



BRENDAN O'HALLARN
Author

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BUILT FROM THE GROUND UP
The First 50 Years of Engineering at Old Dominion University



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Engineering at Old Dominion University

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Frank Batten College of Engineering and Technology

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FRANK BATTEN COLLEGE OF ENGINEERING AND TECHNOLOGY
102 Kaufman Hall | Norfolk, Virginia 23529 | 757.683.3789
engineer@odu.edu | www.eng.odu.edu



OUTER BANKS PRESS
75 East Dogwood Trail | Kitty Hawk, North Carolina 27949 | 252.261.0612
mail@outerbankspress.com | www.outerbankspress.com



MISSION STATEMENT

In accordance with the mission of Old Dominion University, the Frank Batten College of Engineering and Technology promotes the advancement of engineering knowledge, both in creation and dissemination, by providing successful graduates and a continuously improving learning environment to its constituents, while maintaining high ethical, multicultural and global standards.

OKTAY BAYSAL, Dean

OSMAN AKAN, Associate Dean

LINDA VAHALA, Associate Dean

BERNDT BOHM, Assistant Dean

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Congratulations to the Frank Batten College of Engineering and Technology for 50 years of groundbreaking research, innovative teaching and award-winning scholarship.

From its roots as a division of the Virginia Polytechnic Institute in the 1930s, the College has grown into a hub of multidisciplinary excellence. Its research breakthroughs in modeling and simulation, bioelectrics, machine vision and system of systems engineering have earned acclaim for Old Dominion University, not only in Virginia, but worldwide.

Named for the first Rector of Old Dominion University's Board of Visitors, Frank Batten, the College has graduates spanning the globe, making their mark in countless ways, as entrepreneurs, with Fortune 500 firms, as captains of nuclear submarines, and in a myriad of government agencies and non-profits.

In my nearly 20 years at Old Dominion University, I've seen the ingenuity and passion of Batten College engineers on display almost every day. Initiatives like the Mid-Atlantic Regional Spaceport, ODU Business Gateway, and the Virginia Modeling, Analysis and Simulation Center contribute greatly to the economy of Hampton Roads and the Commonwealth of Virginia.

Three Old Dominion engineering faculty have been recognized by the State Council for Higher Education in Virginia with outstanding faculty awards: Sushil Chaturvedi, Gregory Selby and Bill Stanley.

The accomplishments of our engineering students are numerous as well, including environmental engineering student Samantha Salvia being named Old Dominion University's first (and still only) Rhodes Scholar in 1996. W. Channing Blackwell, a 1999 civil engineering graduate, became the first undergraduate student in Virginia history to earn a U.S. patent.

And momentum continues to build. The new home of engineering at Old Dominion, the Systems Research and Academics Building, will open in 2014. Located between Kaufman Hall and Perry Library, it will house a state-of-the-art clean room, lasers lab, plasma science lab, dynamic environment simulation lab, as well as four large student projects studios. I'm confident it will be the site of many discoveries.

To Dean Oktay Baysal and the entire faculty, staff and student body of the Old Dominion University Batten College of Engineering and Technology, congratulations. I look forward to the exciting discoveries of the next 50 years.

Sincerely,

John R. Broderick

President, Old Dominion University

Congratulations
to the
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College of
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for 50 years of
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and award-winning
scholarship.

Since its inaugural class of 12 students, the College can now boast more than 3,200 students currently enrolled, more than 14,000 alumni living worldwide, and it confers about 600 degrees every year. We are proud of our modest beginnings and those milestones that have led this great College to what it is today.

In our first 50 years, we have been advancing engineering and technology for the community, region, and the world. As the Frank Batten College of Engineering and Technology at Old Dominion University celebrates its 50th anniversary year, I would like to take a brief look back, specifically through the lens of the firsts we introduced, those milestones that have brought the college to be the powerhouse that I am fortunate to lead today.

The College was the first at Old Dominion University to offer a Ph.D. program, and it produced its first Ph.D. graduate. The College developed ODU's first International Collaborative Graduate programs, with 50 alumni to date.

We were the first College at Old Dominion to begin offering graduate classes via televised distance learning, the first to offer courses at the Peninsula Graduate Engineering Center, now simply the Peninsula Center for Higher Education, and we developed the first asynchronous distance-delivered degree program of ODU – Master of Engineering Management CD-ROM program.

In the state, Old Dominion was the first university to offer engineering management and engineering technology degree programs, and departments. In the nation, ODU established the first modeling, simulation and visualization engineering department, and its first-ever Ph.D. graduate in modeling and simulation.

Our close collaboration with the NASA Langley Research Center aided in the transformation of ODU engineering to become a research-intensive university, producing hundreds of graduate students and degrees, and tens of millions of dollars of funding for groundbreaking research.

Through the formation of very successful enterprise centers, ODU Engineering helped transform the University to a research-and outreach-intensive focus. Centers such as the Virginia Modeling, Analysis and Simulation Center in Suffolk, the Applied Research Center in Newport News, and the Frank Reidy Center for Bioelectrics, Mid-Atlantic Regional Spaceport, and Business Gateway in our Research Park, have each made a tangible contribution to advancing the University's goals.



Since its inaugural class of 12 students, the College can now boast more than 3,200 students currently enrolled, more than 14,000 alumni living worldwide, and it confers about 600 degrees every year. We are proud of our modest beginnings and those milestones that have led this great College to what it is today. That is why I look to the history of ODU Engineering as my guiding light each day I serve this remarkable school as its dean. Here's to many more trailblazing years of ODU's Batten College of Engineering!

With my best wishes,

Oktay Baysal

Dean, The Frank Batten College of Engineering and Technology

Breaking Ground

Paving the Way for the State's Most Advanced University Engineering Building



ODU President John R. Broderick, engineering student Brittany Gesner, Batten College Dean Oktay Baysal, Board of Visitors student representative and engineering student Kevin Muchiri, and Virginia Delegate John A. Cosgrove turn earth at the groundbreaking for the new Systems Research and Academic Building.



A contingency plan for the rain was prepared, but it couldn't possibly have been less necessary.

Instead, the large, enthusiastic crowd that gathered in a fenced-off former parking lot between the Kaufman Engineering Building and Perry Library on the Old Dominion University campus would have been well served to smear healthy doses of sunscreen.

Almost the entire faculty and staff of the Frank Batten College of Engineering and Technology, along with University President John R. Broderick, Provost Carol Simpson, local dignitaries and even long-retired faculty members gathered in the sun-drenched space to celebrate the Batten College of Engineering and Technology's future.

The occasion was the October 5, 2012 groundbreaking for the new 50,500-square-foot Engineering Systems Building, also marking the official kick-off of the College of Engineering's 50th anniversary celebration. Only steps from Kaufman Hall, the new building is scheduled for completion in spring of 2014, and will feature a state-of-the-art clean room, a lasers lab, a plasma science lab and a dynamic environment simulation lab, as well as four large student project studios.

President Broderick, in his remarks, stressed the new engineering building will be tangible proof of Old Dominion's commitment to graduating students in the vital STEM-H fields of science, technology, engineering, math and health sciences.

Speaking on behalf of the engineering faculty, Batten Endowed Chair in Biomedical Engineering Stephen Knisley, professor of mechanical and aerospace engineering, echoed how moving from 47-year-old Kaufman Hall to the state's most advanced university engineering building will be a distinction for Old Dominion.

Knisley said he hoped to see students "making a difference" with the projects they tackle in the new building, such as the new volunteer partnership in which Old Dominion's engineering students test medical equipment for the non-profit advocacy group Physicians for Peace.

Dean Oktay Baysal, who led the celebration, referenced the College's many accomplishments, from breakthroughs in bio-engineering and modeling and simulation, to the grant-funded research of faculty in every engineering discipline, to the successes of Old Dominion graduates in the workforce and in other academic programs. Baysal said the new building will "offer new opportunities for student learning and faculty research while working toward the vision of becoming a world-class engineering college connecting knowledge, practice and research."



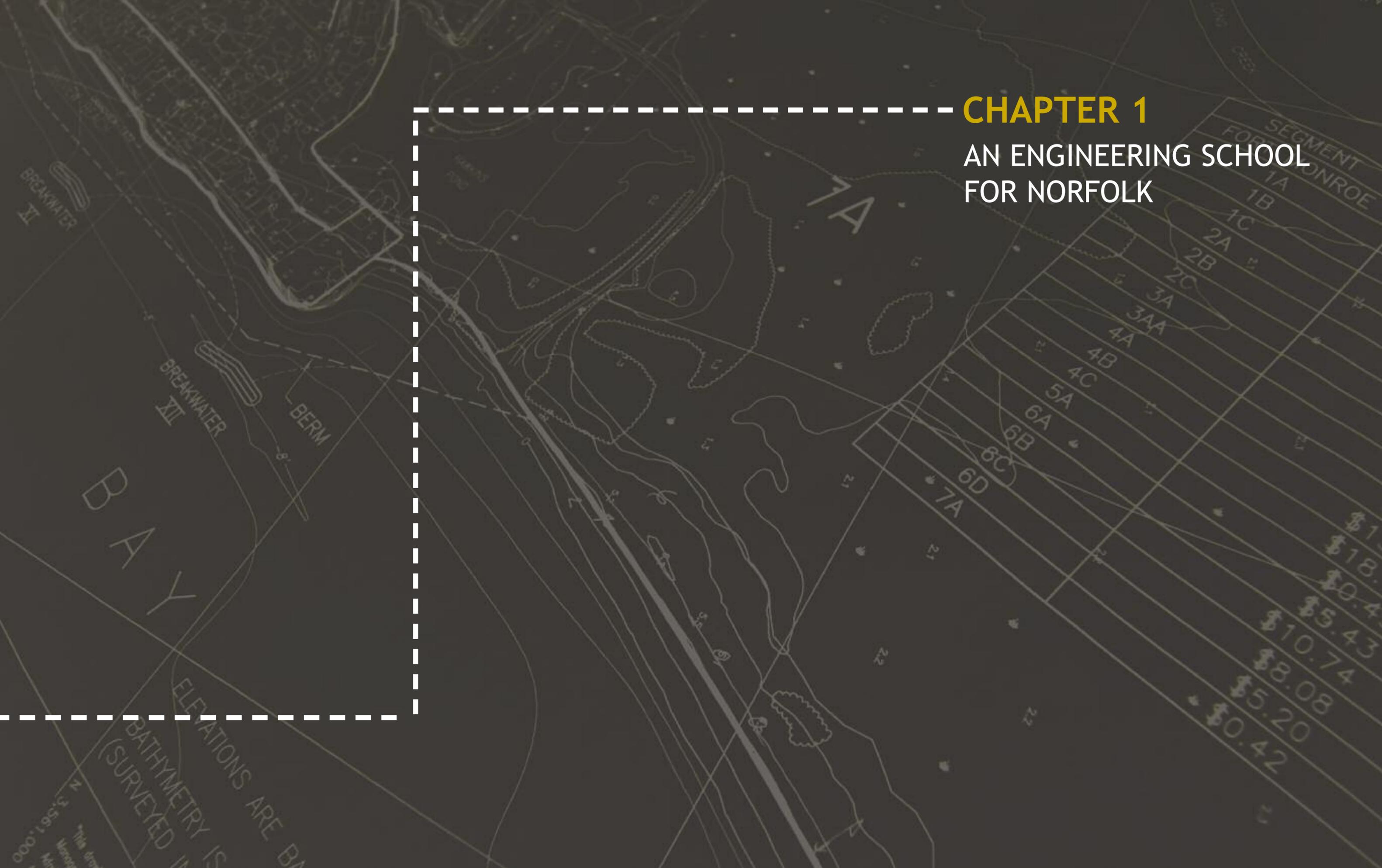
The entire day spoke about the future, but John Weese, who served as dean of the College of Engineering from 1974 to 1982, couldn't help but think about the past. Despite leaving Old Dominion University in 1983 to become director of the mechanical engineering and mechanics division of the National Science Foundation, Weese has kept in close contact with the school. He still serves on the ODU Engineering advisory board. He and his wife, Betty, had traveled from Annapolis, Maryland to attend the groundbreaking ceremony.

Looking around at the bustling event – the construction kick-off for a state-of-the-art engineering building – Weese was decidedly reflective. "It really is amazing how far this school has come," he said. "You feel very good about things like that. It's very satisfying to go back and take a look at it."



CHAPTER 1

AN ENGINEERING SCHOOL FOR NORFOLK



AN ENGINEERING SCHOOL FOR NORFOLK

Old Dominion University's School of Engineering was founded on July 1, 1962. But the roots of engineering on the Norfolk campus stretch back three decades earlier.

In 1930, five years after the idea was first proposed, the College of William and Mary established its Norfolk Division, using the old Larchmont School on Hampton Boulevard to teach college classes in Norfolk. At the time, Norfolk was the largest English-speaking city in the world without an institution of higher learning. The Great Depression had set in worldwide, and southeastern Virginia was hard hit. The new school, however, attracted students right away, due in no small part to the fact Norfolk residents could no longer afford to travel to attend post-secondary school.

The following year, an agreement was struck between William and Mary President J. A. C. Chandler and Julian A. Burruss, president of Virginia Polytechnic Institute (now Virginia Tech) to offer the first two years of its standard engineering program through cooperative education in Norfolk. A member of the VPI faculty, W. Forrest Harrington, was dispatched to Norfolk to found and supervise the program.

Below: Classes at the Norfolk Division of the College of William and Mary-VPI were held in the old Larchmont Elementary School building in Norfolk.

Opposite: VPI student body, 1935, in front of the old Larchmont School.



E. B. Norris, VPI's dean of engineering, said that the program would allow the school to bring its strengths in technical education "directly to the people in this area who are unable to go away for a four-year college training." Because the College of William and Mary's curriculum did not include engineering education, it was a good match, and engineering classes began in the old Larchmont School in the fall semester of 1931.

Among the first faculty members hired was Lewis W. Webb Jr., who would go on to be president of the school from 1946 to 1969. In a series of interviews with historian and Old Dominion University Archivist James Sweeney, Webb described his journey back to his hometown school in the summer of 1932:

"I'm a native of Norfolk, and my first interest was in engineering, as my father was an electrical engineer, and I guess I absorbed a great deal of his interest in things. And so, I elected to go to the Virginia Polytechnic Institute. This was back in the days just prior to the depression. I graduated with a bachelor's degree in 1931.

"In 1931, there were no job openings for electrical engineers...or any engineer. And so, I decided to go back to graduate school. After getting my master's degree, I still didn't have any job and was ready to leave the VPI campus when the dean of engineering called me and asked me if I wanted a job. I said, very positively, I'd take it. He said,

"After getting my master's degree, I...was ready to leave the VPI campus when the dean of engineering called me and asked me if I wanted a job. I said, very positively, I'd take it. He said, 'But you don't know what it is,' and I said, 'That doesn't make any difference; I'll take the job.'" - Lewis W. Webb Jr.



Studying in Tidewater

as Students of the Virginia Polytechnic Institute

In the 1931-32 Bulletin of the Norfolk Division of the College of William and Mary, readers learned of a first-time partnership between William and Mary and Virginia Polytechnic Institute to provide engineering instruction in the Norfolk area.

"The Virginia Polytechnic Institute," the Bulletin announced, "through a cooperative arrangement with the Norfolk Division of the College of William and Mary, is offering to the young men of Tidewater, Virginia the first two years of its standard engineering courses. This plan makes it possible for students of the Norfolk community to take their first two years' work in the VPI engineering courses at home and to carry a program which, if satisfactorily

completed, will ensure admission to the junior class of the VPI, or of other standard engineering schools, with full credit."

The students who enroll for the engineering courses are carried on the rolls as students of the Virginia Polytechnic Institute.

In case there were worries about Norfolk engineering students receiving an inferior engineering education, the Bulletin continued: "The technical courses in engineering are taught by regular members of the Virginia Polytechnic Institute faculty, who have been assigned to teach this work in the Norfolk Division. The students who enroll for the engineering courses are carried on the rolls as students of the Virginia Polytechnic Institute."



Left: December 1960 pre-registration for engineers. Students (from left): Bobby Nelson, Gary Smyle and Allan Kjeldsen, with Edward L. White of the engineering department.

Opposite: During the first year of instruction, 10 faculty members taught engineering to 200 students in the former Larchmont Elementary School.

'But you don't know what it is,' and I said, 'That doesn't make any difference; I'll take the job.' He said to report tomorrow morning to Norfolk."

Webb joined the faculty in 1932, along with Edward White, his roommate at VPI. They teamed up with Harrington, and helped broaden the course offerings to include survey engineering and applied mathematics.

Webb said the value of the program was reinforced regularly in the financial struggles faced by the students' families. It was truly a terrible time for families all across America.

"We came and started the summer program in June of 1932," said Webb. "It was a dismal year for most people, as jobs were practically unattainable, and this little Division, which was being formed in Norfolk, survived simply because people didn't have enough money to send their children to VPI or send them to William and Mary."

A student could study at the Norfolk Division for \$90 per year. "So, if the parents could afford to

keep him fed, they could send their child to college, whereas they couldn't afford to send him to William and Mary or VPI and pay their room and board along with the tuition," Webb said.

Edward White's background was similar to that of his colleague Webb in that he was born and reared in Norfolk, and attended engineering school at VPI. White majored in electrical engineering.

Graduating with a bachelor of science in 1931, White faced the same economic realities of many others enduring the Depression, so he went back to VPI as a student assistant in the physics department, earning his master of science in electrical engineering.

With a job lined up in Norfolk with the Carry Engineering Company, White was excited to leave the academic world for work as an air conditioning field engineer. But only days before his job was to begin, White was informed by Dean Norris at VPI that his employment contract was being rescinded. In an interview with University Archivist Sweeney, White explained what happened next:





“The Dean explained that he had something in our back yard that might entertain us until things got better. And what I was saying also goes true for Lewis Webb – of course, he and I were college mates together. And so he said, until things got better, why not try teaching?”

So Edward White became an engineering faculty member in 1932, and “trying teaching” worked out pretty well. His interview with Sweeney was conducted in 1974, following White’s retirement from Old Dominion, where he taught for 42 years.

Throughout the 1930s, the Norfolk Division grew gradually. Money was exceedingly hard to find, as the Great Depression affected institutions of higher learning as hard as individuals.

The Norfolk Division’s entire teaching staff – and all of its classes – were housed in the old Larchmont Elementary School. Professors’ offices were constructed from former cloak rooms. According to Lewis Webb, it was hardly plush. But he said that closeness also created a feeling of

esprit de corps among the small staff.

“It was quite cozy, and everyone knew each other,” Webb said. “In the beginning, when I first came, there were 10 faculty members, about 200 students. Some of the faculty members were commuting from William and Mary, and so they were part time; I think we had six full-time and four part-time faculty members. We were assigned to teach most anything that came up.”

Despite the school’s modest scope, Webb said the Norfolk Division attracted good students right away. These were students who would have gone away to study at university, but whose plans were altered by the Depression.

“Those students were very good students, and I see them from time to time now. They are top engineers in the city, in the state, and in the country,” he said.

George Webb, Lewis Webb’s son, would go on to his own 40-plus-year career as a professor, at Tulane University in New Orleans, and at Christopher Newport University in Newport

News, Virginia. George Webb said that his father possessed an abiding desire to help better the lives of his fellow citizens.

“He really, very early on, got this burning drive to build something [in Norfolk] for people who were not privileged to be able to go to William and Mary, or go away to school,” George Webb said.

“Because he was an engineer, he had this visual way of dealing with things. He would take Styrofoam and cut out these little blocks to be dormitories. ... There are some pictures of him with these things he made at home that he brought to community clubs and to the state legislature, showing his vision of where the Division ought to go.

“We saw a lot of activity, and that became the life of the family. It was like a family business, and we all did things, including his parents and my mom’s parents. Everybody sort of pitched in.”

The Norfolk Division began to offer evening classes in 1935, to educate students who couldn’t afford to leave whatever employment they had secured in order to attend school full time. That year also saw the first construction on campus specific to the Norfolk Division – physical growth that was helped considerably by an alliance with the City of Norfolk.

With nearly 500 students enrolled, the Norfolk Division had outgrown the former Larchmont School. William and Mary President Chandler put forth an ambitious proposal for a classroom building and gymnasium, as well as a stadium.

The stadium, which still stands as S. B. Ballard Stadium at Foreman Field, was unimaginably large for such a small college division. It was funded by applications to various Depression-era government agencies and completed in partnership with the City of Norfolk, which was ineligible for such program funding.

After the initial stadium project was rejected, the school reapplied under the Virginia Emergency Relief Association and the federal Works Progress Administration, pledging to turn five acres of property deeded by the City of Norfolk to the College. The project was approved June 18, 1935, for a stadium that seated 17,500, more than 20 times the enrollment of the Norfolk Division at the time.

By the end of the decade, the Norfolk Division of the College of William and Mary-VPI had a faculty of 24, teaching a student body of 522. But growth in engineering education at the Norfolk Division was about to explode.

WORLD WAR II CONTRIBUTES TO GROWTH

In September 1939, Nazi Germany invaded Poland, beginning the Second World War. Despite friendly relations with Great Britain and

The Norfolk Division attracted good students right away. These were students who would have gone away to study at university, but whose plans were altered by the Depression.

“Those students were very good students, and I see them from time to time now. They are top engineers in the city, in the state, and in the country.”

– Lewis W. Webb Jr.

Opposite: Starting with the creation of an Aircraft Instruments Institute in 1938, the Norfolk Division contributed strongly to America’s war effort. A pilot training program was added in 1940, also before America’s entry into World War II.

War College

The Norfolk Division Leads the Fight at Home

For a few years in the 1940s, the Norfolk Division of Virginia Polytechnic Institute had the most engineering students of any school on the East Coast. This was thanks to a forward-thinking decision by Division leaders and the military to invest in war preparedness well before the United States officially entered the war.

The initial spark was a Civilian Pilot Training Program created in October 1939 by the Civil Aviation Authority, using instructors from Naval Air Station Norfolk. War was already under way in Europe and Asia, and though the United States wouldn't enter the war until December 1941, faculty member W. Forrest Harrington, coordinator of the VPI program in Norfolk, enlisted as a Navy cryptographer.

The Civilian Pilot Training Program, part of America's national defense plan, offered four full college credits for aeronautics students who had at least two years of college credits.

The program, open to American citizens between the ages of 19 and 26 who met the physical strength requirements, graduated its first class of licensed pilots in May 1940.

The fact that women were eligible to be equal participants in the program proved irresistible to local media.

"Pretty, blonde Sarah Frances Potts, 19-year-old student of the Norfolk Division, College of William and Mary, VPI, has learned to fly an airplane even before knowing how to operate an automobile," The Virginian-Pilot newspaper reported. "The comely young aviatrix, who has yet to drive an automobile, completed her first solo flight at the Norfolk Municipal Airport a few days ago."

"She is one of a group of 10 Norfolk Division students who are learning to fly at the Norfolk Aviation School under the Civilian Pilot Training Program sponsored by the Civil Aeronautics Authority."

As the American entry into the Second World War grew closer, the federal Department of Education set up its Engineering Defense Training Program, a series of courses conducted by select schools of engineering throughout the United States. The Norfolk Division program was accepted because it was part of VPI.

Under the headline "Defense Courses," the Norfolk News-Index reported on February 6, 1941 that the new

Lewis Webb's son George said he remembers an aunt working on the skeleton of a Piper Cub aircraft under the bleachers of Foreman Field.



During World War II, more engineering students attended the Norfolk Division of Virginia Polytechnic Institute than any other school on the East Coast, thanks to the Engineering War Training Program. Students studied welding and sheet metal layout, aviation principles (left and opposite top), and offered women an equal opportunity to tackle the important work (opposite bottom).

night courses were being offered for free at the Norfolk Division of VPI, funded by a federal grant.

Up to 300 workers would receive education in the following skilled trades: surveying and topographic mapping; engineering principles of aircraft; explosives production and inspection; application of aircraft carburetion; aircraft accessories; welding aviation materials; application of aircraft power plants; sheet metal layout for aircraft production; electroplating for aviation; and heat treatment of materials.

Clearly, this was a college preparing for war. Lewis Webb was thinking of keeping his faculty working.

"In order to keep the faculty busy, we started a war-training program," Webb told James Sweeney. "It was called an engineering defense training program to start with. In fact, the first courses that were taught on a vocational level were taught in the physics department."

Immediately following the attack on Pearl Harbor, the Engineering Defense Training Program changed its name to the Engineering War Training Program. The Norfolk Division was divided into a day college and an evening college, allowing it to offer both war training and vocational courses. As the global conflict dragged on, more students signed up for war training, and fewer for the vocational courses.

The courses were a change because they offered women an equal opportunity to tackle the challenging work. And they occupied whatever space on campus could be made available. Lewis Webb's son George said he remembers an aunt working on the skeleton of a Piper Cub aircraft under the bleachers of Foreman Field, learning aviation concepts.

Webb told Sweeney that the War Training Program gave faculty who were qualified an opportunity to keep



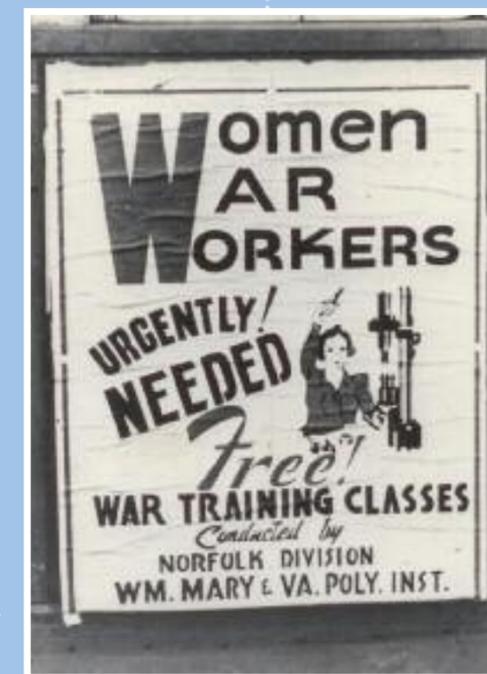
working. "And from that, it developed into engineering science management war training after the war started. This area, this program that we had, was the largest area on the East Coast – the greatest number of students along the East Coast, taking these programs. We had several thousand when it was at its peak. But the main purpose was to keep your faculty busy and also to serve the defense and war needs of the community."

Engineering professor Edward White said it was quite an effort. He said that they taught classes day and evening, placing an added burden on the Division's meager support staff, as well as its faculty.

The war ended with two major impacts to the Norfolk Division. The applied education offered at the war college ended up being rolled into what would become the Technical Institute. It would coexist with the engineering school across the street before merging with Old Dominion's School of Engineering more than two decades later.

As well, the veterans that returned from the Second World War were serious-minded and

determined, and they were adamant that the Norfolk Division achieve its independence from William and Mary, and attain its status as a four-year college.





Canada, which had both declared war on Nazi Germany, the United States maintained the isolationist policies that it had adopted following the First World War.

However, as the United States ramped up its effort to help supply Great Britain with war provisions, and possibly enter the war itself, the Norfolk Division's proximity to Naval Station Norfolk, Langley Field and other military installations soon made it a hub of activity.

The Norfolk Division had already established an Aircraft Instruments Institute in 1938, to teach students to overhaul and repair aircraft. A month after England and her allies went to war against Germany, the Civil Aviation Authority created a pilot training program for civilians through the Division, tapping into Norfolk Naval Air Station's pool of experienced pilots as flight instructors.

The first students completed the course in May 1940, becoming full-fledged pilots. A. Lee Smith, professor and advisor to the Division's Aeronautics Club, provided instruction to the students in meteorology and navigation. By December of that year, nine graduates of the program had joined the U.S. Army Air Corps, and another nine had enlisted with the U.S. Navy. Lee himself would leave the Division in 1943 to enlist in the Navy for the war effort.

Efforts accelerated in early 1941, when the U.S. Office of Education selected the Norfolk Division as one of a handful of colleges to teach Engineering Defense Training. The program taught civilians a series of intensive engineering-related, college-grade courses, such as principles of aviation, sheet metal layout for aircraft production, and heat treatment of metals.



Above: A glimpse into ODU engineering classes of the 1940s.

Right: A spring 1943 engineering drawing class at the Norfolk Division. As it was held during the Second World War, the class was almost exclusively women.

Opposite: Professor Yates Stirling (with glasses, in all three photos) instructs engineering students in mathematical applications, field surveying and laboratory analysis.

After the attack on Pearl Harbor, the Defense Training Program became the War Training Program. The program was split into traditional vocational engineering studies, and the war-training courses, which proved much more popular. The demand for training placed such a strain on the campus that makeshift laboratories were set up in buildings all around campus, including the football stadium. Lewis Webb said that by the end of the war, more than 5,000 individuals had received technical instruction at the Norfolk Division, a number greater than that of any other East Coast school.

"The attempt to get more of the women to take part in the activities of the Naval Operating Base and the Naval Air Station and the Norfolk Naval Shipyard and other defense industries was made very strongly," Webb said, "and we did have a number of women that took courses, even such courses as aircraft welding, aircraft instruments, many in drafting and photographic mapping."

Enrollment in the Division swelled after the war, owing to an influx of returning veterans. That was a problem when it came to housing everyone. In response, Lewis Webb, who was appointed director of the Norfolk Division of the College of William and Mary-VPI in 1946, continued to build.

"His job was to find little pieces of stuff that could be used to help faculty members at an underdog school produce at a level that the Virginia Techs and William and Marys could produce at naturally," George Webb said.

"He would, for example, go to Navy surplus sales and buy buildings. He bought these little one-story buildings that were military surplus





Above: Electronics instruction at the technical institute. Opposite: Promotional images for the technical institute in 1948.

and he put them up on campus so they could [conduct] classes,” George Webb explained. “He was an engineer in the way he managed the university, taking the pieces and putting it together.”

Yates Stirling came to the Norfolk Division as a faculty member in 1946, after retiring as a Navy aviator. He said the facilities on campus were enough to get by – barely.

“They were, you might say, adequate for the moment,” Stirling told James Sweeney in 1975. “But nothing fancy at all. We were able to follow through on carrying out the curriculums which had been outlined for us, but there were no frills at all. It was very fundamental.”

Unfortunately, there weren’t enough resources on campus for Stirling himself, when the school couldn’t pay him a salary. He left the Norfolk Division in 1951 to teach at Norfolk Collegiate.

“We ran out of students and I was low man on the totem pole. And so Lewis Webb at that time said he was very sorry but he couldn’t renew my contract. ...he would be very glad to see me again

when he got some more students,” Stirling said. He returned to campus two years later.

The students who came to the campus after the war also demonstrated a spurt in maturity, developed during the war effort.

“In a way they were more serious minded than the pre-war students,” said Lewis Webb. “We’ve had good students all along. But these students that came back definitely had a more serious objective and it reflected all the way back to a high school group as well... They were both put in the same classrooms, and the [recently graduated] high school students were suddenly faced with a quicker maturity and producing to stay in pace with the veterans. The veterans definitely had a very good influence on our academic side of the institution.”

After the war, the hands-on skills taught formerly in the War Training Program were relocated to the Norfolk Division of William and Mary Technical Institute. Led by Lee Klinefelter, who was an instructor in the War Training

Program, the Institute initially consisted of shops under the grandstands at Foreman Field.

“We were overrun with veterans. We had lots of them. We had all we could handle and more, too. We set up what we thought were very practical programs,” Klinefelter told University Archivist James Sweeney.

Through their determination and achievement, the focused students helped the inexorable push of the Norfolk Division toward accreditation as a degree-granting, four-year institution, as well as helping it to gain independence from the College of William and Mary and Virginia Polytechnic Institute.

In August 1953, the Norfolk Division’s Four-Year College Committee – comprised of Norfolk community leaders, many recruited by Lewis Webb himself – met with the College of

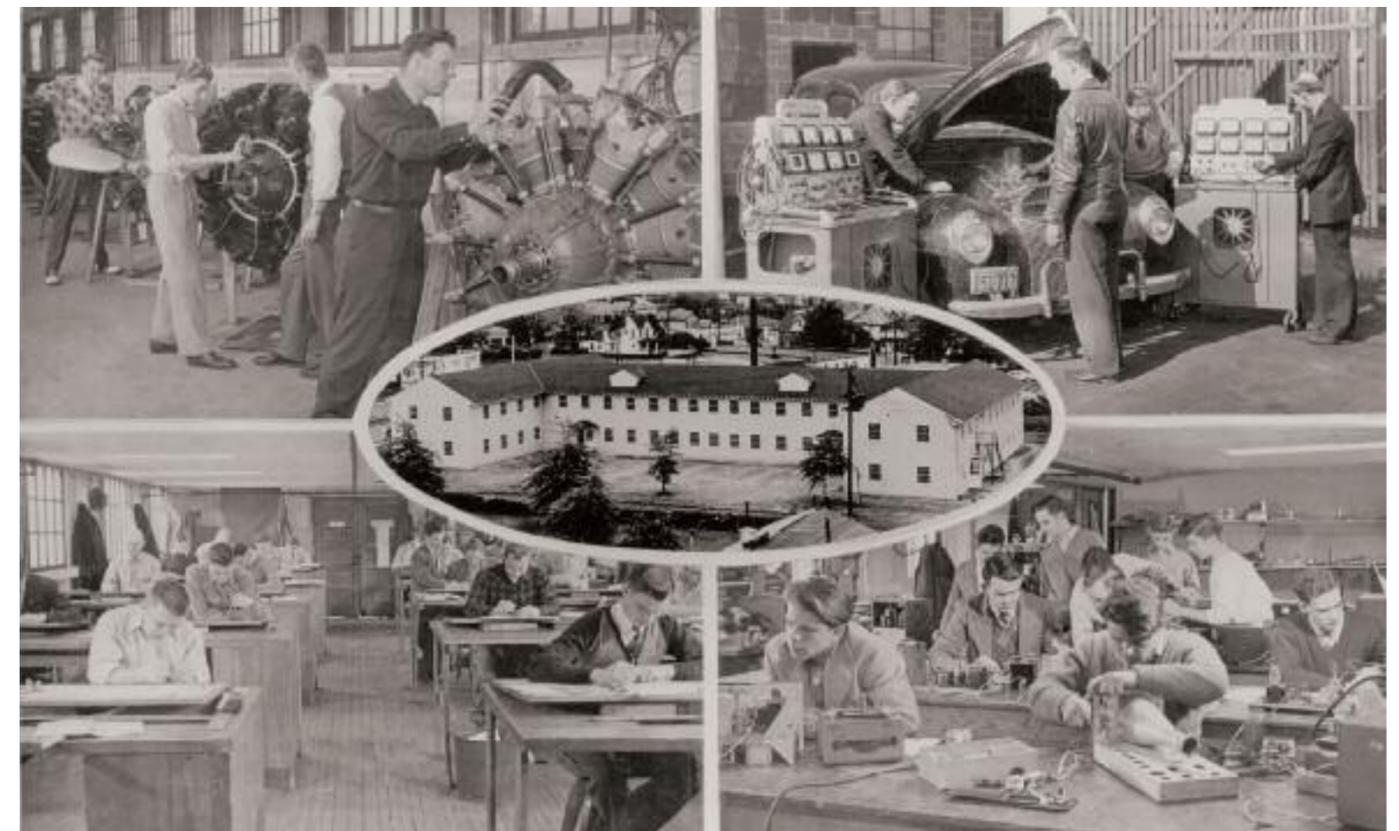
William and Mary’s Board of Visitors. Select programs began to be offered as a four-year option that same year. By 1960, the matter had been taken up by the Virginia General Assembly, with full independence granted in 1962.

A third engineering school in the Commonwealth of Virginia was another matter altogether.

Lewis Webb told the story to James Sweeney in 1974. In 1961 he had raised the subject of his desire for an engineering school in Hampton Roads, and the reaction couldn’t have been less enthusiastic from the University of Virginia and Virginia Polytechnic Institute.

“It was quite obvious that engineering training...should be done in a situation that was urban and engineering-oriented,” Webb told Sweeney.

After the war, the hands-on skills that students were learning at the War Training Program were taught at a new entity called the Norfolk Division of William and Mary Technical Institute.





Freshman engineering major David Braitsch was the first recipient of the Epes-Fitzgerald Paper Company, Inc. scholarship in 1963.

Lampe said he wanted to create a new breed of “scientist doer,” shaped in part by a specially designed senior-year course consisting of lectures, seminars and special projects on the problems of present-day American society.

“The objections, of course, came violently from the University of Virginia and VPI... Their argument was at that time [the Norfolk Division’s] applications for students in engineering were low and the University’s program in engineering was very small, and should have been phased out.”

His engineering rivals at the University of Virginia and VPI underestimated Lewis Webb.

Webb and his supporters from Hampton Roads engineering groups hammered away at the State Council of Higher Education, arguing that the issue of need for a four-year engineering school should at least be discussed. Under constant pressure, it agreed to appoint a panel comprised of the state’s two engineering deans and Webb, as a representative of the Norfolk Division.

Not liking his odds with that arrangement, Webb convinced the Council to invite three experts from out of state to sit on the committee. Deans of engineering schools at North Carolina State, Michigan State and Yale heard the Norfolk Division appeal.

Lewis Webb left nothing to chance. He arranged for a U.S. Navy helicopter to fly the committee members over Hampton Roads, pointing out by air vital industrial cogs such as Langley Field, the Newport News Shipyard and NASA, all located within a short drive of campus.

The committee met four times, concluding with the out-of-state members being convinced. Webb said Dean J. Harold Lampe of North Carolina State said to the group, “Why don’t we quit fooling around with this thing and go ahead and admit that there’s need for an engineering school here? It’s quite obvious.”

The final vote was four to two, with all three out-of-state committee members voting in favor of establishing a school of engineering at the Norfolk Division. In 1962, the Virginia General Assembly authorized the College to offer a bachelor of science in engineering degree, taught in Norfolk and awarded in Norfolk. The College’s formal relationship with Virginia Polytechnic Institute ended in September 1963.

As a final act, Webb convinced Lampe to delay his retirement plans and relocate to Norfolk, serving as the first dean of engineering at newly named Old Dominion College.

In a story in Norfolk’s *Virginian-Pilot* newspaper on January 20, 1963, the State Council of Higher Education Director William H. McFarlane praised the hire effusively. “Dr. Lampe is the kind of good fortune that befalls a college once in 10 years,” he said. “You don’t find men like that every day.”

Lampe told the newspaper of his intention to build a different type of engineering program at Old Dominion College, unlike existing programs at the University of Virginia and VPI.

“Traditional engineering programs are not meeting the demands of the individual. Nationwide, the number of freshmen enrolled in engineering decreased from 7,900 in 1957 to 6,800 in 1962,” Lampe said. “Young people are not challenged by the old, traditional concept.”

Lampe said he wanted to create a new breed of “scientist doer,” shaped in part by a specially designed senior-year course consisting of lectures, seminars and special projects on the problems of present-day American society.

Encouraged by the new building being constructed to house the engineering school, Lampe used his nationally known reputation to hire smart young faculty members from top engineering schools in the Southeast. There was an air of optimism around what was being built.

Clearly, the School of Engineering still had a long way to go. And precious little in the way of financial resources to help get it there.

Below: The faculty of the Engineering School of the Norfolk Division of the College of William and Mary in 1965.



“Dr. Lampe is the kind of good fortune that befalls a college once in 10 years. You don’t find men like that every day.”

– William H. McFarlane

Kaufman Hall

A New Building for an Engineering School

After laboring for years to educate its growing student population in any space that could be found, the engineering school's own building, Charles L. Kaufman Hall, opened in 1965.

Such an occasion merited a grand celebration, and Old Dominion College hosted one, spread over three days, April 29 through May 1, 1965.

The opening was treated as the true inauguration of engineering education at Old Dominion — at least the visible one — as laboratories in the new building would offer education in thermodynamics, mechanical properties and even the brand-new technology of computers.

The building opening featured the dedication of a statue on the front steps, "Free Form," by local sculptor Victor A. Pickett. "My dad loved that statue," George Webb recalled.

In his brief, understated remarks on the first night of dedication, Dean J. Harold Lampe said new materials, methods and frontiers would be dynamic factors in the world of engineering that lay ahead.

"It is undoubtedly true that engineering graduates of four or five years hence will be working on and responsible for the solution of new and complex problems of which we have little knowledge at this time," said Lampe.

That's why Old Dominion's emphasis on the "fundamental and basic" laws of a broad cross-section of engineering was important, Lampe said.

Virginia Governor Albertis S. Harrison Jr. also spoke on the first night of dedication. His remarks were anything but understated as he declared, "I truly believe the next century in America belongs to the South."

A lawyer from Southside, Virginia, Harrison had been pivotal in convincing Virginia's General Assembly to sever the ties between the College of William and Mary and what would become Old Dominion College. Harrison said in his speech that he had "no cause to regret that Bill of Divorcement!" He said Old Dominion College would offer a challenge to any other college or university in the state through its leadership.

"It has the advantage of being a downtown college, and across our nation the educational tides

are coming in for institutions with urban locations. I am told that more than half of America's total college enrollment is in institutions of this kind, if not always of this caliber," Harrison said.

"Old Dominion has the advantage of being located in Norfolk, a city in which there is no temporizing with the demands of progress, and where public support can make possible the creation of a college campus by

"Old Dominion College has done much to make my dreams come true that all young men and women get an education."

— Charles L. Kaufman



leveling block after block of sub-standard buildings."

Harrison told the crowd of civic leaders and College boosters that Old Dominion also had the "priceless advantage" of the citizens of Hampton Roads, who saw the potential of a four-year college in Norfolk, and worked to build it.

One such citizen, had his name placed on the outside of the \$580,000 building, despite humbly trying to refuse the honor.

Charles L. Kaufman, an attorney who came to Norfolk in 1919, was an ardent supporter of the humanitarian, civic and educational needs of his community. As chairman of the Norfolk Redevelopment and Housing Authority, he was instrumental in the action it took to allocate land to the College for the enlargement of its campus.

Governor Harrison paid tribute to the man for whom the building was named, saying: "Perhaps more than any other one man, Charles L. Kaufman, a decade ago persuaded the Board of Visitors of the College of William and Mary that Old Dominion must become a degree-granting college to fulfill its destiny and its obligation to Norfolk and to all of Tidewater. This Charles L. Kaufman Engineering Building launches a degree-granting program in Engineering."

In *The Virginian-Pilot* the next day, reporter John Moreau wrote that Kaufman recalled his modest back-

ground — he was from a large family in a small city with no college. He had long thought, and hoped, that everyone should have a chance at college. "Old Dominion College has done much to make my dreams come true that all young men and women get an education," Kaufman said.

On the second night of building dedication, Newman Hall of Washington, D.C., executive director of the Commission on Engineering Education, and S. E. Liles, president of Tidewater Construction Co., were the featured speakers, articulating their vision for the future of engineering in the United States.

For day three, Saturday, May 1, an open house at Kaufman Hall showed off the new building to parents, high school teachers, pupils and the public.

With an enrollment of 250, and the first class set for graduation in June of 1966, Lampe said Old Dominion College's School of Engineering benefited from strong full-time faculty, and was poised

to offer a stronger curriculum to its students in the near future.

"Outstanding engineers engaged in professional work in the area will serve as part-time teachers for some of the more specialized courses of an advanced nature," he said. "These men will bring to the students their own wealth of experience and knowledge within a particular specialty."



Opposite far left: Kaufman Hall takes shape in 1964.

Opposite: Virginia Governor Albertis S. Harrison Jr. (center) with Norfolk Division President Lewis W. Webb Jr. (right) and school benefactor Charles L. Kaufman at the Dedication of Kaufman Hall.

Above: Kaufman Hall's iconic sculpture "Free Form" by local artist Victor A. Pickett.

Right: When opened in 1965, Kaufman Hall was hailed as one of the most modern engineering buildings in the state.



J. Harold Lampe: The Pioneer

Helping a Fledgling Engineering School Take Flight

Truthfully, Old Dominion University should never have been able to attract a first engineering school dean the quality of J. Harold Lampe.

When Lampe came to Norfolk in 1962, the newly minted Old Dominion College was still instructing engineering students in any space on campus that could be found, including Navy surplus tar-paper shacks that Division Head Louis Webb had purchased for \$100 each. The new engineering building, Kaufman Hall, wouldn't open for another three years.

Lampe was nearing the end of an esteemed career, having spent the previous 17 years as dean of engineering at North Carolina State. The longest-tenured dean of engineering in NC State history, Lampe had led many advances during his time in Raleigh, developing courses in furniture manufacturing and other fields that served North Carolina's industrial needs. NC State built the country's first nuclear reactor on a university campus during his tenure, and Lampe was an important figure in the planning for what would become the state's Research Triangle Park.

His family had deep roots in that community: Lampe Drive near campus is named for him. Lampe and his wife did not want to relocate, but they were powerless to resist the

persuasive influence of President Lewis W. Webb.

"I...knew that he was within a very short time of retiring from NC State. I approached him and first he turned me down cold and said, no, he had no desire to do that and his wife, of course, objected, too," Webb told Old Dominion Archivist James Sweeney.

However, Webb's personal rapport with Lampe would eventually win the day. He had been one of three deans from out-of-state colleges selected to sit on a committee that would arbitrate the request for a degree-granting engineering school in Norfolk. After tense meetings, and despite strenuous objections from the University of Virginia and Virginia Polytechnic Institute, all three out-of-state deans had voted to create the new engineering school.

"It's hard to say exactly what happened, but clearly he and my dad got along really, really well. And he and Dean Lampe convinced enough people on the committee there was a need for an engineering school here," said Lewis Webb's son George.

Webb decided the new school needed a man of stature as its first dean, and there weren't many engineers held in the regard of J. Harold Lampe. Edward White, who at the time was acting as dean of engineering studies at the Norfolk Division, said: "Dean Lampe was known to

everyone in the country when he came to engineering at the Norfolk Division. And, of course, the timetable was such that he retired at NC State just at the time when we needed a new dean."

Lewis Webb's pitch appealed to the engineer in Lampe – build something here.

Webb said he told Lampe, "We needed someone badly to take hold and that we could not attract a very strong individual such as himself because the School of Engineering was not developed, was not accredited, and a great deal of work had to be done. There was no building to house it, very meager laboratories were available, and so it would be a job of building it from scratch."

He even used guilt to try to entice Lampe to come.

"I kept after him and pointed out to him that, although at 64 or 65, he was very strong, [and] active mentally and physically, that he couldn't possibly just retire and do nothing; and also that he would waste his talent by just taking odd jobs and consulting work...I think I really shamed him into taking this job."

Lampe finally agreed to retire from NC State and come to the school, organizing efforts to graduate its first

class. Though his stay was short, Lewis Webb said he and Lampe used the four years to design an engineering curriculum unique in the state.

"He and I worked daily on developing the curriculum which would not duplicate VPI's, which would not duplicate University of Virginia, and be of a different type," Webb said. "We visited a number of different engineering schools...I'd say we visited some 10 or 15 different schools and looked over their programs and talked to schools in large urban areas to see just how they were training their engineers. The results were the type of program...we developed and which I still feel is the effective way to educate engineers."

The new school needed a man of stature as its first dean, and there weren't many engineers held in the regard of J. Harold Lampe.

After overseeing the first class of graduates from the Old Dominion College School of Engineering, Lampe retired for the second time in 1966, but Edward White said he continued to provide advice and counsel to the engineering school that he helped build well into the 1970s.

J. Harold Lampe died in 1986, leaving a legacy here and at North Carolina State, where four generations of Lampes have made their mark.



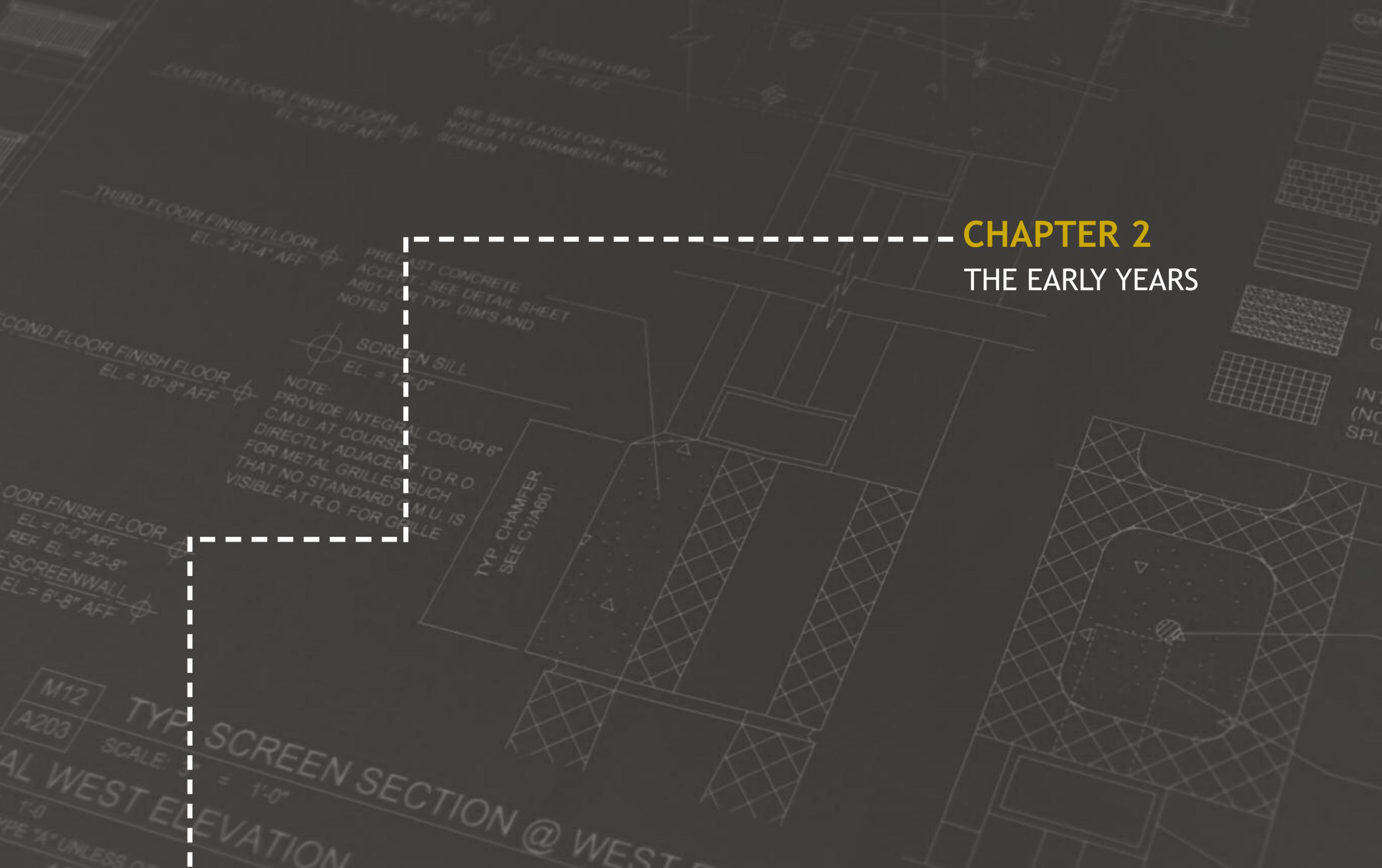
Opposite: Harold J. Lampe, the first dean of the School of Engineering, addresses a class of students.

Right: J. Harold Lampe and Walter Hixon Jr. of NASA survey plans for the new engineering building, to be named Kaufman Hall.



CHAPTER 2

THE EARLY YEARS



Old Dominion College President Lewis Webb and J. Harold Lampe, the man chosen to be the School of Engineering's first dean, had laid the groundwork for engineering to succeed in southeastern Virginia. However, the young, enthusiastic faculty who arrived to teach at this brand-new engineering school quickly realized the challenges.

"The idea of coming into a new academic program, a new engineering program, was appealing. But we were truly just beginning," said Sid Roberts, who was one of several faculty who followed Lampe from North Carolina State to Old Dominion. He arrived in 1965.

"Many of the buildings that currently exist did not exist then," said Bill Stanley, who joined the faculty a year later from South Carolina's Clemson University. "I didn't really think about [the modest state of the campus] a great deal. I came from a fairly modest background, so it didn't seem like that big of a deal."

Bob Ash arrived in 1967, and the professor and eminent scholar is still a full-time faculty member. He remembers being taller than the trees on Kaufman Mall. "It was a brand-new university, basically," said Ash. "The only engineering building was Kaufman Hall. When I first came here, there was no landscaping to speak of."

Below: Construction of Kaufman Mall, 1965.



And of course, money was tight. Despite becoming Old Dominion University in 1969, a nod to the fact that almost all of its programs now granted four-year, baccalaureate degrees, and that graduate programs had been introduced, Old Dominion's second president, James Bugg, wrestled with near-constant budget pressure for his young institution.

News stories at the time focused on state cutbacks to education, reductions that would only get worse in the first few years of the School of Engineering's history. By 1970, Old Dominion University Rector Frank Batten declared that the state government's drastic cuts to its budget request represented a "true and serious crisis for ODU." Then-Governor Linwood Holton, who Batten said was "sympathetic" to Old Dominion's concerns, still threatened to cut the university's operating budget funds from \$15.6 million to \$11.2 million, and its capital outlay requests from \$8.1 million to \$4.1 million.

Batten noted that the proposed budget would allow Old Dominion only \$709 per student from the state's general fund, compared with \$1,651 per student for the University of Virginia, and \$1,384 per student for the College of William and Mary. Successive Old Dominion presidents and University of Virginia Board of Visitors rectors have since made the argument nonstop for more than 40 years that the school is still underfunded, compared to other public university peers in the state.

Lampe had retired after the first class of four-year engineering students was graduated from Old Dominion, but before he left, he hired a stable of bright, ambitious, young faculty members, professors who were undaunted by the University's lack of resources.

Ash, one of the early hires, said after faculty members got over the initial shock of arriving at a school that was in such a beginning state, it ended up being an unexpected benefit. "I used to say we do things because that seems like the best way to do them, as opposed to that being the way we've always done them," he said. "That really does create an unusual paradigm."

When he retired, Lampe was succeeded by Ralph Rotty from Tulane University, who first came to President Lewis Webb's attention because of his son George.

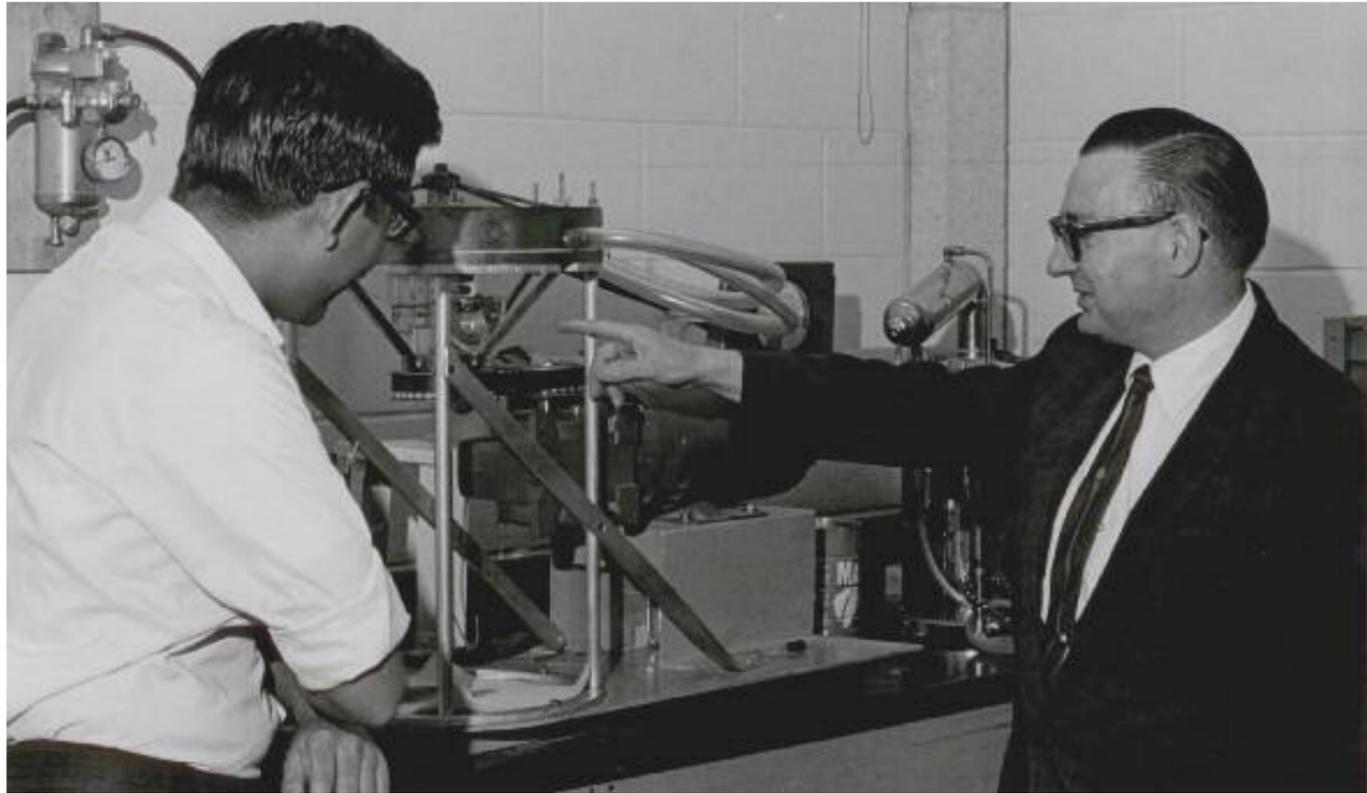
"He was my department chair at Tulane, and he was so terrific, I told my dad he had to look at him. So he came down to New Orleans and see me and the kids, and met Dr. Rotty," George Webb said. "To get somebody with Ralph's credentials to ODU, which was so new then, was tricky." But the persuasive skills of Lewis Webb won the day again, and Rotty decamped to Norfolk.

Rotty's academic credentials were undeniable. But from the beginning, George Webb said he struggled to fit in with the unique,



Ralph Rotty, the second Dean of Old Dominion University's School of Engineering

Bob Ash arrived in 1967, and the professor and eminent scholar is still part of the full-time faculty. He remembers being taller than the trees on Kaufman Mall.



Above: Professor Gene Goglia (right) was instrumental in creating the research partnership with the NASA Langley Research Center.

Professor Gene Goglia had started a soon-to-be lucrative pipeline to the NASA Langley Research Center in Hampton, Virginia.

collaborative tradition that was quickly evolving at Old Dominion. Professor Gene Goglia had started a soon-to-be lucrative pipeline to the NASA Langley Research Center in Hampton, Virginia. Other faculty members were teaching courses for the U.S. Navy and for Newport News Ship Building and Dry Dock Company, which was later sold to Northrop Grumman.

“Ralph had one difficulty, which was he really wanted to make ODU an engineering school more like Tulane,” Goglia said. “The task of sending his faculty all over the place to teach...always made him kind of uncomfortable. I think he would have been better if he had embraced that kind of model.”

Additionally, Rotty faced an unexpected obstacle in the leaders of the research specializations, who had all expected to get the dean’s job themselves. “You’re a brand new engineering school, and the way you get good people to come to your engineering school is you tell all the new department heads that they’re going to become the dean after you’re retired. That created some issues early on,” Ash said.

Despite this tension, there existed strong camaraderie among the people building the new engineering school. “Things were much more casual then,” Stanley said. “There were a lot of parties in my first couple of years there, and almost every faculty member in the engineering school went to almost every party.”

This small staff was also charged with building a new type of

Bob Ash

Longest-Tenured Engineering Faculty Member

When Bob Ash was completing his engineering studies at Tulane University in 1967, he looked for jobs across the United States. On his way back from a job interview in Philadelphia, Ash’s mentor, Ralph Rotty, convinced him to come for an interview at Old Dominion University, where Rotty was the dean of the School of Engineering.

“He said to me, ‘Why don’t you stay here a couple of years, and then go somewhere else?’” Ash recalled. “I said, ‘That sounds like a great idea.’ And here I am.”

Ash, professor and eminent scholar of mechanical and aerospace engineering, is now, in his 46th year, the longest-tenured faculty member in the Frank Batten College of Engineering and Technology. Twice he has left, for two years to a job at NASA’s Jet Propulsion Laboratory in Pasadena, California, and for another year as a research fellow at NASA Langley Research Center. Each time, Ash returned to the only university where he has ever worked.

“I love it here,” he said in a 2012 interview. “In fact, I’m doing some of the most exciting research I’ve done in my entire time at Old Dominion University. I’m feeling really good about where I am.”

Right away, Ash felt a kinship with the new engineering school he joined in 1967.

“The neat thing was that people who came here were really devoted to the programs they built,” he said. “Also, we did things because it seemed like the best way to do them, not because it was the way we had always done them. That was the advantage being in a new school.”

When Ash started in Norfolk, the school’s size ended up being an advantage as well. “We were so small – the engineering school was entirely in Kaufman Hall – that you really got to know faculty across the university,” he said. “We could do things

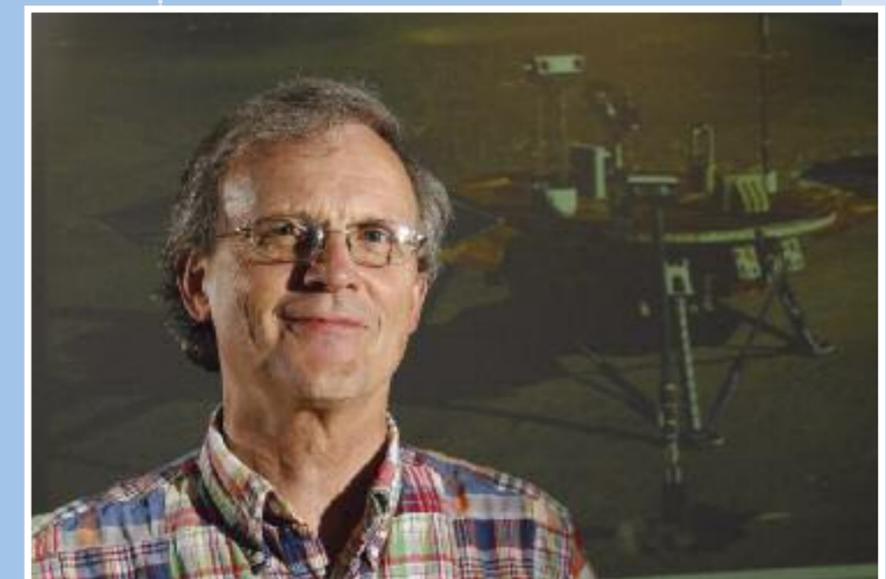
across disciplines without any trouble, because you knew everybody.”

Ash was also attracted to the type of students who wanted to study here. “We typically don’t attract kids who get into MIT,” he said. “But this much is still true: we attract kids who are very willing to work, and willing to do whatever you assign them to do.”

He still rides his bicycle to work. But Ash said the campus he rides to has undergone an incredible transformation, both academically and in terms of campus life.

“We’re a first-rate university, with virtually all the attributes of a first-rate university,” he remarked. “We have faculty who are toe-to-toe with anybody in the world. We have a vibrant student environment now. I used to ride my bike here on the weekends and there wouldn’t be anyone around. Now there’s always something happening here, whether it’s football or theater, or students in Kaufman Mall.”

“I love it here,” Ash said in a 2012 interview. “In fact, I’m doing some of the most exciting research I’ve done in my entire time at Old Dominion University. I’m feeling really good about where I am.”



Clarence Ray

A 40-Year Career Designing Power Plants

Clarence Ray grew up in Norfolk, and had the grades to go anywhere for school. But he stayed home, in part because his dad made him an offer he couldn't refuse.

"I would work in the summers and part-time on the weekend during the school year. If I paid for the first semester, my father would pay for the second semester. Tuition was only about \$600 then, but it was a lot of money for me," Ray laughed.

Graduating with a degree from Old Dominion in 1970, with a concentration in civil engineering, Ray has gone onto a more than 40-year career designing and building power plants, for Duke Power in North Carolina for 36 years, then the last six for The Shaw Group, Inc., a consulting firm based in Charlotte, North Carolina.

Ray and his wife, Sandy, were back at Old Dominion for Homecoming



Above: Officers of the first national society to be organized on campus, the student chapter of the American Society of Civil Engineers.

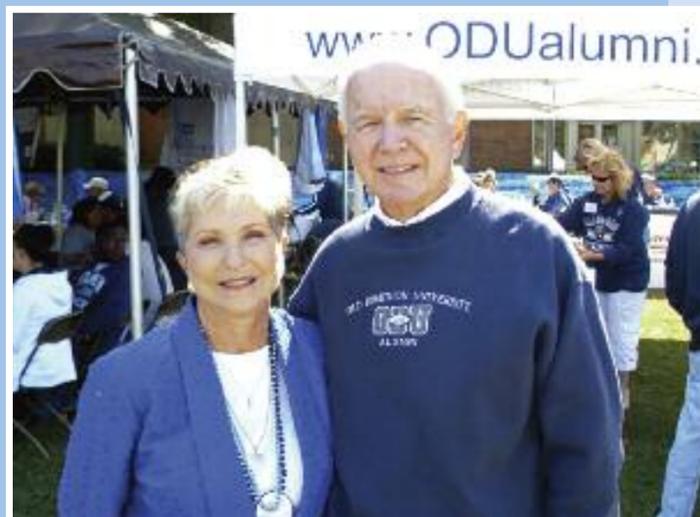
Right: Clarence Ray and his wife, Sandy, returned to the ODU campus for Homecoming in October 2012. While a student at ODU, Ray co-founded a campus chapter of the American Society of Civil Engineers.

"We had one computer on our whole campus, in the Kaufman building, and you'd be there late at night punching cards, making sure you didn't get them out of order."

2012, marveling at how much the campus has grown. "There sure is a lot more here than when I left," he said, "We had one computer on our whole campus, in the Kaufman building, and you'd be there late at night punching cards, making sure you didn't get them out of order." But even at that time, Ray said his classmates, mostly local students, were serious about their studies. "You could see the school getting a little better each year."

When he was a student, Ray and classmate Dennis Fallon – now dean of engineering at The Citadel – founded a student chapter of the American Society of Civil Engineers. Ray said many of his classmates have gone on to do very well in engineering fields, mostly in the Hampton Roads area, but also across the country.

During his Homecoming visit, Ray was excited to see how much the campus has changed since reinstatement of Old Dominion football, a sport that had been dropped from 1941 to 2009. It's changed his office culture, too. "I would hear colleagues talking about their football team and the big game that weekend and I always felt like I was missing out," Ray said. "But the guys I work with sure know about ODU football now."



engineering school. Part of the agreement that permitted the creation of an engineering school in Norfolk stipulated that Old Dominion wasn't allowed to stream its students into traditional engineering disciplines. "Lewis Webb had to agree that our program could not be similar, or even very competitive, with the existing programs in the state of Virginia," Roberts said.

What Webb and Lampe decided was to provide a general engineering education for a student's first two years, with students specializing in their upper-class years, but not into discrete departments. Roberts said it made for a challenging first few years, because the faculty had all come from institutions where rigid engineering tracks had existed for years.

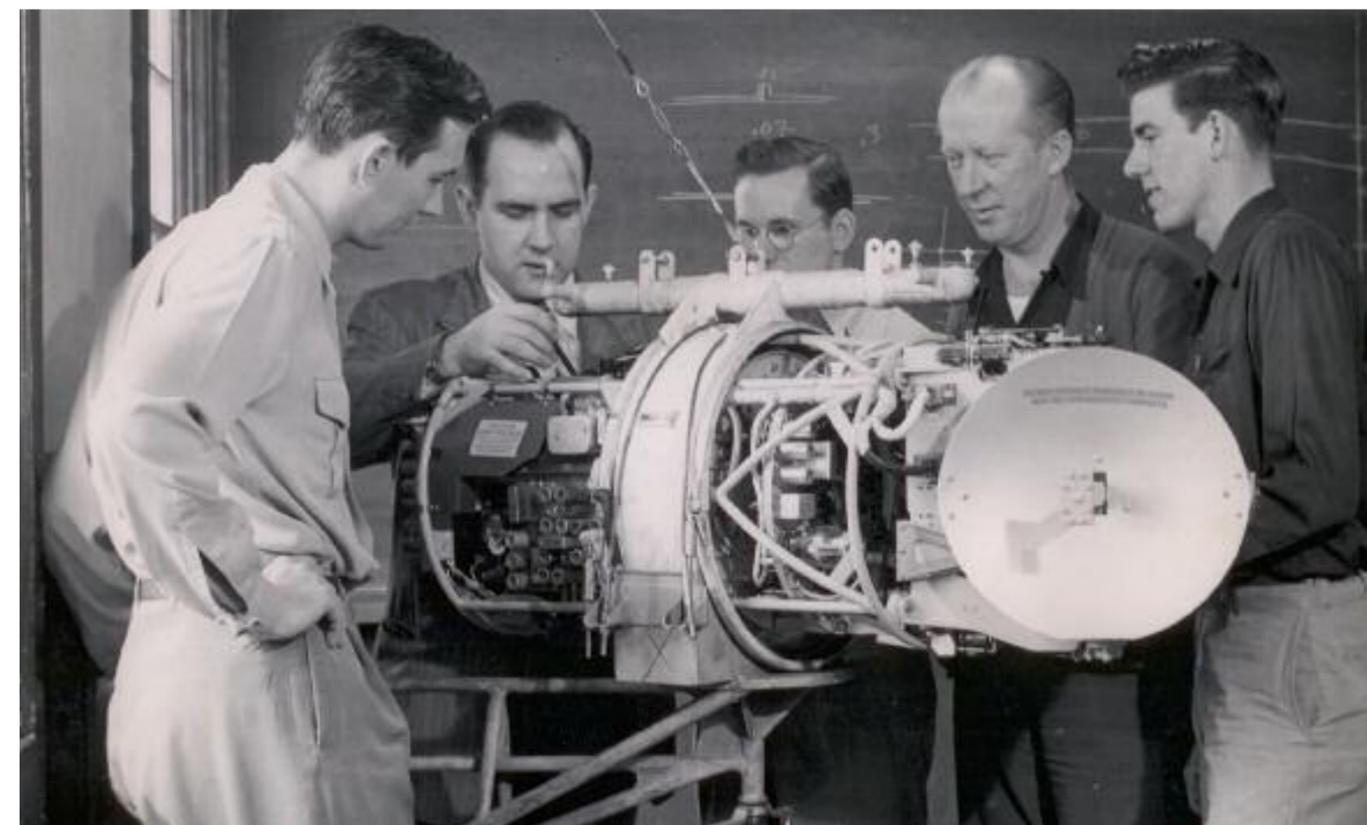
"We were housed there in Kaufman Hall, and we were plenty busy, trying to put together a new style of academic program. Not the conventional, traditional tracks of electrical, mechanical and civil," said Roberts, adding: "And that was part of the excitement, really. The fact of the matter is,

engineering is pretty much the same curriculum for the first two years."

Ash said it also allowed Old Dominion to branch out in terms of its expertise into different areas: "We had thermal engineering, administrative engineering, materials engineering. There were these non-traditional disciplines, which was very forward-thinking in my opinion. The people who came really were devoted to the departments that they built. That resulted in a really exciting department to be a part of."

Long-time faculty member Edward White said that there was one thing of which Rotty was fully supportive. "What Dean Rotty had in mind, I'm sure, was the fact that our engineers, regardless of what their specialty may turn out to be – civil, electrical, or mechanical – are going to receive good fundamental information in regard to across-the-board types of subjects that embrace all of our engineering," White told University Archivist James Sweeney in 1974.

Below: Electronics instruction at the Technical Institute.



Technical Institute

From HVAC to High Tech

Its history as part of higher education in Norfolk is proud and vital. But without a key partnership with the School of Engineering at Old Dominion University, the Technical Institute might have disappeared altogether.

Instead, its rich story has combined with that of the Frank Batten College of Engineering and Technology, creating the joint history that helps Old Dominion conduct engineering technology education better than that offered at just about any school in the country.

While still part of the Norfolk Division of the College of William and Mary, the Technical Institute existed

completely separately, academically. It had its own student records and its own humanities faculty. The technical skills taught to students, such as refrigeration and air conditioning, radio and television electronics, and automotive mechanics, grew out of the war-training programs offered on campus in the Second World War. Its first classrooms were located under the bleachers of Foreman Field.

The Technical Institute was formally established in 1945, and by 1962, had grown to offer three-year, associate-degree programs in three different disciplines. While Norfolk Division President Lewis Webb was still trying to convince the state to grant a new engineering school to Norfolk, the Technical Institute moved across the street from its humble beginnings and into a building on Hampton Boulevard in 1959, the shell of which is now occupied by ODU's College of Health Sciences.

The Ledger-Dispatch and Star, a former Norfolk newspaper, reported that the Technical Institute's new facility "promises to be a prime example of a school specifically designed for its function. Faculty members, expecting the building to be ready for Christmas, believe it to be the finest technical school in the vicinity, tailor-made to turn out technicians in specialized areas."

Edgar Kovner, who became director of the Technical Institute in 1959, remembered the tension that existed between the three-year associate-degree faculty and the faculty of the College as a whole. He told University Archivist James Sweeney in 1974, "They were not accepted. They were looked upon as a thing that shouldn't be there. As a matter of fact when the college eventually went up for four-year accreditation in 1961, they specifically excluded the technical program."

Top left: Faculty of the Technical Institute.

Bottom left: Electronics instruction at the Technical Institute.

Opposite left: Gary Crossman taught at the Technical Institute, then for more than 30 years in the College of Engineering.

Opposite right: Bill Stanley, professor of electrical engineering, who became chair of the engineering technology program.



Throughout the 1960s, attendance at the Technical Institute sagged. The rise of the community college system meant that aspiring television repairmen or air conditioning technologists could get an associate degree in two years – at a far lower price – than the three-year program offered by Old Dominion. Despite being the only institute of its kind in the state recognized by the accreditation organization that would become the Accreditation Board for Engineering and Technology, the Technical Institute saw its enrollment dwindle to only 60 students.

When the specter of closing the Technical Institute was raised, the School of Engineering's second dean, Ralph Rotty, decided to do something bold. He had been following the creation of four-year engineering technology degree programs at a few universities across the U.S., and he decided to roll the Technical Institute into the School of Engineering. Up to that point, engineering technology degrees were much like associate degrees. After the merger, Old Dominion ended up with the first university-level engineering technology program in the state, and one of the first in the country.

"I think Ralph Rotty, who was very clever, started studying these four-year programs, and decided [that an engineering technology program] might work," said Bill Stanley, then a young professor in electrical engineering. "And for whatever reason, he picked me to run it. In the fall of 1970, I moved my office across Hampton Boulevard to the old Technical Institute to become chair."

It turns out that Kovner had been in on the plan. Figuring his own dictatorial style wouldn't work well with the new partnership, Kovner had declined the offer to be chair. "So [President James Bugg] suggested Dr. Stanley," Kovner told Sweeney.

"He seemed like an ideal person, he also had a doctorate, which I didn't," Kovner explained. "He had some clout with the president to keep the program going, plus he had respectability in any field. Rotty sent him over and it was my job to con him or hoodwink him in any way I could to see him take the job. I'm happy to say I was able to fool him. He took the job, not knowing what he

was getting into and he has proved to be a gem."

Within the first year under Stanley's leadership, the new department became the first in the state to offer a four-year degree in engineering technology. And its enrollment increased five-fold in the first four years, "the largest enrollment increase in any department of the University," Stanley said.

Stanley had a foot in each camp, teaching in both engineering technology and electrical engineering for the first few years. He helped navigate the adjustment period between the two sides.

"There's always been some...friendly competition," Stanley said. "The worst I could say is engineering faculty thought we [didn't] need technology programs. Engineering faculty members have a certain level they think at, and that you're going to learn practical applications after you get out of college. The fact is, many of the things that are done in engineering have a hands-on focus."

Despite complaints from some traditional engineers, early support of engineering technology education was key to its growth at Old Dominion. In the 1970s, Old Dominion had three engineering programs and three engineering technology programs.

Gary Crossman, the last engineering faculty member who actually taught classes at the Technical Institute, said that early investment has paid huge dividends for Old Dominion. In terms of the number of engineering technology graduates, Old Dominion is in the top ten in the country.

"While I was here, I was on the accreditation board for engineering technology. I was an evaluator, and I visited probably 25 different schools. I saw technology programs, and I didn't see any better than ours, in all honesty," Crossman said. "We're probably in the top three in the country in terms of engineering technology, but there's no real measuring stick. We would like there to be a measuring stick."



Top: Bill Stanley.



Bottom: School of Engineering Dean John A. Weese.

“This type of modern education has been well received by industry. They’re fascinated by it; they like it and they tell us so. And so our engineers have done well wherever they go. We’ve sent them to all kinds of graduate schools and industry writes back and tells us what a good job our students are doing, and they come back for more engineers, which makes us very happy.”

Rotty was also pivotal in developing the degree program in engineering technology. Old Dominion University was the first school in the state – and one of the first in the country – to offer a four-year degree in engineering technology. Bill Stanley, who was dispatched to become department chair of engineering technology when the School of Engineering absorbed the Technical Institute in 1970, said it took Rotty being very persistent with President James Bugg that Old Dominion apply to the State Council of Higher Education for Virginia to start the program.

“The president wanted to wait another year. But Ralph Rotty was going to push the idea,” Stanley said. “I remember one Saturday...we interrupted a football game [Bugg] was watching. Rotty was insistent. President Bugg met the three of us in the administrative building, and he was mad. ‘How can you justify this?’ he kept saying.”

Stanley said Rotty had heard that Virginia Polytechnic Institute was planning to apply to create its own engineering technology program the following year. Rotty figured that VPI would be chosen above Old Dominion, so the school needed to get its application in a year earlier. President Bugg finally relented. “Within two years, we had the highest percentage increase in enrollment in any department on campus,” said Stanley. “We had the highest enrollment in the state; we started to get the word out to other states. Within a couple of years, we were getting students from all over.”

This unconventional approach to engineering instruction, and the enthusiasm with which faculty pursued teaching and research partnerships with local industry, meant that the School of Engineering grew faster in its first decade than any other school on campus. In 1971, the Engineering Laboratory Building was opened, eventually named Duckworth Hall, for former Norfolk Mayor Fred Duckworth, a long-time champion of the university. The next year, Old Dominion University’s first doctorate program by the School of Engineering was introduced.

Dean Rotty moved on from Old Dominion in 1973, following a year’s leave of absence as a senior post-doctoral research associate of the Air Resources Laboratory within the National Oceanic and Atmospheric Administration in Silver Spring, Maryland.

Rotty’s successor, John Weese, arrived in 1974 from the University of Denver and immediately realized the scope of the funding problem. Reductions in state funding, combined with an overall sag in the

Thomas Sterling

“The Father of Beowulf”

Students at the School of Informatics and Computing at Indiana University Bloomington are fortunate to receive instruction from Thomas Sterling, whose pioneering research in community/Linux cluster computing led to his receiving the Gordon Bell Prize in 1997.

Forty years ago, Sterling was an anxious undergraduate student in engineering at Old Dominion University, having discovered the school while stationed at Naval Air Station Oceana in Virginia Beach.

“I remember when I first became aware of it; I saw an ODU bumper sticker on a car in a parking lot at the Navy base at which I was stationed,” Sterling said. “I found a map – there was no Web, Internet, laptops – figured out where ODU was and drove the 25 miles from Virginia Beach to Hampton Boulevard.”

Sterling enrolled in some night classes, and found them rewarding and challenging. So he adjusted his schedule to work on fighters on the graveyard shift while he attended Old Dominion full time, starting in 1972.

He remembers a school where things were in the process of getting built, perpetually. “The setup was modest but it provided opportunity, too,” he said. “I remember the faculty as being competent and considerate. I always felt welcome. The courses were of quality and I remember working hard to get through them, although I did pretty well.”

Sterling also somehow found time to get involved in student organizations, leading the student electrical engineering organization and publishing the student engineering bulletin, writing editorials under the pen name “Tron.” Sterling was conferred with it in the Navy because of his enthusiasm for solving debugging problems with military technology. His enthusiasm for tackling his school problems led to his engineering research laboratory at Old Dominion being dubbed “TRON-sylvania.”

“ODU was really my life during those years. [It] gave me direction, accomplishment, and the education step-up that was enough such that the momentum has never been quenched,” Sterling said.

After graduating with a degree in electrical engineering in 1974, Sterling went on to do graduate work at MIT,

earning his doctorate in 1984. His professional career has been filled with accomplishment, from earning a Hertz Fellowship while at MIT, to a distinguished 14-year career at NASA, to the 30 years of groundbreaking work in parallel computing that led Sterling to be known as the “father of Beowulf.”

The co-author of six books and the owner of six patents, Sterling is currently associate director of Indiana University’s Center for Research in Extreme Scale Technologies.

In the 1970s, Old Dominion might not have had the academic pedigree of schools like Indiana or MIT, but Sterling considers the University to be the launching pad of his whole career.

“Perhaps it was not the most difficult curriculum in academia, but it was a challenge to me, and I came away with a sound engineering education that has served me well to this day,”

he said. “I feel very lucky that I was able to go there under such difficult circumstances. I cannot imagine how I would have succeeded without that opportunity.”

And Sterling’s nickname from his time at Old Dominion has followed him through the years. His e-mail address at Indiana University starts with four characters: T-R-O-N.

His enthusiasm for tackling his school problems led to his engineering research laboratory at Old Dominion being dubbed “TRON-sylvania.”





Top: Local students attend ODU's Engineering Open House.

Bottom: Gregory Selby, professor of electrical engineering, speaks with an aspiring engineer.

Right: A concrete canoe being readied for competition.

economy from the OPEC fuel crisis and the lingering Vietnam War had caused enrollment to decline precipitously. Old Dominion had 168 students majoring in engineering in the fall of 1974, along with another 188 majoring in engineering technology. "Conditions were pretty dire," Weese said.

To remedy that, the School of Engineering attempted to market itself a little better, especially locally.

In February 1972, the school held its first Engineering Open House. The doors of Kaufman Hall and what would become Duckworth Hall were opened to teachers, schoolchildren and the community, and students demonstrated projects such as the concrete canoe and the egg drop.

Weese saw the Engineering Open House as a way to entice local parents and teachers, who had heard little about the commuter campus in their city, to consider Old Dominion. The annual Engineering Open House has continued for more than 40 years.

The effort went further. Weese personally reached out to guidance counselors at high schools in Norfolk, Portsmouth, Newport News and Hampton, and traveled with Old Dominion University's director of admissions to recruit future students to Old Dominion's local, affordable option for an engineering education.

Many of the students who did choose Old Dominion, however, were different from the students that Stanley had encountered at NC State. "Here in Norfolk, we had to get used to the idea that the students came to us and were part-time students, and [they were] older. That was a benefit, however. By the time people came to us, they had some life experiences, and they wanted to focus on engineering."



The School of Engineering was growing steadily through the 1970s, but one trend was vexing to administrators. The minuscule percentage of female students had not grown; if anything, it had shrunk. In April 1975, the School of Engineering sponsored its first "Women in Engineering" conference, designed to inform female high school students of opportunities in engineering.

The following year, the question "Do women have a place in engineering?" was addressed by a panel at the University's second Women in Engineering Conference. With women numbering only 27 of the 480 students in Old Dominion's School of Engineering, the conference was held to "try to make female students aware of the opportunities in engineering," Assistant Dean Kenneth H. Murray told a reporter from the Old Dominion publication UNews.

More than 20 years later, Old Dominion University's College of Engineering would take further steps to strongly encourage women to choose engineering as a possible career. In 2000, responding to a National Science Foundation report that women were underrepresented in science and engineering, the College would begin a new initiative aimed at the education, recruitment and retention of female students from elementary school through college, called "Womengineers."

"In order for our country to have the quantity and quality of engineers that will be required to maintain our competitiveness in the global marketplace, it is imperative that we reach out to groups that traditionally have been underrepresented in engineering," Bill Swart, dean of the college, said when the initiative was launched.

Early in the 21st century, two other initiatives would be launched by the College, an ODU chapter of the Society of Women Engineers,



"Do women have a place in engineering?"

– Topic addressed at the 1976 Women in Engineering Conference.



In the 1970s, Old Dominion University began hosting Women in Engineering conferences.

John Weese: The Ambassador

Growing the School of Engineering One Community Contact at a Time

When John Weese came from the University of Denver in 1974 to take over as the third dean of Old Dominion University's School of Engineering, he knew the challenges he faced.

In an environment of decreasing support for higher education, enrollment in Old Dominion's traditional engineering programs had dipped to fewer than 200 students. Five faculty members had been denied tenure because the school simply couldn't afford to make the long-term financial commitment to them.

It was clear that the state's other two engineering schools, the University of Virginia and Virginia Tech, were not eager to see Old Dominion grow. "They were not really anxious for Old Dominion's School of Engineering to be successful. Conditions were not ideal for ODU's engineering school at that point," Weese said.

But the new Hampton Roads resident took a look around the region and saw the need for engineers at the region's shipyards, at Norfolk Southern and for the U.S. Navy. "We had a lot of things with which relationships were possible," Weese said. So he set about trying to build them.

A relationship with NASA Langley was already flourishing when Weese arrived, so he helped cultivate cooperative engineering education programs with other institutions and businesses.

Relationship-building was done in the other direction as well. An annual Engineering Open House was implemented, to interest local high school students in attending engineering school at Old Dominion. "It was a program to increase our outreach to all schools in the region," Weese said. "We also reached out to all the community colleges with which we had any connection whatsoever."

Weese encouraged faculty to join or even create regional chapters of national engineering societies, taking a turn himself as president of the Engineers Club of Hampton Roads in 1980-'81.

Those professional associations with engineers from other schools helped Old Dominion break out of the perception that its education wasn't valued by peers, Weese said. "You begin to find that there are all kinds of things on

which you and engineers from other schools can work together."

Weese left Norfolk in 1983 for a job in Maryland with the National Science Foundation. When he left Old Dominion, he wrote a two-page progress statement about where the school had come in his nine years in Norfolk.

He highlighted the growth in enrollment and faculty, and the large amount of funded research generated by the School of Engineering, a figure equaling more than two-thirds of the entire amount received by Old Dominion. "The faculty of the engineering departments conducts most of the University's funded research," Weese wrote.

Weese also wrote about the strength of the partnerships that had been developed in the previous decade with NASA Langley, the U.S. Army Corps of Engineers, the General Electric Television Plant and others: "These interactions have produced or enhanced opportunities for graduates...professional contacts for faculty, scholarships, and general support for the School and the University."

Almost 30 years after leaving, Weese has warm feelings about his time at Old Dominion. He continues his relationship with the school by serving on the ODU Engineering advisory board.

"The years I spent at ODU, the years I spent in Virginia Beach, were immensely rewarding. Our daughters grew up there," Weese said. "It was a fine experience, and [wife] Betty and I look back fondly."



and the Engineering Early Advantage Program (EEAP). Sponsored by the Virginia Space Grant Consortium and administered by ODU's Career Management Center, the EEAP now introduces admitted female engineering freshmen to the College, and engineering as a career.

As it grew gradually through the 1970s, the school was under pressure from within to conform to educational norms. Faculty members, whose colleagues at other universities belonged to formal departments in their discipline, grew louder in their concerns that Old Dominion's lack of a departmental structure for engineering made it more difficult when dealing with other agencies.

Weese gave formal names to six departments: electrical engineering, civil engineering, mechanical engineering and mechanics, as well as civil engineering technology, electrical engineering technology and mechanical engineering technology.

A cooperative education program was established in tandem with Old Dominion's School of Business Administration, making it possible for engineering or engineering technology undergraduates to take prerequisites for an MBA program while doing their engineering studies, thereby clearing the way for quicker completion of an MBA degree after graduation.

But make no mistake – this was still an exceedingly modest operation. Everyone who came to the school from a more established institution has his own stories.

"It was a mess, campus then," said Bill Drewry,

who came as professor and chair of civil engineering in 1976 from the University of Tennessee. "There was a major rework on the mall, and I remember

looking across on a hot day in August and there were about 12 inches of dust all over that mall. I thought, 'My God, what did I get into?'"

Part of the problem was, as a school with very little engineering history, the donor base of successful graduates was exceedingly small. Without donors writing checks, and in a time of state budget cuts, the result was a school with books stacked all over its "rinky-dink" university bookstore, Drewry said.

The fact that there was no proper, well-stocked campus bookstore suggested that the school was flying by the seat of its pants. A long-time faculty member took it upon himself to try to remedy that problem.

In 1978, Edgar Kovner, former director of the Technical Institute and then-chairman of the Department of Mechanical Engineering Technology, and his wife, Kathleen, offered to match up to \$75,000 in contributions to establish an endowed scholarship fund of \$150,000.

The money, which could support as many as 20 scholarships a year, was to aid students in all six departments of the engineering school, putting Old Dominion on the register of institutions providing large scholarships to "attract the cream of the crop," Kovner told the UNews. An employee since 1943 of what would become Old Dominion University, Kovner said the endowment, "established with the help of many hard-working people, will give some of our students the hand they need."

In October 1981, a group of Old Dominion researchers led by G. Marshall Molen, associate professor of electrical engineering, received a \$613,079 grant from the U.S. Navy to investigate the passage of large amounts of current through an electrical switch. It was one of the largest non-NASA grants ever received by the School of Engineering, and helped spark a fruitful research relationship.



Left: Engineering Technology Professor Edgar Kovner and his wife, Kathleen, established a \$150,000 endowed scholarship fund that has funded the education of hundreds of ODU students in the past 30 years.

Other changes were occurring on campus, which would pay many dividends. An Army Reserve Officers' Training Corps program started at the university in fall 1969, attracting 131 students. These soon-to-be Army officers would become some of the best students in Old Dominion's engineering classes in future years.

In fall of 1982, the Hampton Roads Naval ROTC joined the Army ROTC on campus, a joint effort that also involved Norfolk State University and Hampton Institute. Under the command of Captain Harold J. Sutphen, the program numbered an initial 70 students. "[We] intend for the unit to be active in community and university affairs," Sutphen told a reporter from *The Courier*, Old Dominion University's faculty and staff newspaper. "We're looking forward to being active participants in the life of the university."

The School of Engineering had already started to form strong research partnerships with Naval Station Norfolk. In October 1981, a group of Old Dominion researchers led by G. Marshall Molen, associate professor of electrical engineering, received a \$613,079 grant from the U.S. Navy to investigate the passage of large amounts of current through an electrical switch. It was one of

the largest non-NASA grants ever received by the School of Engineering, and helped spark a fruitful research relationship.

Weese stepped down in July 1983 to become director of the mechanical engineering and mechanics division of the National Science Foundation. In a letter about the School of Engineering in 1983, Weese highlighted the growth in enrollment, faculty and funded research. He also wrote at length about the partnerships that Old Dominion was attempting to form with local industry, military and government bodies.

Weese wrote that Old Dominion University was helping fulfill its mandate as an urban university through collaborative relationships. These relationships provided opportunities with nearby institutions, and in turn provided opportunities for Old Dominion's growing cohort of engineering graduates.

After more than two decades of granting four-year engineering degrees, the School of Engineering was looking for another dean. It was also about to undergo a number of major changes, because of the man who ended up accepting the position.

NASA: A Fruitful Partnership

Proximity Integral to Growth

The early growth of the School of Engineering at Old Dominion College, and then Old Dominion University, owed a debt to geography.

Lewis Webb recognized this, and used it to his advantage during the campaign to have Old Dominion named Virginia's third engineering school. While serving as the first president of Old Dominion College, he arranged for a Navy helicopter to fly the state-appointed decision-makers around Hampton Roads, making sure to point out that the National Aeronautics and Space Administration operation at Langley Air Force Base was only 22 miles away.

The engineers at NASA Langley were well aware of the foundation of an engineering school in their back yard. With the launch of the Sputnik satellite by the Soviet Union in 1957, the United States government was engaged in a space race with the Soviets, and needed expertise.

The late Gene Goglia, then-chair of Old Dominion's thermal engineering department, struck up a friendship with John Duberg, associate director of the NASA Langley Research Center.

"John Duberg kind of took ODU under his wing," said Bob Ash, who arrived as a mechanical engineering professor on campus in 1967. "And as deputy director, he was in a position to have a strategic vision of where NASA was trying to go. And they needed a strong local engineering school. By and large, what happened was Duberg encouraged people like Gene Goglia to come over there and kick the hubcaps."

On April 16, 1968, *The Virginian-Pilot* newspaper reported that Goglia had received a grant of \$213,800 "to conduct two research institutes" at NASA's Langley Research Center that summer. Goglia was to co-direct 10-week research institutes, attracting 52 research fellows from across the country. The following year, the program expanded, and the grant for Old Dominion College grew to \$256,000.

The summer research institutes still exist at NASA Langley, and they were the first tangible example of a mutually beneficial partnership that has lasted for almost 50 years.

Right: Mechanical Engineering Professor Samir Ibrahim, who helped develop an accurate and economical method for vibration testing on the first Space Shuttle.

Besides proximity to the strategic space resource, Old Dominion's engineering school had a few other things going for it in cultivating its relationship with NASA. One was Goglia, who had followed Dean J. Harold Lampe (formerly of North Carolina State), to Norfolk. Prior to moving south, Goglia had worked many years at the University of Maine.

Ash said Goglia wouldn't have been tenured at a classic research institution like the University of Michigan or Cornell, "But he was a really solid teacher of thermodynamics." Because of the way Old Dominion's engineering program was structured, every student needed to take thermodynamics as part of the first two years of basic engineering education.

(Continued on the following page)



NASA: A Fruitful Partnership

As well, Goglia recruited graduate students from NASA to come to Old Dominion. "We were doing the required course in thermal engineering, which helped. But if NASA said 'We need somebody who knows about sonic fatigue,' Gene would always say: 'We have someone like that.' He was very, very successful," Ash said.

The partnership led to a generation of bright students being turned on to the concepts vital to space flight. More ODU graduates are employed in engineering at NASA Langley than from any other university in the country.

Eventually, the success of Old Dominion brought competitors. George Washington University began a graduate program in aerospace engineering, bringing 114 students to the campus of the NASA Langley Research Center in fall 1968. Old Dominion joined with other Virginia Universities in forming the Virginia Associated Research Campus (VARC) in Hampton, a graduate program in engineering that would provide skilled professionals not only to NASA, but to the Army research center at Fort Eustis and to Newport News Ship Building and Dry Dock.

Sid Roberts, who took over as assistant dean in charge of graduate engineering programs at VARC in 1971, said Old Dominion was dismayed that George Washington University was able to create a center on the NASA Langley campus. "But we did come up with the idea of placing ourselves close enough to them that we could teach their engineers who were interested in graduate programs," Roberts said.

"At the peak period in the 1970s, we were probably teaching as many as 20 graduate courses a semester. That caused us to get busy, and we promised them that we would provide that graduate resource, as long as we continued to get the students."

Roberts oversaw the creation of a Ph.D. program in engineering, with specialization in aeronautics, which helped attract even more bright young researchers, including mechanical engineering professor Surendra Tiwari.

"He would have been a distinguished professor at any university in the United States," Ash said. "He was

unbelievable. Surendra was a person who covered the really tough part of high-speed flight and aerodynamics. Suddenly ODU had a world-class guy in this area." Tiwari was another protégé of Goglia, who had taught him at Maine.

Ash himself started doing work in the Instrument Research Division of NASA, getting dozens of his own projects funded by NASA. "Gene Goglia would cultivate, for us, these opportunities to build a research relationship with senior researchers at NASA Langley," said Ash, now a professor and eminent scholar. "I can without reservations say I owe my career to that relationship."

The partnership only grew. By 1984, more than 40 percent of the university's \$5.5 million in research grants and sponsored programs was coming from the NASA Langley Research Center. Mechanical Engineering Professor Samir Ibrahim helped develop an accurate and economical method for vibration testing on the first Space Shuttle. A senior design project by students Nhu Vinh and Ravi Kurumety – to test the consequences of a heated space probe landing on a very cold planet – was tested on the Space Shuttle a year later.

The relationship between NASA and Old Dominion helped add to the University's faculty as well. Oktay Baysal came from Louisiana State University in 1982, founding ODU's Computational Fluid Dynamics lab. Duc Nguyen came from Northeastern University to work on the summer program at NASA Langley, and encountered the engineering program at Old Dominion. He's been a faculty member in Norfolk since 1985, doing research in parallel computing. "Eighty-five to 90 percent of my funded projects have come from NASA Langley," Nguyen said. Colin Britcher, professor and associate chair of the mechanical and aerospace engineering department, came from England to NASA Langley Research Center, and ended up on the Old Dominion faculty.

After the end of the Cold War in the late 1980s, and following a corresponding cut in funding nationwide for NASA research, securing grants became more difficult. But that has only led Old Dominion University in the



More ODU graduates are employed in engineering at NASA Langley than from any other university in the country.



Left: Gene Goglia



Right: Sid Roberts

Below: Professor Stephen Barna (left) conducts an experiment with an Old Dominion University student

two decades since to become more innovative in its partnerships. Old Dominion took over operations of the aging spaceport on Wallops Island on Virginia's Eastern Shore, an initiative that has ultimately led to the state-run Virginia Commercial Space Flight Authority.

NASA had been doing research into aviation on the site in Hampton since 1930, and the Batten College of Engineering and Technology even inherited a decade's worth of operation of the historic Langley Full-Scale Wind Tunnel, a historic facility on NASA Langley property.

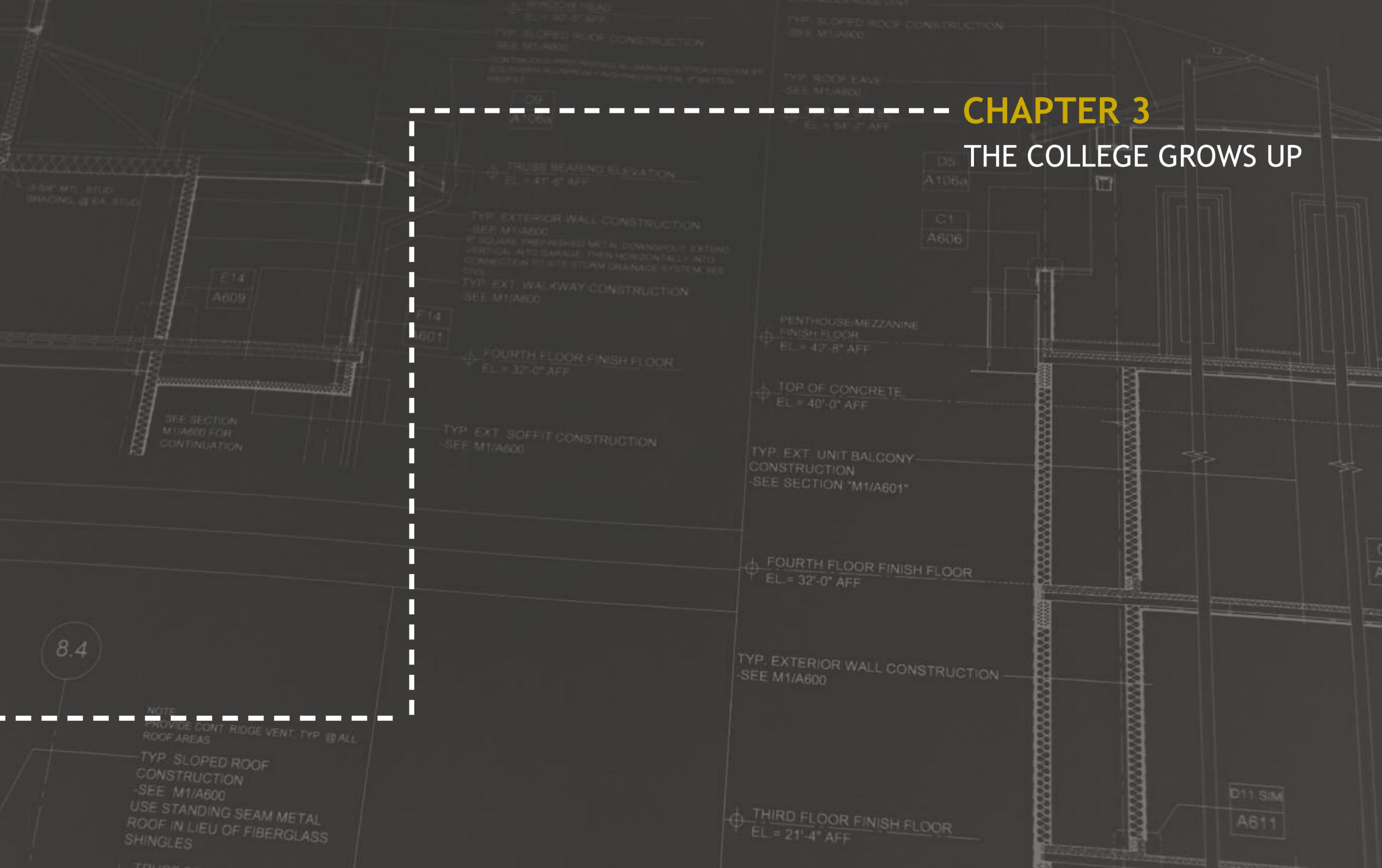
Old Dominion University's stature as a research partner in the aerospace industry was so prominent that the 2004 book "Aerospace Engineering Education During the First Century of Flight" included a chapter on Old Dominion's aerospace efforts.

"There was a concentration of resources, faculty positions and laboratories, in several aerospace sub-disciplines, that...served the perceived opportunities and research needs of the Langley Research Center and the regional industrial base," the book said.



CHAPTER 3

THE COLLEGE GROWS UP



8.4

NOTE
PROVIDE CONT. RIDGE VENT. TYP. @ ALL
ROOF AREAS

TYP. SLOPED ROOF
CONSTRUCTION
-SEE M1/A600
USE STANDING SEAM METAL
ROOF IN LIEU OF FIBERGLASS
SHINGLES

College Station, Texas, home of Texas A&M University, has little in common with Norfolk. Ernest James (Jim) Cross realized this almost immediately after arriving from that school in 1984 as the fourth dean of Old Dominion University's College of Engineering.

Yet the new boss was puzzled as to why Old Dominion was trying to fashion itself in the mold of Texas A&M, a traditional land-grant university where the campus is a village unto itself. That wasn't Old Dominion, a new university in the middle of a large urban area.

"I guess the thing that struck me initially was here we are in an urban situation, totally different than these land-grant schools. Totally different than William and Mary, totally different than Virginia Tech," Cross said. "It seemed to me that in the past, the University was attempting to emulate William and Mary, and in the case of engineering, Virginia Tech, which made no sense to me. So I set about trying to change that whole situation."

In the next dozen years, the now-College of Engineering and Technology at Old Dominion University would transform its entire approach, and that shift in emphasis is prevalent in the College today.

Some of that work had already begun. Mechanical and aerospace engineers were into their second decade of a fruitful partnership with NASA Langley. Cross's predecessor, John Weese, had made a point of seeking out collaborative opportunities with other companies and government agencies that needed engineers.

Those steps became flying leaps into areas that, on the surface, seemed an odd fit for an urban engineering college.

Bill Drewry, chair of the civil engineering department, told Weese when he was hired in 1976 what needed to happen at Old Dominion University: "When I got here, the very last thing from Weese was something like, 'Bill, what do you think of the place?'" Drewry recalled. "And my answer was very close to this: 'John, you really don't want to know what I think of this place. But I'll be glad to tell you about what I think the possibilities are for the future.'"

Drewry said he told Weese the school had tremendous potential, because of the market in which Old Dominion University was situated. Practically none of that potential had been tapped.

"That really began to happen under the leadership of Jim Cross. The guy was phenomenal," Drewry said. "Cross's philosophy, which I loved, was 'in times of adversity, you look at that as an opportunity to do new things.' That's what engineers do. Problems? We solve problems."

The first problem was to settle, once and for all, a battle that had simmered at Old Dominion University for years.

After the Second World War, a Technical Institute was created at the Norfolk Division of William and Mary, offering three-year associate degrees in engineering technology, hands-on courses like heating and cooling systems, and television repair.

Under Dean Ralph Rotty, the Technical Institute was rolled into the School of Engineering, and ODU began offering four-year engineering technology degrees, the first school in the state to do so. The two faculty groups, despite peace-keeping efforts by Rotty and then Weese, remained distrustful of each other.

"There was a virtual fistfight between the groups," Cross said. "Engineering wanted to eliminate engineering technology, and technology was very resentful of their attitude." The solution? Cross changed the name of the School of Engineering to the College of Engineering and Technology. "It was not favored by many!" he said with a laugh.

But the hands-on skills that engineering technology offered were an ideal fit for the community in which Old Dominion was situated. The engineering technology faculty were used as the lead workers in the Engineering Clinic, an operation created in late 1984 to match up local businesses that had engineering problems with the expertise that existed at Old Dominion.



"Cross's philosophy, which I loved, was 'in times of adversity, you look at that as an opportunity to do new things.' That's what engineers do. Problems? We solve problems."

– Bill Drewry

Bill Drewry (left) arrived at Old Dominion in 1976 from the University of Tennessee.

Jim Cross: The Visionary

Taking Chances Brilliantly, Boldly and Brashly

Jim Cross is still engineering, and still doing it on his terms.

In fact he's happily losing money in the car restoration business, Crossmen Industries, a company he started after retiring from Old Dominion University in 2008.

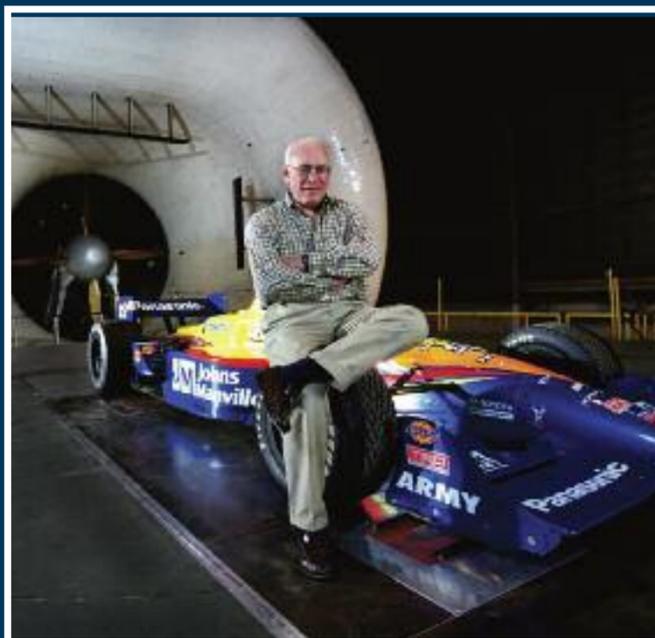
"I restore old sports cars. I thought it would work as a business but it has not. But it allows me to pretend I have a business I can go to during the day, so I can get out of the house and come down here and do whatever the hell I please," Cross said with a laugh.

Some might argue that was how he operated when he was dean of the College of Engineering and Technology.

Cross arrived in Norfolk August 1, 1984, brought to the region in part to be closer to aging parents.

"But I did see opportunities here," he said. "However, when I first walked into the place I thought, 'Oh my God, what have I done?' There was no money. There was no enthusiasm for hardly anything."

In his brash style, Cross threw his enthusiasm behind many innovative projects. The engineering technology program was a unique asset, so Cross spearheaded the



"The university can, and should, be a major contributor to the economic development of the urban region, and not try to emulate the large, land grant schools."

idea of an Engineering Clinic, to solve engineering problems for local industries. Almost 30 years later, that center has grown and evolved into the ODU Business Gateway, a dynamic entity that provides links to Old Dominion faculty and spurs regional economic growth.

Under Cross, Old Dominion's Engineering College opened a graduate center on the peninsula. The school began its foray into modeling and simulation, which has become a spectacular success. Old Dominion engineers even took over operation of the Mid-Atlantic Regional Spaceport, a bold initiative that has helped the institute at Wallops Island on Virginia's Eastern Shore become a viable national facility.

To undertake these steps, Cross said he had to get Old Dominion to stop thinking that it was Virginia Tech or Texas A&M. Not in terms of accomplishment, rather in terms of being an urban institution. Cross believed that Old Dominion needed to concentrate on entirely different things.

The three parts of a university's responsibility are teaching, research and service, Cross explained, adding: "I chose to find ways to emphasize the service concept, and contribute in some ways to the urban economic development."

"The university can, and should, be a major contributor to the economic development of the urban region, and not try to emulate the large, land-grant schools," he said.

And yes, Cross ruffled a few feathers along the way, from members of his faculty all the way up to then-Old Dominion University President Jim Koch. "He fired me at least once," said Cross, "but we had a great working relationship." Not everything that was tried in those years was a success. But at the end of his tenure as dean, it was clear that the College of Engineering and Technology had made major strides.

"I had a whole lot of fun," Cross said. "When I came here, I thought it was a terrible mistake. But the more I got into it, the more I thought, 'We've really got something here.' I don't think we're done growing at all."



Above: ODU's Engineering Clinic has evolved since being formed in 1984. It is now known as the ODU Business Gateway, charged with linking businesses and organizations with the expertise of the Old Dominion University campus.

"The plan was for it to emulate a medical clinic," Cross said. "It would provide the faculty an opportunity to do engineering things, and it would provide services to the community in terms of solutions to engineering problems."

Gary Crossman, an engineering technology faculty member, was appointed as the first director of the Engineering Clinic. "The idea was that it would be an entity here that could communicate with industry and help solve engineering problems by using faculty expertise," Crossman said.

A \$200,000 grant from Virginia's Center for Innovative Technology offered matching funds for industry that used the expertise of the Engineering Clinic. That was the start. Almost 30 years later, the Engineering Clinic has evolved into the ODU Business Gateway, a university-wide initiative that serves as a one-stop shop for companies and non-for-profit or for military organizations seeking a range of problem-solving services.

"Who would have ever thought that we would have gotten to where we are now?" Crossman said.

Veteran faculty members still at Old Dominion University share a similar view of the Engineering College they arrived to join. They all could feel the school going places, but those places seemed to be a ways off, and progress was slow.

"My first thought was that they didn't spend a lot of money landscaping. I used to joke that the landscaping back then was just allowing the different colored broken glass to lie along the sidewalks," said Gary Schafran, now professor and chair of the civil and environmental engineering department.

"First of all, campus was very different. We didn't have all of the buildings we have now," said Osman Akan, present-day associate dean. "The student body was also different. It was basically a university for commuters, there was almost no campus community. As far as academics was concerned, we were pretty much a teaching college."

Drewry, who retired in 2009, said the University was growing up, "but people wanted to grow up at

a faster pace than what the budgets would pay for.” In the late 1970s and early 1980s, Old Dominion lost some promising researchers to other schools and private industry because the school’s progress wasn’t fast enough.

In each engineering department, however, there were signs of growth.

CIVIL ENGINEERING

Old Dominion’s original plan as an engineering school was to offer a general engineering education for every student, then stream into disciplines for the later years of an undergraduate degree. But by the time Drewry arrived on campus in 1976, the different engineering departments had started to take shape.

The challenge was that they all needed to be built from the ground up. “It was nice. I started basically with a blank sheet of paper,” Drewry said.

As an example, when taking over as chair of the new department, Drewry took a peek inside the three file cabinets in the departmental office in Duckworth Hall. “The only thing that was in those file cabinets was decorations for the office for Christmas, the Fourth of July and other holidays,” he said.

A key component of civil engineering is transportation engineering. Unfortunately, there wasn’t the budget to hire a full-time transportation engineer. “We had to use an adjunct, Dwight Farmer, chief engineer with the Hampton Roads Planning District Commission. Thank God we had him. That way we had at least one course in transportation engineering, beginning in the late 1970s,” Drewry said.

Farmer grew up in Norfolk. When he graduated high school in 1969, engineering at Old Dominion University simply wasn’t an option. Ten years later, when he started teaching classes, Farmer noticed the progression. “ODU was just beginning to bud. It was a credible engineering program, but very, very modest.”

Farmer actually taught as an adjunct for Old Dominion University for 30 years, finally stopping in 2009 when the Hampton Roads Planning District Commission named him executive director. By then, Old Dominion had finally hired a transportation engineer in Asad Khattak. Farmer had taught more than 1,000 engineering students. That illustrated to him the value of Old Dominion University’s engineering program.

“I think it helped folks believe they could stay here and practice engineering. If the university could support them, people could do pretty much anything they wanted, professionally, in Hampton Roads,” Farmer said. “Now, every week I meet somebody who says ‘I was in your class.’”



Above: A civil engineering river model.

Another example of the civil engineering department adapting and changing to meet the community’s needs was the hiring of David Basco as a coastal engineering professor in 1986. From Texas A&M like Cross, Basco felt this region lent itself to topical work in the field, not only academic study, but also through local agencies that needed the expertise.

“It’s this ability for us from ODU to reach out and touch all these people who need us. Water-wave mechanics, beach erosion, sea walls, bulkheads – all of this infrastructure that we rely on to protect us from flooding is right here,” Basco said.

Still, the College needed to grow. When Schafran came to Old Dominion from Syracuse University, Drewry showed him what amounted to the environmental engineering laboratory. “It was pretty apparent right off that [the labs] weren’t really being used. There was all sorts of detritus from the structural engineering group just lying around. There was archaic equipment, and a lot of the stuff they had just wasn’t functional,” Schafran said.

Excited by the challenge of resurrecting a lab, Schafran moved to Norfolk, and found there was little in the way of resources at Old Dominion. He had no computer for a month, then finally received a hand-me-down from the civil engineering office. “It was different times,” he laughed.

Despite the challenges, it was a good time to start, as well. Environmental engineering, Schafran’s specialty, was just catching on as a discipline, and through hustle, Old Dominion took advantage of a chance to be first.

“We were the first in the Commonwealth to change the name of the department to civil and environmental engineering. We were the first to create a bachelor of science in environmental engineering,” he said.

The engineers at Old Dominion also tried to engage with their community. Drewry, an environmental engineer himself, helped oversee a project to bring sanitation to the impoverished community of Bayview on Virginia’s Eastern Shore, in tandem with the Virginia Department of Health and The Nature Conservancy. “It was a great opportunity for us to make a difference,” Drewry said.

ENGINEERING TECHNOLOGY

Underappreciated no more inside the College, the department of engineering technology (actually three departments at first: mechanical, civil and electrical engineering technology) continued to grow throughout the 1980s.

“We were the first in the Commonwealth to change the name of the department to civil and environmental engineering. We were the first to create a bachelor of science in environmental engineering, the first to develop a graduate degree.”

– David Basco

Jerry Robertson (Engineering) "Doctor" is In

Long before he came to work at Old Dominion University, Associate Vice President Jerry Robertson realized the need for what is now known as the ODU Business Gateway.

Working for a local manufacturing company that made decorative Christmas garland, Robertson's company was having difficulty with static electricity causing the garland to stick in the machine that cut it into strips.

"I suggested we go to Old Dominion University, to see if they had someone to help," Robertson said. "So here I am walking around the engineering building, seeing if there was someone who could help me. I finally ended up in electrical engineering, and in the office of someone who ended up becoming a pretty good friend of mine, Griff McRee. He was the first one I found with his door open."

As a university in an urban area, surrounded by companies and military bases doing real-world engineering, Old Dominion's expertise could play a key role in the community. The question asked in the 1980s was, how do you do it?

Shortly after he started at Old Dominion University, Dean Jim Cross tried to re-orient the engineering education model away from a traditional baccalaureate engineering model, and toward one that was more service-oriented, to help the community solve problems.

"One of the first things I did was put together a proposal to establish an engineering clinic, which would emulate a medical clinic," Cross said. "It would provide the faculty an opportunity to do engineering things, and it would provide services to the local community in terms of solutions to engineering problems."

Gary Crossman, a professor of engineering technology, was installed as the first director of the ODU Engineering Clinic. He laughed at the memory. "It was me, a phone, and a desk," Crossman said, likening it to the fake companies that act as fronts for spy agencies in the movies.

But as an engineering technology faculty member, Cross said Crossman was the perfect candidate to start and grow the clinic. "The initial plan was that the engineering technology faculty would be the faculty involved in these projects. And the engineering faculty would be involved in the more traditional engineering research," he said. That in turn helped bolster the credibility of the engineering technology department, which was still being viewed a little skeptically by some faculty members in the traditional engineering disciplines.

The clinic was also helped by the fact that it had modest success almost immediately. A grant from Virginia's Center for Innovative Technology offered incentive for local companies to seek out Old Dominion's engineering expertise.

"They provided matching funds so we could go to industry. It gave them a good deal, and we would use faculty and staff to solve those problems," Crossman said.

Robertson, who started working at Old Dominion University in 1981 as resident engineer for the College of Engineering, said the initial clients of the center were people "who showed up with [ideas for] better mousetraps, and they wanted us to help build them."

Robertson said the transformation in the center occurred when Old Dominion experts began to offer advice that stretched beyond mousetraps, into finding different cheese.

"We should be a resource for the business community. We've got infrastructure that's worth tens of millions of dollars, paid for by taxpayers. We have intellectual capital here that's tremendous," Robertson said. "But we also had to be able to tell them their 'baby' wasn't as cute as they thought it was."

"We should be a resource for the business community. We've got infrastructure that's worth tens of millions of dollars, paid for by taxpayers. We have intellectual capital here that's tremendous."

— Jerry Robertson



Associate Vice President Jerry Robertson (right) is executive director of what is now known as the ODU Business Gateway.

By broadening the scope of what the Engineering Clinic did, Old Dominion soon accessed other state and federal funding sources, offering retraining and job placement for military personnel, and help with grant proposals. By the mid 1990s, the name of the office had been changed a couple of times, as it took on different functions. Robertson was appointed director late in that decade when then-Dean Bill Swart didn't like either of the candidates being interviewed for the position.

In 2004, Batten College Dean Oktay Baysal changed its name to the Virginia Applied Technology and Professional Development Center, reflecting the full range of services done out of the center, jobs as varied as outreach to schools and grant procurement for military veterans.

The center had also proved its value to the university as a whole, and in May 2010 was re-launched as the ODU Business Gateway.

Today, the Gateway has transformed the way higher education interacts with businesses, acting as a business-friendly entry point to the intellectual capital, innovative technologies and world-class infrastructure of the university.

Operating from its headquarters at Innovation Research Park @ ODU, the mission of the ODU Business Gateway is to provide companies large and small, not-for-profit organizations, military commands and entrepreneurs a dedicated resource to help solve business problems, expand capabilities and create new ventures.

Ever since its launch, the ODU Business Gateway has evolved and expanded, adding the Hampton Roads Veterans Business Outreach Center, which offers entrepreneurial development services and training to military veterans and reservists.

At its essence, however, the ODU Business Gateway is still that one-stop shop for the person in the community who wants problems solved, and thinks Old Dominion's expertise can help. "Basically, that's still what we do today," Robertson said.

Crossman, who did his studies at the Technical Institute before it merged with the School of Engineering, said the laboratory equipment brought from the Technical Institute, especially in mechanical engineering technology, put the School of Engineering equipment to shame.

Engineering definitely benefited from us coming over. In fact, we still use some of that equipment," Crossman said. "Students today want something that you punch a button and it spits out numbers. They don't want to sit there and write down numbers. I hate to tell them, but that still happens in the real world." Crossman still teaches as an adjunct faculty member in engineering technology, even after having retired in 2008.

Alok Verma, Ray Ferrari Professor of engineering technology, is another long-time faculty member in engineering technology. He started in 1981, and learned under many faculty members from the old Technical Institute, including Ray Ferrari, whose endowed professorship Verma holds.

Verma said the hands-on tradition of building things has served the entire engineering college. "Of course the focus is different," he said. "Engineering programs are focused on the research and development and theoretical analysis. And engineering technology programs are more hands-on and practical, and support manufacturing."

That line of thinking inspired Old Dominion's creation of the Lean Institute in 2004, of which Verma has been the only director. The Lean Institute aids companies in the transition to lean manufacturing techniques. These techniques are of increasing importance as survival of manufacturing jobs depends on meeting bottom-line imperatives.

The hands-on nature of engineering technology also helped inspire design of the atrium that now connects the former Kaufman and Duckworth Halls. Opened in 1986, the atrium, laboratories, classrooms and office space started as a senior design project by a student working under Edgar Kovner, professor of engineering technology.

ELECTRICAL ENGINEERING

In the 40 years since the department of electrical engineering was created in the School of Engineering, perhaps no other department has been responsible for more far-reaching innovations. The Virginia Modeling, Analysis and Simulation Center, the Frank Reidy Center for Bio-electrics, and the Applied Research Center were all started by the present-day department of electrical and computer engineering.

Electrical engineering has been transformed through the use of computers, which makes Old Dominion's successes in the field notable and curious. Thirty years ago, the Old Dominion campus wasn't exactly wired.

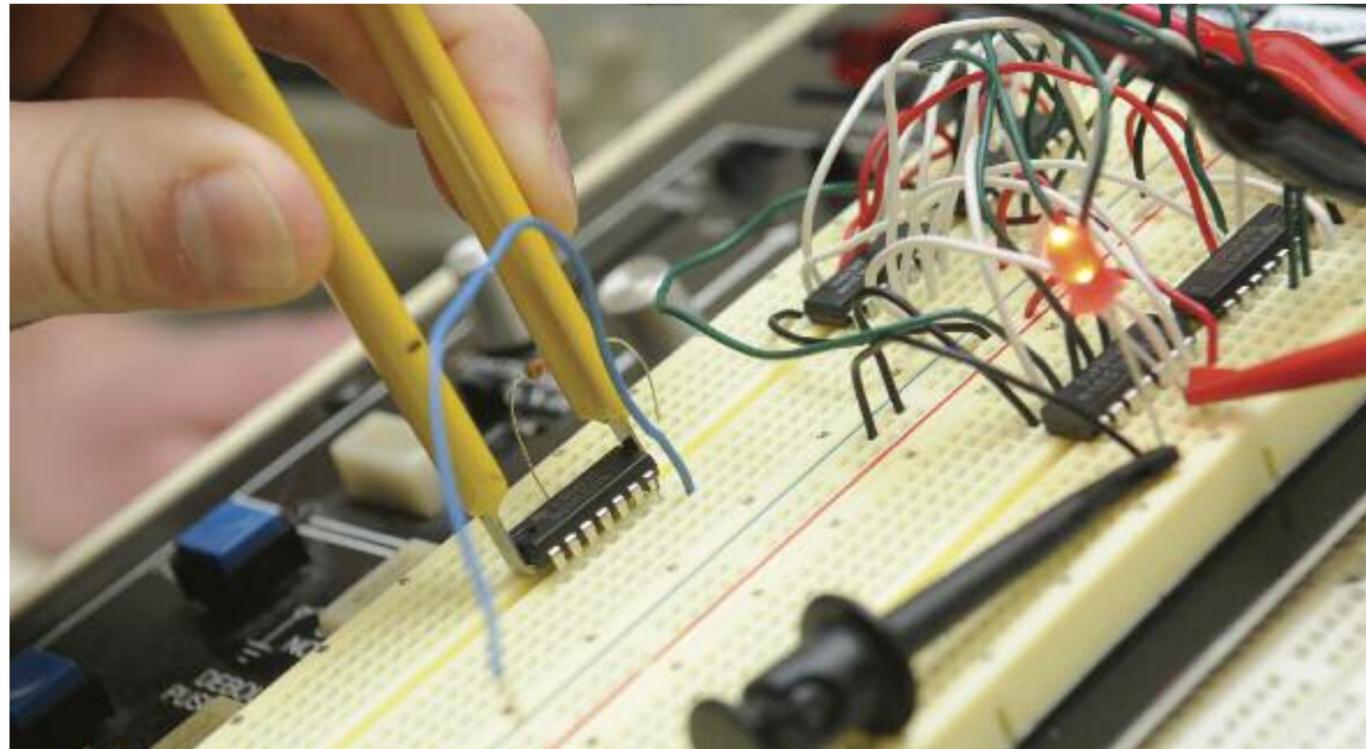
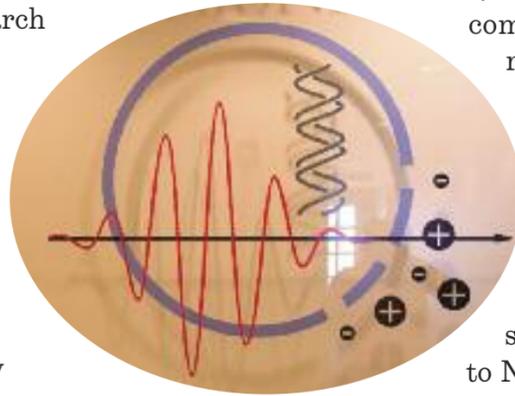
"The lack of computer system sticks out," said former business administration student Bev Forbes, who started as a student worker in the department of electrical engineering in 1978. Forbes is now director of experiential programs

for Old Dominion's Career Management Center, and is liaison to the Frank Batten College of Engineering and Technology.

"When we evolved from electrical engineering to electrical and computer engineering, we really had to change rapidly. Suddenly, it looked like this thing was coming and we needed to jump on

board," said Forbes, explaining that the computer engineering program really was made up as faculty went along.

Roland Mielke, who would serve as chair of the electrical and computer engineering department for a dozen years, also noticed the modest surroundings when he relocated to Norfolk from the University of Wisconsin in 1976. "I never felt like it was an underdog program. It was much smaller, but that has both positive and negative facets to it," Mielke said. "I have been able to influence programs here because we weren't so large, and we were growing and we weren't so well established."



Mielke played a key role in the University's move into modeling and simulation in the mid 1990s, a bold step considering the College of Engineering and Technology had little in the way of background in the emerging field. "I knew what it was, and I had experience in narrow pieces of it. But the stuff that began to happen here in the early '90s really opened the door to getting involved in modeling and simulation," he said.

Another electrical engineering field that Old Dominion researchers stepped into around that time was pulsed power – the use of extremely short, extremely high-voltage pulses of electricity to accomplish various tasks.

Karl Schoenbach came to Norfolk in 1985 from Texas Tech. While earning his doctorate in physics in Germany, Schoenbach, now professor emeritus in electrical and computer engineering, had become fascinated with plasma physics, the high-voltage system that creates X-rays.

"It was not even considered a field on its own," Schoenbach said. "It was considered high-voltage engineering. But in the United States and Russia, in these two countries, they were involved in this field, driven to a large extent by military applications."

In the early 1990s, faced with decreasing military expenditures, a handful of researchers around the world started to look for other applications for the still-experimental technology.



Opposite top: The logo for Old Dominion's world-leading Frank Reidy Center for Bioelectronics.

Opposite bottom: Old Dominion University's dynamic department of electrical and computer engineering has produced innovative, collaborative breakthroughs in many fields.

Below: The lobby of the Engineering and Computational Sciences Building.

“We had all this expertise, all the systems, and we needed to test new concepts. I decided to try it. I wondered if we could affect the growth of certain biological species,” Schoenbach said.

Working with a colleague in the College of Sciences, Schoenbach started to use pulsed power to prevent biofouling – the transmission of harmful biological pollutants, particularly through ship ballast water. Encouraged by that success, Schoenbach sought out colleagues at Eastern Virginia Medical School, including Stephen Beebe, now at Old Dominion, to see if pulsed power could kill other cells of living things.

“There was no funding at that time, but you needed to start somewhere. And we found out that pulsed power can kill cancer cells. So this was the beginning,” Schoenbach said. Old Dominion University is now one of the world’s leading institutions in the field of bioelectrics.

MECHANICAL AND AEROSPACE ENGINEERING

Twenty-two miles: of all the numerical calculations involved in engineering, that very rudimentary figure is as important as any in the growth of the College of Engineering and Technology. That’s the distance between the Old Dominion campus in Norfolk and the NASA Langley Research Center, far closer than any other engineering school.

More than any other thing, the partnership with NASA Langley was responsible for the growth of Old Dominion’s engineering profile. “[NASA Langley] benefited from our engineers constantly being there, but at the same time, we were building engineering at ODU,” said Oktay Baysal, now professor and dean of the Batten College of Engineering and Technology.

Aerospace engineering professor Bob Ash said the talent that NASA Langley allowed the school to assemble in one department was far beyond what a small, new engineering school could normally expect. “It’s why we have a research school of substance,” he said.

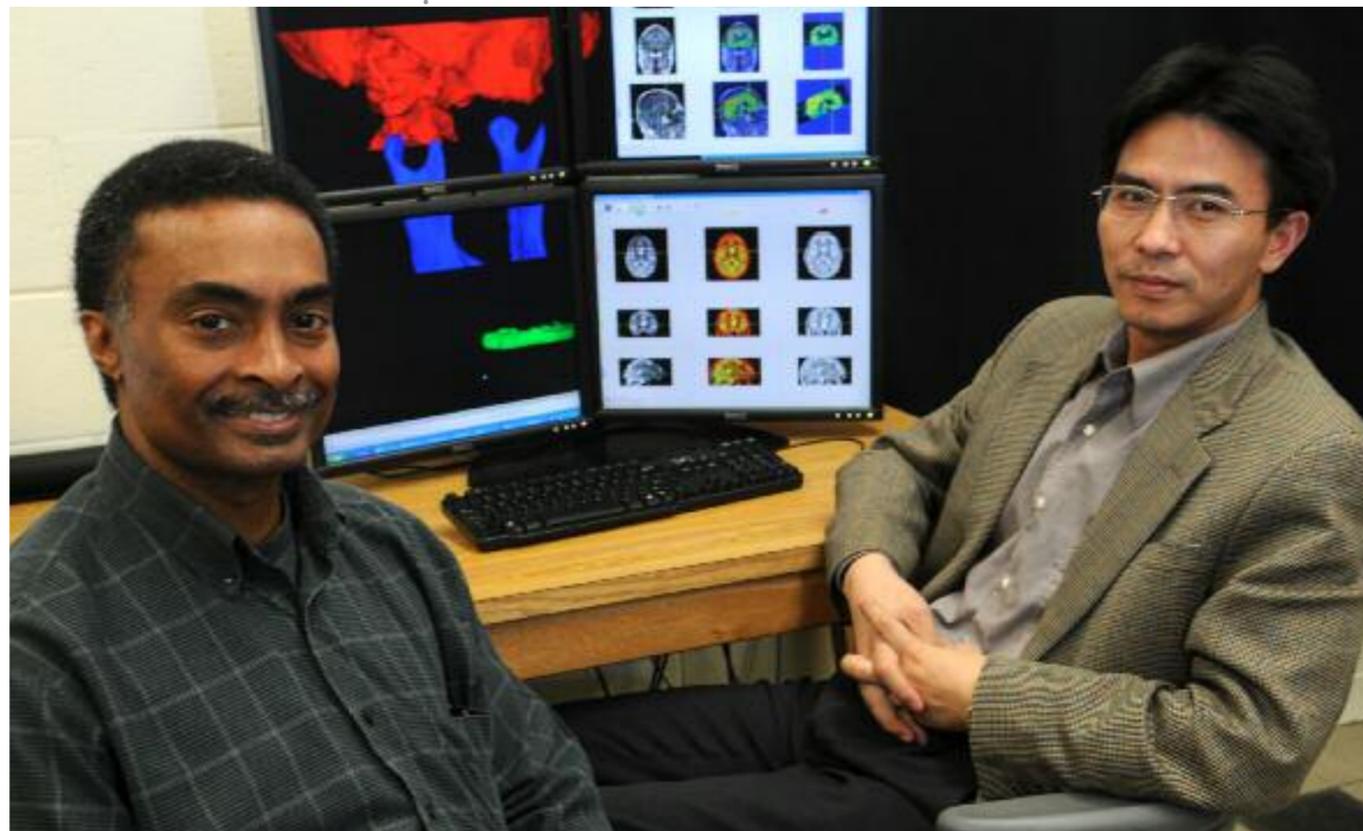
The relationship was formed in the late 1960s, starting with a friendship between Old Dominion faculty member Gene Goglia and John Duberg of the NASA Langley Research Center. Starting with a single grant for a summer research institute, the connection grew to a multimillion-dollar annual research allotment for NASA Langley research center faculty members.

Jim Cross, himself an aerospace engineer, felt that NASA Langley was the ace in his hand. Old Dominion was already part of the Virginia Associated Research Campus in Hampton, a graduate program in engineering that sought to provide a trained workforce for NASA Langley and other workplaces that needed engineers.

More than any other thing, the partnership with NASA Langley was responsible for the growth of Old Dominion’s engineering profile.

Below: Rick Mckenzie (left), professor of modeling, simulation and visualization engineering, and Jiang Li, professor of electrical and computer engineering.

Opposite: Karl Schoenbach with an engineering student.



Cross wanted an ODU-specific presence on what he felt was the school's "territory." Through seed funding from Old Dominion's Office of Research, a permanent presence on the peninsula was founded, originally called the Graduate Engineering Center. It has evolved into what is now known as the Old Dominion University Peninsula Higher Education Center.

Hanging over the partnership was an implicit understanding that the funding could one day slow to a trickle. At the peak, NASA Langley supplied 80 percent of the grant funding received by the College of Engineering and Technology, a total of more than \$3 million per year. In the late 1980s, added competition was seeking those dollars, and the end of the Cold War with the Soviet Union shrunk military budgets and brought a more cumbersome grant application process.

Old Dominion engineering had to make some other bets.

ENGINEERING MANAGEMENT

Engineering management was one of those wagers, and it has paid off handsomely. In the mid 1980s, the school began exploring the idea of creating a department of engineering management, to train engineering students – largely at the

graduate level – in how to manage projects and other engineers.

Engineering management focuses on the intersection of engineering, technology and management in high-technology environments. At the time the concept was explored, it was a very new discipline.

Larry Richards, an Old Dominion professor charged with starting the program, hired Resit Unal in 1987 from the University of Missouri-Rolla, now the Missouri University of Science and Technology, one of the only schools in the country then offering engineering management.

"I came for an interview and they hired me immediately, and Larry Richards and I started the program," Unal said. "Industry recognized the need for someone who was more multidisciplinary, to relate to the different disciplines of engineering, to come up with the requirements and the overall system to run the operations."

The department, initially a partnership with the College of Business and Public Administration, grew to 250 graduate students within five years. Old Dominion started an on-site master's degree program for the U.S. Army at Fort Monroe.

"Our graduates started getting hired, and soon the word got out, and some schools started their

Old Dominion University was one of the first universities in the country to invest heavily in televised distance learning instruction. The college of engineering was among the first to participate. ODU is now one of the nation's largest providers of online distance-learning courses.



Linda Vahala

First Female Tenured Faculty Member

There's an analogy that Linda Vahala likes to repeat about Old Dominion University's College of Engineering, where she has worked since 1987.

Without an overabundance of resources, the College has had to be nimble and flexible, said Vahala, now associate dean of the Batten College of Engineering and Technology.

"Someone once described ODU as a lengthy basketball player, who you knew was going to be successful when he grew into his body. I think that's been very true of our college and our university," Vahala said.

The analogy is a little humorous coming from Vahala, who doesn't reach five feet of stature herself. But the first female tenured faculty member in the College of Engineering has been a larger-than-life presence for hundreds of students over her 25 years in the Old Dominion faculty.

"So many students have kept in touch over the years. I run across students a lot who have graduated, and their children go here now," said Vahala, who has responsibility for student success in her role with the College.

It's a different university than the one at which where Vahala earned her Ph.D. in physics in 1983, specializing

in plasma physics and electromagnetics. Through Karl Schoenbach, professor of electrical engineering, Vahala was exposed to plasma physics applications such as pulsed power and wireless communications on aircraft.

Her real passion, however, has been in working with Old Dominion engineering students, especially non-traditional ones like herself.

"We have a wide distribution of students. Some have gone on to do incredible things," Vahala said. "I think our current dean, Oktay Baysal, has done an excellent job of increasing our female faculty and supporting them here."

Vahala especially likes watching students perform, in and out of the classroom.

"I think all along they've been very innovative. They shoot for the moon. I think that's what I like about the students here. They're very creative and they think outside the box."



own separate engineering management programs," Unal said. That led to another innovation by Old Dominion engineering: the introduction of video instruction.

The idea was first publicized in 1984. The plan, according to *The Virginian-Pilot* newspaper, was to offer televised instruction of select graduate engineering classes from public universities around the state, including Old Dominion, so students could mix and match courses to make their own degree.

With this multi-university initiative moving forward, Old Dominion forged ahead on its own plans for distance learning education for a more complete curriculum, including undergraduate

courses. And it was engineering programs that led the way for the University.

"We started so slow with two video rooms in the College of Education building," said Gary Crossman, who taught engineering technology courses via video learning. "We went over there and taught our courses. And we were only teaching to Roanoke and Richmond."

But Crossman said Old Dominion did it right as well, investing in building satellite technology, and sites across the state and the country, so students could earn Old Dominion degrees from many locations. "ODU created a whole system," Crossman said. "It made it easy on the faculty to teach a distance-learning program."

In 2001, Old Dominion pioneered a program with the U.S. Navy nuclear submarine fleet, providing officers with an opportunity to earn a master's degree in engineering management, via CD-ROM.

Changes in the technology have gradually pushed Old Dominion University away from televised distance learning, and into on-line classes. There remains a large engineering presence in Old Dominion's distance-learning offerings.

Unal taught engineering management through distance learning as a way to increase exposure to the program. "It was just a big success all over Virginia. We had big enrollments," he said. In 2001, Old Dominion pioneered a program with the U.S. Navy nuclear submarine fleet, providing officers with an opportunity to earn a master's degree in engineering management, via CD-ROM.

"The submarine officers were going out to sea and staying there for months. You can't link to anything," Unal said. "When we started the nuclear submarine program we had an expectation of 75 officers enrolling in this. In three years, we had more than 250."

Admiral Robert F. Willard USN-Ret., former commander of the U.S. Pacific Fleet, is a graduate of the CD-ROM-based master's program in engineering management.

David Basco was another of the early adopters of the technology as a teaching tool. He currently teaches graduate-level coastal engineering programs to dozens of students from 28 of 30 coastal states and 12 foreign countries.

Old Dominion has also created a certificate program in coastal engineering, offered entirely online. The 12-credit, non-degree program lets engineering students earn a certificate in coastal engineering, which can be turned into a master's degree through credit transfers and the addition of a thesis.

"The student can work full time wherever they live, can take these classes on line, in real time or asynchronous," Basco said. "And the companies love it because it's such an economical way to train their workforce, and the supervisors get immediate feedback about how their employees are doing. But it turns out these are some of the best students in the classes."

In general, Basco said he has enjoyed the students who have been in his classes at Old Dominion. "When I got here, I noticed right away that the students were quite different than the typical 17- or 18-year-old undergraduates that you'd get at other schools. Many of them were older; they were frequently working."

Old Dominion engineering students carry a reputation locally of being capable, and willing to work. "Consulting engineers tell me that all the time," Basco said. "Because they're willing to come up with some practical experience by working part time, when [they] hire them [they] already expect them to do more than a graduate from Virginia Tech, with no experience."

Cross said in the almost 30 years he's been in Hampton Roads he's seen more and more local companies hiring Old Dominion engineering graduates. "When I first came here, every place you went into [had] engineers from Virginia Tech. But I think over the last 25 years we've become at least equal."

In fact, at the two largest employers of engineers in the area, Newport News Shipbuilding and NASA Langley, ODU engineers comprise the largest alumni group.

Ash said the "blue-collar" composition of Old Dominion engineering students means that they have a reputation for one thing in the workplace: "They roll up their sleeves and go to work."

Despite the successes, challenges remained for engineering at Old Dominion University.

Enrollment had grown dramatically, and state funding was again threatened by budget cuts in the late 1980s. Worse, the specter of NASA grants dropping sharply threatened to severely limit what the school could do, both academically and through its research.

The threatened cuts merely caused ODU engineering's ingenuity to accelerate. Jim Cross found a willing partner in Old Dominion University's new president, James V. Koch. The two men with their strong personalities didn't always see eye-to-eye. But together, they helped the College of Engineering and Technology grow in ways no one could have anticipated.

Gene Hou

From Taiwan to Norfolk, With Two Names

During his thirty years of teaching mechanical engineering in the Frank Batten College of Engineering and Technology, Gene Hou has seen hundreds of students go through his classes, and they're his inspiration.

"I learn from students every day, even now. Not necessarily the knowledge from the book. But they ask me questions, they force me to think about why," said Hou, who arrived in Norfolk from the University of Iowa in 1983, with a less-than-perfect understanding of English. "When I started teaching here, there was a language barrier. English wasn't my first language. But the students were very good to me. They put up with me and they were patient with me."

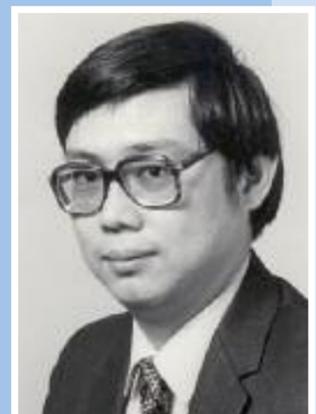
Many of those first students might not be able to find Hou now if they tried to look him up in the Batten College directory. That's for a somewhat amusing reason.

"I am from Taiwan; my name there was Jean-Win Hou," he said. Hou didn't realize that the traditional male spelling of his name in English was G-E-N-E. One day early in his career at Old Dominion, he was comparing

salaries between male and female professors. "Unfortunately, our female faculty members were paid a lot less. I worried that was happening to my salary, too," Hou laughed.

The following fall, students were greeted by a "new" professor named Gene, and Hou hasn't regretted a moment of his time at Old Dominion University.

"We're a small school with a small faculty, but there are a lot of students I'm proud of," he said. "[I] still teach undergraduate classes every semester. Those students, they want to get better. And if I can do a little bit to help them, that's what I want to do."



Jimmy Black

ODU Grads Make Mark Locally

Jimmy Black isn't shy about admitting that his favorite course at Old Dominion University was SCUBA.

The northern Virginia native fell in love with the beach when he came to Old Dominion in 1977, and made life-long friends on the second floor of Rogers Hall. He still has reunions with those friends every year, more than 30 years after graduating.

The 1980 electrical engineering graduate is proud of his school, and that pride has only grown in the years since he's left Old Dominion and founded BBG Incorporated, an electronic engineering design firm based in Suffolk. "It's been amazing watching that school transform," Black said.

He's president and senior engineer at BBG, and his friend and fellow Old Dominion graduate Joe Gander is vice president and senior engineer. Gander was on the ODU varsity sailing team, and though he was a few years behind Black, they were acquaintances at school. They didn't hatch their plan to go into business together until they met working for Unidyne, Gander's first job after graduation, Black's second.

Black said the company they cofounded has been involved in some exciting projects in the past couple of decades, including a video receiver built to fly to Mars, and a battery-powered GPS emitter

that helps police officers do an instant trace on a vehicle traveling at high speed. "We've had some fantastic opportunities, and we get to build things, something every engineer wants to do," Black said.

The company has also deepened its connection to Old Dominion University, hiring interns and full-time employees from the Frank Batten College of Engineering and Technology. Black is a member of the Batten College Engineering Advisory Board, and he and Gander endow a scholarship in the College. They support the environmentally themed engineering ECOConference every year.

"I've always been proud of ODU, it helped me for life," Black said. "But I feel even prouder as time goes by."

Black said the company they cofounded has been involved in some exciting projects in the past couple of decades, including a video receiver for a spacecraft built to fly to Mars, and a battery-powered GPS emitter that helps police officers do an instant trace on a vehicle traveling at high speed.



Jimmy Black, left, with fellow Old Dominion graduate and business colleague, Joe Gander.



CHAPTER 4

MAKING AN IMPACT



O.S
"X" SEE SHEET A702 FOR
ORNAMENTAL METAL
SCREEN ELEVATIONS AND
DETAILS INDICATED AS SUCH

MATERIAL LEGEND



PREFINISHED
SEAM



As the 1990s began, Old Dominion University was feeling the effects of an economy in recession. State support had dropped for higher education at the same time that enrollment had shot skyward. In regard to engineering at Old Dominion, it was a time when necessity became the mother of invention.

The working relationship between Jim Cross, dean of the Old Dominion University College of Engineering and Technology, and new ODU President James V. Koch was helped by the fact that they saw the university in the same terms.

Koch arrived from the University of Montana in 1990. Koch quickly deduced that a university of more than 15,000 students – with the least per-student funding of any public doctoral university in the state – couldn’t be all things to all people.

“I was very much an advocate of what I would call selective excellence,” said Koch. “I thought the university should concentrate its resources in fewer areas, and in five or six programs try to become national, or even international, leaders. I argued that would result in a halo effect, and through those programs, grow the entire university.”

In 1984, Cross had recognized that Old Dominion’s engineering college needed to emphasize its strengths, and poured much of his energy into building up areas where he felt that the University could make a difference, in terms of national research and community engagement. And he wasn’t shy about articulating where the university should place its emphasis.

It involved risks like the audacious plan for the College of Engineering and Technology to take over the historic NASA launch facility on Wallops Island, on Virginia’s Eastern Shore, which has evolved into the Mid-Atlantic Regional Spaceport.

The unusual marriage between public university and NASA facility came at a time when the federal agency was facing reduced budgets. A launch facility that had done pioneering work in the space program, NASA Wallops was deemed surplus at a time when the Kennedy Space Center in Florida was handling Space Shuttle launches – NASA’s primary emphasis at the time.

Engineering Management Professor Larry Richards suggested that Old Dominion University offer to take over the facility. There were challenges, not the least of which was the typical shortage of money. “But we pressed on, and developed a commercial spaceport on the south part of Wallops Island,” Cross said. “At one point it became too big for ODU, and the state took it over.”



Above: A wind turbine at the Full-Scale Tunnel at NASA Langley. Old Dominion’s College of Engineering and Technology managed this facility for a decade.

Opposite: The Virginia Commercial Spaceflight Authority Wallops Island launch facility on Virginia’s Eastern Shore.

The facility is now under the control of the state-led Virginia Commercial Space Flight Authority; Old Dominion University still has a seat on the Authority’s board of directors. Billie Reed, an engineering management professor who was executive director of the Authority since its formation in 1995, retired in November 2012. Dale K. Nash, a 29-year veteran of the aerospace industry, was appointed to serve as the Authority’s new executive director, beginning July 31, 2012.

Virginia Secretary of Transportation Sean T. Connaughton said Nash’s “years of experience in the aerospace industry will be a tremendous boost to the Authority as it works to become the number one commercial space port in the U.S. With his leadership, the Commonwealth can seize upon the tremendous advantages we have in the aerospace industry to grow the VCSFA and create much needed economic development and jobs.”

None of these advantages that Secretary Connaughton speaks about would even exist were it not for a timely partnership with Old Dominion University.

The College of Engineering and Technology also partnered with NASA in another unique way – taking over operation of the giant, historic Full-Scale Wind Tunnel on the NASA Langley campus. The tunnel had allowed researchers to gain a comprehensive understanding

“We pressed on, and developed a commercial spaceport on the south part of Wallops Island.”

– Jim Cross



Mission to MARS

On Virginia's Eastern Shore

In retrospect, it still seems like a pipe dream.

In the early 1990s, Old Dominion University had more than 20 years of a research partnership with NASA. But a mid-sized public university leading a multimillion-dollar effort to blast things into space? Impossible.

Yet in the early 1990s, that's exactly what Old Dominion University did.

At a time when NASA was looking to shed costs, engineering management professor Larry Richards heard about plans to mothball the historic Wallops Island launch facility on Virginia's Eastern Shore. Created by NASA's predecessor agency, the National Advisory Committee for Aeronautics, the facility had been pivotal in the U.S. effort in the Space Race in the 1950s and '60s. Project Mercury capsules had been tested at the site in support of NASA's manned space flight program.

Jim Cross, then-dean of the Old Dominion University College of Engineering and Technology, said Richards thought Old Dominion University could take it over.

"They were interested in ODU coming up there and providing graduate courses, and providing other assistance in the operation," Cross said.

"During the course of the discussions, the possibility of a commercial spaceport surfaced. So we started really hammering on that. Larry Richards and I spent a lot of time trying to develop the idea."

After the idea was more complete, Richards and Cross brought it to then-Old Dominion President James V. Koch. "He thought, 'My God, that might work,'" Cross said.

In 1992, Old Dominion set up its Center for Commercial Space Infrastructure to apply for dual-use grants, allowing both military and government, as well as commercial, launch capabilities.

Koch agreed it was an unusual venture for a public university. "It's different, for sure. But lots of universities have research parks. We simply created a research facility for our aerospace engineering program," he said. "It was a great opportunity to do research, and also make an impact in terms of economic development."

In 1992, Old Dominion set up its Center for Commercial Space Infrastructure to apply for dual-use grants, allowing both military and government, as well as commercial, launch capabilities. The challenge for Old Dominion was that the market for commercial spaceflight had to be built from scratch. Historically, blasting objects, aircraft and rockets into space had been done only by NASA and the military.

Oktay Baysal, current dean of the Batten College of Engineering and Technology, said the first opportunity explored was the Iridium Project, an effort to offer cheaper satellite telephone technology to compete with cellular phones by launching a network of lower-altitude satellites.

"But then, [advancements in] cell phones killed them. Iridium went belly-up. The customer we were counting on disappeared," Baysal said.

Still believing in the value of the commercial spaceport, the Old Dominion College of Engineering dispatched two faculty members from its engineering management department, Billie Reed and Wayne Woodhams, to generate other commercial opportunities. "We put them on Colley Avenue in some shack, and we said, 'This is your office.' That's all we could afford," Baysal said. Old Dominion would pay the salaries of the two Spaceport directors for several years, investing belief in the initiative.



With Old Dominion's College of Engineering and Technology underwriting the salaries, Reed and Woodhams built a customer base, starting with a 1996 agreement with the United States Air Force. A year later, NASA began to provide financial support again in what was now known as the Mid-Atlantic Regional Spaceport.

The location of Wallops Island, 1,000 miles north of the Kennedy Space Center in Florida, has proven to be crucial for the U.S. Space Program. Its different launch orbit provides easier access to the International Space Station.

The Commonwealth of Virginia soon recognized the value of a commercial spaceport inside its borders. It became a partner in the spaceport, creating the Virginia Commercial Space Flight Authority (VCSFA).

Today, the VCSFA is a state facility, rolled under the Secretary of Transportation. Reed retired in November 2012 as the Authority's executive director. Baysal said it was never Old Dominion's intention to operate a commercial spaceport in perpetuity.

"Before, the state was looking at this as experimental knowledge that's being developed. Now that it's working as a commercial spaceport, this is just like the port, rail, and roads," Baysal said. "We conceived it, we developed it, we did the hard work behind it, sustaining it while resources were extremely rare. We showed that it was successful, but now we gave it back."

Baysal continued: "Universities don't run ports; they don't run spaceports. But we demonstrated that it is doable. We said, 'Hey, we're a state institution, whatever we do for our own state, this is a payback.'"

Opposite: A wide-angle view of an inert Minotaur V launch vehicle is erected on the Mid-Atlantic Regional Spaceport's Pad OB at NASA's Wallops Flight Facility in Virginia.

Photo courtesy of NASA Wallops/Jackie Adkins

of aerodynamics, testing everything from air-planes, to space capsules, to a nuclear submarine.

Taking over operation of the facility in 1996, Old Dominion researchers tested everything from race cars, to stop signs, to a replica of the Wright brothers' plane, before the facility was decommissioned in 2009.

"I thought we had significant opportunities in aeronautics and aerospace with these facilities so close by. We had a track record with NASA Langley as well," Koch said.

There were challenges in taking over the facility, not the least of which was resistance from some NASA officials, but Cross said the opportunity was worth the risk. "We proved them wrong, is what we did," he said.

The emergence of Old Dominion University – and Hampton Roads – as a modeling and simulation hub was another example of the College of Engineering and Technology striding confidently into the unknown. The story of the creation of the Virginia Modeling, Analysis and Simulation Center – and Old Dominion's modeling and simulation engineering education from undergraduate through post-doctoral – is as unlikely as the creation of the Spaceport.

However, the Spaceport came about when NASA was looking to shed costs. The foray into modeling and simulation began when the U.S. Department of Defense was investing in modeling and simulation as a training tool, and needed an academic partner. A personal relationship, combined with bold investment in the mid 1990s, allowed Old Dominion to emerge as a leader in higher education modeling and simulation research.

"We had no background in what was being called modeling and simulation. Actually the computational things we did were in fact modeling and simulation, aerodynamics modeling. But it became much more than that," Cross said.

Since the 1980s, the U.S. military had been beginning to substitute simulations for live-action military training exercises, as a cost savings.

Langley Full-Scale Tunnel

Batten College Shapes a Piece of History

It was like a baseball player getting the keys to Wrigley Field, or an opera singer getting a job at La Scala.

Mankind recently began its second century of flight. For much of its first century, there were few facilities more important to the development of flight than the massive, full-scale wind tunnel at NASA Langley. And for more than a decade, that tunnel was operated by aerospace engineers from Old Dominion University.

“That was a very fun experience,” said Drew Landman, professor of mechanical and aerospace engineering with the Batten College of Engineering and Technology, one of several faculty members who worked at the historic facility while Old Dominion managed it. “You’re awe-struck by how big it is. It was just huge.”

Construction of the Full-Scale Tunnel by the National Advisory Committee for Aeronautics began in February 1930, in a swampy corner of Langley Field. The entire complex cost almost \$1 million at the time. When it formally opened in late May 1931, its test section measuring 30 feet high, 60 feet wide and 56 feet long made it the largest wind tunnel in the United States.

For almost 65 years, NASA Langley’s Full-Scale Tunnel (LFST) allowed researchers of aerodynamics to gain a comprehensive understanding of the effects of air flow and air resistance on objects ranging from World War II fighters, to the Mercury space capsule, to the fastest submarine in the world. The LFST helped generations of aircraft fly more efficiently.

But the end of the Cold War, followed by deep cuts to NASA’s budget, caused the aging facility to be shuttered

by NASA in October 1995. Old Dominion University researchers had been doing work on the NASA Langley campus for almost 30 years. Suddenly, this giant facility, a National Park Service National Historic Landmark, literally dropped out of the sky for their use.

Jim Cross, former dean of the College of Engineering and Technology, said the opportunity arose in a peculiar fashion. Negotiations for Old Dominion to take over operation of the much smaller (but also mothballed) Transonic Wind Tunnel at NASA Langley had fallen through.

Disappointed with the news, Old Dominion officials were stunned with the offer that came next from then-NASA Langley Director Paul Holloway.

“We went to the director to discuss the situation with him. He said, ‘Well, we’re about to shut down the Full-Scale Tunnel, what would you think of that one?’” Cross said. They didn’t have to think twice.

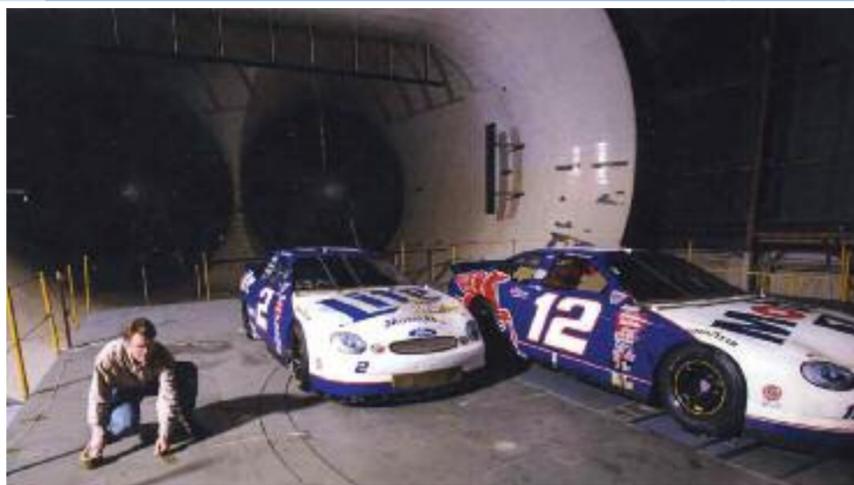
After somewhat acrimonious negotiations over the handover, as many NASA employees were uncomfortable with their historic wind tunnel being operated by someone else, an interim operating agreement was signed on August 1, 1996. A year later, Old Dominion researchers took control of the facility, and realized just how much work needed to be done to make the LFST able to do aerodynamics testing again.

“The deck was stacked very heavily against us. They stripped the place, took everything out of it. Even things like wall outlets for power. They did everything they could to dissuade us from doing it,” Cross said.

Once work began in earnest, Old Dominion aerospace engineers rebuilt the testing facility. Cross said without the work of Landman and Colin Britcher, Old Dominion professor of mechanical and aerospace engineering, the LFST would never have operated again.

Left: The chamber of the Langley Full-Scale Tunnel was used by Old Dominion University engineers to test everything from garden sheds to NASCAR racecars.

Opposite: When it opened in 1931, the Langley Full-Scale Tunnel was the largest test facility of its kind in the United States.



“The first year, we set about trying to make the thing run, just physically run the plant and try to get it calibrated. We had to see exactly what it was we had, and develop all of the instrumentation,” Cross said.

Another obstacle that the Old Dominion team faced was the rule (eventually rescinded) that researchers couldn’t test anything involving airplanes, out of fear the competition would hurt NASA’s existing wind tunnel facilities. “They thought they were going to kill us with that,” Cross said. “So we tested garden sheds, we did traffic signs, you name it.” If there was a potential client interested in wind-testing a product, the Old Dominion team made certain to close the deal.

Facing a budget crunch, Cross went further afield.

He took a trip to Charlotte, North Carolina and knocked on the doors of NASCAR race teams. “I convinced one team, Penske Racing, to come up to the tunnel, and see what we had. They spent a day and a half with us. At the end of the day, they contracted with us for \$250,000,” he said. Eventually, 33 of the 40 NASCAR teams came to do testing at the tunnel.

NASA, in due course, realized the value of the LFST as an aeronautical facility, opening it up once again to airplane testing. That led to more history visiting the tunnel in 2003.

On the hundredth anniversary of the Wright brothers’ December 17, 1903 inaugural flight, Ken Hyde, who spent more than a decade trying to understand the secrets behind their pioneering flight success, brought a reproduction of the Wright Flyer to test in the LFST as part of the Wright Experience, a re-enactment of the life-changing event sanctioned by the descendants of the Wright brothers.

“We met historians, the re-enactment team, pilots,” Landman said. “That was a really fun period. We published a lot of stuff, which was of great interest, in part because the Wrights were a little bit closed in what they would allow people to see. There were never full performance tests done in the aircraft because there was no opportunity.”

As tests continued, and the Old Dominion team demonstrated its ability, NASA began to rely on the LFST once again. A Center for Experimental Aeronautics was created, and Old Dominion researchers partnered



with researchers from Florida State, putting many NASA researchers through training on how to conduct experiments.

Old Dominion’s plans for the wind tunnel were brought to a halt in September of 2003 with Hurricane Isabel, which brought four feet of water into the facility and shut it down for six months. It opened again, and testing resumed, but its days were numbered.

The nationwide trend away from physical prototype testing in wind tunnels also shone a spotlight on the timeworn facility. With empty wind tunnels being closed by NASA across the country, an aging structure on flood-prone land was an easy target, no matter how historic. Still, the planned closure was met with dismay from its former clients, including Ken Hyde of the Wright Experience, who wrote state legislators asking that the historic facility be preserved.

The facility was decommissioned permanently in the fall of 2009, and demolition started the following January.

Oktay Baysal, now dean of engineering at ODU, said each center or institute or research project is founded for a certain mission. “When that mission is accomplished, we roll it off and give a chance to new enterprises,” he said.

The Langley Full-Scale Tunnel was one such mission for Old Dominion, and when NASA Langley informed the school it was proceeding with a previously scheduled demolition, its time was up.

“Here was another successful chapter added by ODU engineering to the proud history of a national landmark,” Baysal said.

For the first half of flight’s first century, there were few facilities more important than the massive, full-scale wind tunnel at NASA Langley. And for more than a decade, that tunnel was operated by aerospace engineers from Old Dominion University.



In October 1994, the Department of Defense set up a war-gaming enterprise center in nearby Suffolk, known as the Joint Training, Analysis and Simulation Center (JTASC). An official for JTASC, a civil servant named Gene Newman, made a presentation that fall to senior administration officials at Old Dominion University. Through an existing professional relationship with Roland Mielke, then-chair of the department of electrical engineering at Old Dominion, Newman proposed that Old Dominion take the lead in providing the academic support to JTASC as they developed new simulation training technology.

Mielke and Newman had an ally in Cross, and another one in Koch. The president actually funded the first year of the nascent research project – which would become the Virginia Modeling, Analysis and Simulation Center – with \$500,000 of university money that wasn't readily available.

“It really wouldn't have happened without us, as a university, making it a priority,” Koch said. The university's investment “came at a time of really tight budgets. But it's been substantially successful – successful in the creation of lots of jobs, and in the growth of this university. We took a risk and it paid off.”

Other off-campus alliances were formed in these years with the Thomas Jefferson National Accelerator Facility in Newport News, and with the Virginia International Raceway in Danville. It continued the pattern of the College of Engineering and Technology looking beyond

Right and opposite: Old Dominion has become one of the leading research universities in the modeling and simulation discipline, moving boldly to meet research needs of the Department of Defense, and branching into other fields of modeling and simulation research, from transportation to health care.”



the borders of the University's campus for opportunities to do research and help spur economic development in the region.

There were accomplishments on campus. A civil engineering student, Samantha Salvia, became Old Dominion University's first – and still only – Rhodes Scholar in 1996.

Salvia, a native of Norristown, Pennsylvania, was a heavily recruited field hockey star who said she picked Old Dominion because officials at the university promoted their engineering department as much as they sold their team. She helped the team win a national championship in 1992 and also played on the U.S. National Team. Salvia earned a master in science from Stanford after returning from Oxford, and today is an environmental engineer in California.

In 1997, new Dean Bill Swart came to Old Dominion University from the Newark College of Engineering-New Jersey Institute of Technology.

Swart was impressed with the different forays into research and partnerships that Old Dominion had undertaken, but as an industrial engineer who had made a career of helping things work better, felt like operations of the College of Engineering and Technology needed to be more efficient. “There were some pieces in place, but they had to be better utilized,” Swart said.

In addition to growing the program – student credit hours in the college grew by 23 percent in his four years as dean, and annual

A personal relationship, combined with bold investment in the mid 1990s, allowed Old Dominion to emerge as a leader in higher education modeling and simulation research.



Modeling and Simulation

An Opportunity Seized

With the conference room at the Virginia Modeling, Analysis and Simulation Center (VMASC) filled to capacity, Virginia Governor Bob McDonnell stood and marveled before a crowd full of industry leaders from across the United States about how far modeling and simulation had come.

"I remember not so long ago when you talked about modeling, it was [about] a person in tight clothes walking down a runway," McDonnell said wryly.

The governor had been invited to the VMASC campus in Suffolk as the keynote speaker at the annual National Modeling and Simulation Coalition business meeting. He told the audience that the general assembly is keenly aware of how modeling and simulation has grown as a discipline, and as an economic engine, in the region.

"It's a real source of pride to have [VMASC] in Hampton Roads, and really in Virginia, because it's a statewide and regional asset," McDonnell said.

Almost 20 years ago, a combination of luck, boldness and determination began the process of turning Old Dominion University, and particularly VMASC, into one of the nation's leading university modeling and simulation research centers.

It started with a strategic shift by the United States military in the 1980s. Because of cost considerations, all branches of the military moved away from live-action military exercises into practice drills done with virtual ships, planes and soldiers.

At the same time, Old Dominion Director of Military Activities Captain Dick Whalen, USN-Ret. and President James V. Koch were eager, in a time of tight budgets for higher education, to seek opportunities for military partnerships.

In response to the military's increased need for modeling and simulation, a war-gaming enterprise center, staffed with 100 military and government contractors, was set up in Suffolk in October 1994, across the Elizabeth River from Old Dominion University.

The Joint Training, Analysis and Simulation Center (JTASC) was charged with developing the processes and procedures, workforce and facility to conduct joint simulation training exercises. But there wasn't the local workforce, or any institution of higher learning in the country equipped to train them and satisfy JTASC's academic needs. Whalen invited Gene Newman, a senior civil servant from the Suffolk facility, to address

senior Old Dominion administration about what training requirements the new center would have.

Jim Cross, then-dean of the College of Engineering and Technology, attended the presentation.

Cross said the engineering field was already using modeling as part of many of its experiments, but what the military was looking for was something different. "I thought to myself, 'What the hell is modeling and simulation? What does the military think that was?' Because we were going to do it," Cross said.

Roland Mielke, chair of the electrical and computer engineering department, was charged with seeing what opportunities could be created between the College of Engineering and Technology and the military.

Mielke had the advantage of having known Newman for a number of years. That fall semester, Mielke and Newman worked on a proposal inviting the University to take the lead in providing academic training to military personnel.

"[Newman] was clever enough to realize that if he was going to build a modeling and simulation enterprise in the area, he was going to need academic support," Mielke said. "The other schools didn't pay attention, because they were further away, and it wasn't clear it was going to amount to all that much. But we did pay attention."

Mielke said President Koch was extremely important in the formation of what would become VMASC. The state hadn't yet caught onto the potential of modeling and simulation, so Koch underwrote the initial funding from the university's budget.

"He front-ended the first \$300,000 or \$400,000 when the University didn't have a lot of money. That was a tremendous risk that he took," Mielke said. By the next year, the state had begun to invest in modeling and simulation at Old Dominion University, and McDonnell, on his visit, pointed out that the state government is the second-largest funder of VMASC.

As a modest operation, the first point of order was to hire a director. For that job, Mielke and Newman chose Tom Mastaglio, a retired artillery officer who was working in the then-hub of modeling and simulation, Orlando, Florida. "We stole a guy from industry down there. They were 15 years ahead of us, and they had the funding agencies from the army down there," Mielke said.

In the fall of 1996, Old Dominion University modeling and simulation operations began in the Tidewater Community College building in Portsmouth. "It was Tom Mastaglio as director, he brought me on as a technical director, and we had a secretary. That was VMASC," Mielke said.

VMASC formally opened in July 1997, and began to fulfill its mission of training modeling and simulation professionals, and providing the academic support for the emerging discipline. VMASC also emerged quickly as a favorite of grant-funding agencies, and not just military ones.

"We had a ball. We recruited over 100 corporate members in the time I was there. By the end of the third year, we were generating more contract dollars than any center or department at Old Dominion," Mastaglio said.

Just as important as the client service work, Old Dominion also invested heavily in modeling and simulation education. By the fall semester of 1998, the academic program was under way, with nine students admitted into a newly instituted master's program in modeling and simulation.

Soon after, a doctoral program was created, and the first recipient of a Ph.D. in modeling and simulation from Old Dominion, in fact from any university in the world, was a retired submarine captain named John Sokolowski. Sokolowski is now executive director of VMASC.

Sokolowski's entire academic career has been at Old Dominion University, so he has seen how modeling and simulation has evolved from straight subcontract work for the military to a far-reaching discipline, useful across myriad fields.

"It certainly had its roots in the military side of things, but clearly it has applications in just about any area you can think of. When we started to explore those different areas, the field became completely wide open," he said.

Modeling and simulation spans the campus as well. While VMASC grew, ODU engineering's Center for Advanced Engineering Environments (CAEE), founded in 2001, was building its own international reputation developing innovative technologies, strategies and approaches for advanced learning environments and networks.

"Its director, Ahmed K. Noor, Lobeck Chair and Eminent Scholar of Modeling, Simulation and Visualization, has written frequently about his visionary research into collaborative distributed engineering knowledge, and advanced learning technologies," said Oktay Baysal, current dean of engineering at ODU.

Baysal said Noor's writing has made the cover of 16 issues of Aerospace America magazine and Mechanical Engineering magazine, "which are circulated to hundreds of thousands of engineers all over the world."

With the creation of an undergraduate program in modeling, simulation and visualization engineering in 2010, ODU engineering also became the first engineering college in the country to offer a complete advanced education in modeling and simulation, from undergraduate through post-doctoral.

At the VMASC campus in Suffolk, researchers from disciplines ranging from transportation, to health care, to the social sciences, work collaboratively to solve problems and add to an ever-expanding body of knowledge. Sokolowski said there are as many as 40,000 modeling and simulation jobs available worldwide right now. He said Old Dominion has developed a reputation of providing skilled professionals to fill those positions.

"Our graduates are going all over the place. Clearly, there are many that are staying in Hampton Roads. But we've got people that have taken positions around the country. We have one graduate who actually went to the Hanes underwear company to start up a modeling and simulation group," he said.

This multi-disciplinary approach also served Old Dominion well when Joint Forces Command had its budget cut in a Department of Defense reorganization. VMASC got its start from Department of Defense funding, but has offset cuts to defense grants through new investments in fields like homeland security.

VMASC remains the place a sitting governor can come to offer praise, and speak about modeling and simulation as an asset to the entire state of Virginia.

"Here's how I see it: When you see computers, I see jobs. When you see solutions, I see tax revenue. So, that's a good partnership that we've got to keep going," McDonnell said.

Retired submarine captain John Sokolowski was the first recipient of a Ph.D. in modeling and simulation from Old Dominion, and from any university in the world. Sokolowski is now executive director of VMASC.





Old Dominion University's Rhodes Scholar, Samantha Salvia.

An initiative started under Swart was the development of the Applied Research Center, a facility constructed by the city of Newport News to leverage the research being done at the Thomas Jefferson National Accelerator Facility.

research expenditures more than doubled to \$11.4 million – Swart also attempted to improve the working climate for faculty and staff in the College.

He initiated regular college-wide faculty and staff meetings, and started morale-boosting events like the college-wide cook-out to kick off the year, and the international potluck dinner just before the Christmas holidays. "I really wanted to change the culture of the place, because there was so much potential there," Swart said.

Under Swart, ODU engineering began the process of launching enterprise centers, facilities created by Old Dominion University, but leveraging partnerships with local government and industry.

One such initiative started under Swart was the Applied Research Center (ARC), a facility constructed by the city of Newport News to amplify the research being done at the Thomas Jefferson National Accelerator Facility.

Old Dominion researchers such as Karl Schoenbach, professor and eminent scholar of electrical engineering, had been doing research collaborations involving the national test facility for atmospheric pressure plasma, the high-tech particle accelerator and free electron laser. In May of 2001, the high-tech ARC opened its doors, housing scientists and inventors from Old Dominion University, Christopher Newport University, the College of William and Mary, Norfolk State University and Jefferson Lab.

Created as an "enterprise center" of the College of Engineering and Technology, much like the Virginia Modeling, Analysis and Simulation Center, ARC provides university resources, such as faculty and student expertise, to meet industry and government needs.

At the dedication ceremony for ARC, Swart said it "makes it possible for Old Dominion to begin collaborative efforts with industry much sooner than would have been otherwise possible. The equipment will greatly facilitate the preparation of research proposals and the training of graduate students."

Now 11 years old, ARC is home to an interdisciplinary team of researchers working in materials science and laser technology, on scientific and technological problems in the areas of thin films, laser and plasma, and the newer fields of micro technology, nanotechnology and biomedical engineering.

ARC Director Hani Elsayed-Ali, professor and eminent scholar of electrical engineering at Old Dominion University, said after a little more than a decade, the span of research ranges from micro electronics and nanoelectronics, to solar cells, to laser and plasma technology.

"Our funding is very diverse, also, from NASA, from the National Science Foundation, the Department of Energy and several industries,"

Johnny Garcia

The Best Mistake He's Ever Made

Who are the people becoming industry leaders through modeling and simulation education at Old Dominion University? They're people like Johnny Garcia.

An affable Navy veteran from Texas, Garcia said it was pure chance – a "mistake" – that brought him into the modeling and simulation field, and into Old Dominion University's Virginia Modeling, Analysis and Simulation Center (VMASC). Some mistake. Seventeen years later, Garcia is founder of SimIs, Inc., an information technology services corporation headquartered in Portsmouth, and just 10 minutes away from his alma mater.

"It's been sometimes magical making this happen," Garcia said.

Brought to Hampton Roads by the Navy, Garcia was selected to the prestigious Seaman-to-Admiral program in 1994, around the time the Navy was downsizing. Simultaneously, Garcia heard that Joint Warfare Simulation and Training, part of what would become Joint Forces Command, was hiring.

Offered a job as a computer operator by the company now known as General Dynamics, Garcia was discharged from active duty. "I had never been exposed to simulations. That started my simulation career," Garcia said.

Showing real aptitude for his new vocation, Garcia was promoted from computer operator to computer engineer, developing the models himself. In those five years, Garcia became passionate about the science behind modeling and simulation.

In 2003, that interest and his job brought Garcia in contact with Andreas Tolk, professor of engineering management and systems engineering at Old Dominion's Batten College of Engineering and Technology. While he continued to work professionally, Garcia began his doctorate through Old Dominion's VMASC while also working closely with Executive Director John Sokolowski.

The fit was perfect between Garcia, a roll-up-his-sleeves problem-solver his whole career, and Old Dominion University. "ODU is different," he said. "A Ph.D. in modeling and simulation, any Ph.D., is about theory. What ODU did is take me out of that

theoretical thinking and put it in context. How was it going to be used outside of academia?

"It's great to show that what you're doing is valid or not valid, but show me an example. Build me something that's going to leverage that."

Now, Garcia presents his work at conferences around the world. "One of my opening lines is [a quote from George Box] that 'all models are wrong, some are useful.' This is true," he said. "You can't expect a model or a simulator to give you an answer. It helps you make better decisions with quantitative and qualitative data."

The expertise he gained also helped Garcia take the big step and launch SimIs in 2007. The company has grown to more than 40 employees, and the Hampton Roads Chamber of Commerce named SimIs as its 2012 Portsmouth Small Business of the Year. Garcia could take this business anywhere, but he said he wants to stay right here.

The key is education. He said the region needs to train modeling and simulation professionals to fill those highly skilled jobs. Garcia makes a point of hiring computer science and modeling and simulation engineering students, to give them hands-on experience while they get their degree, like he received back in the 1990s.

"When they graduate with their bachelor's degree, I want them to have experience. And it all has to do with the classes that our schools are providing," Garcia said.



Johnny Garcia and the staff of SimIs, Inc.

Elsayed-Ali said. “In the area of thin film fabrication and characterization, the expertise that we have puts us among some of the best universities.”

Also in 2001, Old Dominion University launched its foray into magnetic levitation (maglev) technology, seeking to do research to help turn maglev technology into a viable option for mass transit. In partnership with a private company, Old Dominion University erected a white test-track “guideway” on campus, which runs behind Kaufman Hall.

The initial partnership dissolved, but ODU engineering now leads research efforts on campus into maglev technology. Old Dominion researchers led by Thomas Alberts, professor of mechanical and aerospace engineering, reached an agreement to collaborate with researchers

from the Massachusetts company MagneMotion, Inc. in testing efforts of maglev technologies on the guideway.

In 2010, MagneMotion received a \$7.9 million grant from the Federal Transit Administration to test its patented maglev technology at Old Dominion.

In 2010, MagneMotion received a \$7.9 million grant from the Federal Transit Administration to test its patented maglev technology at Old Dominion. University researchers, along with MagneMotion, installed new track on a 150-foot portion of the guideway near the Folkes-Stevens Tennis Center at Powhatan Avenue.

The retrofitted track will allow MagneMotion to conduct a more comprehensive test of its maglev vehicle with help from Old Dominion researchers.

Not all the initiatives launched by the College in the 1990s and early in the 21st century have been as successful as the Virginia Modeling, Analysis and Simulation Center, but each foray

into a new field of research or enterprise brought its own expertise to a growing college.

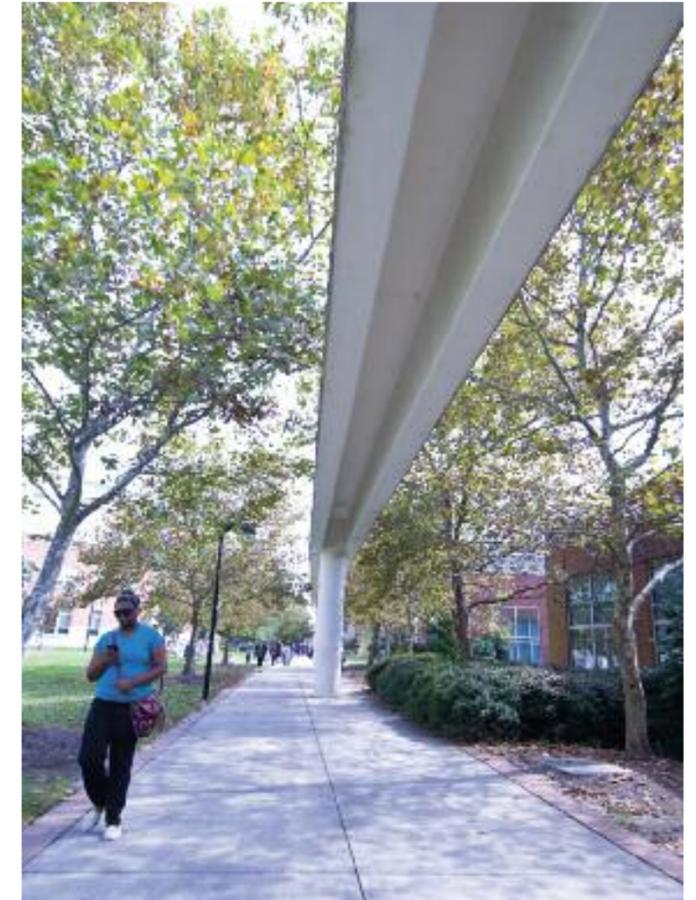
Far from being the unwelcome intruder in engineering higher education in Virginia, Old Dominion University was demonstrating that it belonged, and in some disciplines, that it was leading the way.

“I’m as proud of my time at Old Dominion as I am of anything I’ve done in my career,” said Swart, who left Old Dominion in 2002 to become provost and vice chancellor for academic affairs at East Carolina University.

The past decade has seen the fruits of these labors – of many talented and visionary contributors – blossom into what the College has become today.

Opposite: ODU was one of several universities who formed a research partnership in creating the Applied Research Center in Newport News in 2001.

Below and right: Research into magnetic levitation technology (maglev) continues, on an elevated guideway that has become a campus landmark.



Bill Swart: The Efficiency Expert

Swart's Industry Background Helped a Growing College Run More Effectively

When you go through a fast-food drive-through, at some newer locations, you pay at the first window, and receive your food at the second window.

It's an innovative efficiency idea, and it was the brain-child of Bill Swart, former dean of the Batten College of Engineering and Technology.

"I was an industrial engineer at Burger King Corporation, and part of my charge was to increase productivity of Burger King restaurants," said Swart, who was at Old Dominion from 1997 to 2002.

Among the innovations that were brought to the fast-food industry by Burger King during his time with the company were the two-window drive-through, and the re-location of the drink bar from behind the counter to where customers could access it. "These were changes designed to re-engineer the fast-food restaurant, and they made us more efficient," Swart said.

When he arrived at Old Dominion University in 1997 from the Newark College of Engineering-New Jersey Institute of Technology, where he was dean, Swart said he needed to do some of the same "re-engineering" of Batten College. There had been tremendous growth in the previous decade, forays into areas where the College had never been before. But Swart said his charge was to make the whole thing run a little better.

"There were some good things being done at Old Dominion, but it basically needed someone to provide a vision and a purpose," Swart said.

His initial analysis of strengths, weaknesses, opportunities and threats showed Swart that the College of Engineering was underplaying its hand, not emphasizing the things it was doing better than anyone else.

His action plan included continuing the strategic investments in the centers that had been launched in the previous few years, such as the Virginia Modeling, Analysis and Simulation Center in Suffolk.

"This region and this university are full of opportunities if in fact you take advantage of them," Swart said. "The modeling and simulation area was a very strong

opportunity for us, but even though we had VMASC, we didn't have the academic program." At the time Swart was dean, Old Dominion added graduate engineering programs in modeling and simulation.

Old Dominion University also brought its engineering management education to the United States Navy, providing a CD-ROM-based master's degree in engineering management to senior officers, including most of the submarine fleet. "Admiral [Michael] Mullen of the Joint Chiefs of Staff was one of our graduates," Swart said.

Swart said he's also proud of the creation of the "Womengineers" program at Old Dominion University, to create a college-wide supportive environment for women to succeed in engineering. Today, Old Dominion has the largest percentage of female engineering students of any university in the state.

Swart is currently a professor in the department of marketing & supply chain management in East Carolina's College of Business. A decade after he left Norfolk, he takes great pride in helping position Old Dominion's engineering college for greater success in the years ahead.

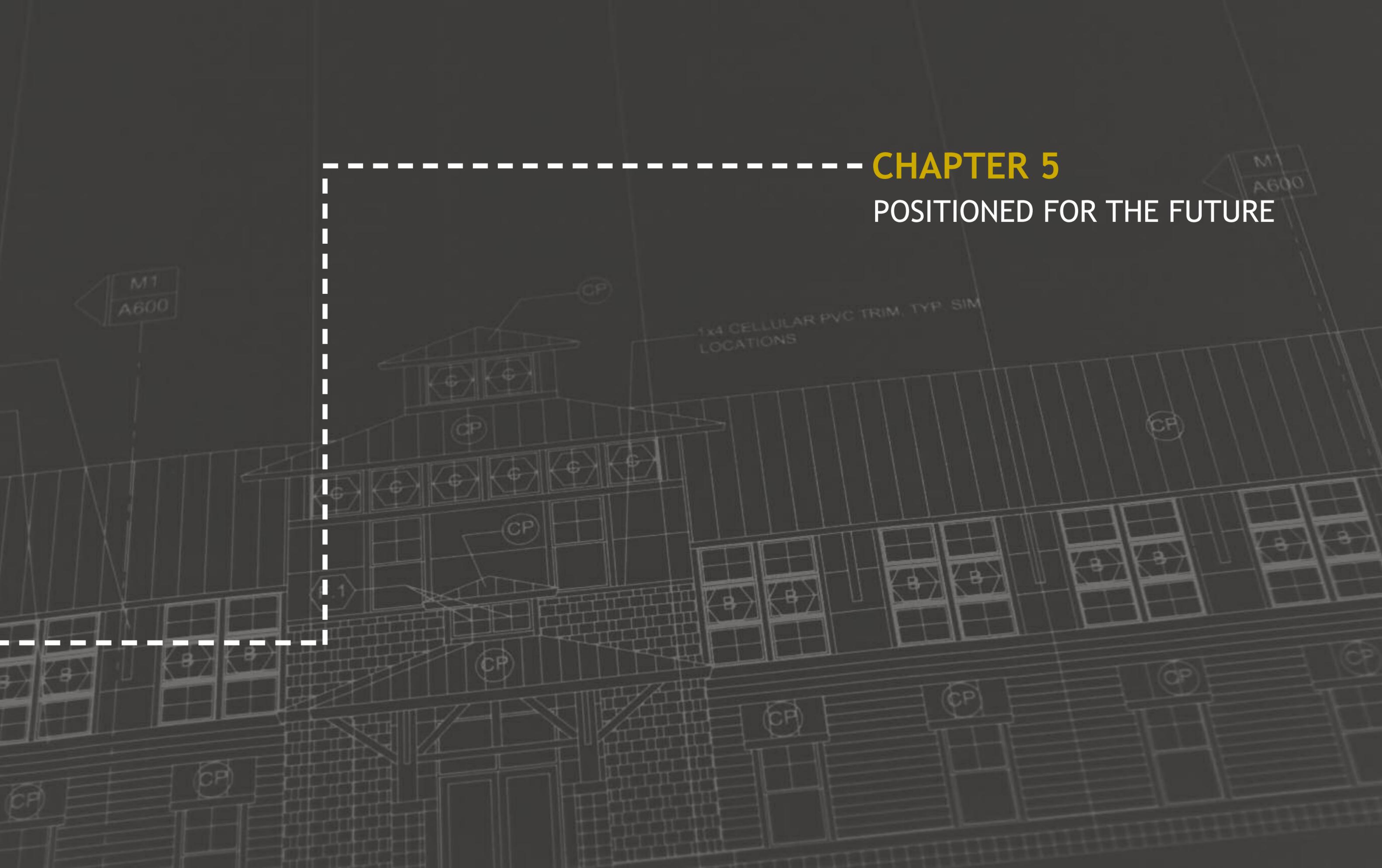
"It was an exciting time at Old Dominion," he said. "It was wonderful to be part of helping create such a dynamic, strong engineering program. It's not your run-of-the-mill program. It's got a proud past and an exciting future."

"This region and this university are full of opportunities if in fact you take advantage of them."



CHAPTER 5

POSITIONED FOR THE FUTURE



Frank Batten gave the largest single gift in campus history, \$32 million, and continued to raise money for the school until his death at age 82.

As a metropolitan doctoral research university, Old Dominion University has tried to serve its community in many ways – through world class faculty research, through innovative and engaging teaching, and through partnerships with business, government and its community.

One of six colleges comprising the 25,000-student university, the engineering school envisioned by Lewis Webb – now known as the Frank Batten College of Engineering and Technology – is playing an important role as the university grows in reputation and accomplishments.

After 50 years, engineering at Old Dominion is worlds removed from the instruction given to returning war veterans in tar-paper shacks on the field adjacent to Hampton Boulevard. And the future looks brighter still.

The naming of the College after Frank Batten, the first rector of the Old Dominion University Board of Visitors, was seen by many veteran faculty members as long overdue. Batten, who created the media company that introduced The Weather Channel to the world, had guided the Norfolk Division’s break from the College of William and Mary, and through its first eight years, during which it achieved university status.

Webb was the public face of the campaign to found an engineering school in Norfolk, but Batten played a vital role behind the scenes, influencing his friends in government and industry to support this young college’s plan for a top-notch engineering school.

In 2003, he also gave the largest single gift in campus history, \$32 million, and continued to raise money for the school until his death in September 2009.

In Batten’s obituary in The Virginian-Pilot newspaper, former Old Dominion President James L. Bugg said nobody has meant more to Old Dominion than Frank Batten: “In terms of time and talent and money and everything else, Old Dominion owes him a tremendous debt of gratitude.”

By the start of the 21st century, the Engineering College Frank Batten had a hand in creating was taking giant steps.

In 2001, the engineering fundamentals division was created, setting up a curriculum of general courses to help new engineering students learn through projects and “by doing,” a hands-on application of engineering principles, rather than just theory. “It inverts the classical approach – starting the engineering education with

exploratory projects, and connecting the acquired knowledge with the capstone projects at the end,” said Oktay Baysal, who was then serving as the associate dean for academics and research.

“It’s project-based learning – project-focused, team-conducted, leading to learning inside and outside the classroom. The new Engineering Systems Building is designed to support these new curricular approaches with its project studios.”

Baysal became interim dean of the College after Bill Swart’s departure in 2002. A professor and eminent scholar in aerospace engineering, and an Old Dominion faculty member since 1982, Baysal sought to build on the professional relationships he’d formed with his colleagues to clear the way for them and empower them to continue to advance Old Dominion University through research. “I had been in the trenches with them,” Baysal said.

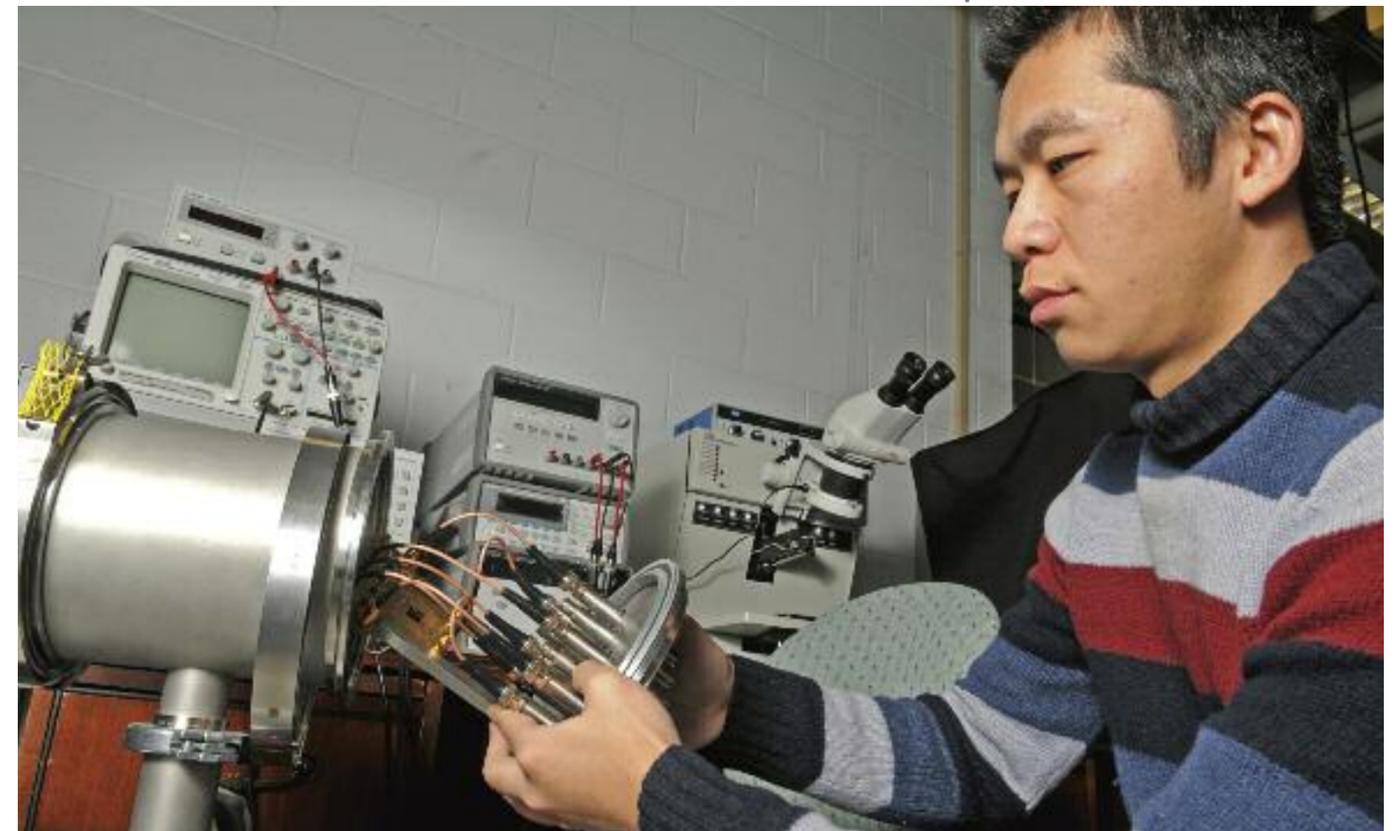
“We created a goal-oriented research infrastructure with defined thresholds to spiral up the ladder of recognition,” Baysal said. When a research breakthrough shows promise, or an area of regional need is identified – such as sea level rise or renewable energy – a cluster is formed, open to interested researchers to access in an unstructured fashion.

“The clusters then provide ideas and recommendations for new people to recruit, new programs, research labs, or even institutes,”



Above: Oktay Baysal, dean of the college of engineering and technology.

Below: A student at the Applied Research Center.



Bioelectrics

Old Dominion a World Leader

Could a cure for cancer be hidden somewhere in the laboratories of Old Dominion University's Frank Reidy Center for Bioelectrics?

The world-renowned research center has assembled talent from all over the globe inside Innovation Research Park @ ODU, applying applications of short-duration, high-voltage electricity to biological cells, a procedure known as bioelectrics.

Reidy Center Director Richard Heller, who came to Old Dominion in 2009 from the University of South Florida, characterizes the work in this emerging field as a race. "And there are a lot of people chasing us now, from all over the world," he added.

Old Dominion emeritus engineering professor Karl Schoenbach was one of the first researchers in the world to realize this. But the applications for so-called pulsed power technology go far beyond even what he envisioned when he became interested in the field more than 40 years ago in Germany.

Schoenbach came to Old Dominion University in 1985, when the military was still the primary user of pulsed power applications, also known as plasma physics. The decline of military research expenditures with the end of

the Cold War, however, meant that bright research minds like Schoenbach needed to find other applications for the technology.

With little funding, the researchers applied the millionth-of-a-second pulses of high-power electricity to mammalian cells, and found some startling effects. "We found out we can kill cancer cells. So this was the beginning," Schoenbach said.

"It was in the early 1990s that there was a time when new ideas popped up," Schoenbach said. "We wondered if it was possible to escape from a relatively narrow range of pulsed power applications, into commercial applications, into medical applications. We had at that time all the expertise, all the systems we needed to test new concepts. I said, 'Let's try it.'"

Schoenbach's first project was done in collaboration with the College of Sciences, using pulsed power to prevent biological pollutants from spreading from the ballast water of container ships. That led to further experiments involving water treatment and the suppression of certain bacteria.

But it was Schoenbach's partnership with researchers from Eastern Virginia Medical School, including Stephen Beebe and Michael Stacey, who are both now at the Reidy Center, that

demonstrated for the first time the incredible potential of the technology for human health.

With little funding, the researchers applied the millionth-of-a-second pulses of high-power electricity to mammalian cells, and found some startling effects. "We found out we can kill cancer cells. So this was the beginning," he said.

A grant from the U.S. Air Force helped Old Dominion expand the field and bring other researchers to Norfolk, including Mounir Laroussi from the University of Tennessee. It also helped Old Dominion host the first worldwide bioelectrics conference in 1999. More than 100 researchers attended.

Then, in 2002, Old Dominion was named the lead university on a \$5 million Multi-University Research Initiative Grant, which allowed for collaborations with other institutions in Germany, Japan and across the United States.

ODU engineering Dean Oktay Baysal said Schoenbach mentioned at a meeting he was having trouble keeping up with the demand of his many research grants. "Here

we had a case where a bright and successful scholar was reaching a time limit. I suggested establishing an enterprise center for bioelectrics," Baysal said.

At first, Schoenbach was hesitant. But Baysal said the creation of the enterprise center allowed him to put more grant revenue into administrative and support staff. "That very quickly led to more recognition, more people and more solutions," Baysal said.

Prominent local businessman and benefactor Frank Reidy was one of those who became very interested in the work being done at Old Dominion. His support of the initiative helped shape what is ultimately known as the Frank Reidy Center for Bioelectrics.

Old Dominion researchers were gaining prominence for their work combining high-voltage electricity and biology, something Schoenbach, a physicist, couldn't have imagined doing. "Not in my lifetime," he said. "I thought it was an exciting field, and a good field, because it uses technology to help society in positive ways. But any research area where two disciplines meet is typically where the new inventions are made, where new things can be created."

Schoenbach and Laroussi were both identified in 2001 by BusinessWeek magazine as experts in the emerging fields of bioelectrics and cold plasma. In 2006, Laroussi unveiled his plasma "pencil," a hand-held device that emits a colored stream of plasma gel shown to kill germs without harming human tissue. Laroussi, director of Old Dominion University's Laser and Plasma Engineering Institute, is now researching the use of cold plasma to kill human leukemia cells.

The Reidy Center has exploded in size, having grown to more than 50 employees, and is one of the most prolific centers on the entire Old Dominion campus in securing grant funding.

Schoenbach said that wouldn't have been possible without the support of the university, and people in the community like Frank Reidy. "It's much easier to stay in the community where you have a name. So you need people who believe in you, and we've had that, both at the university and in the community," he said.

In 2009, Reidy Center Director Heller, who [while at South Florida] was a pioneer in the field of electrogene therapy, reported safe and effective treatment of skin cancer in the first-ever human trial of a gene-transfer process assisted by short pulses of electricity.

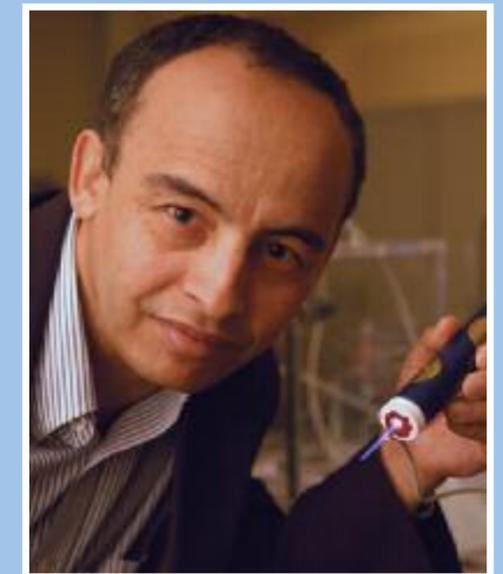
Michael Kong, one of the world's leading researchers in the biomedical applications of cold atmospheric plasmas, joined the Reidy Center in fall 2012 from



Above: Innovation Research Park @ ODU, home of the Frank Reidy Center for Bioelectrics.

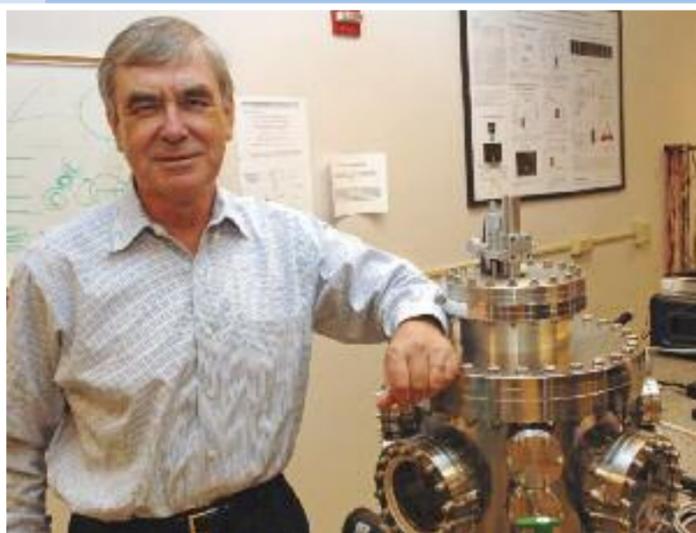
Loughborough University in England. To Heller, each new researcher adds a dimension to what the Reidy Center and Old Dominion can do.

"The potential for this technology is endless," Heller said. "I've said this before and I do believe it: we haven't even got into the meat of it yet. There are just so many different things that can be done. This is why the expansion is so critical, to bring in some additional people, just to have good brains to be a part of the conversation. Because every time we talk about something, we come up with another concept we can do."



Above: Mounir Laroussi, with his plasma pencil.

Opposite: Karl Schoenbach.





Baysal said. “We seek to leverage opportunities, or seek the shoulders of the giants that we can rise above.”

Some institutes can grow to become a center of the Batten College. When a center is deemed to benefit the disciplines outside engineering, it “graduates,” Baysal said, becoming a university-wide center, or even a state-wide entity.

“We provide more revenue-sharing opportunities to empower the directors,” Baysal said. “This is the model we have employed for successes for the ODU Business Gateway, Virginia Modeling, Analysis and Simulation Center, and the now-state-run Mid-Atlantic Regional Spaceport, overseen by the Virginia Commercial Space Flight Authority.”

Old Dominion University continued to experience a difficult financial climate. Baysal said the College was asked several years in a row to cut its already slim operating budget. “It was time to think of different and bolder models to replace the disappearing state dollars,” he said. “The solution was clear: more sponsored programs through competitively earned external funds, contract education through asynchronous distance learning, and development through philanthropy.”

The College endowment is 13 times larger than it was in 2002, now around \$30 million. That has allowed nine internationally recognized scholars to be recruited into newly established endowed professorships, and means a larger percentage of recruitment costs and salary of permanent faculty and staff comes from non-state and non-tuition funds. “In fact, less than one-half of the funds supporting ODU

Below: Lee Belfore leads a tour of the Virginia Modeling, Analysis and Simulation Center



engineering’s annual expenses comes from tuition and the state appropriation,” Baysal said.

That has proved to be a formula for success.

Karl Schoenbach, professor and eminent scholar of electrical engineering, received a \$5 million Multi-University Research Initiative Grant in 2002, which allowed for collaborations with other universities in the new research field of bioelectrics.

Local businessman Frank Reidy was so impressed with the potential of the research in many fields that he donated the money to start what has become the Frank Reidy Research Center for Bioelectrics. Ten years after its formation, the Reidy Center is a world leader.

Having started one of the first engineering management programs in the country in 1987, the Batten College quickly forged strong links with all the military branches, whose local commanders quickly saw value in the graduate engineering courses offered by Old Dominion, and the innovative ways they could be delivered.

A program to provide an engineering management master’s degree via CD-ROM to officers in the U.S. Navy’s submarine fleet was an instant, runaway success, enrolling more than 250 submarine officers within a few years.

Chuck Keating, an engineering management professor at Old Dominion, had made his own connections with military operations, doing grant-funded research in the emerging field of system of systems engineering.

In 2001, after the attacks of September 11 made evident the need for greater understanding of the complex workings of interconnected engineering networks, Old Dominion University created the National Centers for System of Systems Engineering (NCSOSE). With Keating as director of NCSOSE since its inception, Old Dominion faculty researchers have provided vital research in complex system governance to military and government operations, and have helped train the next generation of system of systems engineers.

In the realm of keeping America safe, ODU engineering has also invested in complex vision and video research. Vijay Asari, who came to Old Dominion in 2000 as an associate professor in electrical and computer engineering, spent the next three years developing a computer-based facial image detection and recognition system.

Asari’s research, funded by the Department of Defense and Department of Homeland Security, helped lead to the creation of the Computational Intelligence and Machine Vision Laboratory (Vision Lab). Now under the direction of Professor Khan Iftekharuddin, who came to Old Dominion in 2011, the Vision Lab focuses on developing new algorithms for real-time applications of machine vision technology,

The College endowment is 13 times larger than it was in 2002, now around \$30 million.

“In fact, less than one-half of the funds supporting ODU Engineering’s annual expenses comes from tuition and the state appropriation.”

– Oktay Baysal

The Turks

An "Accidental" Pipeline

After three days on the road, the very day that Okta Baysal drove into Norfolk in 1982 to start his job as an assistant professor at Old Dominion University, his car was totaled on Military Highway. "That was the welcome to Norfolk," he said.

With his belongings strewn all over the road, Baysal called the two telephone numbers he had – one for mechanical engineering professor Sid Roberts, and the other for a young civil engineering professor named Osman Akan.

"They both came and helped me," he said. "I ended up forming a great family relationship with Sid Roberts. My wife is in his wife's book club. Osman has become one of my best friends. He's a man of huge integrity, and one of the smartest men I've ever met."

He's also a fellow Turk.

Akan and Baysal started at Old Dominion University eight months apart, meeting when they became

colleagues. Another Turkish faculty member, Resit Unal, was hired in 1987 when Old Dominion launched an engineering management program. Unal's wife, Mujde Erten-Unal, a faculty member in civil and environmental engineering, joined him a few years later.

Now 30 years after Akan and Baysal started, the Frank Batten College of Engineering and Technology has seven Turkish faculty members. In addition to Akan, Baysal, Unal and Erten-Unal are Ali Beskok, professor and endowed chair in mechanical and aerospace engineering; Mecit Cetin, associate professor in transportation engineering; and Onur Bilgen, assistant professor in mechanical and aerospace engineering.

The unique aspect to the critical mass of Turks is that it's happenstance that they ended up at Old Dominion together. "It's a total coincidence," said Baysal, who hired the three most recent arrivals. "They were all, whenever we did the searches, the top choices. We made the right decisions. They happened to be Turkish."

Baysal said the College's reputation has helped attract scholars from all over the world to Old Dominion University. "Our faculty hails from 18 different countries," he said. "Our already diverse body of students is exposed every day to global engineering perspectives."

All of the Turkish faculty members mention, though, that it's nice to have colleagues who share common experiences. "Sometimes we speak in our own language. We share a culture. It's fun to catch up on things," Beskok said.

"It really is unique that there are so many of us. It's a shared bond, and helps connect us personally, as well as professionally," Resit Unal added.

A soccer fanatic, Akan keeps his colleagues up to date on the goings-on in Turkish soccer. When Istanbul-based team Galatasaray marched to the UEFA Cup championship in 2000, the atmosphere in a small corner of the ODU engineering college was downright festive, Baysal said.

ODU engineering's connection to Turkey has proved to be beneficial, and that's something Baysal is proud of. "As the dean, one of the jobs that I have is to build collaborations, build relationships. I do that. I love doing that," Baysal said. "You always look at the possibilities where you would have an advantage."

Through academic and family links in his native Turkey – Baysal's father was an industrialist and forged strong connections to government, military and industry –

Baysal helped set up a program to offer advanced engineering degrees from Old Dominion to members of the Turkish Air Force.

The program has resulted in 50 active duty members of the Turkish Air Force earning master's and doctoral engineering degrees from ODU over the past seven years.

"Why should they be talking to us as opposed to another university? Well, I share culture, I share heritage with these places. If I do that right, hopefully everyone comes out a winner," Baysal said. "ODU gets many bright, motivated students paying out-of-state tuition. The Turkish Air Force got a very good deal because of the collaborative nature of the program, offered through the Turkish Air Force Academy.

"It's my job to build relationships. I do that with NASA, I do that with Newport News Shipbuilding, I do that with other universities. But I also build relationships in Turkey because I have an advantage. For one thing, I speak the language."

ODU engineering's connection to Turkey has proved to be beneficial, and that's something Baysal is proud of. "As the dean, one of the jobs that I have is to build collaborations, build relationships. I do that. I love doing that," Baysal said.



Opposite: Seven engineering faculty members from Turkey call Old Dominion University their academic home.

Right: The Turkish faculty (from left) Osman Akan, Mecit Cetin, Resit Unal, Mujde Erten-Unal, Oktay Baysal, Ali Beskok and Onur Bilgen.





Above: Sylvain Marsillac, associate professor in electrical and computer engineering.

Right: Khan Iftekaruddin and the staff at the ODU Vision Lab.

to use in things like surveillance cameras, night-vision technology and motion sensing.

Ali Beskok, now Batten Endowed Chair in Computational Engineering and professor of aerospace engineering, met Baysal as a student at a fluid dynamics conference in 1991. “He gave a very nice speech on his research, and we met and we started talking,” Beskok said. “Throughout the years, I would see him at conferences; he would tell me about his experiences as faculty at ODU.”

Beskok came to Old Dominion from Texas A&M University in 2007, and has done award-winning research into microfluidics – the nature of how fluid flows through extremely confined spaces. He was one of five young researchers who received a \$310,000 grant in 2010 from the National Science Foundation to purchase a state-of-the-art scanning probe microscope to boost the University’s burgeoning research into micro technology and nanotechnology.

Along with Beskok, Shizhi Qian, associate professor of aerospace engineering; Roland Cooper and David Gauthier, assistant professors of biological sciences; and Julie Hao, associate professor of mechanical engineering, were listed on the grant.

Hao is one of several Old Dominion engineering researchers who have made a very large impact doing research on a very small scale. In 2009, she received \$500,000 in two grants from the National Science Foundation to continue her groundbreaking work with Micro-Electrical-Mechanical Systems (MEMS), tiny mechanical systems used in devices from telephones to medical equipment.

Old Dominion Engineers at the Applied Research Center in Newport News, including Director Hani Elsayed-Ali, eminent scholar



and professor of electrical and computer engineering, and Professor Helmut Baumgart and Assistant Professor Gon Namkoong, have also achieved attention for their micro technology and nanotechnology research.

Soon after arriving at Old Dominion University in late 2010, Sylvain Marsillac, associate professor in electrical and computer engineering and a leading researcher in solar (or photovoltaic) energy, began collaborating with Elsayed-Ali, Baumgart and Namkoong. In just over two years, Marsillac and his colleagues have earned nearly \$3 million in grant funding from government sources from the U.S. Department of Energy and other sources.

In the Photovoltaic Laboratory in Kaufman Hall, Marsillac and his team fabricate solar cells and then test the different material compositions for energy efficiency. Marsillac and other photovoltaic energy researchers around the world are seeking to make the ideal solar cell – one that’s efficient, lightweight and affordable. “But it doesn’t exist yet,” Marsillac said. His research seeks to help move the efficiency and lightweight aspects of solar cells as far along as possible.

“Our goal is to find new materials that can develop higher efficiency by themselves – or new designs, new architecture – that will result in higher efficiency,” Marsillac said.

Baysal views the recruitment of Old Dominion engineering faculty by larger institutions as an indicator of success. But the school has also worked hard to keep its faculty by providing opportunities that the founders of engineering at Old Dominion could scarcely have believed were possible.

“Today, we have a much stronger College than only a few years ago,”



Marsillac and other photovoltaic energy researchers around the world are seeking to make the ideal solar cell – one that’s efficient, lightweight and affordable.

Left: The Vision Lab does grant-funded research for the Department of Defense, Department of Homeland Security, NASA and other agencies.

The engineering student body, which numbers more than 3,200, is more diverse than ever, and more talented than ever.

Below: Team Tidewater, a group of Old Dominion University/Hampton University students who participated in the 2011 Solar Decathlon.



Baysal said. “Just in this decade, we established seven more institutes that seek solutions to the problems relevant to our region. In fact, the research and education in the College addresses problems in 10 of the 14 Grand Challenges stated by the National Academy of Engineering.”

The proof is all over the College and the region, from the Applied Research Center in Newport News, to VMASC in Suffolk, to a new biomedical engineering program, a new marine engineering program, and a new practice-oriented professional degree, Doctor of Engineering

The engineering student body, which numbers more than 3,200, is more diverse than ever, and more talented than ever. Female enrollment nears 15 percent, and minority enrollment is more than double that figure. That makes the Frank Batten College of Engineering and Technology the most diverse, most gender-balanced engineering school in the state.

Old Dominion also has the largest percentage of in-state students of any Virginia university. Students like Calvin Whealton, who graduated with a bachelor of science in civil engineering in 2011 and is now working on his doctorate in environmental and water resources systems at Cornell University, are reflective of ODU engineering’s talented graduates. Whealton didn’t realize everything that Old Dominion offered until he attended school here.

From Zambia to ODU and Back

Now She’s the Boss

Many graduates of the Batten College of Engineering and Technology make their marks within a few miles of campus. The Hampton Roads region is chock-full of engineers – at tiny companies or Fortune 500 firms – proudly hanging their Old Dominion diplomas on the walls of their offices.

Mfikeyi Makayi is also proud of her Old Dominion education. She’s using hers a little further from the Norfolk campus, however.

Mfikeyi is a trailblazer in her home country of Zambia, battling against stereotypes as an engineer at the Kansanshi Copper & Gold Mine. Since 2010 she has worked as a mining engineer in the town of Solwezi, in the northwestern region of Zambia.

Her duties over the course of two years with the company have included supervising construction projects and maintenance upgrades in the plant, operating production and support machinery in the mine’s open pit, managing and coordinating mining operations, and mastering production drills and blasting techniques.

Makayi is the first female engineer in the history of the giant Zambian mining company Kansanshi Mining PLC, and as such, faces daily challenges.

But Makayi learned determination and a skill set that served her well in her career when she came to study engineering at Old Dominion University in 2002, after being awarded an International Student and Scholar Services scholarship out of high school.

“My time at ODU forced me to be truly independent, determined and a go-getter,” she said. “I had great professors and met my best friends at ODU, so the environment I found and developed in around Norfolk prepared me adequately to deal with such a demanding job.”

Makayi was born in the Zambian capital of Lusaka, growing up in a household with her parents and three brothers. Her family instilled a work ethic that she needed when she came to the United States, simultaneously dealing with challenging engineering studies at Old Dominion and adjusting to life in a new country.

Makayi graduated in 2007 with a bachelor of science in civil engineering. She remained in the U.S. for another year, holding two different jobs in Virginia Beach, including her first hands-on introduction to what she would do in her career. “I ventured into the geotechnical branch of civil engineering, and that is a very important branch in mining,” she said. “I didn’t know I’d end up in mining, but in retrospect, that one year was a backbone to my step into the mining field.”

That step was delayed when the world economy sagged in 2008, prompting Makayi to return to Old Dominion to pursue a master’s degree in environmental engineering, which she received in December 2009.

One of her academic mentors at the university was Saikou Diallo, then a doctoral student and now a research assistant professor at Old Dominion’s Virginia Modeling, Analysis and Simulation Center.

Diallo, also from the African continent, was impressed with his young colleague.

“Mfikeyi is a very bright young lady whom I met during her undergraduate studies at ODU,” he said. “She has a great personality to boot. We became fast friends and I always enjoyed her sense of humor and commitment to helping others. She is an asset to her family and community and has a great future in this world.”



Makayi is the first female engineer in the history of the giant Zambian mining company Kansanshi Mining PLC.

Solar Decathlon

ODU Engineering Students Step Onto International Stage

It started with a chance meeting at an environmental conference.

Almost two years later, a team of engineering students from Old Dominion University stood shoulder to shoulder with architecture students from Hampton University in a worldwide competition, showing off their environmental engineering and design skills in building a home for the U.S. Department of Energy's 2011 Solar Decathlon.

The ODU/HU team, known as Team Tidewater, was selected as one of 20 finalists for Solar Decathlon, along with college and university teams from Belgium, China and across North America. It was a whirlwind experience for the team of 90 architecture and engineering students from the two schools.

The home design, Unit 6 Unplugged, was conceived in a design studio just south of the ODU campus. It was built through the spring and summer of 2011 on a patch of land across the street from the Old Dominion University Student Recreation Center.

A few weeks before the competition, the home was broken down, loaded onto flatbed trucks, shipped to Washington, D.C. and then reassembled at West Potomac Park, a short walk from the White House.

For the 12 days of the Solar Decathlon, Unit 6 Unplugged

– an innovative, affordable, urban infill apartment unit – saw visitors from around the world. In fact, the team's next-door neighbor on the Solar Decathlon site was a team from New Zealand.

The competition was based on 10 tests of energy performance in the homes, and judged by Department of Energy-selected jurors. Jurors chose the University of Maryland's innovative WaterShed design as the winner. Team Tidewater finished a credible 14th in the global competition.

Some team members moved on during the two years that the Solar Decathlon team worked together, or joined the effort late in the process. But project engineer and project manager, John Whitelaw, a doctoral environmental engineering student during that time, was a constant presence.

In addition to understanding the technical side of the house's systems, Whitelaw had to facilitate cooperation between the student team and faculty members at two universities, along with business development, building code considerations, sub-contractor relations and even how to secure the home as Hurricane Irene took aim at the Old Dominion campus.

On top of the design and construction, the team had to work out the logistics of disassembling and reassembling

the structure and moving it back and forth from Washington, D.C. for competition on a tight schedule.

"We built a core team of really dedicated and hard-working students and community volunteers who were able to accomplish these objectives in addition to their academic and work responsibilities," Whitelaw said. "This kind of project-based learning was a great introduction to the challenges of real-world engineering work, teaching us about professional collaboration, client relations, budgeting and resource allocation, the rigors of a design-build schedule, cost-benefit analysis and more."

Old Dominion's Mujde Erten-Unal, the project's principal investigator and associate professor of civil and environmental engineering, and Stella Bondi, assistant professor of engineering technology, along with Hampton University architecture professors Mason Andrews and David Peronnet, were the faculty advisors for the project.

Key Old Dominion student workers for Team Tidewater included Jodi Knorowski, Holly-Ann Hillard, Joshua Davis, Ann Hageman, Christopher May, John Purdue, Wayne Laustsen, Hamami Youssef and Kevin Brinker.

More important than the ranking in the Solar Decathlon, the Unit 6 Unplugged design and engineering of their

prototype net-zero energy unit fits the local Norfolk architecture, performs well, and could be imitated at a relatively low cost in the area. "It showed that the concept of multi-family, net-zero housing could be applied both practically and elegantly in Hampton Roads," Whitelaw said.

Since finishing his first Solar Decathlon, Whitelaw has continued to work toward his Ph.D. in environmental engineering, with a focus on technologies that facilitate sustainable design.

The collaboration between Old Dominion and Hampton University continues, as the two schools will partner for the 2013 Solar Decathlon in Irvine, California with an entry for vision-impaired residents known as The Canopy House. And Solar Decathlon faculty advisors Erten-Unal and Andrews are continuing to lead an effort to get the Unit 6 Unplugged "six-pack" design apartment buildings constructed in Norfolk.



"The six-pack project is very dear to my heart, as the logical culmination of the 2011 Solar Decathlon, where we showed how net-zero energy, multi-family housing might be done in Hampton Roads at an affordable cost," Whitelaw said. "I see it as a great way for the two universities to have a positive impact on their local communities."



Left and opposite: The solar-powered home, designed and built by Team Tidewater, was assembled on the ODU campus, then taken down and trucked to Washington, D.C., where it was reassembled in a week for the Solar Decathlon finals.



Above: A dune buggy designed for the Society of Automotive Engineers "Baja" racer competition.

Below and opposite: Work being conducted at Sylvain Marsillac's Photovoltaic Laboratory.

"Most people I meet only know ODU through the basketball or football teams, if at all. I try to communicate the excellent education ODU provided by the quality of my work," Whealton said. "The principles ODU taught me are the foundation to my current success, and if I had to make the choice again, I would not change to any more 'prestigious' institution."

Old Dominion students can compete. Old Dominion engineering students have participated in national and international competitions. Students have designed dune buggies for the Society of Automotive Engineers "Baja" racer competition, and remote-controlled helicopters for the International Aerial Robotics Competition. Old Dominion engineering students have participated in more lighthearted and philanthropic competitions as well, including the annual Duct Tape Regatta to benefit the Children's Hospital of The King's Daughters, the CanStruction Competition to benefit the Foodbank of Southeastern Virginia, and Red Bull Flugtag 2011, a contest for which mechanical engineering students constructed an aerodynamic office desk.

Competing in the 2011 Solar Decathlon presented Old Dominion engineering students a new platform on which to bolster their bona fides. A dedicated group of civil and environmental engineering students teamed up with a group of architecture students from Hampton University in the Department of Energy-sponsored competition which asks collegiate teams to design and build net-zero energy homes.

Team Tidewater, as the collective became known, worked for nearly two years on Unit 6 Unplugged, an urban infill housing apartment block as aesthetically pleasing as it was energy efficient. At the 2011 Solar Decathlon finals in Washington, D.C., a writer and professional

architect claimed in USA Today that Unit 6 Unplugged was "by far my favorite design."

Team Tidewater finished a credible 14th place in the global competition ranking in the top 10 in seven of the categories. The two schools have qualified for the 2013 Solar Decathlon finals in Irvine, California, with a new design entitled Canopy House.

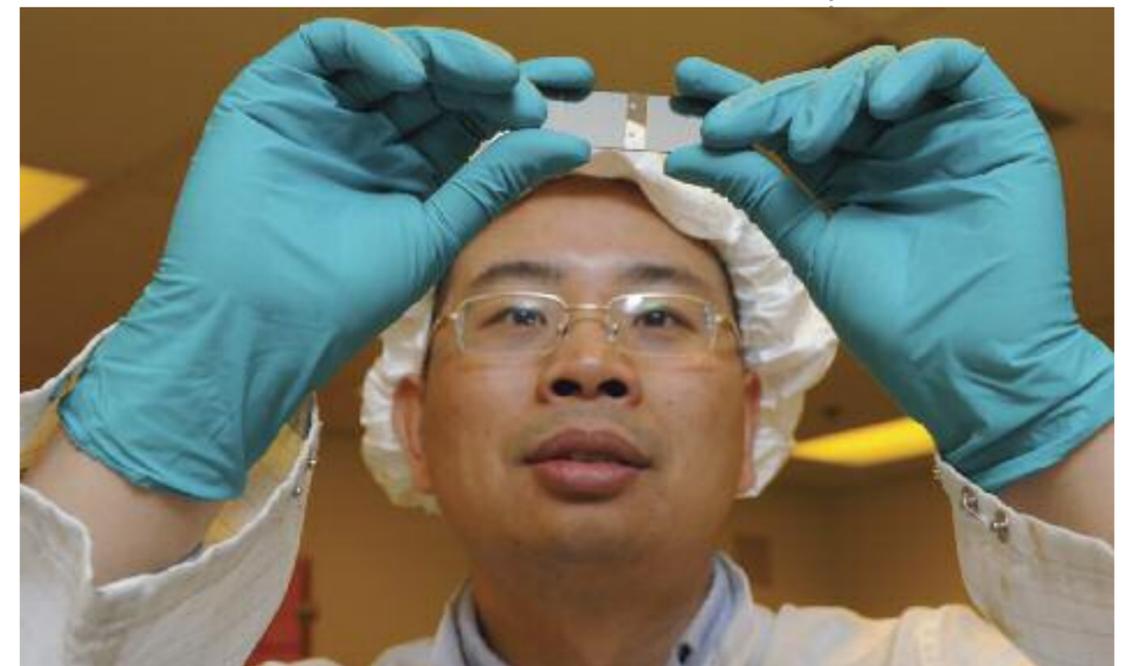
Resit Unal, chair of Old Dominion's engineering management and systems engineering department, said the engineering students who took part in the Solar Decathlon were "a credit to the entire university." Unal personally contributed to the effort - he barely saw his wife, Mujde Erten-Unal, associate professor of civil and environmental engineering and faculty leader for Solar Decathlon, in the months leading up to the competition.

Campus life has changed for faculty and students in many ways in the past 50 years, and perhaps through no greater way than in the creation of an on-campus population of students. Thirty years ago, Old Dominion University had fewer than 1,000 residence beds. Now, there are almost 5,000, and another 2,000 students live within a mile of campus.

"I used to come here Saturdays to work, because the campus was deserted," said Bob Ash, professor and eminent scholar of mechanical and aerospace engineering and a veteran of the Batten College. "Now, during football season, I can't even ride my bike because the campus is just filled."

The 2009 re-launch of Old Dominion's football team has grown the profile of the entire university, and further boosted the sense of campus

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Oktay Baysal: The Steady Hand

Offering Leadership to Old Dominion University

Old Dominion University was supposed to be a short career detour. Oktay Baysal planned to use his doctoral degree for a few years at Old Dominion, then go back to the Gulf Coast to join the family steel trading business.

"I wanted to come and stay maybe a couple of years, do some research with NASA. That's every Ph.D. engineer's dream. The plan was not to stay in academia," Baysal said. The dream of working at NASA turned out to be simply too good to leave for Baysal, now in his 30th year at Old Dominion, and in his eighth year as dean of the Frank Batten College of Engineering and Technology.

"NASA made the difference," he said. "It's just an unbelievable place. When you're working on things that you could only dream about, designing things like rockets, when you see that you are working on hypersonic airplanes, flying many times the speed of sound, these are things that you don't do at any other school."

Baysal could do all of that only 22 miles from his front door. "NASA Langley was an absolutely wonderful place to go to work every day," he said.

Baysal's research helped him advance quickly at Old Dominion, becoming a full professor at age 38, and an eminent scholar at 41.

The campus Baysal arrived to from Louisiana State University, where he did his doctorate, was very small. It was also modestly equipped. "There were just ridiculously small computers. I was doing computational design, and needed massive parallel computers. There was no such thing here," Baysal said. "But I did see the desire of the university to excel, to get better. That was obvious."

And the burgeoning partnership with NASA, started more than a decade earlier, was an obvious strength of the young engineering school.

"It not only transformed me, it transformed the university," Baysal said. "I would say half of the faculty, we were at NASA. The reason that we came here was for NASA. It really brought and kept good faculty. We could see the opportunity that we had here. This is like the Mecca, the Who's Who in aerospace research; they come to spend some time here."

By the late 1980s, when he was considering academic offers from other universities, Baysal felt the momentum spreading across the entire engineering college. The departments of the college were not only growing their own research, they were seeking out partnerships across and outside the university.

"The concept of not only departments, but also centers for research and economic development, was really important," Baysal said. "Those were very entrepreneurial, and very much engaging with your own community and your own research. That was the beginning of what today, the entire university has realized. Now, it is becoming a lot more than just offering degrees."

"When you're working on things that you could only dream about, designing things like rockets, when you see that you are working on hypersonic airplanes, flying many times the speed of sound, these are things that you don't do at any other school."

Baysal became acting dean in 2002, when Bill Swart left for East Carolina University. Jim Cross, who was dean himself from 1984 to 1997 and an aerospace engineering colleague, said Baysal has done a very good job connecting with his faculty, particularly fellow foreigners. Baysal moved to the United States in 1978 after studying in England, and is originally from Turkey.

The benefit he had in taking the dean's job is that Baysal "grew up with" many of his current faculty professionally. "That gave me a huge advantage," he said. "They were my colleagues; they were not my faculty as a dean. In fact, some of them were my role models when I came here as an assistant professor at the age of 28."

"I learned many things from them. I learned who they are, I learned what they like. I learned what they didn't like."

By acting as a servant leader for his colleagues, Baysal said that has allowed them to shine, and collectively bring Old Dominion engineering more and more accomplishments. "Your duty in my position is have the vision to point them in the right direction, then get out of the way when they are progressing to great things."



community. Even skeptics once concerned about the cost of starting a football program now rave about the exposure the football Monarchs have brought Old Dominion University. Engineering faculty members note with pride that star quarterback Taylor Heinicke is a student in the Frank Batten College of Engineering and Technology.

Football has become such a boon to the University, that at the fall 2012 Homecoming game, ODU engineering sponsored a tailgate party on Kaufman Mall in front of the engineering building. The graduates returning to campus scarcely recognized the place.

"This is just phenomenal," said Oscar Gomez, as he looked around Kaufman Mall with his wife and two of his five children. The 1997 mechanical engineering graduate, who earned his master of science in aerospace engineering from Old Dominion in 1999, said the difference in a decade in his alma mater was hard to fathom. "The dorms look different. The grounds look different. There are more buildings. The buzz is there," he said.

John Temple, a 1981 mechanical engineering graduate who has worked at Dominion Virginia Power since leaving Old Dominion, was attending his first football game on campus that day. "It's just wonderful. I'm glad the school has done so well in many ways. I came back here three years ago and couldn't find Kaufman Mall, the campus had grown so much," Temple said.

Even more illustrative are the words of long-time faculty members. Each had their own story of the school's modest beginnings, and their own way of expressing pride in what Batten College has grown into.

"We're builders. We're not about just sustaining something. We have a very proud past, but I believe we also have a very bright future."

– Oktay Baysal

Below: Mounir Laroussi's plasma pencil has shown promise at using cold plasma to kill leukemia cells.



“I’ve seen this university grow from a small institution to a well-known university. I think we can really build this pipeline for a skilled workforce, and improve the productivity of the United States economy.”

– Alok Verma

“This is truly a national-caliber research engineering college,” Ash said.

“It’s been a fun 30-plus years at ODU,” said Alok Verma, Ray Ferrari Professor of engineering technology, and director of Old Dominion’s Lean Institute. “I’ve seen this university grow from a small institution to a well-known university. I think we can really build this pipeline for a skilled workforce, and improve the productivity of the United States economy.”

Where does the school go from here?

A growth spurt is possible, as Batten College moves into its 50,000-square-foot Engineering Systems Building, which will feature a state-of-the-art clean room, a lasers lab, a plasma science lab and studio space where students can collaborate on research projects. Baysal said that will help accelerate ODU engineering’s learn by discovery motto even more.

Gary Schafran, chair of civil and environmental engineering, hopes that Batten College doubles in size. “I mean, it certainly is justifiable by the region that we’re in. We’re in a major metropolitan area. Engineering is important for economic development,” he said.

Growth, change and new advances are something Baysal guarantees will happen with the Batten College.

“We’re builders,” Baysal said. “We’re not about just sustaining something. We have a very proud past, but I believe we also have a very bright future.”



Look at us now. To think it all started in the old Larchmont Elementary School building on Hampton Boulevard in 1931.

In honor of the 50th anniversary of the Frank Batten College of Engineering and Technology, here are 50 notable milestones in the College's history. Thanks to the diligence and passion of the faculty, staff and students of the Batten College, there are thousands more, and they happen every day.

SEPTEMBER 1931 ► Following an agreement between the presidents of William and Mary and Virginia Polytechnic Institute (now Virginia Tech), engineering classes are offered in Norfolk for the first time. VPI students from Hampton Roads can do their first two years of engineering education at home, before finishing their degree in Blacksburg, Virginia.

AUGUST 1932 ► Two young engineering master's graduates at VPI, Lewis Webb and Edward White, are dispatched to their home town of Norfolk to teach at this new engineering school. Both men would stay on campus for the next 40 years.

OCTOBER 1939 ► A Civilian Pilot Training (CPT) program is created at the Norfolk Division in October 1939 by the Civil Aviation Authority. Part of America's national defense plan, the CPT offered four full college credits in aeronautics and helped prepare the nation for eventual war.

FEBRUARY 1941 ► The federal Department of Education selects the Norfolk Division of VPI as one of the sites for its Engineering Defense Training Program. The program, conducted by engineering schools throughout the United States, taught courses like explosives production and engineering principles of aircraft.

SPRING 1946 ► The hands-on skills taught during World War II were in demand after the war's end, leading to the creation of the Norfolk Division of the William and Mary Technical Institute, initially operating in makeshift classrooms under the grandstands at Foreman Field.

APRIL 1959 ► The Technical Institute moves into new headquarters across Hampton Boulevard from the ODU campus. The building was hailed by the Norfolk Ledger-Dispatch and Star as "the finest technical school in the vicinity, tailor-made to turn out technicians in specialized areas."

JANUARY 1961 ► Eight years after the introduction of the first four-year degrees offered entirely at the Norfolk Division, President Lewis Webb raised the idea of an engineering school in Norfolk to the state Legislature. The idea was opposed by the state's two existing engineering schools, the University of Virginia and VPI.

1962 ► Three out-of-state engineering deans join representatives from Old Dominion, University of Virginia and VPI on the panel deciding whether to grant a third engineering school for the state. The three out-of-state representatives unanimously recommend an engineering school for Hampton Roads. The Virginia General Assembly agrees, and authorizes its creation. The formal relationship with VPI ends in September 1963.

AUGUST 1962 ► J. Harold Lampe delays his retirement and moves to Norfolk from North Carolina State, becoming the first Dean of the School of Engineering.

APRIL 29-30 & MAY 1, 1965 ► Kaufman Hall, the new engineering building at Old Dominion, opens in a three-day ceremony. Governor Albert S. Harrison, who spoke on the first night of dedication, declared the building was a tangible sign that "the next century in America belongs to the South."

JULY 1966 ► Ralph Rotty, of Tulane University, becomes the second dean of the Old Dominion School of Engineering, after Lampe's retirement.

APRIL 1968 ► Gene Goglia, chair of Old Dominion's thermal engineering department, is awarded a grant of \$213,800 to conduct summer research institutes at NASA's Langley Research Center. This is the first grant in a successful partnership that has lasted almost 50 years.

SEPTEMBER 1969 ► Old Dominion joins with other Virginia universities in forming the Virginia Associated Research Campus (VARC) in Hampton, a graduate program in engineering created to provide skilled professionals to NASA, the Army research center at Fort Eustis and Newport News Ship Building and Dry Dock.

AUGUST 1971 ► The Engineering Laboratory Building, eventually named Duckworth Hall, is opened, adjacent to Kaufman Hall on the University mall.

SEPTEMBER 1971 ► Twelve months after absorbing the former Technical Institute, the Old Dominion University School of Engineering is approved by the State Council for Higher Education to start the first four-year engineering technology programs in the state.

FEBRUARY 1972 ► The first Engineering Open House is held. The doors of Kaufman Hall and what would become Duckworth Hall are opened to teachers, schoolchildren, and the community.

JULY 1974 ► John Weese, from the University of Denver, is hired as the third full-time dean of the Old Dominion University School of Engineering.

APRIL 1975 ► The School of Engineering sponsors its first "Women in Engineering" conference, designed to inform female high school students of opportunities in engineering.

OCTOBER 1981 ► ODU researchers led by G. Marshall Molen, associate professor of electrical engineering, receive a grant of \$613,079 from the U.S. Navy, the largest non-NASA grant ever received by the School of Engineering.

AUGUST 1984 ► Jim Cross arrives in Norfolk from Texas A&M University, as the fourth dean of the College of Engineering.

NOVEMBER 1984 ► Old Dominion University sets up its Engineering Clinic, an operation designed to match up companies needing help with the College's engineering expertise.

JULY 1987 ► Larry Richards and Resit Unal create one of the country's first engineering management programs at Old Dominion University.

Fifty at Fifty

OCTOBER 1994 ► The Department of Defense's Joint Training, Analysis and Simulation Center (JTASC) is charged with developing the capacity to conduct joint simulation training exercises. After meeting with senior Old Dominion University officials, JTASC and the College of Engineering and Technology begin work on a joint proposal for ODU to be the academic lead for the initiative.

JULY 1995 ► The Virginia Commercial Space Flight Authority is founded to manage the Wallops Island NASA launch facility, now known as the Mid-Atlantic Regional Spaceport. ODU Engineering Management Professor Billie Reed is named executive director, a position he holds until November 2012.

AUGUST 1996 ► ODU's College of Engineering and Technology signs an agreement with NASA Langley to take over operation of the Langley Full-Scale Tunnel, a giant wind tunnel facility that had been shuttered by NASA a year earlier.

SEPTEMBER 1996 ► After Old Dominion University had underwritten the initial funding for the creation of a modeling and simulation academic program, ODU's Virginia Modeling, Analysis and Simulation Center begins operating in the Tidewater Community College building in Portsmouth.

NOVEMBER 1996 ► Environmental engineering student Samantha Salvia becomes Old Dominion University's first (and still only) Rhodes Scholar.

JULY 1997 ► Bill Swart comes to Old Dominion University from the Newark College of Engineering – New Jersey Institute of Technology, as the fifth dean of the College of Engineering and Technology.

AUGUST 1998 ► Nine students begin a course of study in Old Dominion University's newly created master's program in modeling and simulation engineering.

JANUARY 1999 ► W. Channing Blackwell, a civil engineering student, becomes the first undergraduate student in Virginia history to earn a U.S. patent.

JUNE 1999 ► Old Dominion University hosts the first academic conference in the world in the emerging field of bioelectronics. Researchers from around the globe come to Norfolk.

JULY 2000 ► With a three-year grant from the Department of Defense and Department of Homeland Security, Vijay Asari begins work on a computer-based facial image detection and recognition system, which will become the ODU Vision Lab.

MARCH 2001 ► The Center for Advanced Engineering Environments (CAEE) is founded under the direction of Ahmed K. Noor, Lobeck Chair and Eminent Scholar of Modeling, Simulation and Visualization. The center develops innovative technologies, strategies and approaches for advanced learning environments and networks.

MAY 2001 ► Four universities open a research partnership in Newport News known as the Applied Research Center, housing scientists and inventors from Old Dominion University, Christopher Newport University, the College of William and Mary, and Norfolk State University, along with the Jefferson Lab.

Fifty at Fifty

JULY 2001 ► ODU pioneers a program with the U.S. Navy nuclear submarine fleet, providing officers with an opportunity to earn a master's degree in engineering management on CD-ROM. More than 250 naval officers sign up for the program in the first three years.

AUGUST 2001 ► Old Dominion University launches its foray into magnetic levitation (maglev) technology, erecting a white test-track "guideway" on campus, partially running behind Kaufman Hall.

NOVEMBER 2001 ► Following the attacks of September 11, the Batten College creates the National Center for System of Systems Engineering, to help provide solutions to increasingly complex interdisciplinary engineering questions for government and military agencies.

NOVEMBER 2001 ► Oktay Baysal, professor and eminent scholar of aerospace engineering, is named interim dean. In 2004, he would be named the sixth dean of the Batten College of Engineering and Technology.

AUGUST 2002 ► Old Dominion University forms its Frank Reidy Center for Bioelectronics, after being named the lead institution on a \$5 million Multi-University Research Initiative Grant, thanks to support from Reidy, a local businessman.

FEBRUARY 2003 ► A replica of the Wright brothers' first plane, the Wright Flyer, is brought to the Langley Full-Scale Tunnel to be wind tested before re-enacting the historic first flight for mankind on December 17, 2003.

JANUARY 2004 ► The Lean Institute is created in 2004, as a division of the College's Department of Engineering Technology, to aid companies in the transition to lean manufacturing techniques, and train educators in the discipline.

MAY 2004 ► The Frank Batten College of Engineering and Technology creates the Virginia Applied Technology and Professional Development Center, a further evolution of the former Engineering Clinic, to do a full range of services, from outreach to schools, to grant procurement for military veterans.

JUNE 2004 ► Old Dominion University's E.V. Williams Engineering and Computational Sciences Building opens, becoming the first LEED-certified building on a higher education campus in Virginia.

NOVEMBER 2007 ► The new headquarters of the Virginia Modeling, Analysis and Simulation Center, along with the ODU Tri-Cities Center, opens in Suffolk.

JANUARY 2010 ► ODU begins offering an undergraduate degree in modeling, simulation and visualization engineering, becoming the first university in the United States to offer a complete post-secondary education in modeling and simulation, from undergraduate through post-doctoral.

JANUARY 2010 ► Magnetic levitation technology company MagneMotion receives a \$7.9 million grant from the Federal Transit Administration to test its patented maglev technology at ODU. The ODU researchers, along with MMI, begin plans to install new track on a portion of the guideway, completing that work in 2012.

Fifty at Fifty

MAY 2010 ▶ The ODU Business Gateway is launched, expanding the scope of the Virginia Applied Technology and Professional Development Center to encompass the entirety of the University's resources, acting as a one-stop shop for companies, government agencies and military organizations seeking ODU's research and management expertise.

OCTOBER 2011 ▶ Team Tidewater, a team of engineering students from Old Dominion University and architecture students from Hampton University, compete in the Department of Energy Solar Decathlon finals in Washington, D.C.

JULY 2012 ▶ Sylvain Marsillac, associate professor of electrical and computer engineering, opens his Photovoltaics Laboratory, putting plans into action to erect solar panels on the roof of Kaufman Hall.

OCTOBER 2012 ▶ At a ceremony marking the kick-off for the College of Engineering's 50th anniversary celebration, ground is broken for the Batten College's Engineering Systems Building, which will be the most modern engineering building in the state when it opens in 2014.

Opposite: Engineering students Brittany Garman and Fred Hughes.





Acknowledgments

This is dedicated to every person who has had a hand in building the Batten College of Engineering and Technology from the ground up. It was created in spite of resistance, built without resources, and has grown to be a vital part of Old Dominion University and the Hampton Roads community. It's an honor to tell this story.

Thank you to a number of people who have helped in the creation of this book. Thank you to the three dozen current and former faculty and staff members who graciously provided their time and memories.

Thank you to Sonia Yaco, Special Collections Librarian at the ODU Archives, for her eagerness to help and for her excitement about the project. Thanks to Kristyn Danson, of the Batten College of Engineering and Technology, for her expertise and support. Thank you to Dean Baysal for coming up with the idea to publish a book on the College history and for providing the funds to make it happen.

Thank you as well to others who have helped the project, including but not limited to Stacey Nixon, Fred Butler, Brittany Garman, Chuck Thomas, and especially Linda Lauby of Outer Banks Press. Her optimism and energy helped make this very worthwhile project possible.

– Brendan O'Hallarn



Old Dominion University is Virginia's forward-focused metropolitan research university for students who want rigorous academics and an energetic residential community.

ODU's nationally recognized faculty use real-world expertise and award-winning teaching to challenge students to achieve their highest goals.

The university's engaging and relevant learning opportunities teach skills for personal and professional success.

With a determined entrepreneurial approach that drives research and collaboration with business, the university contributes nearly \$1 billion annually to the local economy.