available in the region, and complement the existing programs at Mason. These offerings provide students a choice among several dozen graduate engineering degree programs. Students have the option of selecting a degree program from Mason, ODU, UVa, or VT, and may enroll in any of the graduate courses offered by these four universities. As reported in the 2006-07 Annual Report, we continue to broadcast classes, and the bulk of the budget is used for teaching staff and technical support. The teaching staff

(professors and graduate teaching assistants) are from The Volgenau School of Information Technology & Engineering.

CGEP Offerings

In 2007-08, Mason continued to offer engineering courses in a distance-learning format. There are three separate activities: one VTEL-based course per semester offered by our Electrical and Computer Engineering department as part of the CGEP-wide nanotechnology initiative, web-based distribution of courses from our M.S. program in Computer Science (the courses fulfill the requirements for a graduate certificate in Computer Networking, as well as the requirements for a M.S. degree in Computer Science), and VTEL-based distribution of courses from our M.S. program in Systems Engineering. We are gradually adding courses that could be applied toward a Ph.D. in Information Technology (specializing in Systems Engineering). In 2007-08, two Electrical and Computer Engineering/Nanotechnology courses, nineteen Computer Science courses, and nine Systems Engineering courses were broadcast. (Additional Computer Science courses were distributed via distance learning, but only graduate courses are included in this report.) We have also begun experimenting with offering courses in an asynchronous Web-based format; one Systems Engineering course was taught in this format.

Enrollments

There are three categories of students taking the web-based courses. One group is enrolled in a "net" section of the courses; these students use distance learning as their primary access. A

second group only attends the class (just like any regular class), but may use the distance learning resources for studying and review (this is a popular choice). The third group uses both forms of access during the semester, attending some classes in person, and using the distance-learning format for other classes. The enrollment figures include the students in all three groups. The figures also include students who enrolled in a computer science course in an asynchronous format during a semester the course was not being offered synchronously, using Web-based recordings of an earlier semester's lectures. Similarly, students enrolled in the nanotechnology courses are included in the enrollment figures regardless of delivery method.

Continuous Process Improvement Projects

Mason conducts ongoing reviews of its webcasting technology aimed at enhancing its capabilities. The students who use this equipment are surveyed to determine the usefulness and appropriateness of this medium for instruction. In addition, there are ongoing discussions with the support staff and faculty, to discuss their satisfaction with the technology. Mason continues to increase central support to assist with graduate admissions and marketing. The Volgenau School has put into place several new initiatives aimed at improving the graduate admissions process. The CGEP programs are benefiting from these activities.

Facilities and Support Structure

As reported previously, many of the courses from our M.S. program in Systems Engineering are transmitted using existing facilities from the CGEP program. The technology is based on the VTEL system, the standard system currently used by the CGEP program. Students are able to complete the M.S. program via distance learning. The courses from our M.S. program in Computer Science were transmitted using a specially established distance-learning classroom. Funds from the CGEP program were used to purchase, install, and test equipment and software for this project, which is now in full operation. A student can receive a transmission on a standard Windows-based computer

equipped with Internet Explorer and some freely available browser plug-ins (e.g., Real Player). The student obtains audio transmission and liveboard displays in real time; video is subject to a delay of about 10 seconds. There is also a realtime chat room for asking questions. Students with slow (e.g., dial up) internet connections can eliminate the video transmission. As reported, technical support continues to be provided by Mason's central Electronic Classrooms office. The University's VTEL equipment has been reliable, and student satisfaction with the equipment is good.

Asynchronous Delivery

The Volgenau School has begun experimenting with asynchronous online delivery of engineering courses. In Spring 2008, one graduate Systems Engineering course discussed above and one undergraduate Information Technology course were offered in this format. It is expected that these offerings will gradually increase as the school gets experience with the technology. Both courses include narrated video recordings created using the Camtasia screen recording software. CGEP funds were used to purchase the recording software and hardware. The undergraduate course used WebCT Campus Edition and other collaborative tools as well to create an online learning community. It is expected that these offerings will gradually increase as the school gets experience with the technology and best practices. The CGEP Advisory Board and receive sites have both emphasized the need for flexible course access, as is made possible by asynchronous Web-based classes.

CGEP Perspectives for AY 2007-08

George Mason moved into offering more courses to the CGEP community this year. Prior to this year, our online Computer Science courses, with one exception, were restricted to local Northern Virginia students; this year, we expanded all of our online Computer Science offerings to be available to the entire CGEP community. Next year, we will offer our online MS in Computer Science to any interested receive sites.



Old Dominion University

Linda Vahala – Director

Old Dominion University (ODU) is the host institution in the Hampton Roads eastern Virginia region for the Commonwealth Graduate Engineering Program (CGEP). CGEP regional offices and program staff are located in Old Dominion University's Frank Batten College of Engineering and Technology. The College offers doctoral and masters degrees in Aerospace Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, Mechanical Engineering, System Engineering, Engineering Management and Modeling and Simulation. Engineering courses televised by the University of Virginia (UVA), Virginia Tech (VT), George Mason University (GMU) and Virginia Commonwealth University (VCU) either complement existing programs offered by ODU or provide additional masters programs in Chemical Engineering, Industrial Engineering/Operations Research, and Materials Science. Students have the option of selecting a degree program from one of the CGEP Universities while enrolling in any graduate course offered by CGEP.

Old Dominion University distributes Masters level courses in Engineering Management, Modeling and Simulation, Civil Engineering and a number of other undergraduate and graduate distance learning programs (TELETECHNET) using a variety of technologies, including interactive standard and high definition video conferencing (H.320, H.321, & H.323), digital satellite and Internet video streaming (MPEG-4/H.264), desktop web/video conferencing, and podcasting. Many archived classes are available via video streaming, DVD, and podcasting, with plans to expand all courses to online archive video streaming. Students taking synchronous video streaming courses use a newly designed interface that features chat capability between students, on-screen note taking that the student can then be e-mailed, and the capability of sending

questions/comments to the instructor during class-time.

The Old Dominion University CGEP program began receiving and broadcasting telecourses statewide in 1984. ODU currently receives courses on campus, The Tri-cities Center in Portsmouth, and at the ODU Peninsula Higher Education Center as part of the TELETECHNET program distributed to University sites across the country. ODU offers a Masters of Engineering Program with an emphasis in Manufacturing and Design and a Master of Engineering with an emphasis in Experimental Methods. Both programs have grown and increased the offerings of Old Dominion University's Commonwealth Graduate Engineering Program.

Old Dominion University has contracted with the U. S. Navy to provide a Master's in Engineering Management (ENMA) degree by way of CD ROMs, to officer graduates of the Navy's Nuclear Power School. The program has proven to be a success. Between both semesters of the current academic year ODU catered to 1012 Navy officer enrollments in the program. A significant number of students living in Hampton Roads have completed their coursework by attending televised courses at local receive sites. In 2004-2005, the ENMA program graduated 445 asynchronous course students as well as 207 synchronous course students from outside Hampton Roads, via televised courses. In 2005-2006 there were 163 graduates; in 2006-2007, 139 graduates; and projections for 2007-2008 are for approximately 150 ENMA students to graduate. Commonwealth funds were not used in the program but it has given us the opportunity to broaden our enrollment and to provide some income for new partnerships and opportunities.

CGEP Offerings

Overall Old Dominion University enrollments increased this academic year, including the first year trial with Internet-based delivery.

Old Dominion University, with support from NSF and the Commonwealth of Virginia, developed 4 nanotechnology courses to be taught in the CGEP cluster over the next two years. In Spring 2007, Dr. Helmut Baumgart taught a course in Microelectronics Fabrication at the Nano Node which was delivered to distance learning students using two-way digital video conferencing technology. This technology permits distance students to be video and audio linked into the class as it is given on the ODU campus. Dr. Hani Elsayed-Ali taught a course in Fall 2007 on Plasma Discharge and Material Processing, focusing on processing of nanoscale devices and fabrication of nanoparticles. Dr. Albin is currently teaching an Introduction to Nano Materials course. In Spring 2008, the University is planning asynchronous broadcasting (including podcasting) so that employees in the work force can take these classes at a rate and time that best fits into their schedules.

Degree Programs

- Broadcast: Engineering Management, Modeling and Simulation, Manufacturing and Design, Experimental Methods.
- CD ROM: Engineering Management
- Certificate Programs: Engineering Management, Project Management and Coastal Engineering.

Enrollments

Over the past several years ODU's CGEP enrollments have increased significantly due to expanded delivery methods. Enrollments increased significantly in the Master's program for the U.S. Navy using the CD ROM as the primary delivery method. The program has proven to be a great success by adding an additional 1363 course enrollments to our overall CGEP course enrollments. In addition to the

success of the CD ROM method, Old Dominion is initiating its asynchronous delivery method of pod casting for Modeling and Simulation and Nano Technology courses.

Facilities and Support Structure

ODU operates numerous broadcast and receive classrooms at the main Norfolk campus. In addition, the University operates off-campus centers including the Peninsula Higher Education Center in Hampton Virginia, the Old Dominion University/Norfolk State University Higher Education Center in Virginia Beach, the Norfolk State University/Old Dominion University Tri-Cities center in Portsmouth, the Northern Virginia Higher Education Center as well as sites at Dahlgren and the Quantico Marine Base in addition to our TELETECHNET sites in and outside of Virginia. The University of Virginia and Virginia Tech also operate a combined graduate center in Virginia Beach. Industry receive sites include NASA/Wallops Island and Fort Eustis.

Expenditures

The attached appendixes outline the flow of funds through the Old Dominion University, Commonwealth Graduate Engineering Program over the last several years as well as our plans for next year's expenditures.

CGEP Perspectives for AY 2008 - 2009

The Old Dominion University Commonwealth Graduate Engineering Program continues to be a vehicle for providing high quality distance learning engineering education to the Hampton Roads region and beyond. Old Dominion University will continue to emphasize Master's Degree offerings in the area of Design and Manufacturing and Experimental Methods, Engineering Management, Modeling and Simulation and Nano Technology. All are proven areas of interest for professional engineers needing to continue their education. The ability to provide such education has been of benefit to the Eastern Virginia region as well as the Commonwealth of Virginia as a whole.



University of Virginia

James Groves - Director

Review of Academic Year 2007 - 2008

The University of Virginia continues to serve as a broadcast university within the CGEP network. As in recent years, UVA has offered courses in its traditional CGEP disciplines: Mechanical Engineering, Materials Science & Engineering, Chemical Engineering, Civil Engineering (Structural), Systems Engineering, and Electrical Engineering. State budgeted monies for CGEP supported the staff and infrastructure necessary to implement the various facets of the UVA program offerings. For several years, UVA has also offered working engineers with access to Engineering Physics. That degree offering was originally motivated by the needs of the Naval Surface Warfare Center at Dahlgren, VA. As the need for the degree has waned at Dahlgren, student enrollments have also decreased. The mutual decision was made this year by NSWC Dahlgren and UVA to completely discontinue the program. Thus, this fall was the final time that UVA offered a special course specifically to support the needs of that program. All students in the program will have the opportunity to finish their degree. As in past years, the university continued forward with technology transitions, and involved itself heavily in the offering and development of new CGEP course sharing for nanotechnology. In addition to courses broadcast by UVA, the university received a set of cross-listed courses from Virginia Tech and Virginia Commonwealth University. These courses were made available to on-grounds students, providing them a broader portfolio of course offerings.

CGEP Offerings

To provide students in the distance environment with important educational opportunities, UVA has continued to pursue various strategies that allow additional courses to be offered in the distance environment. This past academic year, one additional offering was made in support of the Engineering Physics program (Theoretical Mechanics), two additional math course offerings were made (Engineering Math I and II), and one additional course was brought in from

Virginia Tech as part of UVA's participation in the nanotechnology course sharing program (MEMS from Fabrication to Application). These courses complemented the standard set of sixteen courses broadcast out by UVA over the academic year.

This year, UVA used a portion of its funds for the nanotechnology course sharing program to support the broadcast of a fully on-line nanotechnology course - Biomedical Nanotechnology. The course was offered for the first time in the fall of 2007 by Prof. Lakshmi Nair. This was the first fully on-line course offered by UVA engineering, as part of any program. It also represented the first on-line course of CGEP's nanotechnology course sharing initiative. UVA's nanotechnology resources also were used to support the development of a team taught Nanocarbon Materials course, co-led by Professor Harry Dorn at Virginia Tech and Professor Mool Gupta at the University of Virginia.

Enrollments

UVA's CGEP activity was approximately the same as last year. The enrollments reported here include both on-grounds and off-grounds students participating in UVA CGEP course offerings, both courses broadcast by UVA and cross-listed courses received by the university. From the perspective of UVA, off-grounds enrollments will not increase substantially until the program successfully makes the transition to offering of courses in an on-line format. Such a format will greatly enhance course accessibility for working engineers.

Continuous Process Improvement Projects

As noted above, CGEP developed its first on-line course offering. The program at UVA believes that this format is the future of distance learning. The course development allowed the program to demonstrate that students at UVA will take an on-line course from a UVA-based instructor. It also afforded the program with an opportunity to look at how course support

procedures change when a course is offered on-line instead of via interactive video conferencing.

This year CGEP supported a part-time staff member for classroom operations. This individual made it possible for CGEP to bring in classes from other institutions, making those courses available to full-time UVA graduate students. The part-time staff member was responsible for setting up and putting away the mobile interactive video conferencing equipment purchased by UVA's CGEP during 2007-2008. This was necessary whenever UVA brought in a distance course in both the fall and spring semesters.

This year CGEP further upgraded its mobile classroom system, initially acquired during 2007-2008. The unit, as originally purchased, did not have the ability to transmit dual stream course materials. This was a problem when UVA students participated in a Virginia Tech course that required the students to make presentations. The instructor in Blacksburg wanted to be able to see the students while also viewing their electronic content. As originally configured, the system could not handle such a dual transmission.

Facilities and Support Structure

UVA's CGEP continued to upgrade its technology for course support. This year, the program upgraded its class session recording capability by expanding the storage capacity of its digital VCR system. In contrast to previous years, UVA was able this year to record and serve up to students the full dual screen course broadcast. In past years this was either not available or only available in a limited set of course settings.

In addition to the digital VCR upgrade, UVA has invested this year in the development of an electronic test grading system which allows a standard paper-based exam to be graded via

tablet computers. The paper exam is given normally in a course, with a specialized footer that allows for automated recognition of each exam page. The exam pages are then scanned in via a high-speed scanner, graded by one or more people using tablet computers, and returned electronically to the students. The system provides many advantages over regular paper-based exam grading, and boasts a faster grading experience than traditional grading methods.

In CGEP's distance learning courses, management of the grading of a paper-based exam has long been a time-consuming task. There can be many exams submitted in multiple physical locations that have to be mailed back to Charlottesville. This physical mailing process is time consuming and prone to human error. Once the exams are graded, the grade total must be calculated, the exams sorted, distributed to student locations, and then returned during class time. This uses a significant amount of instructor, teaching assistant, and administrator time during the grading process, as well as wasted lecture time to return the exam that could be better spent on other pedagogical tasks. This year, the system is in a beta test mode. It is hoped that within two years, the system will be widely deployed within UVA's CGEP.

CGEP Perspectives for AY 2008-09

UVA continues to take strides forward with its CGEP offerings. The program is now looking carefully at how to bring courses into the on-line environment. It is anticipated that that transition will take several years. However, once complete, it could signal a significant, almost revolutionary change in the way UVA participates in CGEP. In particular, the shift to on-line course delivery will make it easier for UVA to market its CGEP offerings to students that are not located near existing CGEP receive sites.



Virginia Commonwealth University

Rosalyn Hobson – Director

Review Academic Year 2007-2008

The Virginia Commonwealth University (VCU) Commonwealth Graduate Engineering Program (CGEP) experienced a very good 2007-2008 academic year. A number of VCU School of Engineering (SoE) faculty participated in the successful National Science Foundation (NSF) Partners for Innovation (PFI) grant proposal. This experience led to greater participation of the SoE faculty in other CGEP activities. A mobile distance technology unit was placed in service in the SoE building and room 105 was upgraded to dual-channel and the Anystream streaming media encoding software was installed. This equipment and classroom upgrade was available fall semester 2007 and greatly facilitated VCU participation in CGEP activities.

The VCU CGEP Master of Science degree in Computer Science at the Naval Surface Warfare Center (NSWC) at Dahlgren Virginia continued as a strong distance learning program. NSWC is one of the largest employers of engineers and scientists in the Commonwealth of Virginia. The CGEP Computer Science program served 28 different NSWC individuals in 2007-08 (down from 52 last year). A number of National Aeronautics and Space Administration (NASA) at Langley Virginia engineers continued enrollment in the VCU Master of Science in Engineering program. These students enrolled in graduate engineering courses transmitted to NASA Langley by VCU and other CGEP Universities.

In partnership with Dominion Virginia Power, VCU initiated a MS in Mechanical and Nuclear Engineering. The VCU SoE received financial support from Dominion Virginia Power to establish this program. Courses are delivered on-campus as well as to the Dominion Virginia Power's Surry Power Station via distance technology. First year Enrollment in these courses has been excellent (22-24 students enrolled).

Virginia Commonwealth University received \$557,001 for FY 2007 in support of CGEP activities. The University, SoE, and NSWC Dahlgren continued an agreement whereby NSWC Dahlgren paid increased tuition for delivery of the Computer Science Program to their site at Dahlgren. This agreement, Entrepreneurial Program Tuition Agreement, (EPT) generated \$59,412 that was allocated by SoE to assist in funding the CGEP NSWC Dahlgren Computer Science Program.

State budgeted CGEP funds were utilized for both transmission and reception of CGEP courses. The transmission portion of the funds has been used in support of statistics, engineering, computer science, and nuclear engineering courses. These funds have been used to support the course instructor in the preparation and presentation of CGEP courses. In addition, CGEP funds were used to support five teaching assistants to provide instructional support and aid with the courses, to provide course materials, and to videotape the courses for those enrollees who, because of circumstances beyond their control, could not attend a particular class session.

The remainder of these funds has been used in support of the received CGEP courses and to equip and/or upgrade CGEP classrooms. Classroom support included a VCU CGEP staff coordinator and graduate student assistants who monitor and supervise enrollments, room usage, and videotaping of courses for attendees who miss classes on various occasions. The actual disposition of funds between transmission and reception of courses may vary from year to year depending on the number of enrollees in the transmitted and received courses.

VCU CGEP participation in the NSF PFI Nanotechnology Initiative has been very successful. Seven courses with a total local (VCU) enrollment of 20 students were received and cross-listed by VCU. The students were very pleased with the courses and the dual-

channel capability in rooms 105 and 106. The opportunity to choose from a wide variety of nanotechnology courses in a single semester continues to be especially appealing to VCU engineering students. The VCU Spintronics course was offered spring semester with a local (VCU) enrollment of two students. A more extensive marketing effort with area nanotechnology industry will increase local enrollment.

CGEP Offerings

VCU CGEP transmitted a total of eighteen courses in 2007-2008. This slightly exceeds the number of courses transmitted the previous year by VCU CGEP. The Computer Science program continues to be the major contributor of CGEP courses at VCU. A total of fifteen courses were transmitted to NSWC Dahlgren during 2007-2008. These courses were transmitted via Interactive Video Conferencing (IVC).

VCU CGEP broadcast STAT 541 Applied Statistics for Engineers and Scientists to other CGEP institutions. Those institutions usually cross-listed this course as their course with a local course prefixes and number. The need for this course is indicated by a typical enrollment of 20 to 30 students each fall.

Enrollments

The VCU NSWC Dahlgren Computer Science Program is completing its sixth full year of operation. This program continues to serve the NSWC need for graduate degree computer scientist. The program experienced decline in enrollment growth with 54 enrolled as compared to 2006-2007 with 95 enrolled. The decrease in enrollment is attributed to diminished demand as the number of NSWC employees completing the M.S. in Computer Science reduces the pool of potential NSWC employee applicants. Of course, staff turnover and growth will increase the applicant pool. Further, the cooperative effort of the NSWC Dahlgren staff and the Computer Science faculty to increase Dahlgren employee awareness of the program will also increase the applicant pool. VCU CGEP expects its Computer Science program and its total enrollment to increase as the VCU CGEP based thesis and non-thesis M.S. degree in Engineering program expands into the business/industry sector.

Enrollment in VCU CGEP originated courses was 74 for 2007-2008. The total received and transmitted course enrollment experienced a decline, 94 enrolled as compared to 127 enrolled last year. This decrease is attributable to the CGEP Computer Science program enrollment decrease. VCU SoE expects enrollment in VCU SoE originated courses to increase as a result of the new M.S. in Mechanical and Nuclear Engineering Program. This program was initiated in partnership with Dominion Virginia Power. Their Surry Power Station nuclear facility employees participate in this program via IVC.

VCU SoE participated in cross-listing courses with other CGEP schools. Five courses were cross-listed as VCU courses with a total VCU enrollment of ten students. VCU SoE transmitted one course that was cross-listed by UVA.

Continuous Process Improvement Projects

VCU CGEP continues to review its procedures, equipment, and support structure for areas that can be improved. A number of equipment upgrades have been made based on input from faculty and support staff. Feedback from students has resulted in changes to improve instruction.

As noted above, a mobile distance technology unit was activated fall 2007. This addition provides SoE with a fourth receive site in the SoE building. Room 105 equipment was also upgraded to dual channel capability. That is, the students can see the instructor on one large display while viewing the presentation, e.g. spreadsheet, on a second large display. This was not possible with the older equipment. The video signal quality is also much enhanced. Multi-point capability is now available to the three distance technology equipped classroom via the bridge located in the Cabell Library. This will greatly enhance the scope of VCU CGEP transmission capabilities. Internet Protocol (IP) capability will be tested in the 2008-09 academic year. In addition the Anystream software system was installed to enable video streaming of the courses so that students can access lecture material at a later time. With the opening of the second phase of the engineering building plan this semester, significant opportunities exist to add distance technology equipped classrooms.

VCU CGEP anticipates significant opportunities for expanded distance learning activity and SoE faculty involvement as a participant in the Nanotechnology Initiative. First year enrollment in the nuclear engineering concentration exceeded 20 students. At least one-third of these students are receiving instruction via distance technology. Further, VCU SoE sees a growing need for MS level graduate coursework in the Richmond area business, industry, and government community. Typically these employers and employees prefer access to this coursework at their work site. This need can best be met through courses delivered via distance learning.

Facilities and Support Structure

Virginia Commonwealth University maintains numerous facilities in support of the Commonwealth Graduate Engineering Program for both transmission and reception of CGEP courses. A modern and complete distance learning room is available in the VCU School of Business. In addition, a distance learning room is available on the VCU Medical Campus in the Thompkins McCaw Library. A large conference room (15 students) in the SoE building is equipped with a Polycom two-way audio/two-way video multi media system. Internet or ISDN connections are available with this system. Two much larger SoE building rooms (40 students) are also equipped with a dual-channel system. A third room is being prepared to accommodate the mobile unit on an as needed basis.

VCU CGEP has moved most distance classes to the distance technology equipped classrooms in the SoE building. It is still necessary to utilize one of the Cabell distance classrooms at high traffic times. With the installation of dual-channel equipment in room 105, the new mobile unit, and the addition of multi-point capability, VCU CGEP has significantly increased its transmission and reception capabilities. This enhanced capability will support increased faculty and student involvement in CGEP activities in the coming years, for example greater participation in the NSF-PFI Nanotechnology Initiative, and the Nuclear Engineering Track.

It is also possible to port the received and transmitted courses at the above noted sites to dozens of other VCU sites (on both the Monroe Park and Medical Campuses) via a closed circuit network. Over 50 classrooms and auditoriums

have such capabilities at VCU. In addition, the Virginia Biotechnology Research Park operates a classroom, which can be outfitted for distance learning. Given our strong relationship with the Biotech Park (VCU is one of its three supporting elements); this added facility might serve the addition of biotechnology related courses to the CGEP mix in the coming years.

CGEP Perspectives for Academic Year 2008-09
With the addition of the new distance learning facilities, Virginia Commonwealth University sees potential for growth. The computer science courses will be offered to NSWC Dahlgren in the fall, spring, and summer semesters. VCU's CGEP plans include several new CGEP courses and an expansion of the M.S. in Engineering degree program. This program now has a non-thesis option, which will be attractive to engineers in the business, industry, and government sectors. The new MS in Mechanical and Nuclear Engineering shows great promise and should grow as the workforce demands in the energy sector increase.

VCU is a significant participant in course cross listing within CGEP. We expect to expand this effort through the NSF-PFI Nanotechnology Initiative. The transmission and reception of graduate engineering courses as a member institution of CGEP is a high priority for VCU CGEP.

The VCU Engineering faculty interact with business/industry/government partners on a continual basis in collaborative research, collaborative teaching, and through professional organizations. Business/industry/government leaders provide additional input on our degree granting programs through their service on our Industrial Advisory Boards (IAB's) for each of our degree granting programs: Biomedical Engineering, Chemical and Life Science Engineering, Electrical and Computer Engineering, Mechanical Engineering, and Computer Science. Through our business/industry/government partners and increased marketing efforts, we see a potentially significant market for the thesis and non-thesis M.S. in Engineering degree via IVC in the Richmond and surrounding areas. The nuclear engineering program developed and offered in partnership with Dominion Virginia Power is an example. Our plan for course offerings to be transmitted from VCU for the coming two years will include 2 to 4 graduate engineering courses.

VCU CGEP invested \$59,412 SoE funds in support of the 2007-2008 CGEP programs. It is anticipated that a similar amount would be

invested in 2008-2009. This is based on the assumption that the NSWDC Dahlgren program and the EPT continue at or above the current level of enrollment.



Virginia Tech

Glenda Scales – Director

Virginia Tech continues to provide leadership for CGEP as a host institution. Our major achievements continue to reside in the areas of increasing faculty recognition, improving our distance learning student community and upgrading our instructional technology.

Increasing Faculty Recognition & Support

Having outstanding faculty teach CGEP students contributes to the success of our programs. Each year it is important to highlight a faculty member who made major contributions to Virginia Tech's distance learning initiatives and particularly the Commonwealth Graduate Engineering Program.

Dr. Kathleen Meehan, Assistant Professor, Electrical and Computer Engineering, has been teaching at a distance for the past two years with her courses in nano-photonics and nanoscale biosensors. She became involved with CGEP with the launch of the NSF grant, [Virginia Partnership for Nanotechnology Education and Workforce Development](#), a nanotechnology course-sharing program with approximately six courses per semester offered across the CGEP network. Dr. Meehan has played an important part in coordinating Virginia Tech's role in the program. Through this partnership, graduate-level nanotechnology courses are available to students in the following areas: Nanotechnology Fundamentals, Nanobiotechnology, Nanomodeling and Simulation, Nanomaterials and Characterization, Nanomanufacturing, and Nanoelectronics. Students interested in the



program will have the ability to work towards a certificate in any one the listed areas (except for Nanotechnology Fundamentals).

When asked if nanotechnology is a valuable field for Virginia Tech and CGEP to pursue, Dr. Meehan responded in the affirmative. "Definitely. Nanotechnology covers a whole breadth of technologies and touches nearly everything in engineering and the sciences." She added that nanotechnology is particularly important in the state of Virginia. "There is a strong economy of nanotechnology in Virginia that continues to grow. Nanotechnology is at the foundation of many industries in the state." This is where CGEP comes in as no single university in Virginia covers all areas of nanotechnology. CGEP leverages each university's strengths through its course-sharing model.

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Nanotechnology has not only increased interaction between universities but between disciplines as well. Dr. Meehan regularly works with people in materials science and engineering, chemical engineering, osteopathic medicine, and others outside of her home department of electrical and computer engineering. Although nanotechnology seems to be a new field, Dr. Meehan says the name is really the only thing new about it. "I've been working with nanotechnology since my graduate school days."

Dr. Meehan has been teaching for several years, but she has made some adjustments to accommodate distance learning since she began teaching at a distance in the fall. She makes sure she has slides and other information posted in plenty of time before class for students to reference and has become more flexible with office hours for her distance learning students.

These communications are usually conducted over the phone. Because many CGEP students are engineers already working in industry, they bring additional knowledge and experience to the table in class discussions. "I enjoy getting to hear about the research that is happening at other universities and in industry throughout the state," says Dr. Meehan.

Dr. Meehan's teaching and research interests include optoelectronics, biomedical optics, semiconductor processing, semiconductor device theory, biosensors, optoelectronic device, optical sensor design and fabrication, silicide-semiconductor devices and sensors, process development, process and device modeling, and optical spectroscopy of biological and biochemical substances.

Continuous Process Improvement

The College of Engineering updated its computer requirement to a Tablet PC in the Fall of 2006 for incoming freshmen. The Tablet PC initiative has developed in multiple dimensions including: institutional commitment and corporate partnerships, faculty support and development, teaching practices and student products incorporating the new technology, and an assessment plan to measure teaching and learning. More faculty are using the Tablet PC to teach distance learning classes. Preparing to implement this mobile and wireless solution required faculty not only to learn the new technology, but also devote extra time to transform their teaching styles to support the evolution of the traditional classroom into a dynamic and engaging learning environment.

The College of Engineering uses the Tablet PCs in departments to support electronic grading as well as international presentations with Skype supplying audio or on-demand video conferencing. We plan to engage more faculty and students learning from a distance with software tools that enable digital inking.

Enrollments

Virginia Tech continues to provide consistent enrollments for the distance learning courses. This year there is a major increase in enrollments from the previous academic year. Notably, enrollments in the internet based classes grew. Faculty are including our distance students in weekly seminar classes as well as giving them the flexibility to enroll in an asynchronous version of the class. This is a

clear sign that more of our classes can be offered with more flexible delivery methods providing more access anywhere and at anytime.

Enrollment Review

Academic Years	Enrollment Trend
2002-2003	1497
2003-2004	2345
2004-2005	2105
2005-2006	2190
2007-2008	2776

Facilities and Support Structure

Virginia Tech continues to invest in a state-wide infrastructure to support interactive video conferencing. The Video Broadcast Services (VBS) organization at Virginia Tech provides leadership for this project and contributes the following overview of the network transition to H.323.

The conversion to H.323 systems provides enhanced instructional delivery by adding a data channel for presenting high quality computer screens while showing the presenter as well. Additionally, students at the receive sites will also be able to make computer presentations. Improved integration of the systems provides simpler and more uniform controls for the faculty as well as the incorporation of the latest technologies such as improvements in camera control and audio input.

VBS has been working during the past year and continues to work closely with key stakeholders including the CGEP and selected faculty to identify instructional enhancements and additional features and functions needed in the system. VBS is also working collaboratively with a Communication Network Services (CNS) partner department, Research and Development, to identify and address infrastructure and Quality of Service (QoS) issues.

VBS maintains and operates Virginia Tech's thirty-two Interactive Video Conference (IVC) classrooms throughout the Commonwealth and the Video Network Operation Center in Research Building XIV located in Blacksburg, Virginia.

The change to H.323 or video over Internet Protocol was necessary because of the age and limited capabilities of the older ATM system. It

also supports the university's plan to provide more robust and integrated information technology strategies.

The upgrade is an opportunity to provide improvements to benefit instruction and learning. It includes new video encoding equipment (codecs), upgraded media players for both tape and DVD presentations, and the installation of high-resolution computer displays in all rooms. Internet delivery now makes Virginia Tech courseware available worldwide at high speed. These upgrades enhance the university's position in the increasingly competitive market surrounding distance learning.

The instructional advantages of H.323 are impressive. They include the following:

- Enhanced display of computer graphics and data. Having twin video channels available means instructors and students have the benefit of high-quality graphics including diagrams, photographs, and equations. Everything is clearer and easier to read.
- Instructors have the option to view several remote classrooms at once.
- On-screen display is enhanced. Previously the choices were either to see the instructor or the graphic material. Now, instructors can share the screen with graphics allowing for a more personal and nuanced connection with students.
- VBS installed remote monitoring capability through Crestron controllers in each on-campus and remotely located conference/classroom allowing a technician in the Virginia Tech Network

Operations Center (VNOC) to monitor distant sites and remotely troubleshoot problems.

- A streaming archive of class material allows students to review a class at any time.

VBS is upgrading its streaming media server capacity from seven terabytes to 16 terabytes. In the coming year, it is anticipated that VBS will develop automatic, real-time archiving of class files. This initiative is in support of a university strategic initiative to provide the necessary infrastructure, expertise and digital repositories to allow course management integration.

The H.323 conversion has helped solidify the university's educational partnerships and joint degree programs both in the United States and abroad. It also enhances graduate and professional degree value. These partnerships allow Virginia Tech to support a more diverse student body and expand educational offerings.

CGEP Perspectives for AY 2008-2009

Virginia Tech will continue to work closely with the partner institutions awarded the NSF Partnership for Innovation grant to place courses related to nanotechnology online. It is also clear that our delivery method will need to transition to provide more flexibility with access from anyplace at anytime.

Additionally, we will focus on marketing our existing programs as well as restructuring our delivery methods. We look forward to an exciting year as we work toward providing new and flexible delivery options for our learners.



Center for Advanced Engineering & Research

Nick Soukhanov – Program Director

The Center for Advanced Engineering (CAE), operating at Central Virginia Community College in Lynchburg since 1986, has merged with the Center for Advanced Engineering and Research (CAER) to continue offering local students graduate-level engineering and technical courses through the Commonwealth Graduate Engineering Program (CGEP) from Virginia Tech, the University of Virginia, Old Dominion University, George Mason University and Virginia Commonwealth University.

“This merger benefits the region in that it centralizes the local access to university and federal research programs,” said Bob Bailey, CAER Executive Director. “By graduating more engineering students at a local level, our existing businesses can grow their knowledge base and remain competitive into the future.”

The Center for Advanced Engineering and Research is a Region 2000 Partnership initiative to develop an industry-focused research and development center that drives innovative products and processes by providing local access to university and federal research and inventions.

- Interest in the Commonwealth Graduate Engineering Program is growing at the Lynchburg receiving site on the CVCC campus.

- Forty six (46) registrations in twenty nine (courses) for the Fall 2007 and Spring 2008 semesters occurred.
- Two degrees were awarded in the spring of 2007.
- One degree was awarded in the fall of 2007
- Two more degrees are expected to be awarded in the spring of 2008
- Total number of Masters Degrees awarded to Lynchburg students since the beginning of CGEP will be 128 in May 2008.
- Mechanical engineering courses from VT were expanded with two nuclear engineering stem courses.
- The Lynchburg receiving site is also serving as a transmitting site on selected occasions.
- Center for Advanced Engineering and Research in partnership with the Region 2000 Economic Development Council has launched a major initiative extending professional development opportunities to the region's expanding diverse technical community. Levels of corporate interest and commitment to educational programs are on the increase.
- Engineering employment continues to grow at an impressive rate with heavy emphasis in nuclear power design and wireless technology development.



The Southern Virginia Higher Education Center

Hope Harris Gayles – Career Counselor & Program Coordinator

The Southern Virginia Higher Education Center (HEC) has been an active participant in the Commonwealth Graduate Engineering Program (CGEP) since March 1986. At that time, the Center was known as the Halifax County-South Boston Continuing Education Center. In 1989, Longwood University became the parent fiscal agency of the Center. Under Longwood's guidance the Center grew and in 2001 moved into a newly renovated facility with state-of-the-art technology and greatly expanded office and classroom space. With the move came the name change to The Southern Virginia Higher Education Center (HEC)—a change designed to be more inclusive of the many Virginia colleges and universities that provide programs through the Center.

The 2005 Virginia General Assembly passed legislation making the HEC an independent state agency. This bill was signed into law by Governor Mark Warner in April and the change went into effect July 1, 2005. The mission of the HEC continues to be providing high quality, accessible, affordable educational programs, of all levels, to the citizens of Southern Virginia. Were it not for the HEC, many doors of higher learning, especially the CGEP, would be closed to those in the region.

The HEC provides six classrooms for use by the CGEP. Classrooms are equipped with color monitors, VCR, and interactive video equipment. In addition its use by the CGEP, the interactive video equipment helps support the Virginia Tech Water Quality professional development videoconferences. The Center has steady enrollment in these professional development videoconferences. Without their availability at the HEC, access would be severely limited to professionals in Southern Virginia.

Other classroom technologies include DVD players, internet access, personal computers, document cameras, scanners and fax machines are available to CGEP students upon request.

The HEC continues to use a variety of techniques to market the CGEP to prospective students. There is a general information bulletin describing all HEC programs that is available to business and industry. Each summer, the Center provides an insert in the Halifax County newspapers' mass mailing subscription drive. This insert is a comprehensive overview of all Center programs, and CGEP is featured in it. Because this insert is included in the newspapers' subscription drive, it is delivered to every household in Halifax County. Another example of the Center's marketing techniques is the annual ad placed Halifax County Chamber of Commerce's Directory. This directory is widely distributed to business, industry, and those new to the county.

The HEC continues to use a combination of telemarketing, direct mailings, industry visits, paid advertising, and open houses to promote the program.

The Center participated in the August 2007 University of Virginia CGEP Video Open House, and we had one student attend. This student has expressed strong interest in enrolling in the program, possibly for the Fall 2008 semester. The HEC's marketing director and career counselor continue to make CGEP a priority. Both attended the June 2007 CGEP annual conference at Virginia Tech and the HEC anticipates having a presence at this year's conference at the University of Virginia.

The Center believes the low enrollment numbers in the CGEP program reflects the low number of bachelor degree holders in Southern Virginia. According to the 2000 U.S. Census fewer than 10 percent of residents held a bachelor's degree. Compounding this problem is the lack of opportunities in the region for residents to complete a science, math, engineering, or technology (STEM) bachelor's degree program. Currently, no bachelor degree completion programs exist at the HEC or its coalition partners, the Institute for Advanced Learning and Research and New College Institute, in the STEM areas. This problem has been recognized, and steps are being taken to improve the situation. The University of Virginia, the Institute for Advanced Learning and Research, and Danville Community College are working together to create engineering pathways from the associate's and bachelor's level through the master's degree program. The *PRODUCED in Virginia* program promises to increase the qualified pool of engineers coming from and working in Southern Virginia. The Southern Virginia Higher Education Center is a strong supporter and advocate of this program, and we believe that its success will translate into eventual stronger numbers in our CGEP program.

The HEC believes that new initiatives driven by business and industry will also increase the number of prospective CGEP students. In the past few weeks, approval and funding have been secured for the creation of a Modeling and

Simulation Center of Excellence at Riverstone Technology Park. In addition, the Gazette-Virginian reported on April 2, 2008, that the aircraft design consulting and software design company, AVID, LLC, would be locating to Riverstone. The Modeling and Simulation Lab, new industry, and future industries that will locate to Halifax County because of the lab should increase the number of prospective graduate engineering students in the region.

The HEC continues to be a solid partner with the Halifax County Public School System in its STEM (Science Technology Engineering and Math) Academy. This program prepares students for the future by offering challenging, intense courses in Science Math and Technology. The STEM Academy is attracting nationwide attention as a method of establishing a base of qualified scientist and engineers for the future. The collaboration between the HEC and the Halifax County Public School System has only grown stronger in the past year, and promises to provide a solid base of CGEP students well into the future.

The innovative educational programs at the Center and, indeed, throughout the region, coupled with the economic development budding in Southern Virginia promises innumerable benefits for its citizens. The HEC continues to lead the charge in transforming the region through education, and in laying the foundation that will provide the region with a large, qualified pool of future CGEP students.



University of Mary Washington

Lynn Hamilton – Technology Academy Director

The Commonwealth Graduate Engineering Program (CGEP) at the University of Mary Washington, College of Graduate and Professional Studies (CGPS) provides three distance education classrooms seating between two and twelve students. Classrooms are equipped with a color monitor, VCR, and interactive video equipment.

If a student formally requests, the evening technical staff will videotape classes. These tapes are available for viewing in the CGPS library. Most students view missed classes via streaming at home, work or in a CGPS computer lab. CGPS also provides library and computer support as required.

Most CGEP coursework is sent directly to the student via the Internet but the evening support staff assists in the delivery and collection of course materials and homework assignments. The evening technicians also provide technical troubleshooting services when needed.

CGEP registration total for AY 2007-2008 was 8. This is a **decrease** of the AY 2006-2007 which registered 19 students. This represents a decrease in enrollment in graduate engineering degrees by Fredericksburg area residents over the past three years.

<u>Academic Year</u>	<u>Students Enrolled</u>
2005-2006	16
2004-2005	30
2003-2004	19
2002-2003	9
2001-2002	20
2000-2001	21
1999-2000	31
1998-1999	34
1997-1998	96
1996-1997	88
1995-1996	131