



Engineers' Forum

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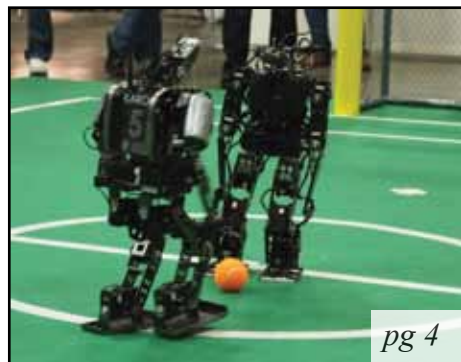


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Dear Readers,

During this crucial time of late-night cramming, intensive studying, and stress, I'd like to give you something to take your mind off those things for just a little while.

I am so excited to present this issue of the Engineers' Forum to you. In this issue, you'll learn about plans for the new Signature Engineering building, what freshmen at Tech can get involved in, the RoMeLa team, and some helpful hints for interviews. There's a lot to be explored, so stick with us!

The Forum is completely student-run. So if you have talent, we want you! Maybe you'd like to get an article or a picture published in a magazine, maybe you'd like to help run a self-supporting business, or maybe you'd just like to be part of the wonderful process from start to finish. This is your chance! We always welcome anyone who would like to contribute, and we appreciate contributions so much that we pay you for them! If you'd like to be part of the process, come by Torgerson 3100 on Fridays at 3 pm and see what we're all about.

The Engineers' Forum is constantly changing and improving, and we welcome your opinions for those changes. If you have any feedback you'd like to share, improvements you'd like to see, or any topics you'd like covered in the Engineers' Forum, please email us at forum@vt.edu.

I'd like to wish you the best of luck on all your exams, a stress-free break, and a terrific end of the semester. Go Hokies!

Christina Kazmer

Editor-in-Chief

ROBOTICS: HANDS-ON AND IN THE LABORATORY

I was busy skimming over a magazine outside my professor's office when I noticed a fairly interesting article somewhere towards the middle of the text. As I was scheduled to speak with my professor in a short time, I was only able to skim the article, and was unfortunately unable to even remember the name of the magazine. But I was caught by the fact that increasingly, we are surrounded more and more by robots. They are used in medicine, manufacturing, experimental work, and virtually any other field one could care to name.

Here at Virginia Tech, the Department of Mechanical Engineering operates the Robotics and Mechanisms Laboratory, also known as the RoMeLa. The facility is accessible to both undergraduate and graduate students interested in the ever-changing field of robotics. Primarily involved in studying the various methods of robot locomotion and sensor devices, the facility is located in the basement of Randolph Hall and is outfitted with state-of-the-art robotics research equipment. An engineer's paradise, it is equipped with computer workstations, a whiteboard for scribbling algorithms and calculations, a Segway, and even a Transformers comic lying around somewhere. A poster on the wall shows a time-lapse photograph of a miniature Humvee transforming into a bipedal robot, immediately evoking thoughts along the lines of "It's not just a Humvee. It's a transformer!"

"IT'S NOT JUST A HUMVEE. IT'S A TRANSFORMER!"

When I visited the RoMeLa, there were several engineering students, both graduate and undergraduate, hard at work at their computer workstations. I was, fortunately, able to ask Viktor, a second-year PhD student, a few overall basic questions about the lab. When asked about what made him become interested in robotics, he replied,

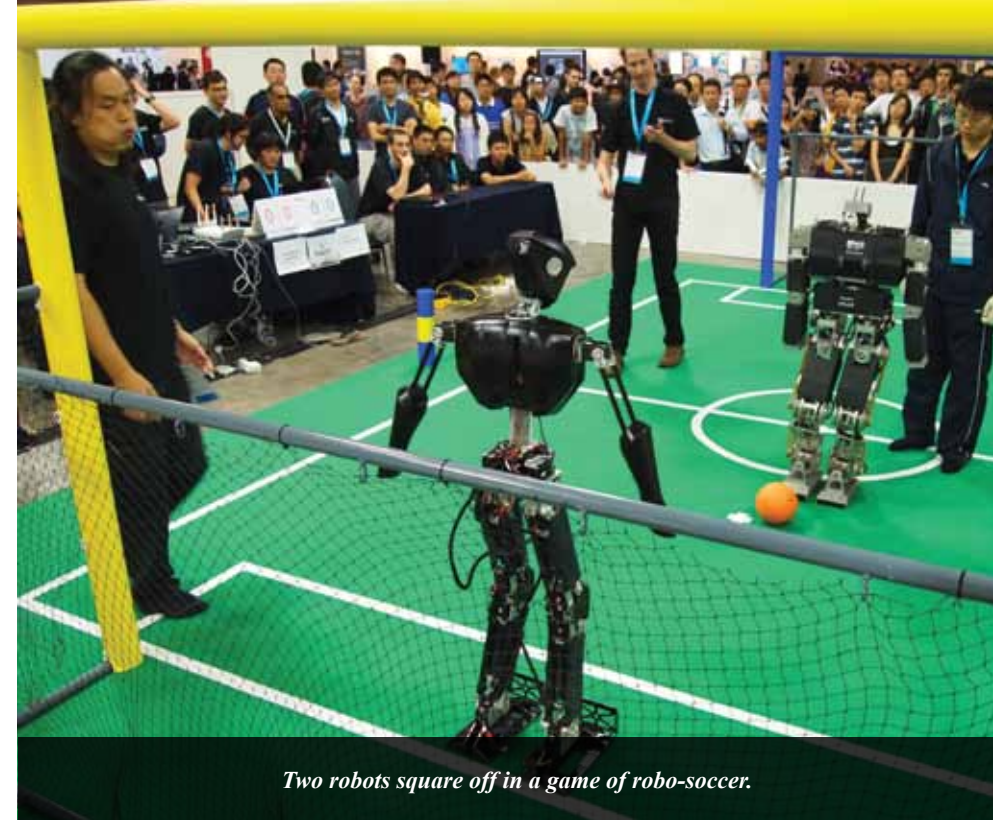


CHARLI, America's first fully autonomous humanoid robot, with the engineers.

"I like knowing how things work, and this drove me to an interest in design. It's a great opportunity to incorporate both mechanical engineering and electrical systems in a practical application." When asked about what his favorite part was about working at the RoMeLa, after giving a few minutes of thought to the question, he chuckled with the response, "I'm not sure."

In addition, the RoMeLa conducts various experiments involving our mechanical, computer-operated friends for the purposes of scientific curiosity and international competition. For instance, toward the end of the 2009-2010 school year, students from the RoMeLa participated in the Multi-Autonomous Ground-robotic International Challenge (MAGIC).

MAGIC is an international competition co-sponsored by the Australian and United States Department of Defense in which teams from all around the globe challenge each other in a series of objectives. Autonomous robotic vehicles are to complete reconnaissance and surveillance missions in an urban-style environment, all while recognizing threats painted as 'hostile.' The objectives include accurate exploration and mapping of a given area, accurately classifying simulated threats, and all within a three and a half hour time limit. Armed with a set of cameras and a four-wheel drive mechanism, it looks like something one would see in a near-future



Two robots square off in a game of robo-soccer.

science-fiction movie. Though the Virginia Tech team was ultimately eliminated from participating in the final competition, only the world's best university teams were considered for final competition.

On campus in the RoMeLa, numerous interesting design project concepts hang along the wall. Older designs include CHARLI (Cognitive Humanoid Autonomous Robot with Learning Intelligence), HYDRAS (Hyper-redundant Discrete Robotic Articulated Serpentine), and RoboCup. CHARLI was the first autonomous, untethered, humanoid robot built in the United States and was even featured in Popular Science as a possible future household helper. Taking its first steps in April 2010, CHARLI looks like something out of an Isaac Asimov novel as a full-sized humanoid robot.

HYDRAS is, as its name implies, essentially a miniature robo-snake. Its locomotion mechanism is designed in such a way that it wraps itself around a structure such as a pole or scaffolding tube and literally 'snakes' its way up or down.

RoboCup is an interesting competition using robotic teams to compete in a game of soccer. Though they look more like Terminator robots than the Spanish World Cup team, they have proven themselves in games. In fact, from a video I viewed,

the goalie is even programmed to raise his arms in a cheer-like gesture when he blocks the ball from entering the goal.

Ultimately, we can see the myriad of uses in the field of robotics in virtually every scientific field. In fact, scientists estimate a breakthrough in artificial intelligence sometime between 2019 and 2050. Ultimately, it will be up to the future innovators, programmers, and engineers to bring this dream to a reality, where humanity and robots work in an even greater extent side-by-side, performing tasks previously unachievable.

Travis Roth is a freshman planning to study Mechanical Engineering.



RoMeLa director Professor Dennis Hong (front left) with a team of robotics engineers, and some of their creations.

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A SIGNATURE LOOK INTO THE FUTURE

OF THE COLLEGE OF ENGINEERING



An architectural rendering of atrium in the Signature Engineering Building with stairway leading to second floor, main auditorium to the left, and cafe in the foreground.

The Signature Engineering Building will soon become the newest facility of the College of Engineering to meet the needs of its expanding research and tacking endeavors. The 153,800 square foot structure will be built at the corner of Prices Fork Road and Stanger Street, a prominent location on the northeastern side of campus. Design work for the facility is on track so that construction could begin as early as July 2011. tacking

The four-story facility will house the Departments of Chemical Engineering and Mechanical Engineering, currently located in Randolph Hall, and will also be the new home of the Department of Engineering Education, currently located in McBryde Hall. Aerospace and Ocean Engineering will also have a laboratory in the Signature Engineering Building.

Dr. Ed Nelson, Associate Dean and Chief of Staff in the College of Engineering, is in charge of overseeing the input in the design process from the College of Engineering. Dr. Nelson stated that the

opportunity of building this facility brings excitement to the College, considered as a national leader in educating engineers and in conducting engineering research. The College will also fulfill its strategic goal in adding quality instructional and research space.

The research space is designed to be both multidisciplinary and highly flexible space, and it will accommodate the changing needs of future research



A second floor view of the Signature Engineering Building's atrium.



A third floor view of the Signature Engineering Building's atrium.



A "cut out" view of the Signature Engineering Building's atrium



An architectural rendering of aerial view of Signature Engineering Building from the corner of Perry and Stanger Streets showing the main entrance and drop-off area.

projects. Research space will be equipped with fume hoods and nitrogen gas. Added research space will also insure the College maintains its competitiveness in securing federal and privately-funded grants and contracts.

Individual faculty members from the respective departments are actively involved with the planning and design of the facility with Zimmer Gunsul Franca Architects. Each department will have faculty, staff, and graduate student offices, and conference space occupying its own floor of the facility.

Eight general classrooms will be included, with six of those classrooms located on the first floor and two on the second floor. The first floor will feature a 300 seat auditorium. The classrooms are being designed for active and distance learning and to promote student interaction.

The architect received feedback from the four academic departments and Virginia Tech-affiliated members to design the lobby by incorporating the

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Perry Street parking lot to be the future home of Signature Engineering Building. Located at the Intersection of Prices Fork Road and Sranger Street.



An architectural rendering of view of Signature Engineering Building along westbound direction of Prices Fork Road (after Stanger Street/Toms Creek Road intersection).



Dean Benson shares some early renderings of the Signature Engineering Building with alumni

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various aesthetic features displayed in the atrium. The Trent jet engine, donated as a gift from Rolls-Royce, is one of a number of interior features anticipated to be on display. The atrium will provide an attractive meeting space for students and will become a prime destination for campus visitors, including prospective engineering students. To resolve the need of travelling around campus for food, a full-service study café is planned in the lobby to serve beverages and a variety of food items, including grab-and-go meals.

In order to comply with the Board of Visitors' guidelines to insure future campus buildings be energy efficient, the building includes many energy saving features that together will earn it the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver rating. The building will incorporate natural light and use rapidly renewable recycled materials. The building will also give students direct access to the Blacksburg Transit stop along Stanger Street, encouraging them to use public transportation.

The building itself is a valuable marketing tool to recruit future faculty and staff who share the

College's vision of embracing interdisciplinary research and are willing to be part of the evolving research community. As in the famous line frequently misquoted from the 1989 film Field of Dreams, "If you build it, they will come." (The original quote was, "If you build it, he will come".)

Fred Hussain is a Senior in Electrical Engineering. Fred envisions that Whittemore Hall should also be renovated to not only to continue meeting the mission objectives of the ECE Department, but to include an updated, state-of-the-art ECE and ISE study lounge, rivaling the CS study lounge in McBryde Hall. Features should include frosted windows, specialized noise-reduction walls, and card-swipe access to grant only ECE and ISE students the privilege enjoy a quiet study environment along with the comforts of contemporary furniture designed for study use.



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ACING THE INTERVIEW

How can you tell an extroverted engineer from an introverted one?

An extroverted engineer will look at your shoes when talking to you rather than his own.

We all know that old joke isn't quite true but it does make a good point. Interacting with people, especially people you want to impress, can be stressful. No matter who you are, you're going to have to deal with at least one situation where you need to impress someone: a job interview. Interviews can be a hard time for everyone, whether they're for an internship or a full-time job. Here are a few pointers that can help.

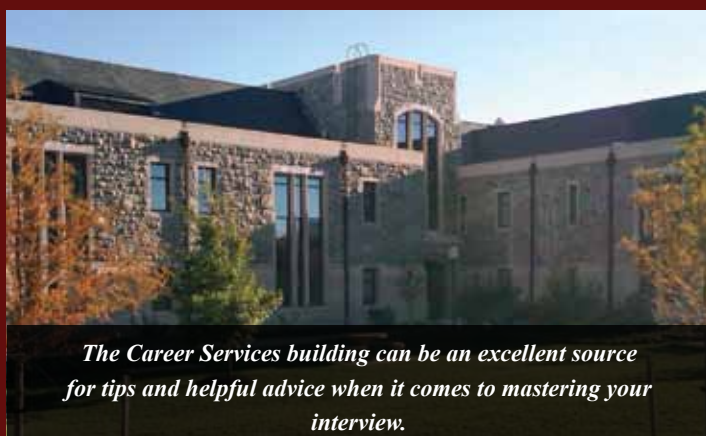
LOOK SHARP.

The job interview is not the time to pull out your fancier-looking Nikes. A suit is best. It shows that you take the interview seriously. If you don't have a suit, don't fret. Make sure to wear a button-up shirt and dress slacks with nice shoes and a tie if you're a guy. That outfit is pretty standard, and everything always looks good. That is, if it's not wrinkled. If it is, iron it before you go. First impressions are important, and one way to make a good impression is to dress appropriately.



PRACTICE YOUR FIRM HANDSHAKE.

A firm handshake doesn't mean squeezing too hard or pumping the other person's hands up and down more than four times. Nor should your hand go limp in the other person's. The right handshake is solid contact, with a slight squeeze and one or two pumps. For the uninitiated, a "pump" is the up and down motion of a handshake. One of the first things that happens in an interview is that you shake hands. A handshake is another part of a first impression, so make it good.



The Career Services building can be an excellent source for tips and helpful advice when it comes to mastering your interview.

"The best advice, though? Wear clean socks, it's always helped me."



COME WITH QUESTIONS.

If you do even just a little bit of research on the company you're interviewing with, you will have an enormous advantage. Your interviewer will almost definitely ask you if you have any questions, so be sure you've done enough research on the company to have at least one. Perhaps their business model intrigued you, or you wanted to know if they were involved in a big signature building in your hometown. Whatever it is that interests you about their company, the time to indicate that interest is with your questions.

ANTICIPATE THEIR QUESTIONS.

Generally in interviews, the questions not only focus on your coursework and experience, but also on your character and who you are as a person. A quick Google search will show you some of the sorts of questions you might be asked in an interview. It will serve you well to think about those sorts of questions before you actually go to the interview, so you are not caught off guard. Some example questions are: "what motivates you," "how do you handle stress," or "what is the most important thing you've learned?" Being familiar with what they could ask will make you more confident in answering.

TAKE YOUR TIME.

If you do get a question that catches you off-guard, keep your cool. It helps to say that you need a moment to think about it. That way, you can say exactly what you want to without sitting there in silence, nervously twisting your hands. Or saying the infamous "um." Try not to use words like "um" or "like." These words are not only just filler, they're imprecise. If there's one thing you'd like to avoid while in an interview, it's looking imprecise. You want to be on point. When you find yourself wanting to say the word "um," just keep quiet for a moment longer. I promise it will be better received than a filler word would.

YOU ARE YOUR ONLY SALESMAN.

In an interview, you are trying to convince a company representative that you are a good match for their position. You are, in essence, trying to market your expertise to them. A good salesperson is never negative about his or her achievements or experience. If you find that you have no experience in an area, say that you are



Studying and going to class are a healthy start for a good interview, but there are more skills to master.



not familiar with it, but draw parallels to something you've done that was similar. You don't have to have direct experience with specific skills to have lots to offer a company. The majority of the time, you'll need some retraining on the job anyway, so don't be hard on yourself. When you focus on your positive skills and traits, the representative is going to see you as the good candidate you are.

The best advice, though? Wear clean socks, it's always helped me. In all seriousness, if you spend a little time preparing, keep your cool, and stay positive, you will have a great interviewing experience. And remember, even if you don't get the job, the interview was still worthwhile. Interviewing is a skill that is necessary for everyone, and it really does get easier with practice.

Christina Kazmer is a senior in Electrical Engineering and an expert in the art of the interview

SOME ADVICE FROM ONE FRESHMAN TO ANOTHER

So you've entered your first year of college, and like most of us you probably have no idea what to do. In high school it was simple, go to class, get good grades, and join a club or two so it'd look good on a college application. In college the process is not so straight forward. While the central ideas of getting good grades and doing extracurricular activities are the same, you're no longer trying to just get into a college. The goal now is to get a high paying job that you'll enjoy and will provide a variety of challenges. To achieve this goal, you're going to have to be working towards choosing your major, figuring out your courses, and getting the best experience you can.

Engineering is not a simple subject. At Virginia Tech alone there are fifteen different specializations within engineering you can go into, and within each of those specializations there are even more specified fields. Chemical engineers can go into anything from polymer engineering to engineering management. Civil engineers can find jobs in structural engineering, geotechnical engineering, surveying, and much more than even that. So the question is, how do you decide which of these fields is best suited to you?

There are several different resources available to students who are looking for a major best suited to their strengths. The best place to start is by attending the information sessions that are given by the engineering departments around the beginning of October. Aside from these lectures, each department at Virginia Tech has academic advisors who can aid students. Advisors can provide information about their department, the opportunities that are available, and any other information one might need.

Due to the fact that any degree in engineering will take any graduate far, the deciding factor for choosing a degree should be what excites you most. You should try to decide what it is that excites you by looking into what is happening in different fields of engineering, what different opportunities are offered by the University, and by looking into what different research projects are being done on campus. Hopefully this process will give you some perspective in regard to what you could be getting into.

Another great thing about engineering is the fact that it is very possible to receive a minor or

double major before graduating. However, before jumping into one of these two categories you're going to have to consider both the advantages and disadvantages to getting such a degree. With some degree programs it's not difficult to get a minor or a double major. For example, a student training to be a chemical engineer might not have to take many more classes to get a major in chemistry as well. It's also possible for engineers to minor in math due to the great deal of overlap between these two subjects. On the other hand, if you decided you wanted to get a double major in mining and minerals engineering and aerospace engineering, it could mean several more semesters in school and possibly very little benefit to you upon graduation. The main thing to consider is, as with choosing a major, what interests you the most and what the long term benefits might be.

Once you've chosen your degree, then it's time to start deciding which classes you want to take. This is where one's academic advisor can come into play. It's never too early to start building a relationship with your academic advisor, they're a great resource,

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From top: The human powered sub team shows off their submarine.
Chang Lu with students in the chemistry lab.
HEVT (Hybrid Electric Vehicle Team) shows off the team's car.

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Research and design teams are a great way to boost your resume while learning valuable skills and having fun.

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they know what classes you'll need to take, and when it's time for someone to write you a recommendation it'll be good to have a faculty member who's known you for several years. Even more importantly, if the advisor knows you well enough to know what your interests are then they can point you in the direction of the classes which are best suited to your goals.

When the job search finally comes around majors, minors, and grades will all be important but something that is of equal importance is the experience you've gotten in college. This experience comes in all different shapes and sizes: a summer job at McDonalds, an internship at NASA, conducting research for one of the professors, working on a design team, and even being a member of the marching Virginians. All of these activities will be things potential employers well want to hear about.

One of the best job related experiences is simply getting a job, but these jobs don't necessarily have to be engineering related. Proving that one has the ability to work with an employer, other employees, and customers can turn a summer of flipping hamburgers into a valuable resource for one's resume. Co-ops and internships are always excellent experiences, and there are a wide range of opportunities available. It's not easy for freshmen to take advantage of these opportunities, but it's not impossible. If a student looks really hard there's

always a chance that a company will be willing to take them on. If you can't get an internship, Co-op, or any other sort of job, you can always try to simply job shadow an engineer for a time. Job shadowing is usually much less of a time commitment than other kinds of experience

Research is another way one can get some experience during your time on campus. There are tons of research projects being done, many of which are eager to take on new blood. While some professors aren't interested in freshmen joining their research teams, there are plenty that will. All research is posted online, and practically every professor has several projects they are working on. If you are interested in these projects you just need to reach out to their professors and ask them about what it is that they are doing, you might be surprised about how

"IT'S NEVER TOO EARLY TO START BUILDING A RELATIONSHIP WITH YOUR ACADEMIC ADVISOR"



Finding a good environment such as the CS lounge where you can get encouragement and help from other students can make a big difference.

eager they are to talk about their projects.

There are tons of ways you can get involved on campus in ways that also pertain to your major. At Virginia Tech there are always design projects that freshmen can get involved with as well as societies, engineering fraternities and research projects. It's never too late, nor too early, to join up with one of these groups, and they are all almost certainly looking for more members. These organizations are a great networking tool, and help augment resumes.

There are also over 600 other clubs and organizations at Virginia Tech that don't have a thing to do with engineering. While one might not think a potential employer wants to hear about the fact that they were in Cave Club for 4 years, these experiences let an employer know what the student is passionate about and the level of commitment they are willing to show to something he or she's involved with. It also lets the employer know the student is someone who enjoys doing more than just math and science, and will hopefully be interesting to work with.

The first few semesters of college are crucial to any student's success in the future. There's a lot that needs to be done and even more that needs to be planned for, but if you use the time you have wisely and take advantage of all the resources and opportunities available at Virginia tech, then you will have no problem being successful in the future.

Daniel "Rapunzel" Bishop is a Freshman Engineer in the Galileo Residential Learning Community and knows what you're probably going through.



Local projects are a good way to put the skills you learn in classes to use so that you actually remember the material.



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