NC STATE UNIVERSITY

Alumni & Friends

Biological & Agricultural Engineering

"We Bring Engineering to Life"

Fall 2001/Winter 2002

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Extinguishing it...

Staff, students, and faculty participated in a hands-on fire extinguisher safety training session provided by the NCSU Fire Prevention Division. Pictured below is staff member Chris Hayes as she moved in on a controlled trash can fire. The fire was set with equipment designed especially to simulate small fires.

Visit the BAE home page at: http://www.bae.ncsu.edu/
Fax comments & questions to: BAE News 919-515-6772

Undergraduates Focused on Goals in Changing Educational Landscape

Our faculty are enjoying teaching and working with the current group of undergraduates. Eager and bright, this year's incoming undergraduates have an average SAT score of 1185. And there are more of them, as BAE's enrollment has grown to 239 undergraduates this year. The new Biomedical degree program is now in place, reflecting and accommodating the changing study interests of these incoming students.

In general, the student body today is better prepared to understand college level challenges and they are focused on career goals like never before. Many have specific positions at companies in mind for their futures and are gearing their studies to their goals.

Faculty believe these students are among the luckiest of learners because this is a great time in our history to be educated. There hasn't been an era so ripe with intellectual exchange and application since mechanization and the industrial revolution. Today's students are learning at the crux of computerization and the technological revolution. They are on the technology future fast-track and the pace is exhausting.

Running with the pace of things, the learning community at every level is in high gear. Administrators are challenged to create and implement new plans of action that will take advantage of innovative technologies while incorporating needed flexibility that responds to repeated change. Faculty are challenged to integrate emerging technology into their research and embrace and test new teaching methods. The students through all of this are challenged with functioning at top level and adjusting seamlessly to change. Like any time of rapid advances, the turmoil produces great

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Faculty News

Elected-Dr. Fred McClure has been elected as Fellow on the International Committee for Near Infrared Spectroscopy (ICNIRS). He has also been chosen to be the North American editor and the Electronic Columns editor of the organization's newsletter.

Retirement News-Dr. Subhas Mohpatra retired effective August 1, 2001 and Dr. Fred McClure retired 1/01/02. We wish them well.

Vermicomposting News-Rhonda Sherman's vermicomposting efforts have received attention at the local, national, and international level. Locally, there have been television interviews and newspaper articles. The Office of the Governor of Kentucky asked her to serve on a panel discussion. Sherman was invited to speak at the Third International Earthworm Symposium in South Korea. ■

ALUMNI & FRIENDS
Biological & Agricultural Engineering
"We Bring Engineering to Life"

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If you would like to contribute to the next issue of BAE Alumni&Friends, please send your contributions to the above address or email us at: bae_news@bae.ncsu.edu.

Focused on Goals...

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success stories and also losses that create nostalgia for the way things used to be. Sorting through what to keep educationally and what to change can sometimes be unclear. We're doing our best to make good judgements so our department's educational offering is high quality. We have a new advisory board in place and the department is open to any suggestions. We are improving our courses and adding new on-line courses. At the undergraduate level, students have increased access to multimedia and program specific equipment and internships that enable them to gain valuable career experience.

The undergraduates today are staying alert to change and exploring its advantages. They have learned to stay focused on the bigger picture: their career goals. To weather the era, students have an open outlook and goals that build on goals. The students know employers are looking for flexible learners with a wide knowledge and skill base. Students realize their future jobs require expertise that crosses into other disciplines. The students are often complementing their course work with part time job experience, volunteer work, extra curricular activities and club memberships. They become affiliated with pre-professional societies and are earning certifications and licenses. The students are in ever increasing numbers seeking to add related minors or additional course work beyond their degree to refine their career goals.

There are currently 21 double majors in the department and many more with two BE concentrations. These students have reviewed every path in hopes of fortifying their future resumes with a total package approach that speaks to employers "I'm your best fit for the position." And our students often are an employer's best fit; BAE graduates have proved it repeatedly, as our students are employed in a wide range of industries. Other engineering programs are often geared towards specific industries, whereas BAE students are taught to look at the bigger picture.

Our department's main emphasis is on sustaining the quality of living for people and the environment through the use of biological sciences. Because of this mission, students explore and mix many avenues of engineering. They pull together mechanical, biological, and computerized processes, developing a total engineering systems approach to problems. BAE graduates are champions of systems engineering for the biological sciences--a kind of engineering approach very much needed in a crowded world.

To help you get to know some undergraduate students better, we have chosen one from each BAE engineering area to reveal the direction of their personal career strategies and hopes for the future. We think you will find it interesting and uplifting to meet some of these current students who will be future engineers.

Meet ***Biomedical Engineering*** student **JoAnn Bricker.** She is "A Tale of Two Cities," as JoAnn splits her life between Raleigh and Norfolk , VA. JoAnn travels two evenings a week between the cities. She is in Raleigh for three schedule-packed days on Tuesday through Thursday, then on Friday she is in another world in Norfolk. There she works at the Ford Motor Company plant on the assembly line building Ford F-150 trucks. JoAnn works on Friday and Monday, giving her the weekend for study, family, and hobbies.

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Department Head's Comments

James H. Young

We had a very successful celebration of the new Biomedical Engineering Degree Program on October 19th. It was great to see many of our recent graduates at the reception as well as current students, BAE faculty and staff, and several faculty from other departments. I want to express my thanks to Dr. Susan Blanchard and students in the BME club for planning the celebration.

I also want to express special thanks to Susan and Don Blanchard for the establishment of the Manning/Blanchard Endowment for Undergraduate Education. The Endowment will fund programs in the following priority:

a. An annual student awards recognition event

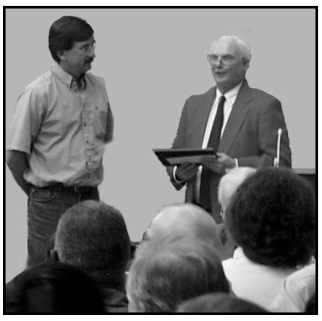
b. Undergraduate student club activities

c. Activities that enhance the undergraduate educational experience

Disbursements will be authorized from the earnings of the Endowment once the principal amount reaches the minimum level of $15,000. Susan and Don are committed to fully endow over a period of several years. In the meantime, if there are others who would like to share in the goals of the Endowment, they may contribute so that benefits to students and undergraduate programs may begin at an earlier date.

The Manning/Blanchard Endowment, as well as the previously announced James A. DeShazer Endowment, will be of tremendous benefit to the BAE department in the future as they will provide funds for important activities which cannot be supported by state-appropriated funds. I would encourage you to support the department by contributing to one of these endowments or to the NC Section of ASAE Scholarship Endowment Fund or the NC Section of ASAE Student Activities Endowment Fund. As state budgets have become more restricted(and apparently will continue), other sources of support for key activities are even more crucial.

Please note the article in this issue which recognizes the thirty-year involvement of Dr. Roger Rohrbach in the teaching of the senior design sequence. While he has turned over the reins of the course to Dr. Mike Boyette this year, he continues to play a major role in the teaching programs of the BAE department through his role as Chair of the Departmental ABET Planning Committee. We will be reviewed by ABET under the new accreditation rules during the fall of 2004. ■



At the 2001 BAE holiday party, Dr.Young presented this year's staff SPA award to Wilson Huntley, an engineering research technician honored for his hard work. (Right) Santa (aka Dr. Humphries) hands out door prizes to winners.

Alumni Updates

In this issue we have an update from **Larry Merrill**. He earned B.S. degrees in Agricultural Engineering Technology (TBE) and Agricultural Economics in 1972. He is married to Nancy Dubbs Merrill and has a daughter, son, stepson and two grandchildren.

Merrill works for Blue Ridge Development Services, a real estate development firm. He says, "I enjoy my work because there are challenges and decisions to be made every day in the real estate development business, mainly those that relate to complying with local, state and national regulations. Not a day goes by that I do not utilize some aspect of my education from NCSU in both economics and engineering, whether it relates to construction, water management, electrification, land management, surveying, financial analysis, etc."

Merrill's most memorable awards were:

1972 Senior Student Honor Award-NCSU Bio. & Ag. Eng. Technology Curriculum.

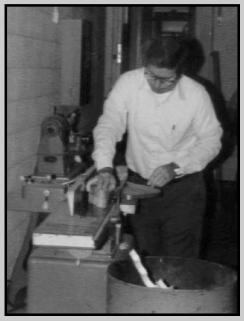
1993 Realtor of the Year award from the High Point Regional Association of Realtors.

1997 President's Award from the North Carolina Association of Realtors. ■

We would like to hear from you! In each issue, we plan to present alumni updates. To participate, e-mail ccmitkow@eos.ncsu.edu or write to us at: BAE Newsletter, Dept. Bio. & Ag. Eng., NCSU, 3110 Faucette Dr., Raleigh, NC 27695-7625.

Senior Design Then and Now ...

(Above) Senior design students in 1986 are sanding mini-cars for a community service project. (Below) The 2001 students watch a classmate test a canoe rowing mechanism built for the handicapped.



(Above) Rohrbach helps with the 1989 Senior Design service project. (Below) He works with a recent senior design student to set up digital multimedia equipment for her design presentation.

Rohrbach & Senior Design: A Synonymous History...

Dr. Roger Rohrbach

There are many BAE alumni who can still hear Dr. Roger Rohrbach's voice creep into their minds every now and then. Think back and you can probably hear him saying, "Well, you're on the right track, but I don't think you've quite got it. You're going to need to rethink that." When you still hear the voice of a teacher, including the lilt of their speech, then maybe you had a teacher who made a difference. Dedicated to the student experience, Rohrbach and Senior Design are synonymous. They just seem like the same thing to most people.

After teaching Senior Design for 30 years, the spring 2001 class was Rohrbach's last group. Rohrbach has not retired, he has just stepped back to deservedly relax and pursue some research for awhile. But you won't see him stop promoting student's abilities to anyone who will listen. A student's project success was always Rohrbach's success too. If a student was frustrated with a project, Rohrbach was also, so they would have to work it out together.

Rohrbach came to the Department in 1968 with a Ph.D. from Ohio State University. Loaded with ideas and energy, he has produced 11 patents, written 3 books, and either authored or coauthored 114 publications and papers. His work with students is most outstanding as he has directed 14 theses and worked with countless undergraduates on their design projects.

Senior Design was first taught by Dr. Bob Holmes and then nurtured through the years by Rohrbach. Senior Design came about because it was obvious that students needed a course that gave them a chance to shine. They needed a course that could pull together all their studies into a project that would show off their individual strengths and efforts and have the project judged by peers. "Senior Design is just about the most difficult course to teach and the most important one in the curriculum as it serves as the capstone for all the technical learning the students have accumulated," said Dr. Young. "The students' projects are often useful and community-benefiting."

Today, Senior Design projects have become the gauge by which students measure their work-world readiness and ability. During this two semester course, students have tons of decisions to make. They have design parameters, time constraints, research work, budgets, supplies and manpower needs to fill. The projects are undertaken using a team approach and monitored by advising professors. The students incur the full gamut of project management tasks and it has proven to be a solid learning experience.

Passing Senior Design was never guaranteed; just because students complete course work that prepares them to take Senior Design, it doesn't mean they will pass it by graduation time. Many students have added a semester to their studies to pass Senior Design.

While the course has proven to be an excellent learning tool for students, it has also been useful to the department as a curriculum assessment tool.

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Campus Celebrates the Initiation of the New Biomedical Degree...

Dr. Susan Blanchard, the newly named Assistant Undergraduate Coordinator for Biomedical Engineering, talks with faculty and administrators about how glad she is to realize this big day.

The initiation of the B.S. degree in Biomedical Engineering (BME) was celebrated on Oct. 19th at Weaver Labs. In attendance were students, former BAE graduates, NC State administrators, alumni, faculty, and staff. ■

Dr. Young talks with students about the potential of the new program.

Posters of students' biomedical work were proudly displayed for all to view.

The crowd applauds as the charter for the new program is presented.

Provost Stuart Cooper, Dr. Ken Esbenshade, Associate Dean and Director of Academic Programs, and Dr. Nino Masnari, Dean of the College of Engineering, were there to welcome the BME degree program to the College's list of offerings.

Dr. Stuart Cooper

Dr. Ken Esbenshade

Dr. Nino Masnari

Food, drinks, and desserts were enjoyed by all at the reception, which was made possible by a donation from The Park Foundation.

Focused on Goals...

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According to JoAnn, "The Ford Motor Company builds almost one truck a minute, therefore, I do the same thing every minute. First, I tighten up two brake lines attached to the master cylinder. Then I use pliers to tighten two gas clips holding the gas lines to the gas tank. With my hands, I plug a cord into the carbon canister and also a gas line. Back to the pliers again, I then tighten the clip on that gas line and walk back to the front of the truck where the master cylinder is. There, a machine automatically drops down so I can hook the master cylinder to the machine, and position both a balancer and power steering container so they can be filled simultaneously." Although it's fast paced work, JoAnn likes the job and enjoys the people at the plant, including her father and many other family members. JoAnn thinks so highly of the company that it is among her first choices for work when she gets her degree in June.

You would think JoAnn would be exhausted after the traveling, studying, and working, but she has the energy to dance. JoAnn is a member of the NCSU Wolfpack clogging team. The dancing is active and fast paced, not unlike the movements of her assembly line job. Mastering swift precise movements seems to be JoAnn's calling. The job, hobby, and studies all point in the same direction.

Move move move... this girl doesn,t stop. Inducted in the All-American Clogging Hall of Fame, JoAnn is such a good dancer that she has taught clogging to others.

Time time time... where does

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Rohrbach & Senior Design

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When used as a gauge, Senior Design provides the department with valuable feedback that is used to measure if the students are getting the information they need from all their courses. Course curriculum weaknesses can be addressed in a timely manner when the department looks at the types, level of difficulty, and quality of the projects undertaken successfully.

The concept of bringing learning out of the book and into the real-world by creating mini-apprenticeships is centuries old, but it is a tried and true method that Rohrbach has given a fresh spin. He has made an old learning technique new again.

Although this kind of teaching and learning is demanding for both student and teacher alike the rewards are definitely worthwhile.

"It's a joy when a student becomes aware of the effort and qualities of a job done professionally." ***Rohrbach***

Everyone at BAE sings praises for Senior Design as a quality student experience. Dr. Boyette, who is teaching the course this year, said, "I plan to change a few things about Senior Design, but overall the concept is great. The students need the hands-on experience that this course provides. Todays companies expect new hires to be a seamless organizational fit, so the hands-on-training becomes essential to the development of a successfully trained engineer." ■

BAE thanks Rohrbach for 30 years of Senior Design teaching effort.

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she get it? JoAnn has held positions in Alpha Zeta Honor Fraternity and Sigma Alpha Professional Sorority and she is president of the NCSU Clogging team and their student government representative. "All these extra activities have taught me leadership, responsibility and honed my time management skills," says JoAnn.

As for the future, JoAnn would like to be employed as a supervisor or engineer for Ford Motor Company. She feels her degree in biomedical engineering and her dance team experience which emphasizes body movements, in addition to her precision work on the assembly line, have given her a unique insight and perspective into the precise repetitive movements that are a challenge to assembly line workers. "Helping others achieve their maximum potential as an employee and jointly improve their physical well-being through an improved environment would be my dream goal in a position at Ford or at any other factory using high-tech machinery in a production application," says JoAnn.

JoAnn would also like to earn a master's degree in Environmental Engineering if she can fit it into her future full-time work schedule. She said her interest in environmental studies comes from her agricultural background. JoAnn is a North Carolina girl from Gibbs Woods, Currituck County, where she grew up in farming county and was highly involved in the Future Farmers of America Program (FFA). Her high school teacher James Guard, an alumnus of Agricultural Education, inspired her to look at BAE to combine her interest in agriculture and her desire to help other people. JoAnn said, "Biomedical studies have delivered on the latter and a degree in environmental engineering would round out my interest. I want to learn more about how the environment challenges biological systems." JoAnn's advisor, Dr. Blanchard, thinks JoAnn will not have a problem finding the time to earn her master's degree. What do you think?

Meet ***Environmental Engineering*** student **Brian Phillips.** Brian is a guy that straight-up knows what he wants to do. Brian said, "I have been watching how people's activities have encroached on woodlands and farmlands in North Carolina, and I think this will inevitably cause situations where environmental systems will be compromised. I believe with my degree and plans to own an environmental engineering firm in the future that I can make a positive difference in situations that exist between the public and the environment."

With a purpose, Brian pursues a full load of courses and has earned three partial scholarships: the BAE Irrigation/ Ronald E. Sneed scholarship and scholarships from CALS and the College of Engineering. Brian also supplements his education expenses working with Dr. Classen and his team of graduate students. Brian said, "This job has exposed me to the importance of communication between team members. At first, I was reluctant to work on a team, but now I am a convert to the knowledge-sharing advantages. I have also learned the benefits of proper documentation of statistical data; I now know it's paramount."

A busy guy, Brian was inducted into Phi Kappa Phi and will be inducted into Tau Beta Pi this February (both are honor societies). Brian thinks it is very important to eventually become an active member of the American Society of

Focused on Goals...

Agricultural Engineers (ASAE). He is the current president of the ASAE Club at NCSU and is working hard to increase student membership. This club is a pre-professional student chapter of the ASAE, whose main organization serves to support the networking and exchange of information among engineers. Most of the BAE faculty are members of this important organization. As president of the student club, Brian says, "I am learning the finer points of delegation, management and organization." Under Brian's direction, the student group has started the year off with a full agenda. On it is a John Deere and CAT tour event, 1/4 Scale Tractor Competition, ASAE Environmental Competition, and a holiday food drive. The group's first meeting hosted speaker Barbara Doll, Project Manager for the Rocky Branch Stream Restoration Project. Interestingly enough, Brian noted that, "The Rocky Branch Stream runs through the NCSU campus on its way to the Neuse River and students can easily view first hand the restoration in progress. It's a great education at our doorstep."

Brian is planning to take additional courses beyond his degree needs. He wants to take an accounting class necessary for operating a business and Spanish because he now values communication skills and sees it as an aid to working with construction personnel and diverse communities. Brian said, "If my environmental firm is successful I will gratefully give back to the university scholarship funds." BAE hopes he does just that.

Meet ***Agricultural Engineering & Animal Science*** major **Robert Hardin**. Bobby, as he likes to be called, is a farm boy from Statesville who fits a lot of chores into a day as is evidenced by his double major studies and internship work. Growing up on a dairy farm provided him with a wealth of knowledge about animals and he is building on this with an animal science major. Bobby's BAE major brings him the engineering skills he wants and he plans to combine both degrees with an interest in animal structures engineering. He is especially interested in the equipment and systems that animal production facilities need. He said, "I want to gain as much knowledge as I can to become capable of managing, operating and even designing farming facilities."

Bobby has a full scholarship from the Animal Science Department and earned a BAE internship from the Philip Morris Corporation. He works as an assistant for Dr. Boyette on tobacco production machinery research. Bobby loves being exposed to hands-on, real-world technologies. He enjoys being challenged to come up with problem solving ideas. To help him with design problems, Bobby has found a friend in computers. Software like Pro-Engineer, Labview, Solid Works and others have let him put his imagination into form. Bobby said, "I have learned a lot about the design process involving agricultural equipment and about practical agricultural considerations too, such as manufacturing and economic concerns. I learned you need to take everything into account when you design things because this will improve your chances of success."

From sunup to sundown Bobby keeps busy. He is a member of the Alpha Zeta Honor Fraternity, involved in the BAE-ASAE Student Club and in the collegiate 4-H and Animal Science Club. He has earned forklift certification and is planning to take the Fundamentals in Engineering (FE) exam to qualify for a Future Engineer in Training certificate (FET), a first

Focused on Goals *continued*

step to earning a Professional Engineer's License (PE).

Future plans for Bobby include a master's degree in machine systems. "Then," said Bobby, "I can consider two career options. I am either likely to continue in school for a Ph.D. to become a university professor with both teaching and extension responsibilities hoping to reach people with my skills, or I may consider my own business having something to do with animal production equipment and facility design. In either case, I want to leverage my background fully." Bobby feels he is on track to meet his career goals and that NC State is doing a good job of preparing him. He is excited about the future because he knows he is in the right field for him and doing what he likes. Bobby wants to have a family and no matter where his career takes him he wants to live on a farm.

Meet ***Bioprocessing*** major **Rebecca Silverstein**. She is from Ramsey, N J and the daughter of an engineer father. When Rebecca started college she was interested in engineering and chose NC State because of its engineering reputation but she was not quite sure which engineering program to choose. She credits the First Year College program for giving her the chance to learn about different fields. Dabbling with courses, Rebecca took BAE 101, an introducton to biological engineering. The bioprocessing segment hooked her and her interest hasn't wavered. To supplement her expenses, Rebecca earned the Charles W. and Jane P. Suggs BAE Scholarship.

Rebecca said, "Bioprocessing

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Fall 2001 Graduates

Rami Guirguis proudly stands with Dr. Young and Dr. Blanchard after receiving both a BE and a BME degree. He is the first graduate of the new BME degree program and responsible for a little graduation day hat humor.

Name	Curriculum
Buchinger, Kerry R.	BE
Carinci, Justin G.	BE
Clinton, Daniel Richard	M.S.
Guirguis, Rami	BE, BME
Gurjer, Yeshwant Ramesh	M.S.
Howard, James Wayne	M.S.
Thompson, Andrew D.	AET
Wight, Marshall G.	AET
Patterson, Jan Marie	M.S.

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interests me because it concentrates on the processes involved in making drugs and food. I think with this degree I will be improving the lives of people and I like that goal. If I can be a part of a team that can come up with a life saving drug process, well then WOW!"

Rebecca knows that to be good at anything it takes a solid educational foundation and job skills, so most of her efforts are on her course work. She likes the BAE bioinstrumentation lab and exposure to the lab's tensile load testing machine. She is also eager to learn computer programs such as Pro-Engineer, TK Solver, Ansys, and Adams. Rebecca says "I like the department's atmosphere because I have really gotten to know teachers and other students and I like the way the professors are all really helpful even outside the classroom." Although not wanting to compromise her studies, she does have time to be a member of the NCSU gymnastics team. Gymnastics is something she has always participated in while in school. "Being a part of a university-level team has definitely taught me time management skills and to set my priorities," said Rebecca. "I have also learned a lot about determination and dedication at this level of competition and these are skills that are very transferable to my career choice."

Rebecca will be looking at positions with pharmaceutical or food processing companies and plans to take the FE exam this spring. She would like to continue her education at the master's level and is hoping that her future employer will be financially supportive. We hope Rebecca continues her education and comes up with a life saving drug that makes us all go "WOW!" ■

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