

MISSION STATEMENT

The Engineering and Computer Science Department aspires to be a place of choice for engineering and computer science education where dedicated students and faculty grow together to reach their God-given potential for service to society and the church.

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EDITOR-IN-CHIEF

Mary Cregan
cregan@andrews.edu

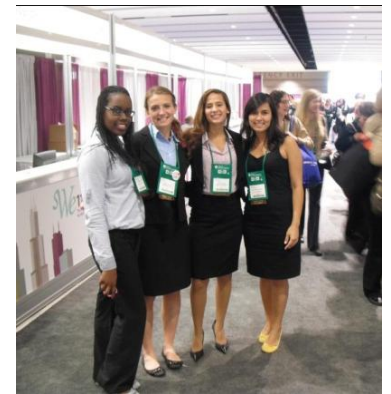
Society of Women Engineers Annual Conference

Cecilia Dias

What a fantastic experience! The annual conference of the Society of Women Engineers in Chicago served as a great learning experience as well as excellent exposure to job searching and internship possibilities. Never having been there before, the four of us (shown on right) did not know quite what to expect. With the help of a handy pocket guide, we made our way to several enlightening presentations, resume help sessions, and the career fair. One of my favorite sessions was presented by two women engineers from GE who walked us through a "Lean Product Development"

process using a practical example of producing a new laundry dispenser. Other sessions I attended included "Interviewing Strategies: Do I Fit the Company...and Does it Fit Me?" and "The Art of Using Six Sigma for Process Optimization." With so many options each of us went our own way and met up again for meals or to discuss the sessions in the Lava Lounge. The career fair was the biggest event and of the most interest to the two of us that are seniors. I was especially grateful for the resource center where resumes could be edited and printed. Each one of us can honestly say that we hope other women in this department have the chance to attend the SWE

conference in the future, and most importantly before their senior year in order for them to have a chance to grow and be more prepared for the bountiful networking, internship/job options, and learning experience opportunities that can be found at a conference like this.



From left to right: Nina Lassonnier, Mary Cregan, Cecilia Dias, Shayane Oliarte

Advice to Freshman

David Penny

Okay, so now it's official. What you have heard is true and has been confirmed. Studying to become an engineer is hard work. Now that you have that part figured out, what are you going to do about it? You could quit, find an easier major, and transfer to another program. If last semester proved to you that

engineering was not what you thought it was, then maybe this might be a good idea. But what if this is not your desire? What if you have always felt as though this was what you wanted to do... to become an ENGINEER? Not necessarily because you rock at geometry, trigonometry, algebra, chemistry, and physics, but instead because you

feel as though this is something that you have always been called to do.

This being said however, the recent semester has proved to you that you will indeed need to know those things that may not have drawn you to engineering in the first place, i.e. pre-calculus, calculus, chemistry, etc...

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The Job Interview

Jordan Pattasaw

We all come to a point in our lives where we should start looking for a job to begin our careers. Very few companies will hire just anybody and they all have some type of screening process. It is well known that everyone puts their best effort into trying to convince an interviewer that they are the best candidate for the position offered.

How does one ace a job interview? Here are some very effective tips from Alison Doyle found at <http://jobsearch.about.com/cs/interviews/a/aceinterview.htm>.

One must do research on the company. It's best to know as much as possible about the company and

the position that you are trying to fill. Knowing a lot about the company's history and plans for the future will give you an advantage in an interview.

Practicing your answers and questions is beneficial as well. Practicing may prevent, or decrease the chances of you freezing up under the pressure. It also helps make your speech smoother and may calm you down since you know what you are going to say.

Next is a tricky area: behavior based interviews. Employers know that previous performance is the best way to predict or identify a pattern of behavior, and thus performance. Make a list of all of your relevant strengths and

weaknesses. Emphasize what you can do to benefit the company rather than just what you are interested in.

Above all else stay calm! Anxiety and memory are inversely proportional. The more nervous you are the less you can remember. You should also try to be as punctual as possible, even if you have to get to the interview early. Practicing the route also helps a great deal.

Andrews Career Services has helpful information as well as career counseling. Visit their website for more helpful information:

www.andrews.edu/services/career_services/au_career_services/

“Practicing your answers and questionsmay prevent, or decrease the chances of you freezing up under the pressure.”

Active ECS Student Clubs



SAE Club with the Baja Vehicle

NATIONAL SOCIETY OF BLACK ENGINEERS (NSBE)

NSBE was recently recognized as an official chapter at Andrews University

Joseph Fluence
President

Nina Lassonnier
Vice-President

Micah Mayne
Secretary

Ebenezer Akyiano
Treasurer

SOCIETY OF HISPANIC PROFESSIONAL ENGINEERS (SHPE)

Atniel Quetz
President

Ricardo Huancaya
Vice-President

Larry Mendizabal
Secretary

ASSOCIATION FOR COMPUTING MACHINERY (ACM)

Shemaiah Telemaque
President

Joseph Abandoh-Sam
Vice-President

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

Andrew Mejuer
President

Robert Jewett
Vice-President

Thomas Zirkle
Secretary

Stefan Von Henner
Treasurer

ECS Departmental Vespers

Josh Bissell

The monthly departmental vespers is a big hit with the Engineering and Computer Science students. We also welcome attendees who come from other departments. Who can blame them? With free food provided, worship credit, singing, and relaxing with friends, who would not like it?

Once a month one of the ECS faculty hosts the Friday night vespers event, providing food and a warm place for the students to gather to eat

and join in the vespers service.

The service is led by various students from speaking, to organizing, to leading out in song service. The evening begins as students arrive and mingle, talking about the week and all the recent happenings, telling jokes and stories, and relaxing. Then the meal begins with a prayer and the good times continue while everyone shares in the feast. After the meal as things begin to settle, the vespers program starts. After a few songs are sung together, a video is shown,

a speaker shares a short message, or a Bible game is played.

The evening is always interesting, always delicious, and always fun.

It's a time when students and faculty can gather together outside of the classroom to share and fellowship with each other. It brings the department closer together.



Current Student Research

Adam Shull & Spencer Groff

As part of the excitement common in the Feedback Control Systems class taught by Dr. Kwon, Adam Shull and Spencer Groff had the opportunity to develop, design, and build a water cooling system. This system implements feedback control to maintain a water output temperature by varying the water flow rate through a heat exchanger (also specifically built for the project). The system incorporates a small electric pump, a custom heat exchanger, two water reservoirs, a

thermocouple, a LabVIEW control circuit and output interface.

Overall, the system can be understood as a version of the cooling system that nuclear power plants use to assure that the water that they are ejecting to the environment is of an appropriate temperature for the local habitat. In such a case, the temperature is critical, but the flow rate is irrelevant.

During the course of the project, it became apparent that there was an inherent time delay of 5

seconds present in the system. It is unclear whether this time delay was due to the requirements of flowing through the heat exchanger, the specific heat of water, the ramp rate of the pump, the response time of the outflow thermocouple, or the Agilent power supply controlled by LabVIEW.

In order to cope with the instability this time delay injected into the feedback system, a first order time-delay optimization algorithm was used in making a PID controller

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“...develop, design, and build a water cooling system... to maintain a water output temperature by varying the water flow rate through a heat exchanger...”

“Lockheed Martin is a defense contractor employing 126,000 people across four divisions: Aeronautics, Space Systems, Information Systems & Global Logistics, and Electronic Systems.”



“While one should never feel they have learned all there is to know, I feel that I left Andrews University with an education I can be proud of.”

Notable Alumni: Jonathan Ford

Jonathan Ford

When asked about his new job, Jonathan Ford, a 2011 electrical engineering graduate who recently started working for Lockheed Martin, he replied:

“Lockheed Martin is a defense contractor employing 126,000 people across four divisions: Aeronautics, Space Systems, Information Systems & Global Logistics, and Electronic Systems. More about Lockheed Martin can be found at <http://www.lockheedmartin.com/aboutus/index.html>.

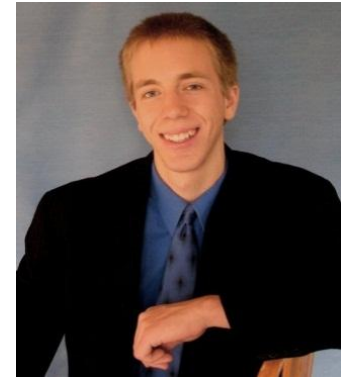
I am working for Lockheed Martin MS2 in southwestern New Jersey in the town of Moorestown. MS2 is part of Lockheed Martin’s Electronic Systems division. The Moorestown facility employs around 500 employees and is the largest site within MS2.

Of the hundreds of programs worked on in Moorestown, the most visible is the Aegis Combat System. This system provides command and control for many of the Navy’s battleships as well as those of various US allies. Aegis interfaces many systems including sensing, communication, weapons and control. As

the premier combat system in the world, it is under continual development with each release known as a baseline. I have been working on two different baselines since I began working here in May 2011 shortly after graduating from Andrews University.

The first baseline is for the Australian Navy. They are building three Air Warfare Destroyer (AWD) ships. I am serving as a Systems Engineer for the Aegis Display Systems (ADS) element. This element deals with the user interface to the Combat system from a software perspective. The hardware has already been designed. My job in a nutshell involves using and abusing the system to find problems, working with the developers (coders) to have the problems fixed, and then verifying the solution. I also participate in more formal testing with a Government tech rep to verify the system performs its required functions.

The second baseline I work with is the Advanced Capability Modernization or AMOD. Everything in the defense industry is an acronym. This baseline is the latest and greatest Aegis system and possibly the largest baseline from a personnel perspective. My role on this baseline is



to support the ADS element with problem documentation, verification and confirming their resolution.

I was hired into Lockheed Martin’s Engineering Leadership Development Program (ELDP). This is an accelerated leadership program that teaches its members about the various technologies Lockheed Martin uses and the business practices employed in a project lifecycle. The 2-3 year program concludes with the participant completing a technical masters degree. Over this period the ELDP participant transitions through several work rotations to gain a broad perspective on the various aspects of work Lockheed Martin performs.

As of now, I have completed the first portion of this program which has been an intensive course covering a wide array of technologies Lockheed Martin works with such as Radar, Sonar,

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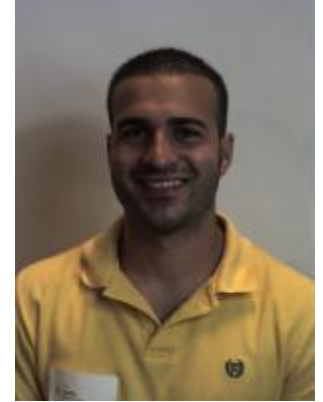
New Student: Larry Mendizabal

Micah Mayne

Larry is a transfer student from Southern Adventist University who left because they only had a two-year pre-engineering program. The scholarship money and location in comparison to Walla Walla was the deciding factor backing this decision to attend Andrews University.

When we asked Larry what inspired him to choose Engineering, he said, "I chose Engineering because I liked math and wanted a challenging career". Mendizabal who is an active member of SAE (Society of Automotive Engineers) and SHPE (Society of Hispanic Engineers) says, "I like the department and warm teachers. Though it

is small, it is quite active". When asked which class was his favorite, Larry replied, "My favorite class has to be manufacturing processes with Dr. Boon-Chai. He makes me laugh and reminds me of Jackie Chan".



Notable Alumni: Jonathan Ford

Communication Systems, Shock and Vibration etc. Although rigorous, I found this course to be very instructive and enjoyed it immensely. I was pleased to find that my education put me at or above the level of those in the class with me, some of whom graduated from well-known schools. Many of the skills and knowledge I acquired while at Andrews University have already come in handy.

Over the next eight months or so the ELDP class will be going through the project life cycle. From what I know at this point it seems to be quite similar to the Senior Design

Project. However, there are 30+ people on the team working across geographically separated locations. I am coming up to the end of my first rotation and will be leaving the Aegis Display Systems team to possibly an entirely different type of work, still to be determined.

Outside of work I have become quite involved at the local church, playing piano and leading the music nearly every other week. I also help out with the audio system (for those who know me this is little surprise). I am in a local volleyball league with a few church members.

In conclusion, working for Lockheed Martin is a great experience in which I am learning new things every day. While one should never feel they have learned all there is to know, I feel that I left Andrews University with an education I can be proud of. In my experience so far, I find that life moves even faster once you leave school, so savor every moment you have, make the most out of everything bad or good, and keep God at the center of all you do."

"... savor every moment you have, make the most out of everything bad or good, and keep God at the center of all you do."



Summer Internship Experience

Mary Cregan

In December of last year I began my search for a summer internship. I applied online to several companies and also went in person to offices near my home in Rhode Island. I gave out my resume and spoke with supervisors about job openings. Although going to the companies in person did not give me any leads on a job, it was a great experience and helped me get over some of the anxieties about job seeking. In February I received a call from the Naval Undersea Warfare Center about a phone interview. I did not receive a job offer afterwards but I learned a valuable lesson: make sure to know everything about your resume. This may seem obvious but I was questioned about some things on my resume that I was not as well prepared for as I would have liked. In April, I received a call from Electric Boat in Groton, Connecticut offering me an internship for the summer and I gladly accepted.

Electric Boat is a subsidiary company of General Dynamics and has locations in Connecticut, Rhode Island, Washington DC, Massachusetts and Hawaii. Electric Boat is a government contract company that designs and builds submarines for the US Navy. I worked for the

Ship Control and Monitoring Systems Department which designs the Ship Control Station on a submarine. We design and test all components of this station which deals with the major functions of the submarine such as steering and diving. During my summer internship, I had three main projects assigned to me; designing a test box, testing a simulation system, and editing code for a graphical user interface (GUI).

The first project I was given was to design a test box to be brought on a submarine to test switches. I was given the basic layout of the circuit they wanted to use and I had to design everything else myself. My first task was to determine all the parts that would be used and comprise a parts list with part numbers to be ordered. I then had to finalize the circuit design as well as the physical layout of the test box itself. Once all the parts were in, I gave the sketch of the circuit to a different department who made a circuit card and installed all the components into the box. Through this process, I got to work with several departments and learned to coordinate everything together. I was lucky enough to have the box finished right before I left at the end of the summer. As an intern, it was a great feeling

“Electric Boat is a government contract company that designs and builds submarines for the US Navy.”

starting a project and seeing it to completion.

The second project I worked on was to run fault tests on a simulation system. This involved changing the code written in Matlab and Simulink and observing the changes made when various faults were added. Although this was a tedious job, I learned a lot about various functions of a submarine.

The final project I worked on was editing GUI code. This simply consisted of adding to code written in C to make changes on the look of one of the screens in the Ship Control Station.

My experience at Electric Boat was a great way to spend my summer and I really got to learn a lot and experience the real world of engineering. On my second to last day there, I was offered a full-time position after I graduate. I have accepted the job and look forward to working there in the future.

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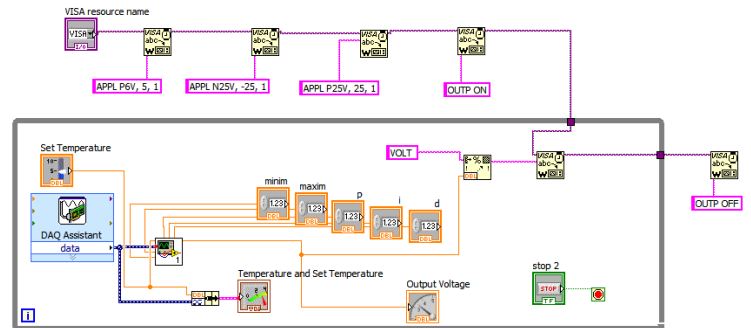
Current Student Research

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whose goal was to reduce the settling time of the system as much as possible while maintaining stability. When completed, the technique successfully maintained a stable system and reduced the required settling time by 6 seconds.

In conclusion, the project

was quite enlightening. An understanding of the rudiments of control theory and how that theory is applied through a LabView controller proved especially eye opening. This coupled with the challenges in designing and constructing a custom heat exchanger proved to be a challenging and hands-on adventure into feedback control systems.



Heat Exchanger LabView Code

Plasma Speaker Project

Bryan Bankhead

During the fall semester of 2011, Tanner Williams and I built a plasma arc speaker. A plasma speaker is a device that generates a beam of plasma on which you can then overlay an audio signal and produce music. The idea behind this project came about while surfing on the internet. We found a YouTube video of one in action and decided that it would make an interesting project.

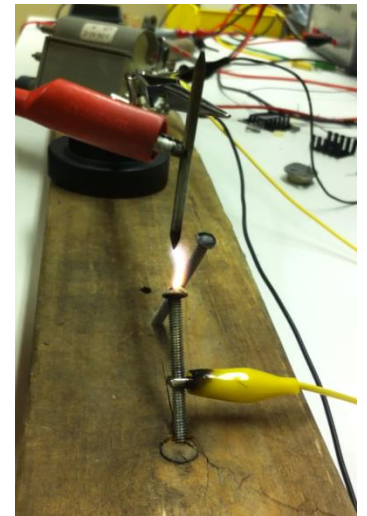
The concept behind a plasma speaker is not too complicated. You first take a flyback transformer and send it an alternating carrier signal. We used a 555 timer to generate a carrier signal around 30KHz. The flyback transformer takes the low

voltage high current carrier signal and transforms it into a low current high voltage signal. This generates a small beam of plasma or a continuous spark. Once you have a spark, you can then overlay an audio signal which is played on top of the carrier signal using pulse width modulation. This generates an audible noise you can hear as the plasma beam pushes the surrounding air molecules at the same frequency as your audio signal.

As long as your carrier signal has a frequency beyond the audible range, you get a clean medium for playing music. The plasma acts like a speaker membrane much like a normal speaker would. However, since the plasma has no mass it has

no response time. This means that the sound you get out is almost exactly the same as your input signal.

During our testing in the Creative Space, we were able to play music from an iPod directly onto the plasma speaker. Unfortunately, we were unable to generate a clean carrier signal so there was some added noise as well. We also determined that the volume of the music was proportional to the length of the beam. By adding more power, we were able to create a longer beam and thus improve the volume of our speaker. At this point, the plasma speaker is not ready to be a home stereo replacement but it definitely has potential.



Advice to Freshman

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So what can you do now? The steps to success given below are from a well-known actor, bodybuilder, and former Governor of California. His steps, though not directly related to engineering, can still prove valuable to us. Though these steps are not the comprehensive, exhaustive, magical solution to all of your problems, I have found them rather useful not only in engineering but also in other life situations as well.

1. Trust yourself. Who do you want to be? Not what your parents or teachers want you to be, but YOU. If you know for yourself that engineering is really what you want to do then DO IT. On the other hand, if you were only in it because an engineer is who other people wanted you to be, then it may be time to rethink.
2. Break the rules. Be original. Think outside the box. What is the point of wanting to become an engineer if all you want to do is be like everybody else? Last time I checked,

- that was not the definition of an engineer.
3. Do not be afraid to fail. You cannot always win. Do not be afraid of making decisions. If you never fail, you will never push yourself harder the next time. Success will come, so don't be afraid of failure.
4. Do not listen to those who say that you cannot do it. There will always be those who say that engineering is too hard and they cannot do it. If this is something that you really want, go get it,

- period!
5. The most important step: work your butt off. This is engineering! No matter how smart you are there is no way around hard work. Muhammad Ali was once asked: "How many sit ups do you do?" His answer, "I don't know - I only start counting when it starts hurting..."
6. Always find time to help someone else. Even with all of the success I am sure you will have, nothing gives more satisfaction than helping someone else.

Meet the ECS Faculty



From left to right:

Back Row: Dr. Donald DeGroot, , Dr. Roy Villafane, Dr. Gunnar Lovhoiden, Dr. Stephen Thorman,
Front Row: Dr. George Agoki (Chair), Dr. Hyun Kwon, Prof. Bill Wolfer, Dr. Boon-Chai Ng

