ece

4805/4806

POSTER EVENT

April 17, 2019 / The Inn at Virginia Tech

Two-Semester Major Design Experience (MDE)

VIRGINIA TECH™

The Major Design Experience (MDE), ECE 4805-06, is a key milestone in the challenging path to joining a select group of professionals in our society, Virginia Tech electrical or computer engineers. The MDE as a culminating experience is one of the many ways Virginia Tech ECE reflects today's reality that electrical and computer engineers create technology that is transforming modern life – from transportation, agriculture, and manufacturing, to healthcare, education, entertainment, and social interactions. These 145 students have each worked and learned together with their design team over the last two semesters. Throughout the MDE, undergraduate and graduate students are presented with opportunities to apply their technical, communications, and teamwork skills to design, build, and test one meaningful and exciting project for actual customers.

This year, we have focused on ensuring the richness of the experience as the MDE still continues to grow. Building on a 52% increase in the number of projects over last year, we now have 34 teams participating supported by 14 external corporate and eight Virginia Tech internal sponsors; some of which are sponsoring multiple concurrent projects. Industry response to our program continues to be exceptional. In addition to our growth, we had our first truly international, global collaborative project. We received two sponsorships from OneWeb, LLC to develop Dual Core Technology for a Time and Space Partitioning Software Architecture. We partnered with INP ENSEEIHT University in Toulouse, France where each of our schools had an engineering team developing a solution. This project was not only a great technical challenge, these teams worked with a French customer and collaborated in the global arena. Special welcome and merci à tous to our French customer and to our fellow engineers from Toulouse. Multiple corporate sponsors have come to the department and said, "this is great, this is an activity where we can invest." I think that you will agree with me that the result has been a wealth of inspiring and useful projects that have challenged our students to solve open-ended technical problems defined by our industry partners and guided by our faculty subject matter experts, better preparing our students for the realities of the workplace.

A special thanks to our industry sponsors, instructors, and subject matter experts for their dedicated expert support to guide, shape, and nurture our students throughout this process. Engineering, at scale, is a team sport and I couldn't form a better team than the great professionals who support our MDE.

Congratulations to the students for their commitment to learn, grow, and produce the great results evidenced in these 34 projects. I'd ask each of these students to take a moment in the next few days and reflect on the myriad activities where they've been challenged and grown. On behalf of the students and me personally, thanks again to our industry sponsors, our subject matter experts, and our MDE faculty for their continued support and exceptional dedication to tackling these worthy, real-world challenges.

Luke Lester
Professor and Department Head
Bradley Department of Electrical and Computer Engineering

Welcome and thank you for attending the Spring 2019 Bradley Department of Electrical and Computer Engineering Major Design Experience (MDE) Projects Event. Today's activities mark one of the key culminating events for our emerging engineers. We certainly appreciate everyone here taking time to share in this celebration of our students' year-long journey and we hope you enjoy the demonstrations.

Today we are celebrating the achievements of 145 students across two continents coming together on teams and diligently working on 34 diverse industry challenges. We are pleased to showcase the student teams and their projects from our 4805/4806 Major Design Experience and a very special welcome, bienvenue, to our design engineering partners and our customer from France.

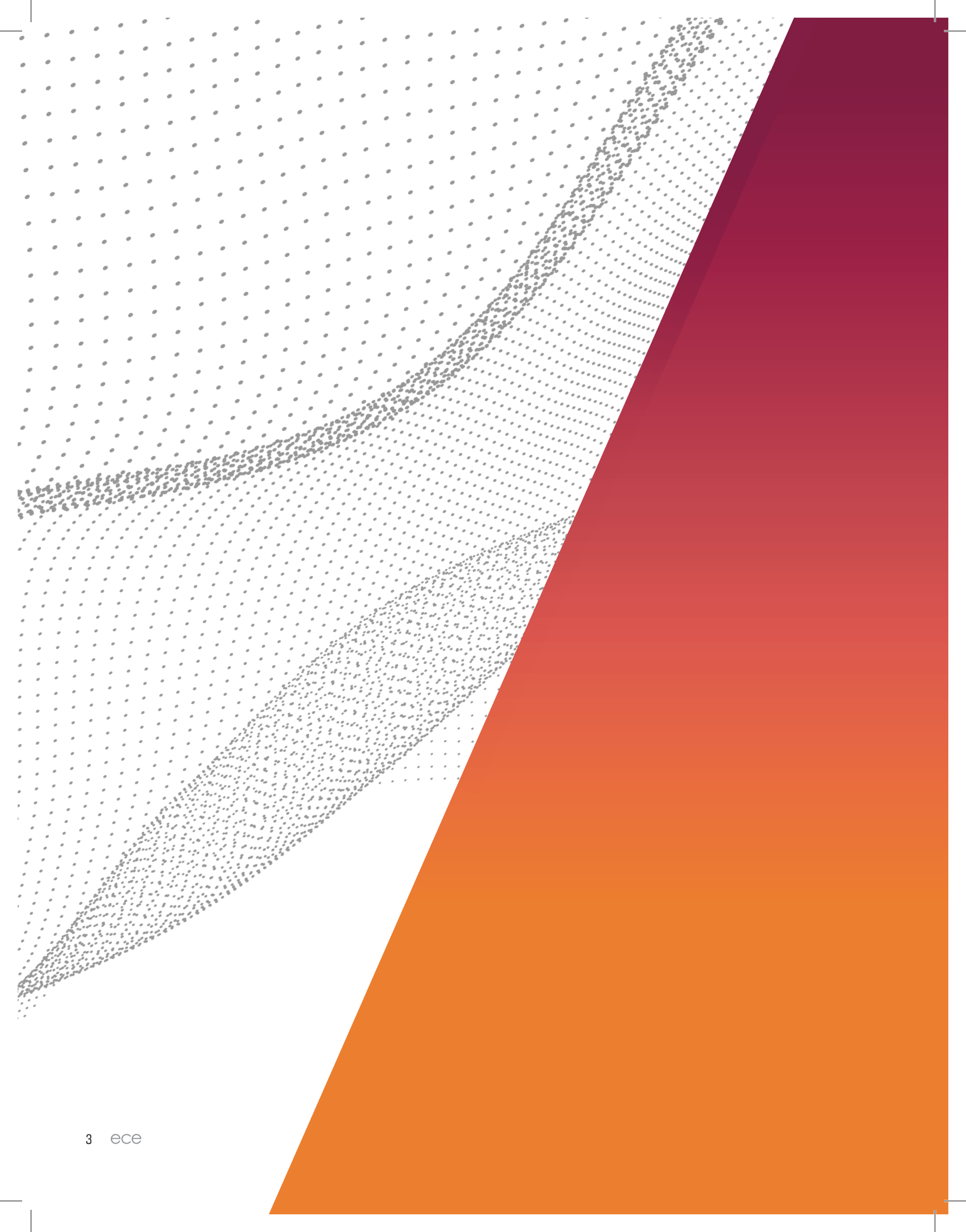
The goal of the MDE program is to provide students with a culminating or capstone experience to bring together the myriad of engineering experiences from each of their many classes and solve a "real-life" industry project. The MDE seeks to ensure our students work together on a team, communicate with multiple audiences, and work through uncertainty and ambiguity for a period of time long enough to experience both the rewards and challenges of their design decisions and activities. Our sponsors provide the voice of the customers and focus the student teams to meet requirements, which students must first identify and understand. Our subject matter experts provide the students with technical expertise and experience while ensuring the students remain in the lead and are able to make appropriate decisions and, in some cases, make mistakes along the way. Except for experience levels, this project is managed exactly as if the students were just hired by a company and placed on an engineering team. The students are responsible for generating the project plan and then executing their plan.

This program is only possible with the dedicated support of our sponsors and subject matter experts whom we wholeheartedly thank for their unwavering assistance. Thank you for engaging with our program and for helping our students be prepared to engineer and build a better tomorrow.

I want to acknowledge and thank Dr. Luke Lester for having the vision to establish the MDE program and to Gino Manzo for creating the first instances of the MDE course sequence to realize that vision. Special thanks, from me personally, to the highly capable and patient team of instructors who guide and mentor all our students throughout the program. They collectively bring more than a century of industry experience and expertise to Virginia Tech and our MDE program. Thanks to Gino, Ken Schulz and Toby Meadows for welcoming me and for your tireless support to continually make MDE and our students better!

Finally, we thank our 145 students, who embraced the uncertainty and were brave enough to try something new. Stepping out of your comfort zone is always a valuable learning experience. We wish you all the best as you pursue your aspirations and make your contributions to the world of tomorrow.

J. Scot Ransbottom
Director, ECE Major Design Experience



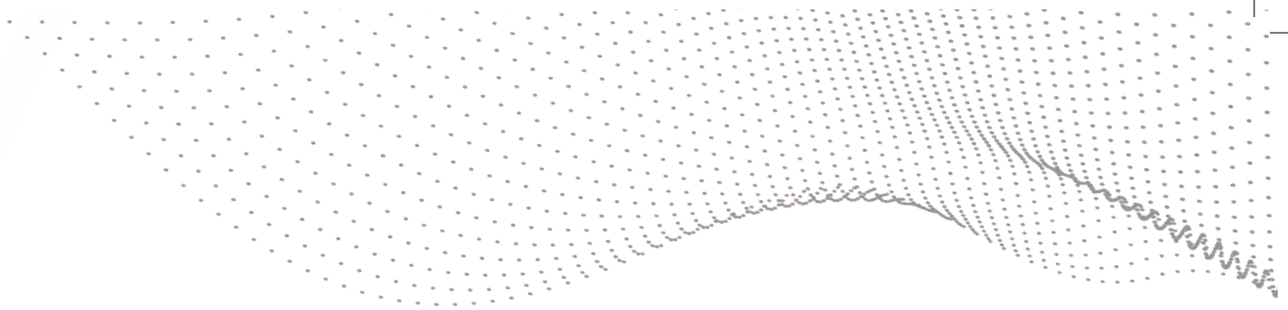
AGENDA

Check-In	**10:45am**
Welcome and Team Presentations	**11:30am**
Lunch and Poster Review	**1:00pm**
Awards	**3:00pm**

All guests are requested to vote for Best Poster. **Every vote counts.**

Sponsors

We greatly appreciate their support.



OneWeb Satellites

Steelcase

BRADLEY DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
VIRGINIA TECH

HUME CENTER FOR NATIONAL SECURITY AND TECHNOLOGY
VIRGINIA TECH

THE DIVISION OF INFORMATION TECHNOLOGY
VIRGINIA TECH

Wiley|Wilson®
Constant Progress

Project Leadership

This class is only possible because of the commitment, dedication, and spirit of our customers and subject matter experts. Thank you!

SPONSOR	CUSTOMERS	PROJECT	SUBJECT MATTER EXPERT	Page
Alion Science and Technology, Annapolis Junction, MD	Steve Barnes, Brendan McElrone, Nate Hall, Brian Ventura, Scott Wiley	Spectrum Interference Isolation	Chris Headley	**11**
Altria, Richmond, VA	Christopher Minor, Walter Cramer	Automated Collection and Processing of Machine Run-Hours	A. Lynn Abbott	**12**
Analog Devices, Greensboro, NC	Michael Jones	Radio Frequency Performance Enhancement through Digital Processing	Louis Beex	**13**
BAE Systems, Manassas, VA	Richard Berger	FPGA System-on-Chip Algorithm Optimization	Peter Han	**14**
Collins Aerospace, Rockford, IL	Pete Luksas, Arthur Blanc	Advanced Technologies for Improved Inspection Processes	Jia-Bin Huang	**15**
Collins Aerospace, Rockford, IL	Mark Bellinger	Continuous Optical Power Wireless Sensor Transmitter	Yizheng Zhu	**16**
Collins Aerospace, Rockford, IL	Ian Humphrey, Timothy Brett	Cyber Security in a Multi-Level, Open Architecture System	Walid Saad	**17**
Collins Aerospace, Rockford, IL	Todd A. Ell, Bob Rutkiewicz	Visual Object Tracker (VOT) Benchmarking Using UAS Captive Flight System	Pratap Tokekar	**18**
Collins Aerospace, Winston-Salem, NC	Wynn Parrish, Russ Proctor, Thao Phan	Develop a Phone/Tablet Maintenance Application	William Plymale	**19**
General Motors, Detroit, MI & IEEE, Blacksburg, VA	Logan Davenport, Vineeth Kirandumkara	IEEE Robot Team: Embedded and Electrical	Arthur Ball	**20**
Lockheed Martin, Moorestown, NJ	Richard Pederson	Non-Blocking Multicast Network Verification	Walid Saad	**22**
Micron, Manassas, VA	Zuzana Steen, Brian Huber	How Atomic Layer Deposition Can Be Used for Gas Sensing Applications	Masoud Agah	**23**
Micron, Manassas, VA	Zuzana Steen, Anthony Smith	Nanofabrication and Characterization of Hybrid Optical-Magnetic Nanotransducers	Wei Zhou	**24**
MITRE, McLean, VA	Chris Schmidt, Andy Thompson, Dale Herdegen	HF Broadcasting, Alerting, and Beaconing	Peter Han	**25**

SPONSOR	CUSTOMERS	PROJECT	SUBJECT MATTER EXPERT	Page
NAVAIR MCAS Cherry Point, NC	Michael Sparr, Nick Stine	UAV Vertical Replenishment– Hardware Team	Pratap Tokekar	**26**
NAVAIR MCAS Cherry Point, NC	Michael Sparr, Nick Stine	UAV Vertical Replenishment– Software Team	Pratap Tokekar	**27**
NAVAIR NAS Patuxent, MD	Chris Kimmel	Reference Architecture: Navigation Reference Models	William Diehl	**28**
NAVAIR NAS Patuxent, MD	Katie Hauck	Swarming of UAVs Equipped with RF Sensors	Majid Manteghi	**29**
NAVAIR NAS Patuxent, MD	Andrian Jordan	Unmanned Vehicle Ground Control Station	Ryan Williams	**30**
Navsea Warfare Center, Dahlgren Division, Dahlgren, VA	Lynda Hester, Angel Moises Iglesias, Serita Seright	Non-Circular Bore Scan and Mapping System	Alfred Wicks	**31**
OneWeb Satellites, Toulouse, France	Pierre Morere	Evaluation of Dual Core Technology for Time and Space Partitioning Software Architecture	Jean-Charles Fabre	**32**
OneWeb Satellites, Toulouse, France	Pierre Morere	Evaluation of Dual Core Technology for Time and Space Partitioning Software Architecture	Changwoo Min	**33**
Steelcase, Grand Rapids, MI	Edward Vander Bilt, Wes Allen, Wes Taylor	Vibration Monitoring Sensor	Thomas Martin	**34**
Virginia Tech ECE, Blacksburg, VA	Elena Lind, Nash Kocher	Aerosol Detection Using LIDAR	Adam Barnes	**35**
Virginia Tech ECE, Blacksburg, VA	Mahi Abdelbar	E911 Localization for Indoor Locations	Michael Buehrer	**36**
Virginia Tech ECE, Blacksburg, VA	Paul Plassmann	ECE Inventory Application Development	Paul Plassmann	**37**
Virginia Tech ECE, Blacksburg, VA	Alexander Leonessa	High-Level Control of Humanoid Robots	Alexander Leonessa	**38**
Virginia Tech ECE, Blacksburg, VA	Alexander Leonessa	Nasa Robotics Mining Competition (Astrobotics)	Alexander Leonessa	**39**
Virginia Tech ECE, Blacksburg, VA	Luke Lester	Visual Recognition of Farm Animals Utilizing Quadcopter Drone Technology	Luke Lester	**40**
Virginia Tech ECE, Blacksburg, VA	Aisling Kelliher, Thanassis Rikakis	Wireless Remote Health Monitoring System	Mike Buehrer	**41**
Virginia Tech Hume Center, Blacksburg, VA	Jonathan Black	Extreme Doppler Communications and Processing	Louis Beex	**42**
Virginia Tech IT, Blacksburg, VA	Steven Lee, John Krallman	System Design of a Citizens Broadband Radio Service Deployment at Virginia Tech	Allen MacKenzie	**43**
Wiley Wilson, Lynchburg, VA	Walt Mendenhall, Steve Bowman, Mark Adkinson, Dan Morton	Subtransmission Voltage Distribution	Jaime De La Ree	**44**

In addition to our project sponsors and subject matter experts, there were many others who significantly contributed to the success of this class. We want to take this opportunity to express our deep-felt appreciation for their support.

Guest speakers in order of appearance:

Ms. Xu Qian Leidos
Program Director

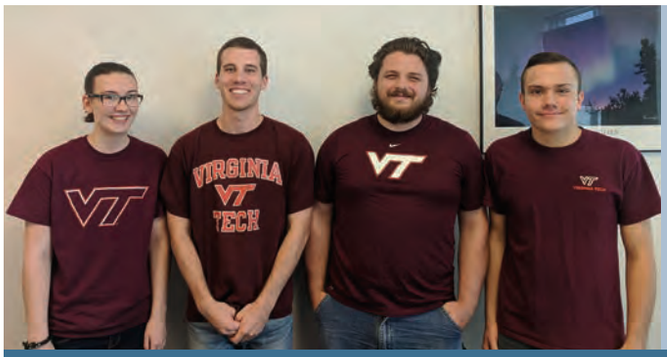
William Baumann Virginia Tech - ECE
Design Studio Safety Training
and Material Procurement Instruction

Grant Brewer
Associate Director of Technology Commercialization
Link: The Center for Advancing Industry Partnerships
Innovation and Intellectual Property Management

Peter Delos Analog Devices
Technical Assistance and Guest Speaker

PROJECT TEAMS

SPECTRUM INTERFERENCE ISOLATION



CHALLENGE

Identify, classify, and isolate interference signals in radio frequency spectrum data utilizing modern artificial intelligence and deep learning techniques.

LEFT TO RIGHT: Megan Moore, Gaeron Friedrichs, Josh Wicka, Aaron Brandel | **SME:** Chris Headley

Aaron Brandel Fredericksburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to continue working with machine learning and communication signals. I also plan on developing sensor software/hardware.

CLASS COMMENT: I appreciated gaining new skills as I worked with signal data generation and machine learning. Through this class I also gained additional team project experience that will be useful as I progress in my career.

Gaeron Friedrichs Milford, PA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to continue into academia and pursue research regarding antennas and electromagnetics.

CLASS COMMENT: This course provides an immersive industry experience into an industry experience with the context of modern engineering problems. The projects are relevant and provide a link to highly qualified technical experts, mentors, and customers, which allows all individuals involved to expand their professional networks.

Megan Moore Springfield, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: In the future, I want to work in the defense industry for the government. I intend to get my master's degree in electrical engineering with a focus in electromagnetics.

CLASS COMMENT: The experience of writing a proposal and working directly with a customer was invaluable. The added bonus of learning teamwork skills was also very important.

Joshua R. Wicka Warrenton, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I have recently made plans to spend the next year after graduation working in Germany. After that I'm aspiring to find a job where I can make use of the knowledge that I have accumulated here at Virginia Tech.

CLASS COMMENT: It was nice to see the years of hard work in the classroom come to fruition during this class.

PROJECT SPONSORS: STEVE BARNES, BRENDAN McELRONE, NATE HALL, BRIAN VENTURA, SCOTT WILEY

ALION SCIENCE AND TECHNOLOGY

AUTOMATED COLLECTION AND PROCESSING OF MACHINE RUN-HOURS

CHALLENGE

Develop a Raspberry Pi based digital counter to collect and process machine run-time hours and share it over a CAT-5 network.

LEFT TO RIGHT: Jacob Daugherty, Andrew Brower, Zaid Ajlouni, Amir Mahin | **SME:** A. Lynn Abbott

Zaid Ajlouni Clearwater, FL

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to use my engineering degree to find progressive solutions and tackle future challenges. I aspire to use my knowledge from Virginia Tech to make an impact on the industry and people's lives.

CLASS COMMENT: I really appreciated the challenges we faced in this class. This course gives students the opportunity to prove their technical quality and ability to work in a team, and to experience the engineering industry.

Andrew Brower Bridgewater, NJ

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to work for the military and in the private sector for an aerospace company. Later in my career, I want to open my own motorcycle business.

CLASS COMMENT: I greatly appreciated the experience in working with a team, as well as cooperating with professionals within the school, such as our mentor and subject matter expert, and our customer.

Jacob L. Daugherty Hillsville, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to be a highly valued and respected individual that can help tasks and plans move to a successful conclusion because I was a part of the process. I hope to become someone who doesn't necessarily bring an education but more of an understanding and well-lived experience.

CLASS COMMENT: This class taught me that growth (professionally or personally) is not the result of what you are willing to put into something—it is the result of what you are able to stand back and take away. It is something that can be greatly expanded by the efforts of others. It is always something positive if you have the mind to see it.

Amir Mahin Dhaka, Bangladesh

Bachelor of Science in Electrical Engineering

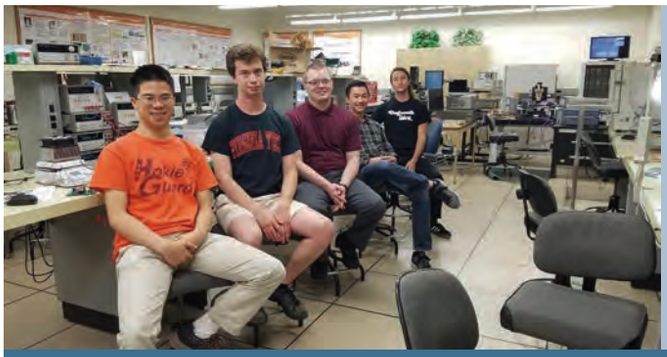
ASPIRATIONS: I wish to design and build electronic circuits for systems that would help the environment.

CLASS COMMENT: I enjoyed the opportunity to work on a real-world challenge and learn outside of textbooks.

PROJECT SPONSORS: WALTER CRAMER, CHRISTOPHER MINOR

Altria

RADIO FREQUENCY PERFORMANCE ENHANCEMENT THROUGH DIGITAL PROCESSING



CHALLENGE

The goal is to use digital signal processing to increase the linear operation of a GaN S-Band power amplifier. Students will select an algorithm to use to achieve the linearization and will use metrics such as output power, efficiency, size, weight, and cost to evaluate the performance of their design.

LEFT TO RIGHT: William Lu, Ryan Reed, Peter Kent, Minh Ngo, Ramsey Sfeir | **SME:** Louis Beex

Peter Kent Bristow, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to eventually work in the semiconductor industry or design new transistors.

CLASS COMMENT: I really enjoyed the hardware testing and using the different measuring devices. I also really enjoyed employing the problem-solving process as a team to solve the unique problems faced in this project.

William Lu Blacksburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to apply the knowledge I have learned to make contributions to the world.

CLASS COMMENT: This class did a great job at providing valuable industry experience, and showing how projects in the industry are managed and progressed.

Minh T. H. Ngo Blacksburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I will join the Center for Power Electronics System (CPES) at Virginia Tech in Fall 2019 to pursue a master's degree in high voltage power electronics. I hope to get a Ph.D. and become a professor one day.

CLASS COMMENT: The Major Design Experience at Virginia Tech pushed me to work on projects outside of my comfort zone and grow my expertise in fields of study I had not touched before.

Ryan Reed Blacksburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to pursue a master's degree and become an expert in the radio frequency field.

CLASS COMMENT: Through this class I was able to learn about pressing issues in the radio frequency field and gain an appreciation for the problem-solving processes.

Ramsey Sfeir Winchester, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I intend to work on analog circuit design in Richmond, VA.

CLASS COMMENT: It was valuable to interact with a client company, and the process helped illuminate where the effort of carrying out an ambitious project really lies.

PROJECT SPONSOR: MICHAEL JONES

ANALOG DEVICES

FPGA SYSTEM-ON-CHIP ALGORITHM OPTIMIZATION

CHALLENGE

Implement signal-processing algorithms on an ARM processor and FPGA on the Zybo board and benchmark the results to determine which implementation is most efficient.

LEFT TO RIGHT: Harrison Williams, Dyrick Williams, Ming Wen, Timothy Vales | **SME:** Peter Han

Timothy Vales Alexandria, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: After graduating, I would like to work for a company where I can explore my passion for digital systems and be part of a team that will revolutionize technology.

CLASS COMMENT: This course gave me the opportunity to work with professionals in their field, and it has also taught me the importance of working in an efficient team with a common goal. Being able to network and work with professionals is my biggest takeaway from this course.

Ming Wen NanNing, GuangXi, China

Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

ASPIRATIONS: Learn more, be better.

CLASS COMMENT: I enjoyed working on a big project with a group of people in the same major and a real customer.

Dyrick Williams New Kent, VA

Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

ASPIRATIONS: Sound synthesizers of the hardware and software variety have been an interest of mine and I hope to apply my technical and creative skills to create an innovative sound synthesis technique.

CLASS COMMENT: This major design experience has given me the opportunity to work on a team with a project structure to set us down the right path, yet enough freedom to develop our own solution.

Harrison Williams Los Alamos, NM

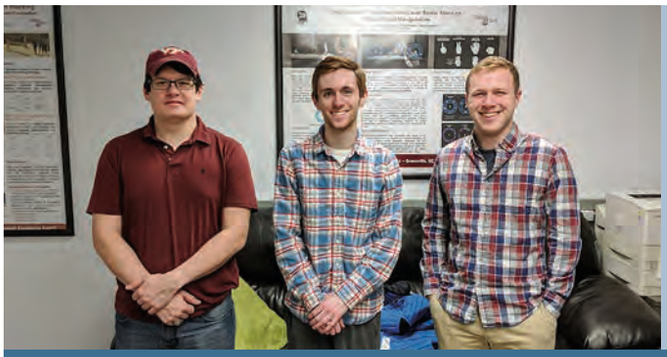
Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to pursue a graduate degree and do research in computer hardware architecture and security.

CLASS COMMENT: I appreciated the opportunity to develop the technical and project management skills required to complete a large task outside of a structured classroom environment.

PROJECT SPONSOR: RICHARD BERGER

ADVANCED TECHNOLOGIES FOR IMPROVED INSPECTION PROCESSES



CHALLENGE

We were paired with an ISE Senior Design team to improve the inspection process of their landing gear. We designed a tablet app to maximize efficiency in their process and make tasks more automated.

LEFT TO RIGHT: Brandon Huynh, Brian Levitt, Alex Krasner | **SME:** Jia-Bin Huang

Brandon Huynh Altavista, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to pursue a career in the design of electrical systems in industrial equipment or space systems.

CLASS COMMENT: This class has provided me with the foundation and tools to apply my theoretical learning to solving an engineering problem, preparing me for life after graduation.

Alexander Krasner Charlottesville, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I will be seeking to work on future user interfaces and interactions for augmented reality technologies.

CLASS COMMENT: I learned a lot about dealing with out-of-the-blue challenges and interpersonal communication in order to create a satisfactory solution to a problem.

Brian Levitt Darnestown, MD

Bachelor of Science in Computer Engineering

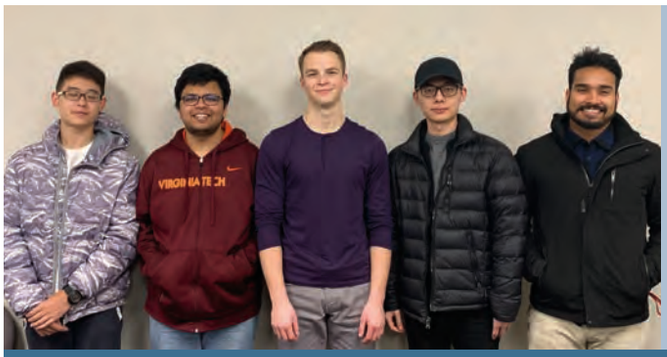
ASPIRATIONS: I will be working for QuantaDyn after graduation, helping them develop military training simulators.

CLASS COMMENT: I learned how to overcome all the obstacles relating to a project like this.

PROJECT SPONSORS: PETE LUKSAS, ARTHUR BLANC

Collins Aerospace

CONTINUOUS OPTICAL POWER WIRELESS SENSOR TRANSMITTER



CHALLENGE

Design a circuit powered by a photocell charging circuit to transmit pressure sensor data from aircraft fuel tanks to a PC. This will enable a technician to monitor aircraft fuel levels wirelessly rather than mechanically.

LEFT TO RIGHT: Yibo Xu, Aditya Prabhu, Daniel Cutler, Hairuo Zhang, Shahil Patel | **SME:** Yizheng Zhu

Daniel Cutler Willow Street, PA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I love working on embedded systems programming, particularly for communications systems. Additionally, I am fascinated by aircraft avionics systems and will be working full time at Aurora Flight Sciences beginning this summer.

CLASS COMMENT: I appreciated being able to go through the proposal process and develop a relationship with the customer, as well as working to provide the customer with the best possible functioning prototype.

Shahil S. Patel Chester, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to work for a company that has a big impact on the country.

CLASS COMMENT: I was able to work with great group members.

Aditya Prabhu Chennai, Tamil Nadu, India

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to have a career learning and working with antennas and radio frequency engineering.

CLASS COMMENT: The flexibility allowed to work on our projects gave us a lot of room to learn and work well as a team.

Hairuo Zhang China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to gain a more competitive position after graduation and be a solid engineer by using the knowledge and experience that I have now.

CLASS COMMENT: The Collins Aerospace project gave me an opportunity to play the role of an employee in a company and helped me gain leadership and planning skills, as well as group work experience.

Yibo Xu Zhengzhou, Henan, China

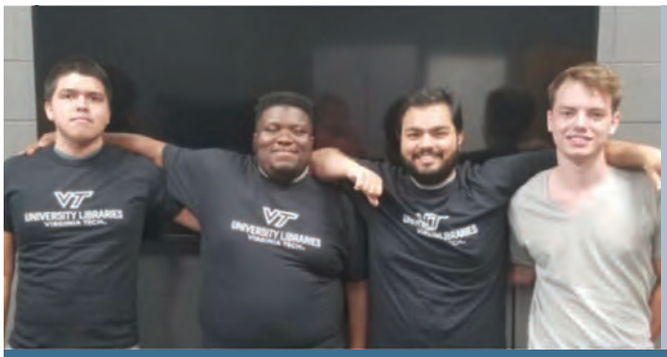
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to be a professional, skilled power systems electrical engineer.

CLASS COMMENT: This class allowed me to improve my teamwork skills and apply what I learned to real-world problems.

PROJECT SPONSOR: MARK BELLINGER

CYBER SECURITY IN A MULTI-LEVEL, OPEN ARCHITECTURE SYSTEM



CHALLENGE

This project's challenge was to address the storage and retrieval of multi-layer data on an airborne computer node through the implementation of a secure database, with user access levels, which stores, encrypts, and decrypts image files on the airborne server.

LEFT TO RIGHT: Joshua Orozco, Yaw Duodu, Vibhav Nanda, Matthew Ritzinger | **SME:** Walid Saad

Yaw S. Duodu Woodbridge, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My plan is to work in the defense sector to help advance intelligence, aircraft, vehicles, and electronics systems used in that field of work.

CLASS COMMENT: This class gave me the opportunity to work on an industry project while still in school. It gave me the necessary technical and interpersonal skills to help prepare me for work in the future. Working with an industry professional has made it clear what will be required from me, and what to expect when I begin to work full time after graduation.

Joshua Orozco Woodbridge, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My goal after my undergraduate education is to work for a company that focuses on either electronics or power systems.

CLASS COMMENT: I appreciated how this class allowed us to use what we learned in our engineering courses to develop both technical and interpersonal skills while working on an industry-focused project.

Vibhav Nanda Delhi, Delhi, India

Master of Science in Computer Engineering

ASPIRATIONS: The cybersecurity industry is growing and expanding as IoT devices become more prevalent. I would like to familiarize myself with the breadth and depth of the industry—ranging from the business to the technical aspects.

CLASS COMMENT: This provided me with an opportunity to work with a real client and manage the technical and business sides of the project. Additionally, the opportunity to mimic a real life environment gave me insight into how the industry works.

PROJECT SPONSORS: TIMOTHY BRETT, IAN HUMPHREY

Collins Aerospace

VISUAL OBJECT TRACKER (VOT) BENCHMARKING USING UAS CAPTIVE FLIGHT SYSTEM

CHALLENGE

Use image processing and UAVs to perform autonomous visual object tracking.

LEFT TO RIGHT: Duc Le, Jesus Bustillos, Jiayuan Zhang, Hassan Aljaziri, Yanbo Shi
SME: Pratap Tokekar, William Gerhard

Hassan Aljaziri Al Khobar, Saudi Arabia

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My goal is to earn a master's degree and Ph.D. in Electrical Engineering from King Abdullah University of Science and Technology in Saudi Arabia.

CLASS COMMENT: I enjoyed the opportunity of the professional experience I got through this class which gave me a great understanding on how to deal and work with real world problems by applying what I learned in my classes at Virginia Tech.

Jesus Bustillos Woodbridge VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My goal is to enter the workforce and to expand my studies. I want to continue my development as an electrical engineer and explore a variety of roles such as project manager or designer.

CLASS COMMENT: The senior design experience has allowed us to use and improve both technical and professional skills as a team to solve real-world problems. It has been a good opportunity to understand what the professional work environment will be like.

Duc Hong Le Ho Chi Minh City, Vietnam

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My interest is in hardware testing/validation for IC manufacturing. A first generation college graduate, I plan to finish my Electrical Engineering bachelor's degree and work in a system engineering field, eventually becoming a project manager.

CLASS COMMENT: The design class helps students who will soon become electrical engineers apply knowledge that has been taught in classes. This class shows the level of professionalism that will be expected in the workforce.

Yanbo Shi Jiangsu, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to focus on my research and contribute to humanity.

CLASS COMMENT: This class is a good opportunity to work as a team on a company's project. Also, it is an unforgettable experience in our undergraduate career.

Jiayuan Zhang Taiyuan, ShanXi, China

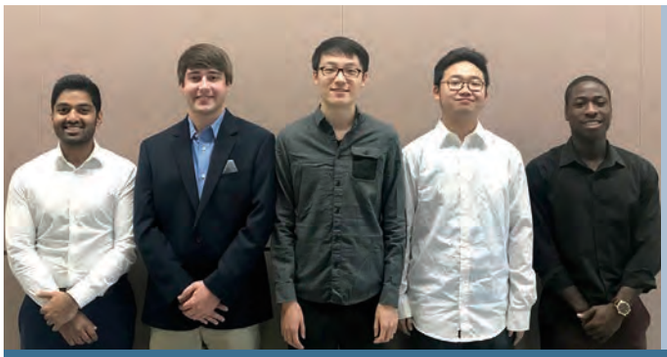
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I will focus on IC design after graduation.

CLASS COMMENT: This class gives us the real experience of communicating with customers and dealing with real-world problems.

PROJECT SPONSORS: TODD A. ELL, BOB RUTKIEWICZ

DEVELOP A PHONE/TABLET MAINTENANCE APPLICATION



CHALLENGE

To create a mobile/tablet application for the conversion of hex numbers representing fault codes into plain text for troubleshooting. Aimed to streamline maintenance for technicians with minimal technical experience. Solution is predicted to have Bluetooth functionality in order to create an easier connection method.

LEFT TO RIGHT: Varun Nekkanti, Jeff Lundquist, Tianshu Xu, Mingzhe Zha, Emmanuel Codjoe | **SME:** William Plymale

Emmanuel Codjoe Stafford, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My career aspiration is to get a job in the power engineering field and to put the knowledge I have acquired to use.

CLASS COMMENT: I appreciate the fact that we gained experience working in a team and getting important feedback from the professors.

Jeff Lundquist Georgetown, MA

Bachelor of Science in Computer Engineering

ASPIRATIONS: Upon graduating, I plan on working for a defense contractor as a software engineer.

CLASS COMMENT: This class has provided application development and team management experience that can only be gained from a hands-on, real-world project.

Varun Nekkanti Chantilly, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I want to work for a company that works with revolutionary technology that not only helps the general public but also people in need.

CLASS COMMENT: I really enjoyed the way we were told to organize and divide the work that we were assigned. I used the skills I learned from this class in other classes and my professional life.

Tianshu Xu Shanghai, China

Bachelor of Science in Computer Engineering

ASPIRATIONS: After graduation, I will go into the industry and take a position related to software engineering.

CLASS COMMENT: The teamworking method is a great experience in my college life. Professors give us a lot of help while doing the project. The opportunity to work on this real-world problem also gives me a good preparation for my future work and study.

Mingzhe Zha Xi'an, Shaanxi, China

Bachelor of Science in Computer Engineering

ASPIRATIONS: I would like to work as a software engineer in the future.

CLASS COMMENT: This two-semester long class is a new experience for me. I was able to learn many different teamwork and industry project skills from the class.

PROJECT SPONSORS: WYNN PARRISH, RUSS PROCTOR, THAO PHAN

Collins Aerospace

IEEE ROBOT TEAM: EMBEDDED AND ELECTRICAL

CHALLENGE

Design an autonomous robot and develop solutions for the IEEE SoutheastCon 2019 Competition.

LEFT TO RIGHT: Chenjun Liu, Moqi Zhang, Xiyuan Li, Hao Kang, Chengliang Lu, Talha Khan, Tingjie Liu, Xinrui Li
SME: Arthur Ball

Hao Kang Manassas, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: My plan is to go into hardware and software development.

CLASS COMMENT: This class provided professional teamwork experience that is essential to my professional development.

Talha Manzoor Khan

Bhopal, Madhya Pradesh, India

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to do hardware product development.

CLASS COMMENT: This class gave me an insight into project management and also experience working with power systems and robotic systems. It also gave me an insight into the professional world and what it takes for a project to be successful.

Xinrui Li Blacksburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to find a position I am really interested in.

CLASS COMMENT: I learned the importance of teamwork from this opportunity

Xiyuan Li Shanghai, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to become a Billionaire.

CLASS COMMENT: I like the interesting real-build assignment in this class which is different from other theoretical class.

Frank Liu Chester, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I want to be a hardware design verification engineer who checks for any functional errors and flaws to ensure the performance of the hardware.

CLASS COMMENT: I enjoyed getting hands-on experience in teamwork and professionalism.

Continued on next page ⟶

PROJECT SPONSORS: LOGAN DAVENPORT, VINEETH KIRANDUMKARA

IEEE ROBOT TEAM: EMBEDDED AND ELECTRICAL

Continued from previous page

Tingjie Liu Suzhou, Jiangsu, China

Bachelor of Science in Computer Engineering

ASPIRATIONS: I would like to become an expert-level programmer.

CLASS COMMENT: Gaining experience with working on a real-world problem was great.

Chengliang Lu Shanghai, China

Bachelor of Science in Computer Engineering

ASPIRATIONS: I want to become a real engineer who changes the world rather than just codes in the office.

CLASS COMMENT: I appreciate the participation from the mentor professor, SME professor, and customer, who actually helped us go through a lot of problems.

Moqi Zhang China

Bachelor of Science in Computer Engineering

ASPIRATIONS: After I get my master's degree, I plan to work in the field of autonomous vehicles.

CLASS COMMENT: This class was really fantastic for me. It provided me an opportunity to work on a real-world problem and develop my professional knowledge about embedded systems design.

Chenjun Liu Wuhan, China

Bachelor of Science in Computer Engineering

ASPIRATIONS: I aspire to become a design verification engineer.

CLASS COMMENT: From this class, I learned the essence of teamwork and how to apply my technical knowledge to a professional situation.

PROJECT SPONSORS: LOGAN DAVENPORT, VINEETH KIRANDUMKARA

NON-BLOCKING MULTICAST NETWORK VERIFICATION

CHALLENGE

Build and test the implementation of a new construction method for a non-blocking multicast network.

LEFT TO RIGHT: James Otwell, Mohammed Aarij, Samuel Giacinto, Christian Mielke, Juliet Clark | **SME:** Walid Saad

Mohammad Aarij Fairfax, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to continuously learn new skills and improve on the current skills I have to develop impactful solutions.

CLASS COMMENT: Working on a real-world innovative solution while gaining technical and business skills was very fulfilling.

Juliet Clark Fairfax, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My long-term goal is to become a university professor in either computer science or computer engineering. I also want to take action to allow minority women to have access to technology education earlier on.

CLASS COMMENT: I appreciate how this has taught me about dealing with team dynamics on projects that operate as a real-world experience.

Samuel Giacinto Blacksburg, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I want to use my skills to help others.

CLASS COMMENT: I appreciate the people that I got to work with on my team.

Christian Mielke Severna Park, MD

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I am working towards becoming an engineering manager or a project manager.

CLASS COMMENT: I appreciate the fact that business skills are important to this project and having an opportunity to work on these skills through the class.

James Otwell Haymarket, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I hope to use my knowledge in computers to support and expand upon different disciplines and broaden my breadth of knowledge in the process.

CLASS COMMENT: I have enjoyed working on cutting-edge research that I know will benefit the technical world in the future. The professional experience and knowledge I have received from this class will be invaluable to my career development.

PROJECT SPONSOR: RICHARD PEDERSON

LOCKHEED MARTIN

HOW ATOMIC LAYER DEPOSITION CAN BE USED FOR GAS SENSING APPLICATION

CHALLENGE

Investigate the electrical characteristics of an Aluminum Oxide thin film grown by atomic layer deposition to be used for gas sensing.

LEFT TO RIGHT: Maximillian Medley, Junxian Yao, Logan Miller, Satish Pant, Xinran Li | **SME:** Masoud Agah

Xinran Li Chengdu, Sichuan, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My goal is to become an integrated circuit designer.

CLASS COMMENT: The class gives me an opportunity to work with a real company beyond just research.

Maximillian Medley Newfields, NH

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to use my degree to help provide a positive environmental impact in the future.

CLASS COMMENT: This class allowed me to gain experience in working with a customer and understanding the importance of communication.

Logan Miller Stafford, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to contribute to society by developing devices that would make a positive, lasting impact for future generations.

CLASS COMMENT: This class provided me with the opportunity to work hands-on in a cleanroom environment. This is valuable experience that I will take with me for the rest of my life. I am grateful Virginia Tech allowed me to be a part of a team working on a real-world issue.

Satish Pant Chantilly, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My aspiration is to join the industry and work on challenging projects where I can improvise and utilize my technical skills and knowledge in a practical and impactful manner.

CLASS COMMENT: I appreciate the real-world experience this class offered along with the opportunity to collaborate with industry leaders and develop our business, communication, technical, and problem-solving skills.

Junxian Yao Suzhou, Jiangsu, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: Upon graduation, joining a big electronics corporation to design hardware is my target, and I will allow myself three to five years to accumulate hands-on experience. After that, I want to work as a project manager or department director.

CLASS COMMENT: The senior design project was a challenging but fun journey. It taught me a lot about professional communication and teamwork, and also provided great real-world insight. Now I have a more comprehensive understanding of the industry.

PROJECT SPONSORS: ZUZANA STEEN, BRIAN HUBER

Micron

NANOFABRICATION AND CHARACTERIZATION OF HYBRID OPTICAL-MAGNETIC NANOTRANSDUCERS

CHALLENGE

Our proposed nanotransducers will be capable of photothermal stimulation of deep brain circuits. The magnetic nanoparticles will assist in the guiding of such stimulation to provide accurate and non-invasive treatment. This proposed hybrid nanotransducer will provide a new advancement for noninvasive brain-machine interference.

LEFT TO RIGHT: Giovanni Arreaga, Kurt Nana-Nzepa, Sydney Overton, Keegan Stone | **SME:** Wei Zhou

Giovanni Arreaga Lakewood, CA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to work on microcontroller applications in the field of control systems.

CLASS COMMENT: I appreciated the opportunity to get cleanroom experience. The class also taught me that plans do not always go as expected and that you have to work with your team to overcome issues.

Kurt Nana-Nzepa Woodbridge, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like the opportunity to work as an equipment engineer at Micron. This will improve my knowledge and skills required for success with developing new nanoelectronic semiconductor processes.

CLASS COMMENT: I really appreciated Micron Technology and Virginia Tech for giving me hands-on experience with this project. As a result, I have developed an in-depth knowledge of semiconductor equipment and I have a thorough understanding of semiconductor safety procedures. In addition, I have received hands-on experience with semiconductor toolsets and experience working in a cleanroom environment. I am really grateful for the experience, so thank you.

Sydney Overton Fredericksburg, VA

Bachelor of Science in Electrical Engineering
Bachelor of Science in Physics

ASPIRATIONS: I hope to further my education and receive a Ph.D. in engineering. Following the completion of my education, I hope to develop meaningful engineering solutions for degenerative brain diseases.

CLASS COMMENT: I enjoyed the opportunity to work with our customer to create an industry situation for the team to experience. Additionally, I appreciated the ability to hone my interpersonal skills which will help me secure success later in my career.

Keegan Stone Ashburn, VA

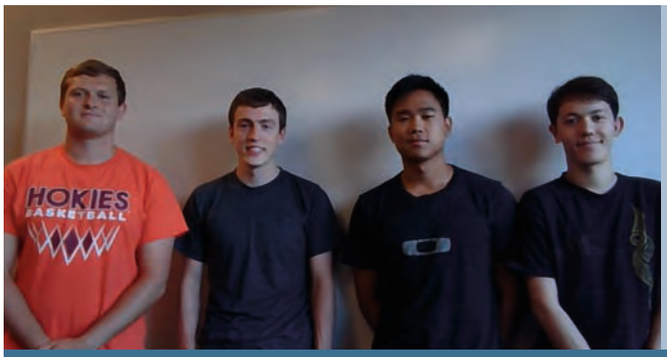
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aim to get a job in radio frequency engineering where I can apply the knowledge I have learned while at Virginia Tech.

CLASS COMMENT: The ability to get hands-on experience of working in a cleanroom, as well as working closely with a customer, was invaluable.

PROJECT SPONSORS: ZUZANA STEEN, ANTHONY SMITH

HF BROADCASTING, ALERTING, AND BEACONING



CHALLENGE

Create a software terminal which enables broadcasting, beaconing, and receiving over an ad-hoc network in a disaster relief environment.

LEFT TO RIGHT: Andrew Sargent, Rory Kirkpatrick, Derek Lew, Pierce Spahn | **SME:** Peter Han

Rory Kirkpatrick Edmonds, WA

Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aim to put my electrical and computer engineering skills to use in the defense sector.

CLASS COMMENT: The most meaningful part of this class for me was the experience gained in managing communications in a professional manner with the sponsor.

Derek Lew Gainesville, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to use the base knowledge gained in college to continue growing my technical skills throughout my career. Eventually, I would like to move into leadership once I have built a strong foundation of technical knowledge.

CLASS COMMENT: I like the experience of interacting with sponsors that work in the industry and have experience and knowledge to share.

Andrew Sargent Oakton, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I wish to use my degree in electrical engineering to help design electronic devices that are used in everyday life.

CLASS COMMENT: The most meaningful aspect of this class was being able to learn what it is like to work on a project in industry.

Pierce Spahn Charlottesville, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to use my electrical engineering to work with signals and communications.

CLASS COMMENT: I liked having the opportunity to talk with people who have the experience we need.

PROJECT SPONSORS: CHRIS SCHMIDT, ANDY THOMPSON, DALE HERDEGEN

MITRE

UAV VERTICAL REPLENISHMENT-HARDWARE TEAM

CHALLENGE

The challenge of this project is to create an autonomous search and rescue UAV to find a downed drone somewhere in the desert. Once found the UAV will retrieve the drone and drop it off at a set location, then fly back to base.

LEFT TO RIGHT: Jason Lew, Nick Summerville, Rachel Neugent, Edmond Torskiy | **SME:** Pratap Tokekar

Jason Lew Gainesville, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to work in the aerospace industry focusing on electronics or communications systems.

CLASS COMMENT: I enjoyed being exposed to real-world challenges that required multidisciplinary engineering approaches.

Rachel Neugent California, MD

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to continue to grow as an electrical engineer to leadership positions where I can help others continue to pursue a neverending need for knowledge.

CLASS COMMENT: I felt the class helped really put emphasis on holding yourself and others accountable to a schedule and completing tasks. This seemed to be a lot more like the real world than having a professor pushing you through every step of the way.

Nicholas Summerville Kinnelon, NJ

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to continue my education in order to receive an MBA so that I can pursue leadership roles in industry. I am currently working in aerospace, but we will see where I will ultimately end up.

CLASS COMMENT: I think that the best part of this class is the real-world experience that the professors and sponsors provide. The work does not feel like regular homework, it feels more like a job and prepares you for the real world.

Edmond Torskiy Chicago, IL

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My career aspirations are to become an expert in my field while educating myself more and more about electrical engineering.

CLASS COMMENT: I enjoy being able to apply the knowledge that I have gained to a real-world problem while working as a team to achieve a common goal.

PROJECT SPONSORS: MICHAEL SPARR, NICK STINE

NAVAIR

UAV VERTICAL REPLENISHMENT– SOFTWARE TEAM

CHALLENGE

Our challenge as the software team was to code and simulate an autonomous hexcopter mission to recover a downed UAV.

LEFT TO RIGHT: Ethan Barnes, Parker Conrath, Alexander Neely, Nicholas Shaljian, Daniel Knapp | **SME:** Pratap Tokekar

Ethan Barnes Hurt, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My aspirations are to use what I have learned here at Virginia Tech to benefit my home area in southern Virginia.

CLASS COMMENT: I have enjoyed learning and experiencing a little more of the professional aspects of engineering through this class.

Parker Conrath Lovettsville, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I hope to design and develop autonomous and robotic systems for the future.

CLASS COMMENT: The ability to work on a real-world scenario with a corporation provided valuable experience and allowed to me to apply my skill-set in a unique way.

Daniel Knapp Springfield, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to develop a career involving power electronics to increase power efficiency so that I may improve the lives of others.

CLASS COMMENT: I appreciated the opportunity to work with a representative from our sponsor and our SME from Virginia Tech to work towards developing a solution to a real-world problem.

Alexander Neely Reston, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I hope to use the power of computing to solve big problems.

CLASS COMMENT: This class is a great way to make industry connections and learn what is expected in a full-time job.

Nicholas Shaljian Tinton Falls, NJ

Bachelor of Science in Electrical Engineering

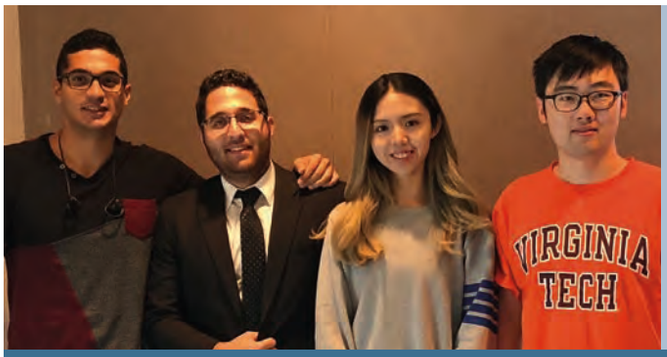
ASPIRATIONS: Following my undergraduate degree, I aim to pursue a career in power electronics. With the knowledge I learned at Tech, I would like to improve the efficiency and reliability of electronic technology so as to lower the environmental impacts of wasted energy and mass produced replacements.

CLASS COMMENT: I greatly appreciated the professional independence this class taught in that the students were required to be hands-on while the teachers were required to be hands-off. This led to the development of eye-opening real-world problem-solving skills to overcome challenges and see to the completion of the project. These skills could not be learned by simply following a rubric and receiving back a grade.

PROJECT SPONSORS: MICHAEL SPARR, NICK STINE

NAVAIR

REFERENCE ARCHITECTURE: NAVIGATION REFERENCE MODELS



CHALLENGE

This project focuses on a single domain space element of CORE Avionics. It is intended to promote the understanding and use of systems engineering methodologies while providing a root model that can be applied to multiple programs. This Generic Navigation reference model is utilized across Ship, Aviation, Ground, Space, Subsurface, and Weapons systems.

LEFT TO RIGHT: Danial Okhovvatgilani, Payam Kanzi, Wenxuan He, Jiasheng Li | **SME:** William Diehl

Wenxuan He Changsha, Hunan, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: Live and learn.

CLASS COMMENT: This class gave me time to apply engineering problem-solving skills to the real world. I discovered the value of project management and the importance of communication. I think this is an excellent course for all senior students.

Payam Kanzi Reston, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: Following graduation, I aspire to become a well-rounded electrical engineer who can utilize every experience and aspect of my career. After starting my job in the industry, I wish to pursue my master's degree in analog electronics.

CLASS COMMENT: In this course, I got an opportunity to experience working in the real world of industries and business. It helped me to improve my communication, teamwork, and other technical skills. I never could have learned any of these skills in the classroom.

Jiasheng Li Shanghai, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to design the future, and become a professional in the field.

CLASS COMMENT: This class gave me some ideas about how to do a project in a company and how to communicate with your customer.

Danial Okhovvatgilani Aldie, VA

Bachelor of Science in Electrical Engineering

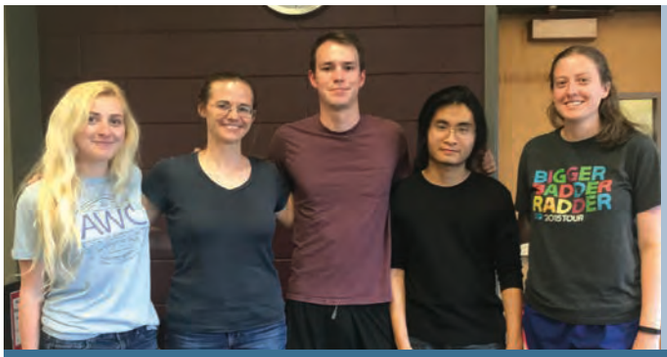
ASPIRATIONS: I am hoping that my career is in a field where it can help me make money to provide for my family and my close ones. I also want my career to be in line with my studies in a way where I can use my knowledge to help people who need it the most, like people in third world countries who do not have access to electricity.

CLASS COMMENT: I was thankful for getting some real-world experience in regards to teamwork, and working on a project that is on a deadline not for myself but for a different customer. I also learned how to be responsible and communicate better with my team and the customer. Teamwork makes the dream work!

PROJECT SPONSOR: CHRIS KIMMEL

NAVAIR

SWARMING OF UAVS EQUIPPED WITH RF SENSORS



CHALLENGE

Modeling error of a drone antenna array with MATLAB. This model will be used to determine which errors require improvement before a successful drone array can be constructed.

LEFT TO RIGHT: Carley Kelly, Diane Cline, Kevin Kawecki, Andrew Pham, and Victoria Baker | **SME:** Majid Manteghi

Victoria Baker Newport News, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to earn a master's degree in power electronics, and pursue a career in that field.

CLASS COMMENT: I enjoyed learning more about a subject that I did not know much about, and becoming friends with my teammates.

Carley Kelly Annapolis, MD

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to use what I've learned from electrical engineering to serve others and help better society.

CLASS COMMENT: I appreciated the opportunity to work closely with others and be a part of a team.

Diane Cline Mechanicsburg, PA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want a career where I am always learning something new and do work that will benefit society.

CLASS COMMENT: I enjoyed the opportunity to collaborate with other students and solve a problem as a team.

Andrew Pham Lynchburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I will pursue a career in reverse engineering and vulnerability research.

CLASS COMMENT: I appreciate the teamwork experience.

Kevin Kawecki Huntington, NY

Bachelor of Science in Computer Engineering

ASPIRATIONS: I am seeking a career in firmware development.

CLASS COMMENT: I liked the opportunity to develop a high-level project with the coordination of an offsite customer.

PROJECT SPONSOR: KATIE HAUCK

NAVAIR

UNMANNED VEHICLE GROUND CONTROL SYSTEM

CHALLENGE

Design and build a ground control system that controls and communicates with two unmanned aerial systems.

LEFT TO RIGHT: Sanad Al Senaidi, Noor Sangid, Ariana Spalter, Luke Knoble | **SME:** Ryan Williams

Luke Knoble Virginia Beach, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I would like to work with people. Whether it be modeling what makes us tick with software and hardware, or what is just as interesting - integrating technology into and onto people and their lives to better interface with others and our environment.

CLASS COMMENT: I appreciate how much experience I have gained working with and for a team. Also, I now understand how cc'ing works.

Noor Bassem Sangid Beirut, Lebanon

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I will be seeking opportunities related to the energy industry and electrical technological advancements.

CLASS COMMENT: The opportunity to solve real-world engineering problems while engaging with a specialized organization in the industry has been invaluable.

Sanad Al Senaidi

Al Ain, Abu Dhabi, United Arab Emirates

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to become a successful businessman and an important figure, and I believe that Virginia Tech is one of the stepping stones towards fulfilling this achievement.

CLASS COMMENT: I appreciate experiencing how the real world works, which is one of the many things that this class has taught me. I have also learned and enhanced many skills that are important for me to reach my goals.

Ariana Spalter Longwood, FL

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I will pursue graduate studies in electrical engineering with a focus in robotics or sensing. Ultimately, I hope to work within the research area of a company with an aim towards producing innovative products that benefit society.

CLASS COMMENT: The course has taught me how to view and manage a real-world design project through both an electrical engineering and business lens.

PROJECT SPONSOR: ANDRIAN JORDAN

NAVAIR

NON-CIRCULAR BORE SCAN AND MAPPING

CHALLENGE

To design and fabricate a new automated bore measurement system to aid in monitoring the health of internal bore components for non-circular bores.

LEFT TO RIGHT: Josh Outhous, Robert Ratway, Alexander J. Zukosky, Ethan McCarty | **SME:** Alfred Wicks

Ethan McCarty Bloomsbury, NJ

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to use my knowledge, as an electrical engineer, to provide support and help toward everyday issues, and to possibly create a device to prevent them from happening again.

CLASS COMMENT: I valued the experience of being able to work with Naval Surface Warfare Center Dahlgren Division on a real-world issue/project. Learning how everything fits together is beneficial for any future projects.

Josh Outhous Mechanicsville, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My goal is to work with communication systems and interference mitigation for the Navy.

CLASS COMMENT: This class provided a helpful experience of working on a team to solve a real-world problem.

Robert M. Ratway Stafford, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to further my education and career with a focus in secure communications.

CLASS COMMENT: I had a great time with the experience of working through a real company on an interesting project.

Alexander J. Zukosky Levittown, PA

Bachelor of Science in Electrical Engineering

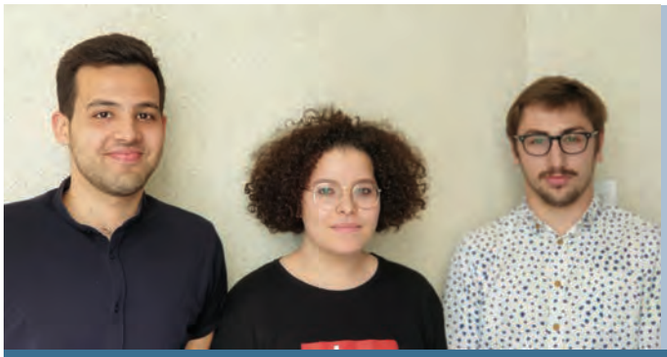
ASPIRATIONS: With a concentration in power engineering, I aim to perform and excel in complex environments pertaining to power systems.

CLASS COMMENT: I enjoyed the ability to work with like-minded individuals on a long-term project that tested a plethora of skills and traits developed over my educational and professional career.

PROJECT SPONSORS: LYNDA HESTER, ANGEL MOISES IGLESIAS, SERITA SERIGHT

NAVSEA WARFARE CENTERS DAHLGREN

EVALUATION OF DUAL CORE TECHNOLOGY FOR TIME AND SPACE PARTITIONING SOFTWARE ARCHITECTURE



CHALLENGE

The project will provide a demonstration of the opportunity to use dual-core technology (Cortex A9) for applications based on the current AOS satellite solution using a time and space partitioning hypervisor.

LEFT TO RIGHT: Ziaad Benamar, Nahla El Hamdouchi, Joris Louge | **SME:** Jean-Charles Fabre

Ziaad Benamar Tetouan, Morocco

Master of Science in Computer Science
INP-ENSEEIHT Toulouse, France

ASPIRATIONS: To be a leader and highly competent in the field of embedded systems.

CLASS COMMENT: The class tutorials at the INP-ENSEEIHT provided interesting intercultural insights into the American approach at Virginia Tech. I enjoyed both the autonomy and the international collaboration.

Nahla El Hamdouchi Sefrou, Morocco

Master of Science in Electrical Engineering
INP-ENSEEIHT Toulouse, France

ASPIRATIONS: To contribute to efforts to promote free access to information worldwide.

CLASS COMMENT: I appreciated the flexible course format at the INP-ENSEEIHT engineering school in France which was adapted to our needs and availability. It offered an inside view of the American course at Virginia Tech.

Joris Louge Toulouse, France

Master of Science in Computer Science
INP-ENSEEIHT Toulouse, France

ASPIRATIONS: To be a builder of the world of tomorrow.

CLASS COMMENT: I enjoyed collaborating with the intercultural US-French team from Virginia Tech and the INP-ENSEEIHT Toulouse, France, the close relationships with our tutors, and having the freedom to set our own schedule.

PROJECT SPONSOR: PIERRE MORERE

OneWeb Satellites

EVALUATION OF DUAL CORE TECHNOLOGY FOR TIME AND SPACE PARTITIONING SOFTWARE ARCHITECTURE

CHALLENGE

The project will provide a demonstration of the opportunity to use dual-core technology (Cortex A9) for applications based on the current AOS satellite solution using a time and space partitioning hypervisor.

LEFT TO RIGHT: Xuan Li, Bowen Xu, Cristian Diaz-Claure, Zachary Chrystal | **SME:** Changwoo Min

Zachary Chrystal Albany, GA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I am commissioning into the United States Navy as a Surface Warfare Officer upon graduation.

CLASS COMMENT: I valued having the opportunity to apply my technical knowledge in a real world format by working through actual engineering processes.

Cristian Diaz-Claure Dunnsville, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I would like to research machine learning or AI at a company, or strictly just for research.

CLASS COMMENT: I now understand the criterion that the industry demands—at least on an international level, the intricacies involved in foreign export control laws, and the importance of these.

Xuan Li China

Bachelor of Science in Computer Engineering

ASPIRATIONS: I hope to become a professional engineer.

CLASS COMMENT: I appreciate this course giving me another opportunity to explore embedded systems.

Bowen Xu China

Bachelor of Science in Computer Engineering

ASPIRATIONS: My goal is to enhance my professional skills and keep gaining experience.

CLASS COMMENT: I appreciate the opportunity to work on a real-world problem with a French company, and this class laid the foundation of my future career.

PROJECT SPONSOR: PIERRE MORERE

OneWeb Satellites

VIBRATION MONITORING SENSOR

CHALLENGE

Design a low-cost sensor that can record vibrations that exceed a threshold onto an external memory along with a timestamp. The sensor will be used to analyze damages to Steelcase's products during transit to the customer.

LEFT TO RIGHT: Kalp Maniar, David Flores, Fabiha Nowshin, Brendan Jeffries, Riyadh Aloshan | **SME:** Thomas Martin

Riyadh Aloshan Saudi Arabia

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to use the knowledge that I have gained at Virginia Tech to become a successful businessman and an important figure.

CLASS COMMENT: The Major Design Experience course provides essential knowledge to understanding the process of real-world design problems by presenting a wide variety of interesting projects. The course taught me the importance of project management, team communication, and implementing design ideas.

David Flores Fredericksburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to continue working in the EW field as a system engineer.

CLASS COMMENT: I appreciated the opportunity to collaborate with a group of my peers to go through the design, build, and test cycle of a device that was customer-driven.

Brendan Jeffries Winchester, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to establish a solid foundation for advancement while maintaining a healthy work-life balance.

CLASS COMMENT: I enjoyed experiencing teamwork on a large project for a real-world problem.

Kalp Maniar Richmond, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to gain credibility as a skilled engineer and then pursue my MBA in order to continue learning and become a respected leader.

CLASS COMMENT: This class has taught me valuable lessons about both the engineering side as well as the business side of a company. I plan to take these lessons and jumpstart my career as an engineer.

Fabiha Nowshin Dhaka, Bangladesh

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to pursue a master's degree to gain a deeper understanding and to excel in the field of electrical engineering.

CLASS COMMENT: This class taught me how to apply technical and communication skills to solve real-world problems.

PROJECT SPONSORS: EDWARD VANDER BILT, WES ALLEN, WES TAYLOR

AEROSOL DETECTION USING LIDAR

CHALLENGE

This project focuses on development of a tropospheric aerosol LIDAR to measure aerosol profile within the lowest 4-5 km at 355nm. The system is designed to work remotely.

LEFT TO RIGHT: Brian Famili, Sultan Almarzooqi, Emre Karaman, Shenghan Lei, Zhongnan Chen | **SME:** Adam Barnes

Sultan Almarzooqi
Abu Dhabi, United Arab Emirates

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My aspiration is to use the knowledge I gained to serve my country.

CLASS COMMENT: This class made me experience a real job project which gave me the opportunity to use and apply what I learned in my courses in real life.

Zhongnan Chen Nantong, Jiangsu, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to seek my master's in electrical engineering.

CLASS COMMENT: I have learned a lot of real-world skills that I never have learned before.

Brian Famili Timonium, MD

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I will be working at EDG2 as an electrical engineer and hope to work my way through the company.

CLASS COMMENT: I appreciated the experience I gained about meeting expectations and how to best appease your clients.

Emre Karaman Centreville, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: Electrical engineering is relevant to every part of our daily lives, and with my career and the opportunities I have been given, I want to help make a difference. I want to be challenged to never stop learning, and to foster an environment where others are inspired to do the same.

CLASS COMMENT: This class has put into perspective that all work is not like the schoolwork we have been accustomed to: deadlines need to be planned out, and a structured team can make all the difference.

Shenghan Lei Shanghai, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to start my career as soon as possible.

CLASS COMMENT: The mentor and SME are both very nice and patient in teaching us.

PROJECT SPONSORS: ELENA LIND, NASH KOCHER

E911 LOCALIZATION FOR INDOOR LOCATIONS

CHALLENGE

Smartphones get less accurate information for indoor locations due to interference of GPS and cell signals, which can prove dangerous in an emergency. The E911 Localization project aims to improve smartphone tracking for use in the Enhanced 911 system, and have smartphones provide accurate indoor location information using PDR, GraphSLAM, and other techniques in quasi real-time.

LEFT TO RIGHT: Saad Badoghaish, Huan Le, Qais Al Hajri, Arash Behpour, Junjie Liang | **SME:** Michael Buehrer

Saad Badoghaish Al Khobar, Saudi Arabia

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to get more experience working with and developing electronic circuits that can be useful for my country and the people around.

CLASS COMMENT: I learned a lot about localization from this hands-on experience. We experienced a lot of difficulties throughout the project and that gave us the opportunity to solve these problems and learn from them.

Arash Behpour Ashburn, VA

Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to be a master in algorithms and problem solving. I would like to be skillful in the areas of machine learning and computer vision!

CLASS COMMENT: I really like working in a team environment which gives me experience on how it would be working in a team at a company.

Qais Faris Rashid Al Hajri
Athaiba, Muscat, Oman

Bachelor of Science in Computer Engineering

ASPIRATIONS: I want to be a part of a team that impacts the world through technological innovations that enhance accessibility and improve health.

CLASS COMMENT: This class has taught me organization skills, including project scheduling, technical writing, planning, and leading in a short period of time. It allowed me to practically apply the skills I gained from classes I had taken at Virginia Tech. This class also gave me some sense of the skills required in a real-world job.

Huan Le Annandale, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: My hope is to find an environment with varied, fun, and fulfilling work where I collaborate closely with others.

CLASS COMMENT: I appreciate the amount of communication required among me, my teammates, our SME, and our customer. We had to make a serious effort to keep up-to-date with one another to stay on schedule. Academia can sometimes be isolating with how little communication and collaboration there is, so this is a welcome change.

Junjie Liang Foshan, Guangdong, China

Bachelor of Science in Computer Engineering

ASPIRATIONS: My aspiration is to build my own smart home system.

CLASS COMMENT: I appreciate the Android development experience that I gained during this project and the opportunity to work with such a great team!

PROJECT SPONSOR: MAHI ABDELBAR

ECE INVENTORY APPLICATION DEVELOPMENT

CHALLENGE

We developed applications for iOS and Android for the VT ECE Department that allow them to have more resources at hand for managing their vast inventory.

LEFT TO RIGHT: Tyler Cuomo, Dillon Butler, Giacomo Modica, Xiaoqing Zhang | **SME:** Paul Plassmann

Dillon Butler Red Bank, NJ

Bachelor of Science in Computer Engineering

ASPIRATIONS: I aspire to do work that I love, while always changing the future.

CLASS COMMENT: This class taught me valuable lessons and gave me real-life experience when it came to working in a team.

Tyler Cuomo Powhatan, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I plan to join the world of consulting and further develop my professional and technical skills while bridging the gap between technology and business.

CLASS COMMENT: I appreciated the open-ended aspect of the class. We were given what the customer wanted, and I enjoyed the freedom of development.

Giacomo Modica Alexandria, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I plan to stay educated on current technology and applications, and always be doing something new.

CLASS COMMENT: I felt that this class helped me with my professional development by showing me how to overcome many team-related issues.

Xiaoqing Zhang Chengdu, Sichuan, China

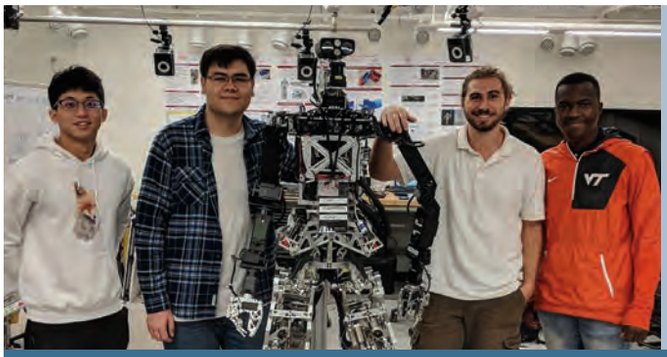
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would love to create my own applications with both software and hardware. My happiness comes from creation.

CLASS COMMENT: I appreciate that my teammates helped me with the coding things, which was great teamwork. I'm so thankful that my mentor taught me the professional experience and shared his knowledge in this project.

PROJECT SPONSOR: PAUL PLASSMANN

HIGH-LEVEL CONTROL OF HUMANOID ROBOTS



CHALLENGE

Create a framework for a high-level controller for a humanoid robot. The robot in question is Virginia Tech's THOR, a hazardous rescue robot for use on ships. The framework outlines how VT TREC labs will control THOR in the future.

LEFT TO RIGHT: Jack Liu, Aslan Turabekov, William Moran, Thierno Issabre | **SME:** Alexander Leonessa

Thierno Issabre Bamako, Mali

Bachelor of Science in Computer Engineering

ASPIRATIONS: I plan to design software and hardware that is easy to use for all cultures, ages, and backgrounds.

CLASS COMMENT: I enjoyed working on a project that did not have a known solution. This class guides you, but also gives you the freedom you need to successfully solve a problem never solved before.

William A. Moran White Post, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: My career aspiration is to make a name for myself in embedded system design. My dream job is as an engineer for the Rich Energy|Haas Formula One team.

CLASS COMMENT: This class has taught me to be a better researcher and how to solve the real-life problems that arise with engineering problem-solving.

Jack Liu Zhuhai, Guangdong, China

Bachelor of Science in Computer Engineering

ASPIRATIONS: My goal is to work on mobile app development

CLASS COMMENT: I appreciate the teamwork experience!

Aslan Turabekov Astana, Kazakhstan

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to work in a field where I can challenge myself and learn, becoming a better person.

CLASS COMMENT: I appreciate all the valuable experience and knowledge gained while working on this project. As an electrical engineer working on a mostly CPE project, I am proud that I was able to keep up with my team members. Working on this project taught me how to be in a position where I know little but still succeed.

PROJECT SPONSOR: ALEXANDER LEONESSA

NASA ROBOTICS MINING COMPETITION (ASTROBOTICS)

CHALLENGE

The Astrobotics team is responsible for the fully autonomous operation of a mining robot for 10 full minutes. The robot must navigate an obstacle field, mine the material, and deposit the material in a collection bin.

LEFT TO RIGHT: Ethan Johnson, Alex Petrovsky, Ryan Cerrone, Rohan Dani, Daniel Fisahatsion | **SME:** Alexander Leonessa

Ryan J. Cerrone Winchester, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: After I graduate, I plan on working for Northrop Grumman Innovation Systems for a few years. I would like to get into project management at some point. After a fair bit of time, I would like to teach at the collegiate level.

CLASS COMMENT: I appreciate the experience of working in a group for an extended period of time. It has opened my eyes to both the benefits and drawbacks of working in a group.

Rohan J. Dani Ashburn, VA

Bachelor of Science in Computer Engineering

ASPIRATIONS: I want to become an industry leader in designing intelligent robots that can be used in different sectors, such as workforce, space, and normal life. This can range from aerial to ground to ocean bots that can be different shapes and forms, possibly humanoids, too.

CLASS COMMENT: I appreciate this course because it allowed me to learn more about the overall development of a software application of a robot and meshing it with an overall mechanical system. It also helped me understand how communication is so important and how passion for the project is the best way to succeed, especially as a team leader.

Daniel Fisahatsion Herndon, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I intend to build a long-term career in the space industry.

CLASS COMMENT: The class gave students the opportunity to work on real-world problems and apply skills acquired through the Virginia Tech ECE Department.

Ethan Johnson Williamsburg, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: Upon graduation, I intend to work in a manufacturing setting and expand my electrical engineering knowledge with real-life applications.

CLASS COMMENT: I appreciate the opportunity to work with other engineering groups (Mechanical and ISE) as a collaborative group and resolve a real-life problem using the knowledge I have learned at Virginia Tech.

Alex Petrovsky Natick, MA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to develop technology which extends the human capability. One day I would like to start my own company which embodies this idea.

CLASS COMMENT: MDE is an opportunity to use classroom knowledge as a foundation to explore more complex problems, many of which have no predefined solution.

PROJECT SPONSOR: ALEXANDER LEONESSA

VISUAL RECOGNITION OF FARM ANIMALS UTILIZING QUADCOPTER DRONE TECHNOLOGY

CHALLENGE

This project requires the team to protect livestock from predators utilizing an Intel Aero Drone and FLIR Vue Pro Thermal Camera. The goal of this project is to detect predators outside an electrified livestock enclosure and deter them with a bright spotlight.

LEFT TO RIGHT: Alex Orlov, Liz Doggett, Bobbie Dee Kennedy, Matthew Strehle, Kelly Mak | **SME:** Luke Lester

Liz Doggett Poquoson, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to become a subject matter expert in my field and help get younger minds excited about STEM fields!

CLASS COMMENT: I appreciated the experience gained through working with such a fluid project. Learning how to develop our own constraints and deadlines will be invaluable in the workforce.

Bobbie Dee Kennedy Smithfield, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: Following graduation, I hope to work in the field of renewable energy and encourage young females to pursue engineering careers.

CLASS COMMENT: This class has provided me with valuable real-world experiences and allowed me to apply the problem-solving techniques that I developed throughout my college career. I appreciated the exposure to a professional work environment and the guidance from our customer and mentor throughout this process.

Kelly Mak Forest Hills, NY

Bachelor of Science in Computer Engineering

ASPIRATIONS: I hope to be able to make change in the world.

CLASS COMMENT: I appreciated learning about how industry expectations are different from academic expectations.

Alex Orlov Fairfax, VA

Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I think spaceflight represents humanity's future, and I want to be a part of it.

CLASS COMMENT: I learned about autonomous drone engineering through my project. The class gave me the opportunity to learn more about team dynamics and the professional side of engineering.

Matthew Strehle Newport News, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I hope to pursue a career that is fulfilling and applicable to my field of study. In my lifetime, I aspire to "invent the future" and be of good service to society.

CLASS COMMENT: I appreciate the Major Design Experience as I believe it has helped me understand what the transition from student to working professional entails.

PROJECT SPONSOR: LUKE LESTER

WIRELESS REMOTE HEALTH MONITORING SYSTEM

CHALLENGE

This project will develop a wireless system to capture wireless data using a tablet from different kinds of sensors including IMUs and cameras. The captured data will be stored, processed, and periodically sent through cellular to health professionals. The major concerns of this project are privacy and security.

LEFT TO RIGHT: Aditya Jain, Elieser Mejia, Abdulmohsen Nadeem, Jinhua Wang, Haisong Deng | **SME:** Mike Buehrer

Haisong Deng Shanghai, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to find a job in a big company and become a design team leader.

CLASS COMMENT: I appreciate the real-life working experience and research opportunity.

Aditya Jain Jaipur, India

Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

ASPIRATIONS: Establish my own technology consulting company which deals in both software and hardware engineering projects.

CLASS COMMENT: This course taught me valuable management and technical skills that will help me in a real-world corporate work environment.

Elieser Mejia Hanover, MD

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I will attend graduate school at Virginia Tech for an M.S. in electrical engineering and continue my current research endeavors in nano-enabled photonic and electronic devices and systems. Afterwards, I intend to pursue a Ph.D. focusing on the development of neuromodulation devices utilizing plasmonic nanostructures coupled with short-pulsed near infrared lasers. My long-term career aspiration is to work at the Johns Hopkins Applied Physics Lab in the brain-machine interface group.

CLASS COMMENT: I appreciate the commitment and patience of our mentor, subject matter expert, and customer in helping us develop both our technical and interpersonal skills.

Abdulmohsen Ahmed Nadeem
Jeddah, Saudi Arabia

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I really want to make a positive impact on Saudi Arabia and I want to use what I learned to help others.

CLASS COMMENT: I want to make a positive impact on the world. I really enjoyed this project because I believe it allowed me to use the skills I have learned to help others.

Jinhua Wang Wuwei, Gansu, China

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My goal is to become a professor in the future in an engineering college. My first choice would be to do this at Virginia Tech.

CLASS COMMENT: To a certain extent, this class provides me a very good opportunity to understand how a real-world team works. We have real customers and we get real feedback from them, either satisfaction or dissatisfaction. This class brings us from the classroom to the real world. All in all, this is a very good course.

PROJECT SPONSORS: AISLING KELLIHER, THANASSIS RIKAKIS

EXTREME DOPPLER COMMUNICATIONS AND PROCESSING

CHALLENGE

To define and simulate extreme doppler scenarios in an effort to calculate the symbol error rate (SER) of communication bursts sent between fast-moving objects.

LEFT TO RIGHT: Peyton McClintock, Connor McCauley, Justin Allan, Joseph Profeta | **SME:** Louis Beex

Justin Allan Sparta, NJ

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to one day be in management in a company that is pushing the limits of what communication technologies can do. I want to hopefully benefit the world by making technology available for everyone.

CLASS COMMENT: The professional skills and business etiquette learned are things I will most definitely use in my future, so I am grateful for learning them.

Connor McCauley Salem, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to start my career in engineering and eventually use my communication skills to become a project manager.

CLASS COMMENT: Communicating with your team is one of the most vital skills I have learned.

Peyton McClintock Fairfax, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I plan to be a future signal processing engineer at L3 Adaptive Methods, developing sonar systems and software for the US Navy.

CLASS COMMENT: I appreciate the opportunity to meet new people and work on a challenging yet rewarding project.

Joseph A. Profeta IV Pittsburgh, PA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: Upon graduation, I will be commissioning into the Navy as a Surface Warfare Officer.

CLASS COMMENT: I appreciate the professional experiences from this class and the continued teaching of how to properly work in and lead a high-functioning team.

PROJECT SPONSOR: JONATHAN BLACK

SYSTEM DESIGN OF A CITIZENS BROADBAND RADIO SERVICE DEPLOYMENT AT VIRGINIA TECH

CHALLENGE

Complete a system design of a Citizens Broadband Radio Service (CBRS) deployment at Virginia Tech, as well as recommend and test pilot access point locations and system coverage.

LEFT TO RIGHT: Haozhe Zhang, Jeremy Shaver, Connor Kearns | **SME:** Allen MacKenzie

Connor Kearns Audubon, PA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I am looking to become a communication engineer following graduation.

CLASS COMMENT: I appreciate the opportunity this class has provided to work alongside a team with a customer with the help of a subject matter expert and mentor professor. I really enjoyed being able to work with up-and-coming technology, as well.

Jeremy Shaver Middletown, PA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: After graduating in May, I will be commissioned as an Ensign in the U.S. Navy and will attend flight school in Pensacola, Florida. I hope to use the knowledge and skills I have acquired during my education at Virginia Tech later down the road after serving in the Navy.

CLASS COMMENT: Working with Steven Lee and Dr. Allen MacKenzie opened my eyes to many of the real-world problems and complicated issues electrical engineers strive to find solutions for and overcome. The experience gained from the class and the way it was structured was paramount in my technical and professional education and will shape the way I apply myself to future opportunities and employment outside the military.

Haozhe Zhang Qingdao, Shandong, China

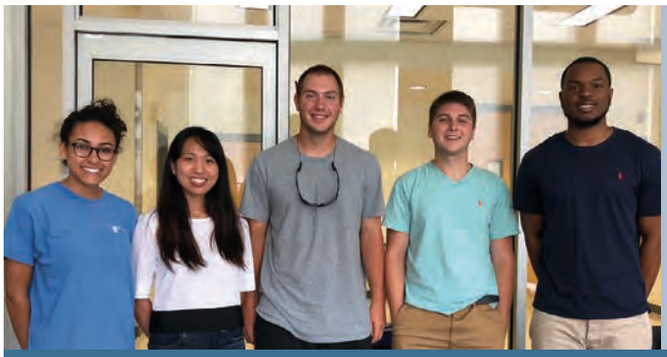
Bachelor of Science in Electrical Engineering

ASPIRATIONS: I want to improve my study skills to prepare for working in a team in the future. One day, I hope to become a real engineer.

CLASS COMMENT: As a member of the VTIT group, I trusted the other team members. It was really emphasized to me that group power is better than working on my own.

PROJECT SPONSORS: STEVEN LEE, JOHN KRALLMAN

SUBTRANSMISSION VOLTAGE DISTRIBUTION



CHALLENGE

Design a privately-owned 69-12.47 kV substation for an industrial facility to improve reliability, meet future load growth, and incorporate on-site renewable energy and cogeneration.

LEFT TO RIGHT: Natalia Marin, Ayoung Song, Ryan McVey, Nick Skoff, Jonathan Okafor | **SME:** Jaime De La Ree

Natalia Marin Alexandria, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: After graduation I will start a career at Alion as a power systems engineer. I hope to continue to get my M.S. and become a leader in my field.

CLASS COMMENT: I appreciate the professional experience provided by this class and the opportunity to work on a real-world problem applying what I learned in my classes at Virginia Tech.

Ryan McVey Purcellville, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I aspire to become a well-rounded electrical engineer in the field of power systems.

CLASS COMMENT: Unlike the traditional classroom experience, this class provides a unique opportunity to apply everything you've learned to an open-ended design problem. The class is fun yet challenging and teaches you valuable lessons about working on a real engineering team.

Jonathan Okafor II Woodbridge, VA

Master of Science in Electrical Engineering

ASPIRATIONS: Upon graduation, I will start my career with Mott MacDonald as an electrical engineer in their renewable energy sector. With experience in this field, I hope to implement these renewable energy technologies in developing countries around the world.

CLASS COMMENT: I valued the experience of being able to work with Wiley Wilson on a real-world problem with experienced professionals in the field of power systems.

Nick Skoff Chester, VA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: I would like to work in power system protection at an electric utility.

CLASS COMMENT: I appreciate the opportunity to work on a real engineering design problem where there is not one exact right answer.

Ayoung Song Suwanee, GA

Bachelor of Science in Electrical Engineering

ASPIRATIONS: My goal is to apply skills developed at Virginia Tech to industry and continuously strive to achieve more.

CLASS COMMENT: I appreciated the professional experience, where not only was I able to develop my technical skills, but also advance my interpersonal skills.

PROJECT SPONSORS: WALT MENDENHALL, STEVE BOWMAN, MARK ADKINSON, DAN MORTON

Wiley|Wilson® Constant Progress

We want to acknowledge and thank the many people who contributed to this program.

Luke Lester
for his vision and continued, unyielding support to make this class available for students.

Gino Manzo, Toby Meadows, & Ken Schulz
for being our Professors of Practice, working with sponsors, running the class, mentoring teams, and making the class better.

Greg Atkins
for managing the class website.

Mary Brewer, Nicole Gholston, Kimberly Johnston, JoAnna Lewis, Susan Broniak, Minerva Sanabria, Jamie De La Ree, Paul Plassmann, and Laura Villada
for setting up information sessions and guiding students into the class.

William Baumann and Bob Lineberry
for allowing us complete access to the design studio and conference room, and for providing assistance to students in need.

Karin Clark & Lisa Young
for being our partners and diligently working to secure us industry sponsorships.

Arthur Ball
for integrating the Master's students into our class and providing them ongoing guidance.

Kim Medley
for ordering our materials and helping us solve supplier issues.

Kathy Atkins & Melanie Gilmore
for providing financial guidance and support.

Roderick DeHart & Brandon Russell
for solving our many IT issues and printing the team posters.

Bianca Norton and the Virginia Tech Inn staff
for helping plan, cater, and secure all arrangements for this Poster Event.

Mohammad Al-Mamun & Amrita Chakraborty,
our teaching assistants specializing in semiconductor projects who provided excellent safety, tool, semiconductor processing, and mask design training.

Virginia Tech does not discriminate against employees, students, or applicants on the basis of age, color, disability, sex (including pregnancy), gender, gender identity, gender expression, genetic information, national origin, political affiliation, race, religion, sexual orientation, or veteran status, or otherwise discriminate against employees or applicants who inquire about, discuss, or disclose their compensation or the compensation of other employees or applicants, or on any other basis protected by law.

For inquiries regarding non-discrimination policies, contact the Office for Equity and Accessibility at 540-231-2010 or Virginia Tech, North End Center, Suite 2300 (0318), 300 Turner St. NW, Blacksburg, VA 24061.