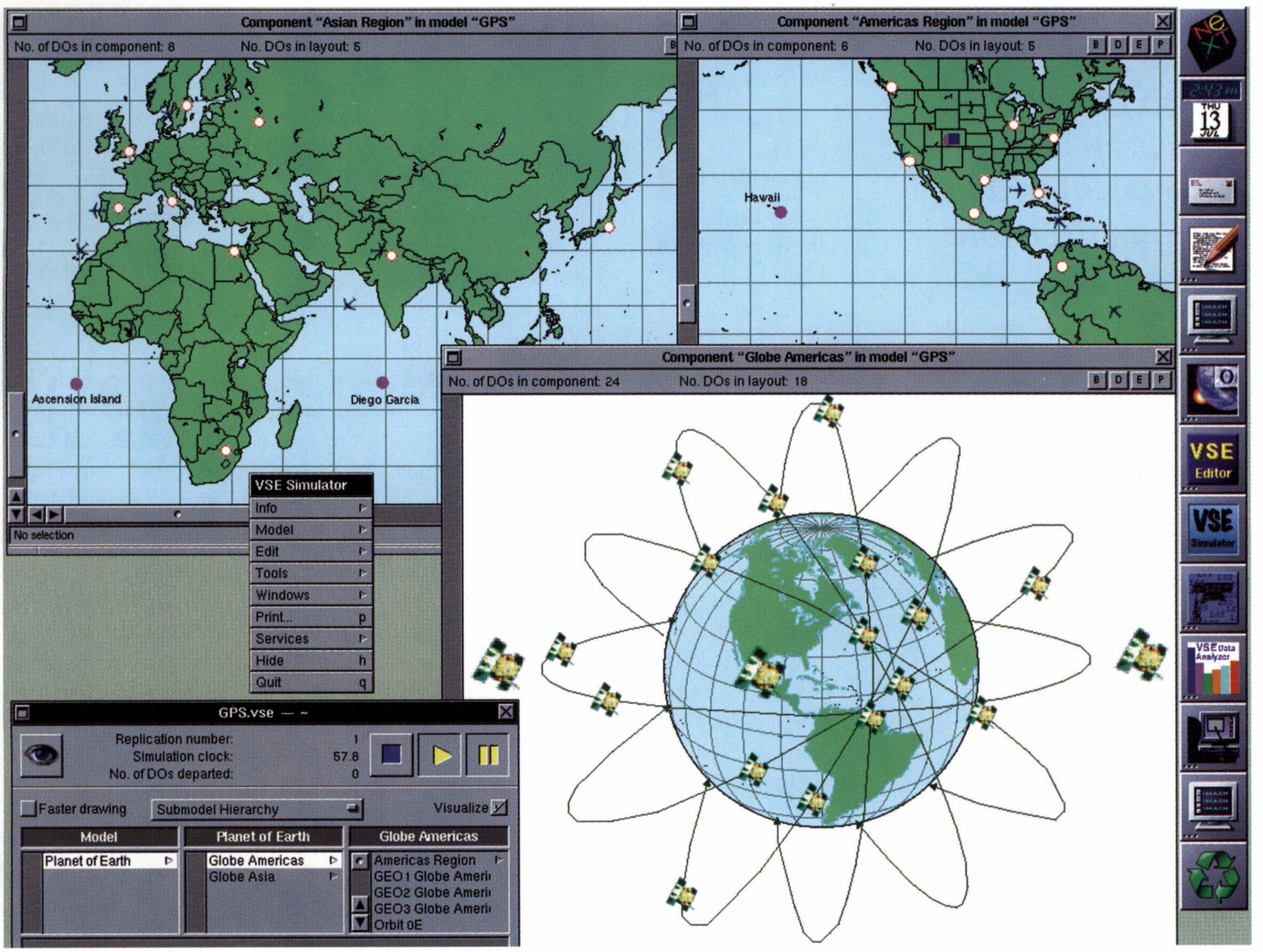
ENGINEERS' FORUM
VOLUME 15 • NO. 2 APRIL • 1996

THE FUTURE OF VISUALIZATION IS HERE



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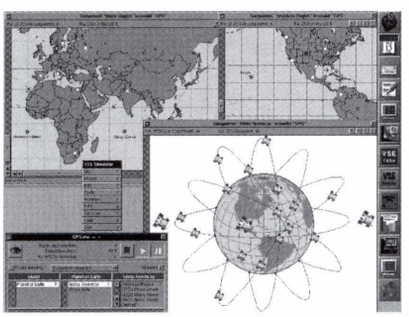
- E-WEEK IN REVIEW
- SPORN AWARD WINNER
- INTERNATIONAL PROGRAMS

BRIDGE OVER TROUBLED WATERS

By including all the users in the planning and development process, everyone will feel their voices have been heard and considered in the final decision.

On the Cover



Visual simulation of satellite communication/Global Air Traffic Control using the VSE. Photo courtesy Osman Balci.

The proposed bridge across the mall is an ill-conceived idea, symptomatic of the university's disregard of the voice of the community. It will take away from this university much more than it will give back by blocking the view of War Memorial.

As I look down the mall towards the War Memorial, I cannot imagine the bridge there without cringing. I have always felt the War Memorial's pylon design was to direct my eyes to the sky and heavens beyond. The memorial is there to remind us on a daily basis of those who fought and died for our freedom. That soaring vision will be lost with the addition of the bridge.

Depending on how the bridge is constructed, the tops of the pylons will be cut off from view or the viewer's eyes will be directed toward the bottom of the bridge, not the heavens above as the artists intended.

A faulty argument against acknowledging student complaints was the fact War Memorial was also protested. When the War Memorial was built in the 1950's, the students rose up against it. The view of the Drill Field and Duck Pond beyond was blocked. It also looked like a fish out of water without the trees to frame it.

As the trees have grown and risen above the tops of the pylons to frame the memorial, the memorial has taken its place along side other respected and revered buildings on campus. The impressive view of the Drill Field and beyond is still visible from the top of the memorial. The bridge design cuts short the impressive long distance view we have today of the memorial. It will hinder the introspection and reverence the memorial instills.

By having well-announced public hearings, students, faculty, staff, and the surrounding community can learn about proposed capital improvements and voice their opinions about the subject. By including all the users in the planning and development process, everyone will feel their voices have been heard and considered in the final decision. Without this dialogue, the growing feeling of resentment towards the university will continue.

Lisa Traub

Lisa Traub,
Editor

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International Engineering

BY CHRIS LUNDBERG

As the blizzard of '96 swept eastward through the United States, 18 excited engineering students chanced the weather to board a plane bound for Europe. Their destination was Riva San Vitale, Switzerland, location of Virginia Tech's European Studies Center. These students were the first of two groups scheduled for a week of international engineering collaboration with their French counterparts.

The American students were members of various senior engineering design teams selected to take part in the program. Just over 40 Tech engineering students, divided into two groups, participated in the program. The first group met with 16 French students in Riva San Vitale, while the second flew to the Ecole de Mines de Nantes, the French students' school in Nantes, France, to work with engineering students there. Both groups would spend a week in Europe, working on their senior design projects with the French students.

During the day, students from both countries worked on engineering projects, discussed management techniques, prepared a final report, listened to speakers, and took tours of various corporations. In Riva San Vitale, students listened to a representative of General Motors talk about the importance of international experience and the huge job market for people with international backgrounds. Students in Nantes took tours of Aerospatiale, a French airplane corporation, and Chantiers de Atlantique, a ship building company. An excursion to the city of Nantes and a trip to the Atlantic coast also kept the students occupied during any free time they had.

Engineering students in Nantes, France. Photo by Bob Veltri

Engineering was not the only reason for the trips, however. Cultural exchanges and international relations were also very important aspects of the encounters. In the small town of Riva San Vitale, a lot of rain put a halt to any evening outdoor activities. "Trivia games were often the evening activity of choice for the students," said Carlene Arthur, house mother for the Riva San Vitale trip. "American students would ask French students about American facts, and vice versa." Charades and dancing were also popular activities at Casa Maderni.

In Nantes, American students were treated to a few parties by their French hosts, as well as going out on the town on occasion. "With all that was going on, we never slept," said Jessica Wilt, a student on the Nantes trip. Through various cultural exchanges, Americans learned how French students party, and the French were introduced to the fine art of 'speed quarters,' a popular American party game. On their final night in France, the town of Nantes threw an 'American Party' and invited the whole town to send off their American visitors.

The French students who participated in the program were also completing a requirement for working on a design project in English. The visiting Americans provided the perfect opportunity for these students to complete their requirement while also accomplishing a useful international engineering project. The natural question is how well could the French students and the American students communicate?

When asked about any language barriers on the trip, Carlene Arthur responded, "Most of the French students were very fluent in English. Language barriers were not much of a problem." Cultural differences were noticed however. One in particular mentioned by members of both trips was the difference in working style of Americans and French students. French students tend not to move forward until they are sure everyone understands what is going on completely, and all specifics have been worked out. American

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International Studies Program Allows Students to Venture Abroad

BY CHRIS LUNDBERG

The International Studies program at Virginia Tech is a program designed to provide interested students a way to study abroad for varying amounts of time. Their are many international exchanges every year with countries around the world. In recent years, Virginia Tech students have traveled to — and studied in — places such as Brazil, Denmark, Hong Kong, France, Switzerland, and New Zealand.

For most of the international exchanges Virginia Tech participates in, knowledge of a foreign language is not required. Although it may not be the primary language in most foreign countries, English is spoken fluently in many schools around the world. Traveling to a foreign country and learning the customs of other cultures, even if only for a brief period of time, is something that all students should do at least once in their college careers.

Many different groups at Virginia Tech sponsor foreign exchanges, including many departments of the College of Engineering. These exchanges run at various times during the year. Every year dozens of students visit foreign countries to work with their international counterparts. Projects, course work, and cultural exchanges are highly stressed during these short trips.

Virginia Tech students also have the choice of studying in Europe for a semester, or even a year. Many students choose to study at Virginia Tech's European Studies Center in Riva San Vitale, Switzerland. Many core curriculum and language courses are offered, to be credited toward a degree in the students' field of choice. Students live in the Casa Maderni, a 200-year-old Swiss villa, and travel to many European cities such as Rome, Venice, and Paris. A semester in Europe is educational, different, and most of all, fun.

Currently, Virginia Tech also has a few students studying for the whole year in France, and is looking for more willing students. This year of study can be credited toward a degree. To be eligible to study abroad for a year, students must be relatively fluent in the primary language of their country of choice. There is a one-month refresher course so that students may learn any new foreign customs or

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Composites are Defining the Shape of Things to Come

BY SCOTT WALTERS

If future historians were to look back on our current day, they would proclaim the dawning of a new age, a composite age. Just like the ages of stone, bronze, and iron which came before it, composites are revolutionizing our world. They are appearing in everything from bicycle frames to the space shuttle, and their practical applications are increasing rapidly.

What makes this material so appealing is the ability to program its characteristics. Composites are a combination of two or more materials. By varying the ways these materials are combined and formed, different characteristics are possible. This ability allows designers to place strength where it is needed and remove material where it is not. The result: a stronger, lighter design. Strength and weight are just a few of the many possibilities of composites. No wonder they have been dubbed the engineer's dream material.

Virginia Tech knows the potential of composites and is actively supporting research in this field. One department working with composites is the Engineering Science and Mechanics department. Graduate student Marc Schultz and Professor M.W. Hyer of the department are currently working on one such project. They are testing carbon fiber composite tubes for energy absorption during crushing. This testing will help with future design of non-reusable energy absorbers for automobiles and aircraft.

The idea is when these vehicles experience an impact the composite body will absorb some of the energy. Schultz explains "the cylindrical shape absorbs energy the best and is the easiest to integrate into automobile design." He also points out that carbon fiber is an ideal energy absorber. When carbon fiber is crushed, multiple fracture points form. These fracture points are exceptionally good at absorbing energy. The more fracture which occurs, the more energy is absorbed. In addition, the light weight of the carbon fiber will have less impact on total vehicle weight. This is especially important when considering the fuel economy of automobiles.

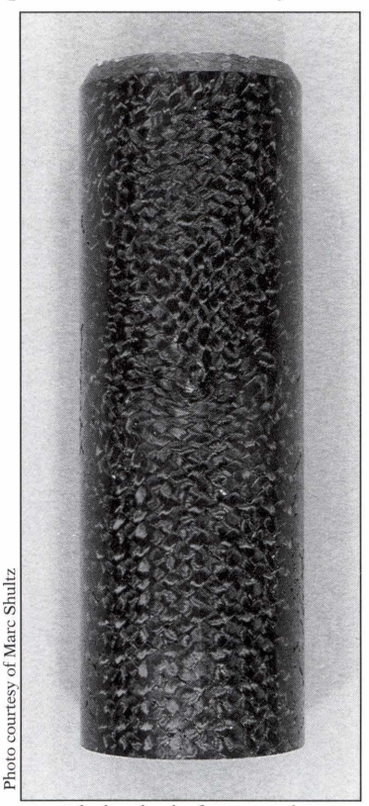


Photo courtesy of Marc Shultz

Braided tube before crushing.

Funding for the project is being provided by the National Science Foundation Science and Technology Center (NSF-STC) here at Tech. The NSF is currently promoting research resulting in what Schultz refers to as "immediate usage." They want the knowledge gained in these projects to be easily and rapidly integrated into industry.

The project is currently in its early stages. Schultz and Hyer are examining the relationship between the load placed on the tube and the resulting deformation. By graphing the load versus deformation the energy absorbed can be ascertained. Schultz and Hyer have only crushed one cylinder so far. The initial test was statically crushed in the ESM department's low load capacity load frame. They are trying to perfect the test procedure before stepping up the test schedule. Schultz explains, "We are using these initial tests to eliminate as many variables as possible."

The initial crush test exposed a few problems in the test procedure with the data results. During the crushing procedure, readings are taken from four strain gauges placed at the twelve, three, six, and nine positions in the middle of the tube. During the initial crush, the readings from the sensors varied and the graphs diverged when they should all be consistent. Schultz and Hyer believed there was either a problem with the crushing fixture or a material problem with the tube. They attempted to determine the problem by placing a hollow aluminum tube in the press and taking similar measurements. This had the same problem as the composite and their initial suspicions that the press was coming down at an angle were confirmed. Modifications were made to the press to remedy the problem, however the two are still not sure that this will solve the problem without creating new problems. Continued preliminary testing will eventually perfect the test procedure.

The hollow cylinders are manufactured in two phases. First, a braided tube of AS4 carbon fiber, called a sock, is woven at Atkins and Pearce Technologies. The sock is then molded into a solid tube at North Carolina Agriculture and Technology. The tubes are molded using a resin transfer molding (RTM) process. The sock is placed over a Teflon mandrel and placed inside a sealed steel tube. A vacuum is created in the steel tube and the epoxy resin is injected around it. The resulting product is one-eighth inch thick with a two-inch outside diameter and a 36-inch length.

Schultz and Hyer then cut the tube up into six-inch test lengths. The final step is to grind a chamfer around the end which will be

subjected to the crush plate. The chamfer acts as a crush initiator. This allows the initial stress to be great enough to start the crushing action.

According to Schultz, without the chamfer the crushing action would not be initiated and a catastrophic failure would occur instead because the energy loss is at a minimum and the failure is not as predictable. These crush initiators will have to be designed into the actual absorbers to use in aircraft and automobiles. Schultz explains that an initiator can be molded into the tube during the RTM process. This will eliminate the expense and additional time required to grind the chamfer.

Although Schultz and Hyer will start by testing a number of the standard AS4 cylinders, they also plan on altering a number of variables to see how the energy absorption is affected. One plan is to change the fiber type. Zoltek fibers will be substituted for the standard AS4. Before the sock is woven the individual carbon fibers are formed into bundles and woven together to form the sock. The Zoltek fiber is arranged in larger bundles than AS4 and will help reduce costs, according to Schultz. Schultz and Hyer would also like to incorporate a triaxial weave instead of the biaxial weave. They believe the triaxial weave will increase the strength and stiffness of the cylinder.

The type of sizing used will also be varied. Sizings are the coatings on the fibers that bond the fiber to the matrix. By increasing the strength of the sizing bond the total strength of the composite can be increased. Another factor which needs to be examined is the effects of environmental conditions. Temperature, moisture, and chemicals all have an effect on the energy absorption of the tubes. If carbon fiber is to be used in aircraft and automobiles, then it will be exposed to a wide range of these factors.

The group currently plans on doing around 64 total tests by the end of the project. In order for them do this and be able to alter the variables the tubes will need to be made here at Tech. The pair have visited the tube manufacturing sites to learn more about the process. Schultz also wants to incorporate dynamic crushing.

Similar research has shown varying relations between static and dynamic testing. Combined with the end use of the absorbers demands dynamic crushing.

The university, however, does not have the correct apparatus to perform these tests. Dr. Hyer is currently trying to work out a research deal with General Motors. He is trying to arrange it so Marc can do the dynamic tests this summer at their research center in Warren, Michigan.

Schultz is earning his Ph.D. at Tech. After this project is completed, he may move to testing other integratable shapes. He pointed out that the majority of accidents involve another vehicle hitting the front side quarter panel at an angle. A structure would need to be designed so it could absorb front, side, and diagonal quarter panel impacts. According to Schultz, a cone shaped energy absorber shows promise in this design application.

Whatever path this project takes, one thing is for sure: Composites have changed our world and will continue to far into the future. **EF**

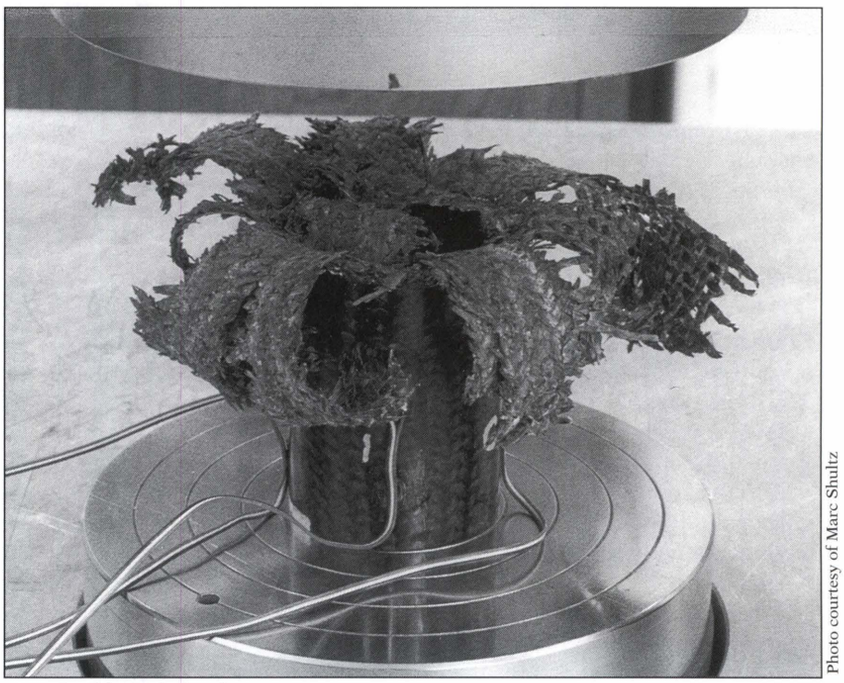


Photo courtesy of Marc Shultz

Crushed braided tube.

Engineers' Week: Not Just For Freshmen Anymore

BY BETH OBORN

"Throughout the years the whole idea of what Engineers' Week is about has been lost," said Idine Ghoreishian, this year's Engineers' Week chairman for the Student Engineers Council (SEC), which sponsors the event at Virginia Tech. National Engineers' Week is a yearly event held at many different universities across the country to celebrate and honor the contributions that engineers make to society.

"In the past five or six years the trend has become more that the freshmen are introduced to the different types of engineering," Ghoreishian said of the Virginia Tech event. Engineering upperclassmen sometimes think the event is only for freshmen. Although fulfilling that purpose remained an important part of this year's planned activities, it was not the dominant goal. "Our objective this year is to get more people involved. We're trying to pull everybody together." Ghoreishian said.

During the search for new event ideas, the planning committee looked at the E-week programs at Virginia Tech from years past. They found some interesting events which were discontinued as the focus shifted. During the eighties, for example, faculty and students participated in a talent show for the entertainment of their peers. The committee also discontinued one event, the panel discussion often beginning the week. Last year, upperclass engineering students formed the panel, but in the past there have been faculty panels and panels filled with corporate representatives. Each time the students said it would be helpful to have a different panel to speak with.

Mary Kennedy deals Blackjack at Monte Carlo Night.

Photo by Ivan Lei

The first official event of this year's Engineers' Week was the Tech Showcase held on Friday, February 8. Every engineering major has at least one professional society related to it. There are also many other engineering related socities. The Showcase is where all these organizations have a chance to explain what they do and attract new members.

Another informational feature of Engineers' Week wasn't aimed at current students at all, but at prospective engineering freshmen. Tau Beta Pi, an interdisciplinary engineering honor society, annually sponsors an Engineering Open House. This year it was held in Squires Student Center on Monday, February 19. Hundreds of high school students converged on Squires from many different states to hear about the engineering program at Tech. Faculty from every engineering major present some of the academic highlights. Highlights of the disciplines are also shown in a poster presentation. This year TBP also sent the prospective students on lab tours, which were enormously popular. Another feature of this year's event was a toothpick bridge competition.

The Egg Drop competition on Wednesday, February 21 presented an engineering challenge to all interested parties. When you drop a raw egg off the third floor balcony at the back of Derring Hall it usually breaks. Twelve contestants were given two pieces of white paper and three feet of masking tape and told to construct something to keep the egg from breaking when it hit the ground. Paper was torn and taped back together in many different shapes. Then the contestants ran up to the balcony and prepared for the drop. One egg did not even reach the starting line, it broke on the way up the stairs. A line of people formed, all bending over the wall, as Ghoreishan dropped the protected eggs one by

Photo by Ivan Lei

Matt Danza inspects the winning egg at the Egg Drop Competition.

one. Some were crushed, some cracked, the yolk of one was ejected whole. Julae Norman, a general engineering freshman, won the contest with a design that combined a parachute with padding around the egg. Most contestants used only one of these two strategies.

The catapult contest, sponsored by the Society of Engineering Sciences, SES, planned for Thursday night, February 22, was unfortunately cancelled due to lack of interest. There were only two contestants. "We're going to try to think of something else for next year," said Shelly Henkel, vice president of the SES and overseer of of the catapult contest. One possibility she and other members of her society are thinking about is a Pinewood Derby where homemade cars race down a wooden track. To make the task more exciting each team would have to construct the car out of a given set of materials, and fit inside a certain volume. The track would also have a variety of bumps and curves.

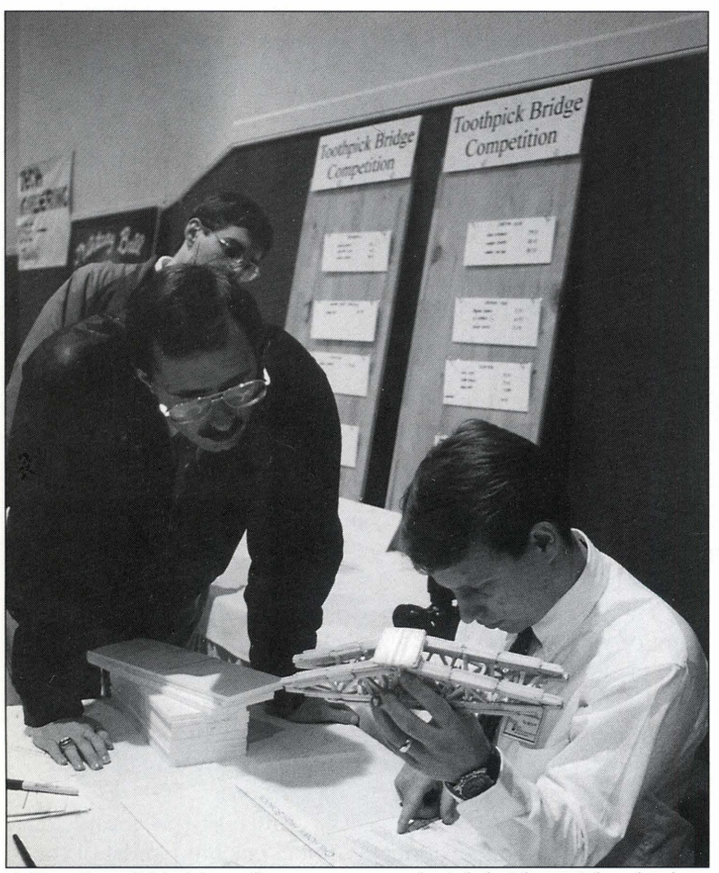


Photo by Lisa Traub

A Tau Beta Pi initiate discusses a toothpick bridge with a high school teacher.

Monte Carlo Night was a social event managed by the Institute of Industrial Engineers. Tables decorated in white, black, and red, featuring roulette, blackjack, hi-low, poker, and craps were set up in the Pamplin Atrium. The dealers wore white shirts and little black vests. Prospective gamblers were separated into teams of up to five people each. Each

Continued on page 16

Visualizing

BY AMY SIMMS

The founders of ORCA Computer, Inc., have taken academic research far beyond the status quo and into the future. What began at Virginia Tech in 1983 as research in developing a modeling environment has become the Visual Simulation Environment, a software package which will be released commercially this summer.

With VSE, users will no longer need a different simulation package for each type of problem. Because VSE operates in a truly object oriented graphic based environment, it can be used to simulate anything, from a manufacturing line to a computer network.

This unique project was born in 1983, when the U.S. Navy funded research in building a discrete event Simulation Model Environment. "When we started this research," said Dr. Osman Balci, "there was virtually nothing in the literature about this type of simulation model." Dr. Balci is an associate professor of computer science at Virginia Tech and one of the originators of the VSE project.

He had to start from scratch to solve a very complex problem, developing a prototype for a domain-independent SDME. In other words, the software could not be restricted to any particular type of problem. The objective of the SDME project was to provide a comprehensive, integrated set of tools to offer support throughout the entire model development life cycle, to assist in the quality assurance of the model, to increase the efficiency and productivity of the model creator(s), and to decrease the development time of the model. According to Dr. Balci, this research was experimental and often based on trial and error.

With VSE, users will no longer need a different simulation package for each type of problem. Because VSE operates in a truly object oriented graphic based environment, it can be used to simulate anything, from a manufacturing line to a computer network.

In 1992, guided by the efforts and findings of the SDME, the Visual Simulation Support Environment prototype was completed on a Sun computer workstation. The VSSE took the research in simulation one step further by introducing a visual interface. Development of the VSE was started in August 1992 based on the experience gained from both the SMDE and the VSSE prototypes. The VSE software was created using the object oriented software engineering environment of the NEXTSTEP operating system. The use of NEXTSTEP is important because it allows the VSE software to be truly object oriented. "This is the way to develop software in the 1990's," said Dr. Balci. Beta testers of the VSE have included students in CS4214 Simulation and Modeling course in both the Spring and Fall 1995 semesters.

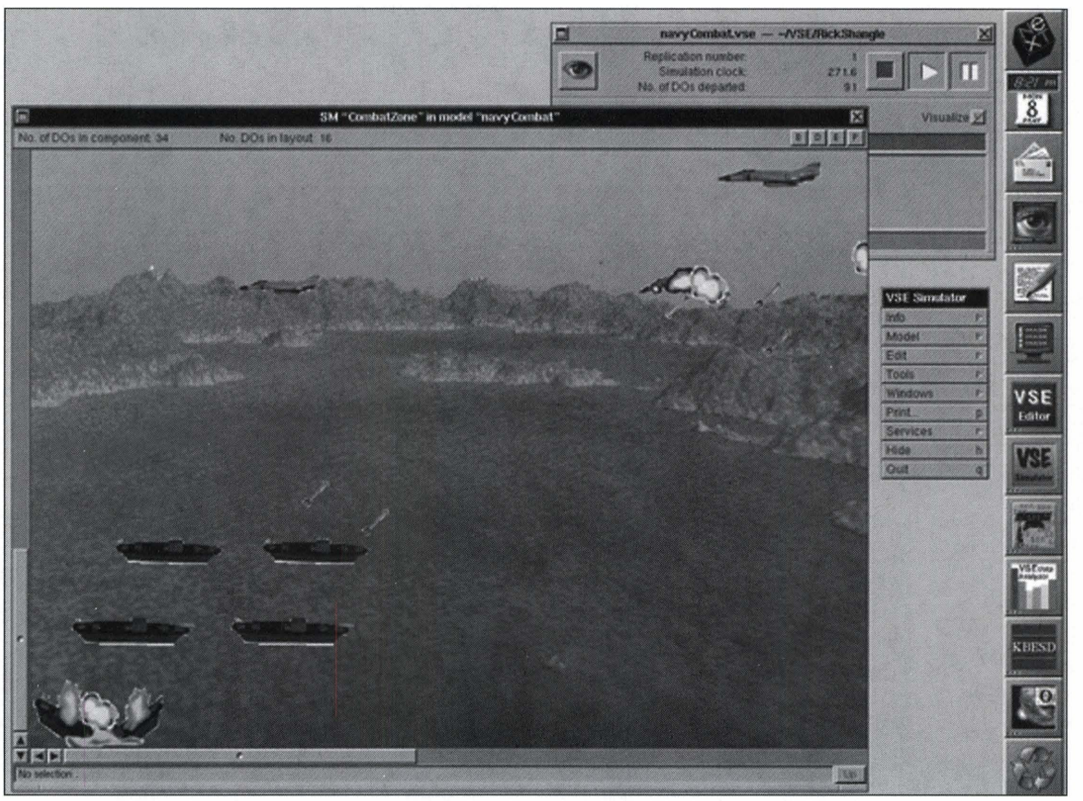
The commercial development of VSE was made possible by technology transfer, which, according the Dr. Balci, is the future of university research. Technology transfer is the modification of research into a commercially viable product. In the case of the VSE project, Balci, along with Tech students Anders Bertelrud and Charles Esterbrook and Richard Nance, director of the Virginia Tech Systems Research Center, formed ORCA in 1995 in order to satisfy a contract awarded by the Naval Research Laboratory and the Naval Surface Warfare Center, Dahlgren. The deliverables for this contract are a visual simulation model of world-wide air traffic control and satellite communication using VSE and the creation of a commercialized version of VSE. In essence, technology being developed at the Simulation and Software Engineering Lab at Virginia Tech was transferred to ORCA, a contractor capable of developing a commercialized product.

According to Dr. Balci, one very important feature of VSE is its flexibility. Instead of several software packages used for different types of simulation, VSE can be used to simulate anything. "This allows the person who understands the model to design it, by giving him or her the tools needed", said Dr. Balci. A major challenge in creating a simulation software environment he said, is that in order to build a good model the user must have knowledge of the system to be modeled. Unfortunately, the user is not always knowledgeable in the area of simulation or computer programming. This demonstrates another important feature of VSE, ease of use.

Since VSE is completely object oriented, most of the simulation can be built graphically. For instance, if

the future

one was to simulate a bus route, the first step would be to draw or scan in pictures of buses, passengers, and any other object in the system. The interaction of these objects would then be defined using the English-like scripting language. "The VSE is intended for people who are not computer scientists," said Anders Bertelrud, a former Tech student and ORCA co-owner.



Visual simulation of a naval combat scenario using VSE.

Photo courtesy Osman Balci

Another important, and unusual, feature of VSE is its picture based format. Most simulation environments are icon-based, so the user is limited to the graphical objects included with the software as icons. With a picture based environment, the user can import a post-script object, draw a model, or scan a picture to be used as any object in his or her simulation. The types of object which can be represented with VSE are unlimited. In addition, the picture is only a property of the object it represents, so it can change over time. For example, a simulation could show a plane exploding by changing the picture associated with the plane as it explodes. The unlimited visual possibilities of VSE are important. As Dr. Balci said, "Visualization is very important when communicating with others."

The object-oriented nature of VSE enables a picture to be only a property of an object. Each object is a member of a class of similar objects, such as planes or passengers, and each class has associated methods, such as flying or boarding. The classes are hierarchical and can be decomposed into separate levels, each having its own methods. A simple example would be a model of a bus. The uppermost level of the hierarchy is the bus itself and methods could be moving, stopping, turning, etc. When the class "bus" is decomposed to show the next level, we see the passengers inside of the bus. Methods associated with a the class "passenger" might be sitting or walking down the bus aisle. Of course, a typical model would have many levels of hierarchy with each class having numerous associated methods. The hierarchy size is only limited by the power of the computer, and errors can be traced through the hierarchy. In addition to these features, VSE allows the creation of "intelligent" objects. These are dynamic objects which have some associated logic. For example, a missile could "decide" where to go based on other factors in the system. Since this type of object is not uncommon in the age of computers, this is yet another important feature of the VSE.

The future of VSE is bright, as version 1.0 of the commercial software is to be released this summer. This release should coincide with the release of OpenStep 4.0, which will allow ORCA to port the VSE software from the NEXTSTEP operating system to more common operating systems including Windows 95, Windows NT, and Sun Solaris. Since it has been developed under a government contract, the commercialized version will be free to the federal government. It will also be available for student use, including graduate students who may want to incorporate it into thesis or doctoral research. "I am happy that this research has gone all the way," said Dr. Balci. "This sort of technology transfer is good for the university and for the community." **EF**

Sporn Award Winner is a Credit to Profession and Community

BY ANNA WEGMAN

Every once in a while, a student has a professor that positively impacts their perception of school and life. This phenomenon doesn't occur often and generally students don't realize the effect a professor has until they are no longer under the professor's tutelage. By then it is too late to let the professor know the effect that they have had. Hence, the remedy of the Sporn Award.

Each year the Student Engineer's Council provides an opportunity for students to recognize their favorite professors by nominating them for the Sporn Award. The applications for this award are written completely by students. A committee within the Student Engineer's Council composed of volunteer students reads all of the nominations sent in. The committee then nar-rows the competition down to five deserving professors. At this point, the students who nominated the five finalists are asked to come to an SEC meeting to make an oral presentation about the professor. The members of the SEC then vote on the winner of the award.

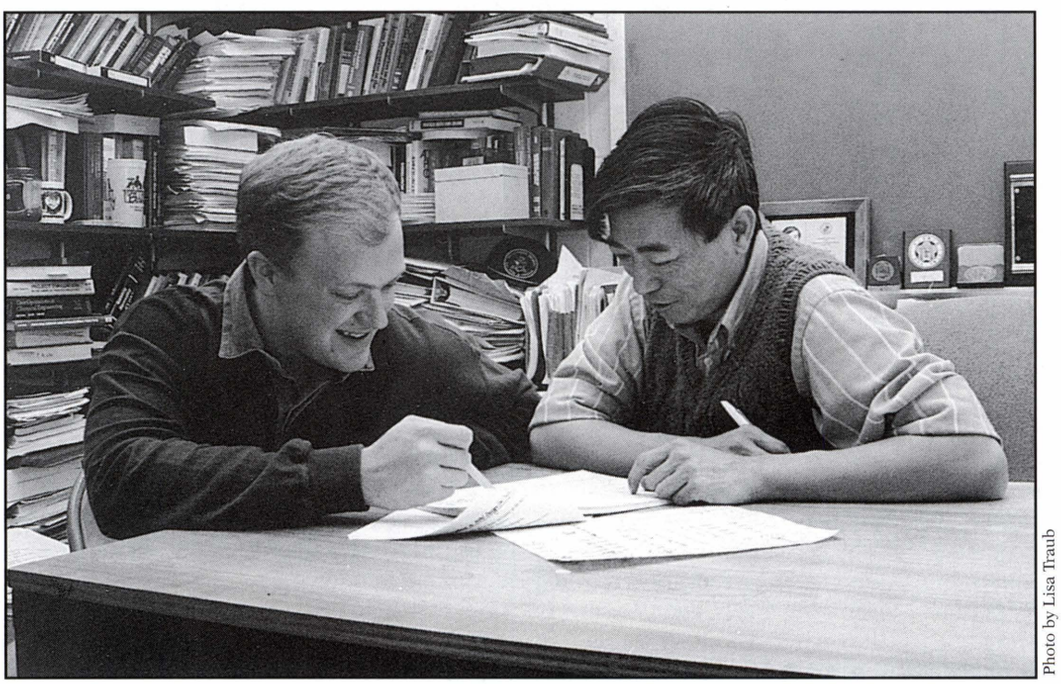


Photo by Lisa Traub

Jesse Blocher, a junior in ChE, discusses homework with Dr. Liu.

This year's recipient of the Sporn Award is Dr. Y.A. Liu of the Chemical Engineering Department. Lale Gokbudak, a senior who was in Dr. Liu's design class, nominated him for the award.

Dr. Liu began his education at the National Taiwan University were he received his Bachelor's of Science degree. He then came to the United States where he attended Tufts University to earn his Masters degree. Finally, Liu obtained his Ph.D. from Princeton University. Dr. Liu has been recognized with such notable national awards as the Fred Merryfield Design Award, the George Westinghouse Award, and the National Catalyst Award. These awards sought to honor Liu for both his engineering research and design, and his teaching excellence.

The research that Dr. Liu conducts is primarily in the realms of "computer-aided design, process integration and synthesis, bioprocess design and development, and artificial intelligence in chemical engineering." Dr. Liu has also written textbooks on both artificial intelligence and neural networks. All of Dr. Liu's research contributes to his classroom style in his senior design class.

Dr. Liu came to Virginia Tech in 1982 from Auburn University. He is the Frank C. Vilbrandt Professor. His contributions to the University can be observed through his research, but more notably, Dr. Liu has a great impact on the students he interacts with.

Lale Gokbudak "had the pleasure of being in Dr. Liu's process and plant design class." Her perception of Dr. Liu has been formed both through his status as a teacher and as an advisor to seniors. Concerning his teaching methods, Dr. Liu commented, "I work them hard; they don't complain." Gokbudak agreed, saying Dr. Liu's "teaching style can be best described as fast paced." But evidently, students don't mind if Liu is demanding because "he'll talk to you for as long as necessary until you understand the material."

In such a demanding curriculum as Chemical Engineering, a teacher's accessibility is important. Dr. Liu is known to be available to his students at almost any hour of the night when they have a project due using the mainframe. A teacher so dedicated to his students is rare and fortunately he will be recognized for his role as a professor. Dr. Liu also has the important role of advisor to his students.

Gokbudak commented, "Besides class work, he is also quite aware of the other most important concern of seniors — their future." Dr. Liu serves as a vital link

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Student Leads Charge Against Bridge Proposal

BY MATTHEW DANZA

Every 10 years, Virginia Tech produces a master plan and submits it to the General Assembly for funding requests. The master plan includes proposed construction to help solve architectural and spatial needs of the university. In 1994, Virginia Tech submitted a master plan which included a proposal for the new Communication and Technology Building with a single span bridge.

The proposed bridge crosses the Mall and connects Newman Library to the Communication and Technology Building. There is significant opposition to the bridge proposal among the Virginia Tech community. Students and faculty alike are opposed to such a bridge. Paul Tubach, an undergraduate student in the Landscape Architecture Department, is one the more vocal opponents.

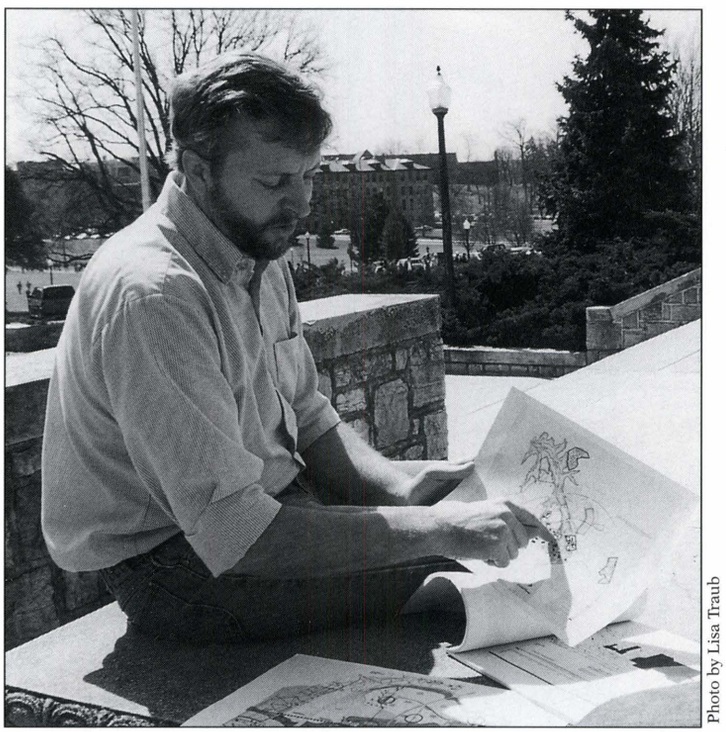

Photo by Lisa Traub

Paul Tubach explains the open space plan.

A Man and His Quest

Tubach has been a member of the university community off and on for about 20 years. During this time, he has witnessed many of the changes the university has gone through. "As I watched the master planning process evolve, I noticed problems in the planning process," Tubach said. "Hancock, for example, demonstrates a problem with the in-fill development strategy currently being used. The practice of squeezing building into tight spaces cannot continue to be used if quality spaces on campus are compromised. Constructing buildings in the diminishing open spaces will compromise the visual quality of this university. The bridge is just such a proposal."

The bridge proposal encouraged Tubach to take action. For his senior project he actually developed an alternative master plan for the university. In it he addressed problems with the bridge proposal as well several other proposals for the university. "My initial arguments were against the bridge," Tubach said. "But the bridge is just an outward manifestation of a deeper problem within the master planning process. This encouraged me to develop my alternative 1995 master plan. In it I have analyzed the past development patterns of the university, looked at the current development proposals, and came up with a long range strategy for the next 50 years for development of this campus. I also have developed an open space plan to help protect and preserve some of the quality open spaces left on campus."

The proposed bridge crosses the Mall and connects Newman Library to the Communication and Technology Building. There is significant opposition to the bridge proposal among the Virginia Tech community.

Problems With the Bridge

Students, faculty, and staff are opposed to the bridge for different reasons. In his 1995 Alternative Master Plan, Tubach outlines several different reasons the Virginia Tech community is upset. These reasons include:

- The bridge blocks the view of the War Memorial.
- The bridge violates open space needs of the campus.
- The bridge does not solve the Mall's true problem of building along the edge of the Mall.
- The bridge is too large for a the rural setting which is Blacksburg.

Tubach agrees the Mall is weak visually, and agrees that construction can help strengthen the Mall. However, he believes the bridge does not begin to address the true problem of the Mall. "Before we can talk about the bridge we must understand the essence of a mall. What is 'mall-ness?' First, recognize the Mall as a structural element," Tubach explains. "The nature of a mall consists of buildings and an edge condition with a terminus. Our mall lacks edge buildings on one side of the Mall, but it does have a strong terminus in the War Memorial. That is why the Mall is weak. Putting a bridge across only shortens the Mall, becomes the new

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Krum Recognized for Leadership

BY CHRIS PRIMAVERA

When asked the importance of leadership, employers will tell you it is paramount in today's working world. Since the beginning of time man's advancement has stood on the shoulders of great leaders. Good leadership provides a way to achieve individual and collective goals. This invaluable trait is one of the most important gifts a graduating senior can possess at the start of his or her career path. Although sometimes unsung, our leaders provide us with the framework so we achieve all our aspirations. These pillars of society deserve to be acknowledged.

In March of this year, the Student Engineers' Council recognized mechanical engineering junior Brian Krum as the winner of the Torgersen Leadership Scholarship. The award was established by the Council in 1985 in celebration of the centennial anniversary of the College of Engineering, and in honor of Paul E. Torgersen, Virginia Tech's current president and former dean of the College of Engineering.

The SEC raised $20,000 through corporate donations to be used specifically for the acknowledgment of student leaders with respectable academic standing. A committee composed of student members selects five finalists out of those applicants meeting the requirements of 75 hours passed and a minimum QCA of 3.0. Two letters of recommendation, one citing the students leadership abilities and one boasting academic excellence, round out the application process. Although meeting these qualifications assures the applicant's eligibility, the committee focuses the most attention on the students themselves.

Photo by Lisa Traub

Brian Krum receives the Torgersen Leadership Scholarship from Maggie Becker.

Through a standard interview session, the committee has the chance to better ascertain the students leadership capability in an informal, one-on-one situation.

This is where candidate Brian Krum stood out. Leadership is not new to this seasoned veteran. Krum took on the leadership role of drum major in his high school band. Assuming the task of instructor and role model gave him adequate practice in motivating his peers. So when it came time for Krum to accept a co-op position with Delco Electronics, he was ready and well prepared to become the director of the company's SPORT, Student Program Organizing Resources & Technology.

"A leader is one who has the ability to make others want to change their attitude for the better."

Through this organization, Krum was able to collaborate the talents of over 180 other student interns to save Delco over $1 million through cost and savings projects. Krum's leadership merit pushed him into his most challenging role as production supervisor. Krum's subordinates were a much more experienced group, secure in their views. Krum focused all of his efforts on gaining the trust and motivation necessary to command the respect essential for a leader. This provided the best opportunity to see Krum's motto in action. "A leader is one who has the ability to make others want to change their attitude for the better."

This definition of a leader is what drives Krum to handle his positions. He believes through the right communication and diction tactics, a leader can give group members a sense of "self-worth and team responsibility."

Krum knows the importance of being adaptable and versatile to cover all "shades" of a leader. His extensive experience in leadership situations has taught him many useful managerial, organizational, and team strategies. Krum believes if goals are kept "reasonable and attainable," the success he craves will come with ease.

The Torgersen Scholarship strives each year to recognize the College of Engineering's best student leader. This year's winner, Brian Krum, has found a way to integrate his academic and leadership roles to gain a well rounded view of what needs to be done to secure good leadership. Through his vast experiences in the "real world," Krum gained an appreciation of the obligation of each leader to conduct an orchestra of players through any challenge. He recognizes the importance of following a "well-respected, trusted leader." EF

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terminus, and blocks out the memorial. The bridge is not the solution; the edge condition needs to be reinforced. That will solve the problem of the Mall."

A misconception which existed during the bridge planning process was the memorial is too small for the Mall. In fact, this idea became a major factor in the approval of the bridge. Tubach proved that the War Memorial is not too small. He examined the length of the Mall at Washington D.C. to the heights of several terminus buildings. The length of the Mall from Washington Monument to the Capital Building is 7200 feet while the Capital Building is 150 feet tall. That creates a height to length ratio of 1:48. From Washington Monument to Lincoln Memorial is 4150 feet, and Lincoln Memorial is 87 feet high. That ratio is 1:47.7. The length of the Virginia Tech mall from Main Street to the War Memorial is 1562. The height of the pylons is 32 feet, also creating a ratio of 1:48. Therefore, Tubach concludes that the Mall is in proper height-length proportion. "A bridge would not strengthen the Mall," Tubach says. "It would destroy this delicate balance."

Most people who oppose the bridge are outraged by how it would block the view of the War Memorial and

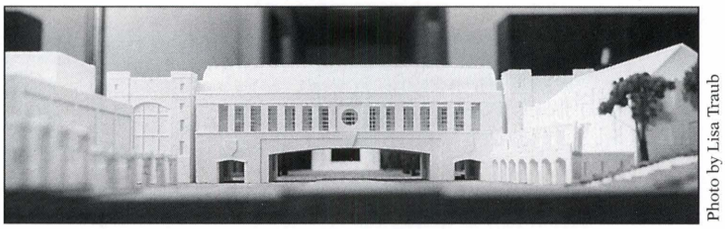


Photo by Lisa Traub

The model of the bridge and the War Memorial can be found in Burruss Hall.

subsequently the rest of the university. "The sketch done by the architects [of the bridge] in the 1995 master plan shows that the memorial, trees, and sky are all visible through the underpass. This is what got the master plan passed," said Tubach. "But there is a tremendous difference between what we see and what we get."

In an effort to demonstrate the enormity of the bridge, Tubach scaled measurements from a bridge model in Buruss Hall. He found the height of the bridge to be 50 feet and the bridge underpass at the center was scaled at 22 feet. Tubach estimated that a 4-foot viewing level (average car viewing height) from Main Street would only yield at best 64% of the memorial.

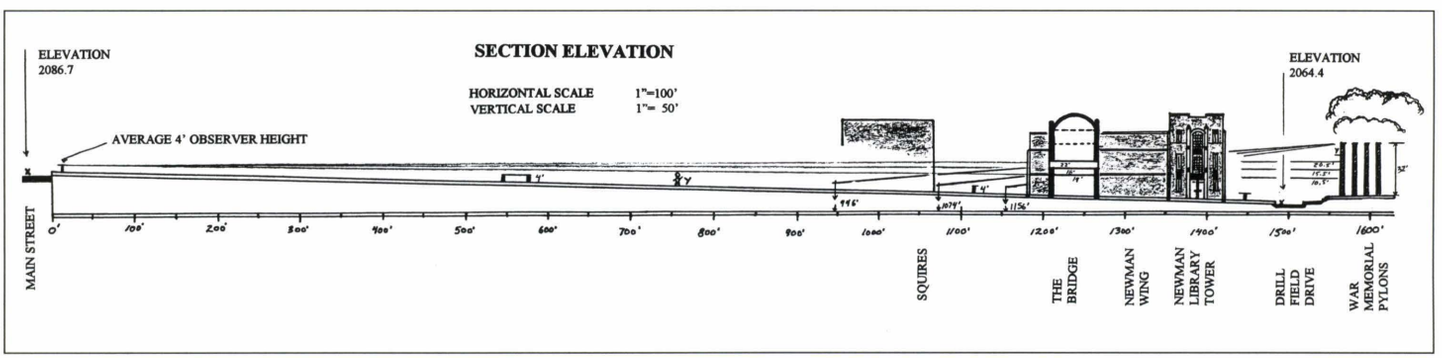
"The sketch done by the architects [of the bridge] in the 1995 master plan shows that the memorial, trees, and sky are all visible through the underpass. This is what got the master plan passed," said Tubach. "But there is a tremendous difference between what we see and what we get."

"In the worst case scenario, Tubach explained, "you have to be 51 feet from the bridge before you can see the full top of the pylons. If the underpass height is 22 feet, you have to travel 2/3 the length of the Mall before you can see the memorial. To get past the bridge, you have to travel 1270 feet. The Mall's only 1500 feet long," Tubach explains. "My analysis confirms the majority of views of the Memorial along the VPI[sic] Mall will be compromised and significantly blocked by the bridge. This contradicts the architects assertion the bridge will frame the Memorial and enhance the view. Many consider the Memorial to signify the heart of the university and blocking 64% of the view is not, in my humble estimation, enhancing the view of one of the finest buildings on campus."

The Fight Begins

Tubach plans to produce his master plan and make it available to the Virginia Tech community. He also would like to hold public meetings presenting his alternative master plan and bridge proposal to the university community. In addition, he has opened up his e-mail address. He encourages anyone with an opinion to contact him at ptubach@vt.edu. Tubach hopes to form a student coalition with a primary goal to fight the bridge.

"I've had numerous faculty and students ask me 'What can I do to contest this?' That's why I've opened up my e-mail address to everyone," said Tubach. "The first plan for a coalition will be to oppose the bridge. From there we will establish long range goals that keep students better informed of planned expansion and have a greater voice in the planning process." **EF**



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students, on the other hand, tend to be more concerned with getting to the final result. According to students on the trip, these two styles meshed nicely so that the final international engineering product was better than either group could have done alone.

...the final international engineering product was better than either group could have done alone.

The similarities between American and French students were much more pronounced than the differences. "It's not like you might think, that [the French students] are completely different. It's surprising how like us they really are," said Tim Sweitzer, a student on the Nantes trip. Both the French students and the Americans knew when it was time to get down to work, but they also knew that this exchange was more than simply an international engineering project. All students were able to connect with each other on a social level as well as an engineering level, enhancing the cultural experience for both the French and the Americans. Jessica Wilt commented "We really got along well."

But eventually the week had to end for the two American groups. Was it a good experience for the Virginia Tech students and faculty? "It was an excellent trip." said Carlene Arthur. "We wanted to change our tickets to stay an extra day." commented Jessica Wilt. Tim Sweitzer said, "We loved it!" EF

International Studies

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technical terms required for their major. Studying for a year in a foreign country is an excellent and exciting way to spend a part of college, as well as being a great resume builder.

Incoming freshmen, undergraduates, and graduate students are all welcome for all programs. Students interested in any of Virginia Tech's international programs should contact Carlene Arthur (540) 231-3973; e-mail: carthur@vt.edu for more information. EF

Sporn Award

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between college and life after, whether it be a job or graduate school. He has many connections and he tries to enhance his classroom activities with speakers "to talk about graduate programs, the interview process, and environmental engineering." In this way his students learn to appreciate the vital role of industry and communication skills before they are thrust into the workplace.

Dr. Liu chose the teaching profession because he enjoys the opportunity to "motivate and inspire young people."

In terms of graduate school, Dr. Liu will "personally contact graduate programs in order to insure that his students get top priority at the schools they wish to go to." A professor so dedicated to the success of his students can't help but be loved. As Gokbudak sums up, "His class and outside assistance are quite practical and unsurpassed by anyone else in our department."

Besides his role as professor at Virginia Tech, Dr. Liu is also involved in many other meaningful pursuits. Related to his career, Dr. Liu's work with the United Nations Development Program has him traveling to other countries to educate engineers and scholars about design. In a developing country, this knowledge can prove invaluable to the future of the country.

Dr. Liu is also very involved in the religious community at Tech, serving as an advisor to a Christian fellowship. Besides being an advisor, he participates in this group through a Bible study that he teaches. The Chinese community at Tech benefits from Dr. Liu's involvement as an advisor to the Association of Chinese Students and Scholars. Dr. Liu has been able to remain a well-rounded participant in the stimulating environment of Blacksburg, Virginia, even with all of the obligations of being a professor.

Dr. Liu chose the teaching profession because he enjoys the opportunity to "motivate and inspire young people." This desire to motivate is not only visible to his students, but is also evident in his commitment to his community. Dr. Liu's dedication has not gone unnoticed. His students recognize and appreciate his personal interest in their achievement. This particular year, a student decided to give back to Dr. Liu for all that he gives to his students. As a result, the engineering students on the Virginia Tech campus have recognized Dr. Liu as the winner of the Sporn Award. EF

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team was given a set amount of money to lose or increase as their luck held. Throughout the night the tables were full of excited people. At the end of the night the winning teams received gift certificates to different local businesses. Monte Carlo Night is one of IEE's usual fund-raisers. According to Mary Kennedy, vice-president of IEE, they hold the event for any interested sponsor.

Stereotypically, athletics and engineers don't mix, but the SEC Olympics, held on Sunday, February 25, were the last event of Engineers' Week. The events were held in the square between Barringer Hall and Johnson Hall. Teams of seven or eight people from the different engineering societies competed in volleyball, tug-of-war and a relay race. Omega Chi Epsilon, a national chemical engineering honor society, won the volleyball and tug-of-war events. The National Society of Black Engineers won the relay race. The relay was a complicated multi-step process involving such activities as hula-hooping, running around a baseball bat ten times, bouncing on a pogo ball, and walking a distance holding in the mouth, an egg on a spoon. After calculating all the points Omega Chi Epsilon won the day. They received a trophy proclaiming their victory.

The departmental informational sessions stretched through both weeks of activities, one each night from Sunday to Thursday. Different majors used different programs, but the purpose was the same, to inform and to attract. As an example, the Materials Science Department, had a walk-in and browse type of format. One room contained posters describing all different parts of the major as well as undergraduates, graduate students, and faculty to answer any questions. Experiments and demonstrations went on in other rooms. Food and a raffle every half-hour were also offered.

"I want people to get excited about it." Ghoreishian said before the events began. In general, they did. Virginia Tech celebrated Engineers' Week 1996 with useful information, amusing social events, and challenging competitions. Now the only question left is what they're going to do next year. EF

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