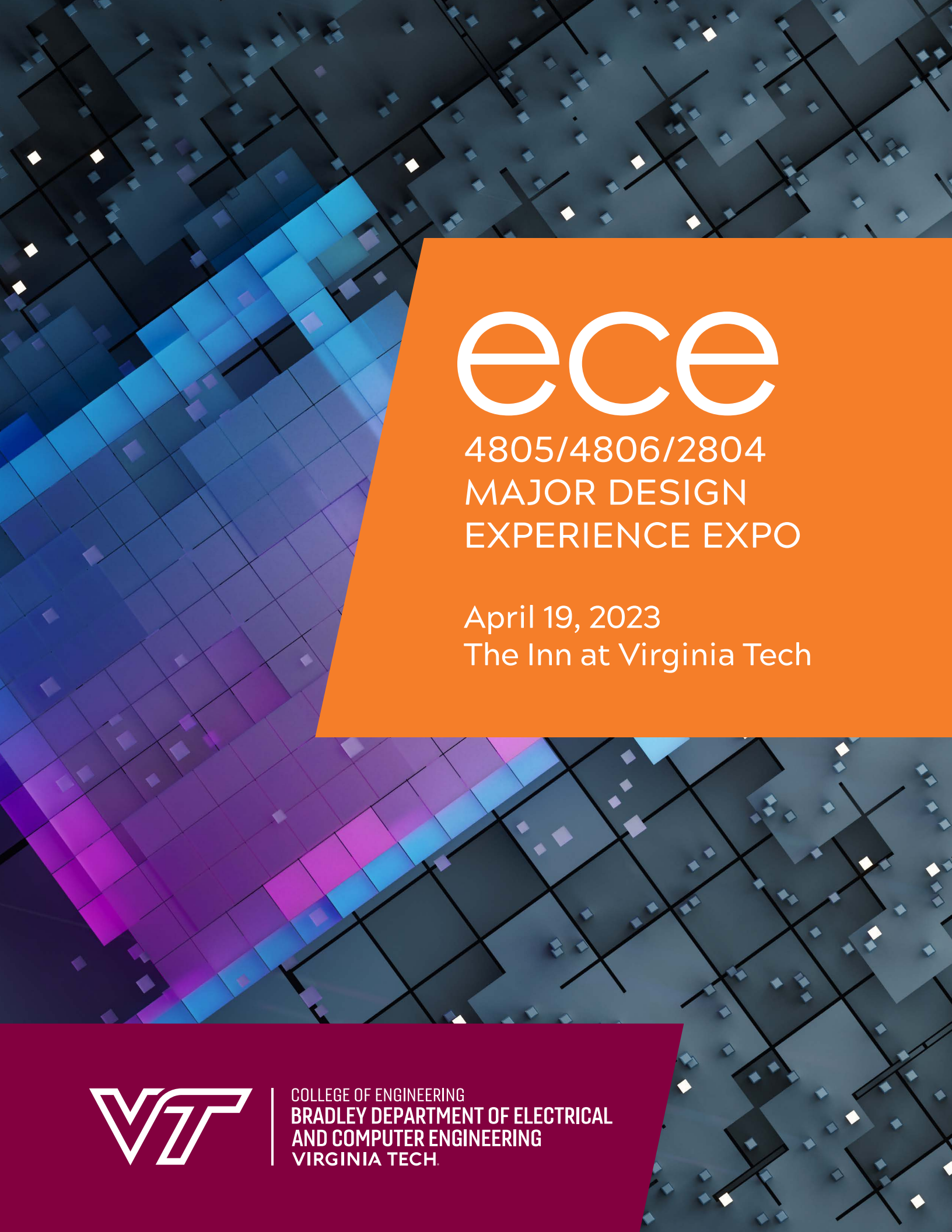


ece

4805/4806/2804 MAJOR DESIGN EXPERIENCE EXPO

April 19, 2023
The Inn at Virginia Tech

COLLEGE OF ENGINEERING
BRADLEY DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
VIRGINIA TECH

AGENDA

Registration	9–10 a.m.
Welcome	10:30 a.m.
Tracks	11:00 a.m.–12:45 p.m.
Posters and Pizza	12:45–2:15 p.m.
Awards	2:15–2:45 p.m.

PRESENTATION TRACKS

Track 1 - Drill Field | Judge: Janice Burr | Master of Ceremony: Toby Meadows | Tech Support: Alex DeRieux		
S23-01	X-Band Hybrid Beamforming: "Stingray"	pg. 14
S23-09	Wireless Sensor Platform	pg. 22
S23-16	5G mmWave Up/Down Converter FPGA Mezzanine Card	pg. 29
S23-17	5G mmWave Software Defined Radio Transmitter/Receiver	pg. 30
S23-43	Experimental Cellular Positioning System	pg. 56
S23-33	Personal Locator Beacon Team	pg. 46
Track 2 - Duck Pond | Judge: Mike Penzo | Master of Ceremony: Shelley Stover | Tech Support: Christopher Pham		
S23-04	Augmented Reality Surface Transit	pg. 17
S23-05	HDD & SSD Self Destruction Devices	pg. 18
S23-18	Safe Lock Hacking Device	pg. 31
S23-19	Sensor Fusion Trade Studies	pg. 32
S23-26	ATSDA	pg. 39
S23-36	OT Device Software Asset Extractor	pg. 49

The Major Design Experience (MDE) provides our emerging undergraduate engineers with the opportunity to apply the skills they've learned throughout their undergraduate courses, and build effective solutions to the betterment of society. This Spring 2023, we are proud to present our largest expo since the inception of MDE. These 221 students organized and worked together to tackle 43 different challenging projects. Each project focused on the design, build, test, and delivery of a real solution for a real customer. Twenty unique industry sponsors and four organizations from Virginia Tech have sponsored projects for this cohort. Each sponsor serves as the customer throughout the project lifecycle providing feedback and mentorship to the participating students.

Many of these students started their undergraduate education online and remotely. They have already persevered and demonstrated determination and grit—characteristics needed as engineers working in the field of ECE.

We could not have provided our students with these realistic project experiences without our 20 sponsoring companies, many of whom were dealing with their own challenges. Some of those sponsors supported multiple concurrent projects this term. Thank you to CPES, General Dynamics-Mission Systems, and VPT, Inc. for their overwhelming support of multiple team projects. I'd also like to thank our Virginia Tech directorates, departments, and research centers who supported just over 30 percent of our current projects.

Congratulations to each of our 221 students. Your dedication and diligence are evidenced throughout these 43 projects. On behalf of these students, and myself, thank you. It is because of you, our industry sponsors, our subject matter experts, and our MDE faculty that we are able to develop these students as our next generation of professional engineers.

Luke Lester
Roanoke Electric Steel Professor and Department Head
Bradley Department of Electrical and Computer Engineering

Welcome to the 2023 Spring Major Design Experience (MDE) Expo where our Electrical and Computer Engineering students are showcasing their engineering knowledge, skills, and abilities. We have 221 MDE students representing 43 project teams. This class of students started their first year of college in the context of COVID and they have already displayed resilience and adaptability within stressful situations. These students have persisted and demonstrated their readiness to rise to meet and address significant world challenges with high quality engineering results.

The main goal of the MDE program is to provide our ECE students a realistic engineering experience and to provide them a safe environment to grow and learn for their first engineering project as part of a design team. These students developed creative strategies to build, test, and deliver their projects. We hope you will take time to discuss the technical, planning, communications, business, and teamwork activities that underpin their results.

The MDE program would like to thank Luke Lester for his vision to establish the MDE program and for his continued support in every aspect of the program. Special thanks to the instructors and teaching assistants who make this all possible. Because of each of you, we are all better indeed!

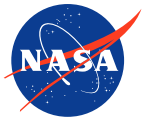
The students could not have adapted and delivered without the tireless efforts and support of our SMEs and more than 20 unique sponsor/customers. MDE is made possible with the dedicated support of our sponsors and subject matter experts whom we cannot thank enough. We, and our students, appreciate your commitment to encourage and facilitate our Virginia Tech ECE students as they prepare to make lasting contributions to society by engineering and delivering quality solutions to tackle our most important societal needs.

To our ECE students: We recognize that the MDE is not without its challenges, but you committed to the process and produced, mostly, exceptional results. You stand at the door to becoming our newest colleagues in our wonderous field of engineering, **WELCOME!** And as VT ECE Hokie engineers, be certain that you are ready to invent the future in the spirit of "Ut Prosim" (That I may serve)!

J. Scot Ransbottom
Director of Design Projects
Bradley Department of Electrical and Computer Engineering

SPONSORS

We greatly appreciate their support.


NASA


VIRGINIA
TECH


NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE


CPES
Center for Power Electronics Systems


PSIONIC


COLLEGE OF ENGINEERING
BRADLEY DEPARTMENT OF ELECTRICAL
AND COMPUTER ENGINEERING
VIRGINIA TECH


ROYCE GEO


VPT


SSAI


Wiley|Wilson
Constant Progress

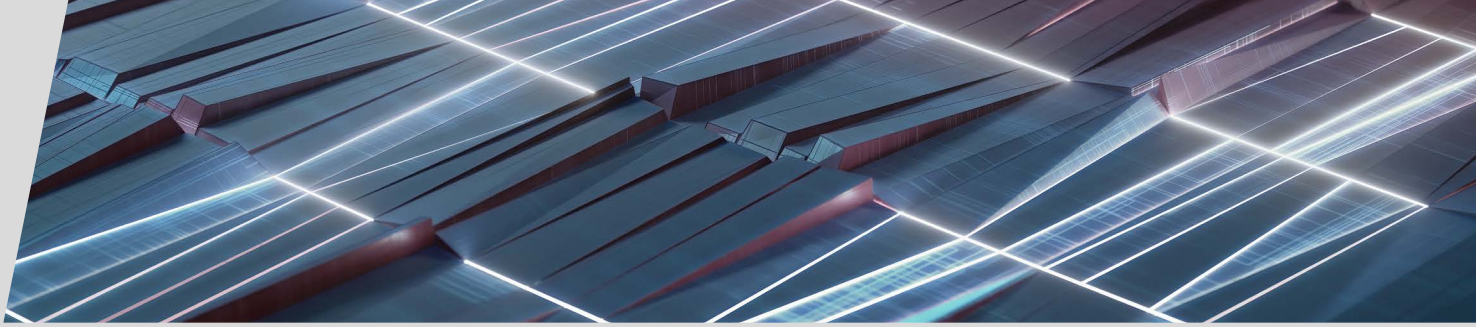

VIRGINIA
CYBER RANGE


ZETA
ASSOCIATES

Project Leadership

This class is only possible because of the commitment, dedication, and spirit of the following Customers and Subject Matter Experts. Thank you!

#	Sponsor	Customers	Project	Subject matter expert (SME)
S23-01	**Analog Devices, Greensboro, N.C.**	Michael Jones, Sam Ringwood	X-Band Hybrid Beamforming: "Stingray"	Jeffrey Walling
S23-02	**Micron Technology, Manassas, Va.**	Anil Chinthakindi, Marius Orlowski	Organic Electrodes For Flexible Electronic Devices	Amrita Chakraborty
S23-03	**Micron Technology, Manassas, Va.**	Anil Chinthakindi	Impact of Thermal Cross-talk on Bit Immunity	Marius Orlowski, Amrita Chakraborty
S23-04	**General Dynamics Mission Systems, Fairfax, Va.**	Ethan Brooks	Augmented Reality Surface Transit	Brad Tilley
S23-05	**General Dynamics Mission Systems, Fairfax, Va.**	John McDermott, Ethan Brooks	HDD & SSD Self Destruction Devices	Dean Smith, Ryan Gerdes
S23-06	**General Dynamics Mission Systems, Fairfax, Va.**	Ethan Brooks	AstroNav Celestial Navigation System	Steven Ellingson
S23-07	**NAVAIR, NAS Patuxent River, Md.**	Israel Jordan, Andrian Jordan	IEEE Robotics Machine Perception Team	Arthur Ball, Stephen Moyer
S23-08	**NAVAIR, NAS Patuxent River, Md.**	Israel Jordan, Andrian Jordan	IEEE SoutheastCon 2023 Hardware Competition Object Manipulation Team	Arthur Ball, Stephen Moyer
S23-09	**NAVAIR, MCAS Cherry Point, N.C.**	Casey Bui, Jason Klok, Bobby Terry	Wireless Sensor Platform	Alkan Soysal
S23-10	**Wiley Wilson, Lynchburg, Va.**	Gary Li, Dan Morton, Chuck Miedermayer, Mark Atkinson	Virginia Tech EV Charging Infrastructure	Kelley Dunning-Andrews
S23-11	**Virginia Tech ECE, Blacksburg, Va.**	Luke Lester	Lester Labs Automated Grading Service: Morgan Silver Dollar	Creed Jones
S23-12	**Virginia Tech ECE, Blacksburg, Va.**	Luke Lester	Lester Labs Automated Grading Service: Lincoln Head Cent	Creed Jones
S23-13	**Virginia Tech ECE, Blacksburg, Va.**	Luke Lester	Lester Labs Automated Grading Service: Indian Head Cent	Creed Jones, Jianzhu Chen
S23-14	**Virginia Tech ECE, Blacksburg, Va.**	Luke Lester	Photovoltaic Cells Fabrication	Rutwik Joshi, Amrita Chakraborty
S23-15	**Kronos Fusion Energy, Arlington, Va.**	Priyanca Ford, Michael Laughlin, Bobby Weggel, Carl Weggel	Kronos Fusion Fuel Simulator	Shelley Stover
S23-16	**Aspire and DEVCOM**	Jeffrey Walling	5G mmWave Up/Down Converter FPGA Mezzanine Card	Jeffrey Walling



#	Sponsor	Customers	Project	Subject matter expert (SME)
S23-17	**Aspire and DEVCOM**	Jeffrey Walling	5G mmWave Software Defined Radio Transmitter/Receiver	Jeffrey Walling
S23-18	**Virginia Cyber Range, Blacksburg, Va.**	David Raymond, Thomas Weeks	Safe Lock Hacking Device	Joe Adams, Thomas Weeks
S23-19	**Psionic, Hampton, Va.**	Rob Fleishauer, Jeff Monaco	Sensor Fusion Trade Studies	Shelley Stover, Nektaria Tryfona
S23-20	**NASA Langley & SSAI, Hampton, Va.**	Jeryl Hill, Jacqueline Kendall	Extendable Mast Gimbal Controller for NASA Artemis Solar Arrays	Carl Mills
S23-21	**NASA Goddard & SSAI, Greenbelt, Md.**	Christopher Green, Jackie Kendall, Brandon Smith, Makhan Virdi	NASA SSAI Machine Learning Whistler Detection	Chris Wyatt
S23-22	**Montgomery County Public Schools**	Valerie Ransbottom	A Vision for Christiansburg Middle School Auditorium	Kelley Andrews, Araoz Gustavo
S23-23	**Montgomery County Public Schools**	Valerie Ransbottom	Automated Stage Lighting System	Gustavo Araoz
S23-24	**VPT, Inc., Blacksburg, Va.**	Dan Sable	Magnetic Levitation Team 1	Campbell Lowe
S23-25	**VPT, Inc., Blacksburg, Va.**	Dan Sable	Magnetic Levitation of a Permanent Magnet Object with Analog and Digital Systems	Strehle Mattew
S23-26	**VPT, Inc., Blacksburg, Va.**	Michael Lin	ATSDA	Paul Plassman
S23-27	**Virginia Tech CPES, Blacksburg, Va.**	Yuhao Zhang	GaN FET Semiconductor Wafer Characterization and Analysis	Yifan Wang, Qihao Song, Ming Xiao
S23-28	**Virginia Tech CPES, Blacksburg, Va.**	Dong Dong	Planar High-Power Density Transformers: Analysis and Fabrication	Shelley Stover, Nektaria Tryfona
S23-29	**Virginia Tech CPES, Blacksburg, Va.**	Eric Hsieh, Qiang Li	Tool for Power Converter	Eric Hsieh, Adhistria Naradhipa
S23-30	**Virginia Tech CPES, Blacksburg, Va.**	Dushan Boroyevich	Embedded Wireless Human Machine Interface for Monitoring and Controlling Power Electronics Building Blocks	Vladimir Mitrovic
S23-31	**Lockheed Martin Company, Fort Worth, Texas**	Tony Keith	ECE/NOAA - Fault Detection for Autonomous Underwater Vehicle	Dan Stilwell

#	Sponsor	Customers	Project	Subject matter expert (SME)
S23-32	**Virginia Tech ECE, Blacksburg, Va.**	David Gray	ThermoFlyAi	Joe Adams, David Gray
S23-33	**Zeta Associates, Fairfax, Va.**	Jared Desai, Michael Drescher, Nic Rohr	Personal Locator Beacon Team	Thomas Krauss
S23-34	**Virginia Tech ECE, Blacksburg, Va.**	Jaime De la Ree	Heartbeat Collection & Classification System	Jaime De La Ree
S23-35	**Dominion Energy, Richmond, Va.**	Matthew Gardner	Solar Compute Migration	Jaime De La Ree
S23-36	**FoxGuard Solutions, Christiansburg, Va.**	Colin Grant	OT Device Software Asset Extractor	Joe Adams, Colin Grant
S23-37	**FoxGuard Solutions, Christiansburg, Va.**	Colin Grant	FPGA Network Clamping Device	Jason Thweatt, Joe Adams
S23-38	**Commonwealth Edison, Chicago, Ill.**	Akansha Jain	Stacked Benefits of Battery Energy Storage System	Scott Dunning
S23-39	**Energix Renewables, Arlington, Va.**	Luke Henry	Sustainable Optimization for Agrivoltaic Power	Kelley Andrews
S23-40	**Royce Geo, Arlington, Va.**	Adam Estrada, Nick Thompson	Automated Target Recognition System	Joe Adams, Tim Talty
S23-41	**BetaPrime Consulting, Inc., Reston, Va.**	Jonathan Ballagh, Neil Steiner	Project Hermes — Wireless Mesh Network for Herd Tracking	Cameron Patterson
S23-42	**NAVAIR, MCAS Cherry Point, N.C.**	Turney Gregory, Dylan Gooch, Daniel Moran	Data Acquisition Device	Peter Han
S23-43	**Virginia Tech ECE, Blacksburg, Va.**	Carl Dietrich	Experimental Cellular Positioning System	Carl Dietrich

Guest speakers

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

Shelley Stover

Communications

Sal Bezos, Mark Mondry, and Corwin Warner

Innovation and Intellectual Property Management.

PROJECT TEAMS

X-Band Hybrid Beamforming: "Stingray"

S23-01

LEFT TO RIGHT: Sreevathsa Giridhar, Ian Brown, Yichen Xu, Zhizhou He, Eddie Avalos
SME: Jeffrey Walling

CHALLENGE

Configure a time-division duplexing radar and add radar pulse customization capabilities of X-Band Hybrid Beamforming Phased Array Development Platform developed by Analog Devices Inc. These pulse customization capabilities will give the user the ability to alter pulse width (PRI), duty cycle, and pulse repetition frequency (PRF) of X-Band radar pulses produced by the system.

Eddie Avalos Springfield, Va.

Bachelor of Science in Electrical Engineering
Space Systems

Aspirations: After graduation I will commission into the United States Air Force as a Developmental Engineering Officer and be stationed in AFRL Rome Lab, Rome, N.Y.

Course Comment: I was able to explore my interests in a professional team environment. I gained knowledge and experience in RF radar systems in conjunction with microcontrollers.

Ian Brown Cabin John, Md.

Bachelor of Science in Electrical Engineering
Communications & Networking

Aspirations: After graduation I will pursue a Master of Engineering in Electrical Engineering at Virginia Tech. My career goal is to be a digital signal processing engineer.

Course Comment: This course gave me hands-on experience with circuit design and troubleshooting, as well as experience with formal presentations in a professional setting.

Sreevathsa Giridhar Doha, Qatar

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My aspiration is to become a Machine Learning Engineer.

Course Comment: The major design experience was a great opportunity to interact with an industry client and work in a collaborative team environment, which will prepare me for my career.

Zhizhou He Guangdong, China

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: After graduation I will work towards a Master of Science degree. My career goal is to become an embedded software engineer or software development engineer.

Course Comment: This course gave me experience with RF radar systems, signal processing, and debugging. I also gained experience working with others as a team.

Yichen Xu ZunYi, China

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: My career goal is to research projects related to digital design or analog circuits. I also want to research chip design.

Course Comment: This class gave me a chance to study how radar works. While researching MATLAB code used for radar systems, I learned about the mathematical model of radar signal processing.

CUSTOMERS: SAM RINGWOOD, MIKE JONES

ANALOG DEVICES
AHEAD OF WHAT'S POSSIBLE™

Organic Electrodes for Flexible Electronic Devices

S23-02

LEFT TO RIGHT: Calvin Hong, Anshu Madwesh, Aaron DiFilippo, Sheena Deivasigamani
SME: Amrita Chakraborty

CHALLENGE

Create an organic top electrode that can be used for flexible ReRAM cells in place of a conventional metal electrode. This is done by using a conductive organic polymer, PEDOT:PSS, and improving upon its conductivity through various enhancement procedures.

Sheena Deivasigamani Sharjah, UAE

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I want to get a master's degree with a focus on digital design and get a job in the semiconductor industry.

Course Comment: I came to understand the detail and effort required to complete a project in industry. I also worked in the cleanroom, which is one of the more valuable experiences I've had at Virginia Tech.

Aaron DiFilippo Spotsylvania, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I plan on going into the semiconductor/digital design field to develop ASICs and FPGAs.

Course Comment: The course has allowed me to better hone my skills in engineering professionalism and industry standards. The hands-on lab work is an experience I am grateful for.

Calvin Hong Centreville, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I hope to complete a masters in the digital design area, focusing on memory, and get a job in the semiconductor industry working with memory.

Course Comment: This course gave me a better understanding of how to solve open-ended problems, and has given me skills in prioritizing. It has also given me lab skills, which is a different environment.

Anshu Madwesh Roswell, Ga.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I hope to pursue a career in computer chip design in the semiconductor industry.

Course Comment: This course gave me a better understanding of how to solve open-ended problems. The hands-on experience working in the cleanroom was very valuable.

CUSTOMERS: ANIL CHINTHAKINDI, MARIUS ORLOWSKI

Impact of Thermal Cross-Talk on Bit Immunity

S23-03

LEFT TO RIGHT: Yilin Liu, Risa Philpott, Faaria Syed, Lucy Le, Michael Wallace
SME: Marius Orlowski, Amrita Chakraborty

CHALLENGE

Design and execute an experimental data acquisition methodology to observe and alter memory cells in Re-RAM arrays for investigating thermal cross-talk's impact on the reliability of a heated, neighboring cell. The proposed approach aims to create a structured framework for conducting research on ReRAM cells more efficiently and effectively.

Lucy Le Williamsburg, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: I strive to be the best version of myself as an engineer. I would like to go into a career where I utilize my creativity, passions, and ongoing potential to help advance technology.

Course Comment: I am very fortunate to have this collaborative experience. I was able to utilize my communication and team bonding skills to effectively perform project tasks. This was a great experience.

Yilin Liu Wuxi, China

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I aim to contribute to advanced memory technologies that have the potential to revolutionize computing, with my foundation in electrical engineering and passion for research.

Course Comment: This class provided practical, hands-on opportunities to solve real-world engineering problems. The problem-solving skills and collaboration have prepared me for future challenges.

Risa Philpott Rocky Mount, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My objective is to have a fulfilling career in my engineering focus area: hardware digital design and software systems.

Course Comment: This research opportunity has reinforced a valuable mindset: just because something has always been one way, doesn't mean it should stay that way.

Faaria Syed Centreville, Va.

Bachelor of Science and Master of Engineering in Computer Engineering
Computer Engineering (general)

Aspirations: I aspire to use quantum computing to enhance AI systems, driving the field of artificial intelligence and machine learning towards unprecedented advancements.

Course Comment: I gained valuable skills in communication, teamwork, and relationship-building, while working on a hands-on project that provided me with practical experience.

Michael Wallace Apex, N.C.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: My goal is to achieve a career helping solve unique and interesting problems using my degree in chip-scale integration.

Course Comment: This class was helpful for improving my ability to collaborate and work as part of a team.

CUSTOMERS: ANIL CHINTHAKINDI

Augmented Reality Surface Transit

S23-04

LEFT TO RIGHT: Burke Butler, Brian Swogger, Kevin Lizarazu-Ampuero, Nathan Williams, Danny Faruqi, and James Lin
SME: Brad Tilley

CHALLENGE

Create a program to navigate the user around the Virginia Tech campus. This program is for an augmented reality (AR) headset that places a navigation path with a range of 50 ft with corners marked to guide the user to their destination, while identifying hazards and places of interest.

Burke Butler Chesterfield, Va.

Bachelor of Science in Computer Engineering
Software Systems and Machine Learning

Aspirations: My career goal is to be a full stack developer at a project consulting firm.

Course Comment: This course has been a great introduction into what working on a long-term team project is like.

Danny Faruqi Arlington, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My career goal is becoming a full time developer for mixed reality experiences.

Course Comment: Taking this course has given me the opportunity to apply my skills to a longet-term, more multifaceted project than I've done in the past, which is a great experience to have.

James Lin Falls Church, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to work as a low level software engineer in the operating system or embedded system fields, which are important in all aspects of how people use devices today.

Course Comment: Taking this course gave me the opportunity to design something from just a product description, with a group of people with different skills. It is a good look into industry work.

Kevin Lizarazu-Ampuero Arlington, Va.

Bachelor of Science in Computer Engineering
Software Systems and Machine Learning

Aspirations: I want to work as a software engineer to harness the power of machine learning and AI to create new products, making a positive impact for present and future generations.

Course Comment: This course gave me the opportunity to embark on a year-long project that gave me personal experiences working on a fast-paced team and communicating with sponsors and stakeholders.

Brian Swogger Chesapeake, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My career goal is designing hardware for virtual reality (VR).

Course Comment: This course is a good look into what working on an actual design team is like.

Nathanial Williams Leesburg, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My career goal is to work on a project as an Electrical Engineer in a company that will be working on technology that will change a large aspect of our daily life.

Course Comment: The course is a good way to experience a challenging project in a team setting, with sponsor companies and a support team as well.

CUSTOMERS: ETHAN BROOKS

GENERAL DYNAMICS
Mission Systems

HDD & SSD Self Destruction Devices

S23-05

LEFT TO RIGHT: Qi Wang, Esther Boachie, Alexander Summerton, Brian Sullivan, William Moore, Ryan Phillips
SME: Dean Smith, Ryan Gerdes

CHALLENGE

Provide autonomous systems with self-contained modules for quick destruction of onboard storage media such as hard disk drives (HDDs) and solid state drives (SSDs) by developing two systems to exploit electromagnetic principles. This uses a degaussing coil sufficient to overcome the coercivity rating of the magnetic media to sanitize magnetic media such as HDDs, and an electromagnetic pulse generator to sanitize flash memory media such as SSDs.

Esther Boachie Hampton, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I desire to deepen my knowledge in software creation and data analytics as a computer engineer, designing solutions to meet the engineering challenges of the 21st century.

Course Comment: This course has provided a valuable opportunity to collaborate with an engineering team to achieve a shared goal and hone my technical skill set through a real-world project.

William Moore Winchester, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: To one day lead a project that has some kind of positive and lasting effect—something I can point to and be proud to be a part of.

Course Comment: There is a lot of communicating that needs to happen, internal and external. Our group had a clear progression in the quality of that communication which was very cool to witness.

Ryan Phillips Fairfax, Va.

Bachelor of Science in Computer Engineering
and Bachelor of Science in Computer Science
Networking & Cybersecurity and Secure Computing

Aspirations: Get a well paying and satisfying career.

Course Comment: It was interesting to actually take on a large scale project and work in a team setting.

Brian Sullivan Purcellville, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: To pursue the project management side of engineering, starting with software and then being able to cover a wide variety of engineering fields.

Course Comment: The course gave me a better understanding of working on a larger engineering project team, along with the challenges that come with it.

Alexander Summerton Silver Creek, N.Y.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I want to develop customer solutions for scalable automation utilizing both my hardware and software knowledge.

Course Comment: I enjoyed working with a diverse team on a project that gave me a new understanding of electromagnetic principles and their interaction with storage hardware.

Qi Wang Xiangtan, Hunan

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I hope to live a full life every day.

Course Comment: This course allowed me to apply a lot of what I learned in the department, and demonstrated the importance of teamwork.

CUSTOMERS: JOHN MCDERMOTT, ETHAN BROOKS

GENERAL DYNAMICS
Mission Systems

AstroNav Celestial Navigation System

S23-06

LEFT TO RIGHT: Evan Allen, John LaPore, Sayf Eldomiaty, Brennan Olds, Joshua Lawrence, Eddie Gustin
SME: Steven Ellingson

CHALLENGE

Build a system that uses celestial navigation to determine its location within 1.5 NM to help people find their way if GPS is unavailable. We combined a camera, tripod, and orientation sensor to create a system that allows users to simply take pictures of the night sky and find their coordinates.

Evan Allen Virginia Beach, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My career goal is to become a cybersecurity professional and research new ways to protect people from hackers, especially in safety-critical settings like vehicles.

Course Comment: This project was an incredible experience. I learned how to work on a real project with a real customer in a domain I previously knew nothing about.

Sayf Eldomiaty Burnsville, Minn.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: Develop my professional career in machine learning and artificial intelligence by working on interesting engineering applications in fields such as signal processing or communications.

Course Comment: MDE Gave me valuable hands-on experience in planning, designing and managing a real life engineering project.

Edward Gustin Norfolk, Va.

Bachelor of Science in Computer Engineering
and Bachelor of Science in Computer Science
Networking & Cybersecurity and Software Systems

Aspirations: To work in software engineering or computer science with a dynamic company, and to continuously refine my skills and abilities in a team-oriented environment.

Course Comment: The experts and mentors were knowledgeable and supportive, and the project provided experience in teamwork, communication, and project management.

John LaPore Tampa, Fla.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I would like to stay current in the industry during my military service in order to ensure a smooth transition to civilian life, and pursue a career as a cybersecurity professional.

Course Comment: The educational experience of how real engineering is done was very interesting to me. Building our project to satisfy the needs of our customer felt like a real accomplishment.

Joshua Lawrence Newport News, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: My aspiration is to continue down the inspiring path of being a Computer Engineer, and hopefully find ways to enjoy every step.

Course Comment: Throughout this course I've learned a lot about long-term project planning, allocating resources over the lifespan of the development, and interacting with customers.

Brennan Olds Ellicott City, Md.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My career goal is to become a software engineer so that I can continue learning about machine learning and artificial intelligence applications.

Course Comment: This course provided a valuable experience. It taught me how to manage a long term project from start to finish, and allowed me to work with a team in a new capacity.

CUSTOMERS: ETHAN BROOKS

GENERAL DYNAMICS
Mission Systems

IEEE Robotics Machine Perception Team

S23-07

LEFT TO RIGHT: Top row: Juan Suquilanda, Jay Schramm, Araceli Cabrera-Ortuno, Pradyuman Mehta
Bottom row: Azam Shoaib, Ronuk Mohapatra, Devangini Talwar, Jhonny Velasquez
SME: Arthur Ball, Stephen Moyer

CHALLENGE

Design the software architecture and algorithms of Virginia Tech's robot that will compete in the 2023 IEEE SoutheastCon Hardware Competition. Algorithms include object detection, object targeting, navigation, object sorting, low level sensing, and localization.

Araceli Cabrera-Ortuno Annandale, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity
Aspirations: I want to work in the computer security industry and possibly get into academia.
Course Comment: This course has helped me learn more about robotics and working in a team environment.

Pradyuman Mehta New Delhi, India

Bachelor of Science in Computer Engineering
with a focus in Machine Learning and Cybersecurity
Aspirations: I eventually want to start my own company in the tech industry.
Course Comment: This course has given me more industry exposure and practical experience than any other.

Ronuk Mohapatra Fairfax, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy
Aspirations: I want to be the leader of my own startup company one day.
Course Comment: This class enhanced my technical, presentation, and leadership skills as well as gave valuable insight into how work is done in a professional workplace setting.

Jay Schramm Gaithersburg, Md.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy
Aspirations: I want to learn more about robotics and its applications.
Course Comment: This course has helped me learn and work in a team environment similar to what I'll find in industry.

Azam Shoaib Woodbridge, Va.

Bachelor of Science in Computer Engineering
Software Systems
Aspirations: I want to create software that improves human life.
Course Comment: This course has helped me learn many aspects of being part of a team.

Juan Suquilanda East Windosr, N.J.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy
Aspirations: Travel and gain new experience abroad.
Course Comment: I learned how leveraging resources efficiently can contribute to a team's success.

Devangini Talwar Atlanta, Ga.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity
Aspirations: Be successful, content, and traveling in whatever I do.
Course Comment: This course has helped enhance and broaden my knowledge related to robotics and the industry.

Jhonny Velasquez Woodbridge, Va.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy
Aspirations: I aim to continue my education through graduate studies, focusing on a career as a research scientist in AI/ML. My goal is to contribute to technologies that have a positive impact on society.
Course Comment: The senior design course has taught me the value of working as a team while facing the challenges of designing and building a solution to an engineering problem.

CUSTOMERS: ISRAEL JORDAN, ANDRIAN JORDAN

NAVAIR

IEEE SoutheastCon 2023 Hardware Competition Object Manipulation Team

S23-08

LEFT TO RIGHT: Top Row: Yussef Ait-Bella, Lauren Chuderewicz, Jimmy Ewin
Bottom Row: Lifan Ren, John Fiorini, Tran Thanh
SME: Arthur Ball, Stephen Moyer

CHALLENGE

Design a mechanum drivetrain, power systems, and sensor integration for the SoutheastCon 2023 Hardware Competition requires an autonomous robot to interact with several unique game objects on a dedicated game board and complete various game tasks to earn points in a limited time. We have also designed a multi-system strategy for collecting, sorting, and stacking game pedestals using a robotic arm and carousel sorting mechanism. Everything adheres to the dimension requirements and keeps the robot operating smoothly.

Yussef Ait-Bella Stafford, Va.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: My aspiration in life is to travel the world and connect with people of various backgrounds and use my technical experiences to help those in need.

Course Comment: I was exposed to challenges ranging from mechanical design to project management. It was an elaborate learning experience and a great transition into the real world!

Lauren Chuderewicz Virginia Beach, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I plan to pursue a career working with robotics and autonomous vehicles to improve the safety and reliability of these systems.

Course Comment: This course has helped me develop my collaboration skills and apply the knowledge I have gained from other courses to solve an engineering problem.

John Fiorini Basking Ridge, N.J.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: My aspiration is to explore the intersection of music, electronics, and software. I want to create innovative technologies that help people create, connect, and explore.

Course Comment: Senior Design taught me more about how to collaboratively lead a team and facilitate effective communication. It also improved my design skills and knowledge of robotic systems.

Jimmy Ewin Round Hill, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: My aspiration is to use my education to solve impactful, challenging engineering problems.

Course Comment: This course gave me the experience of working on a large engineering team to deliver a product to a customer.

Lifan Ren Ningbo, China

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: I tried to "escape" from robotics, and ended up doing more robotics.

Course Comment: This class introduced an additional challenge by hosting an interdisciplinary project within just the ECE department.

Tran Thanh Ho Chi Minh City, Vietnam

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

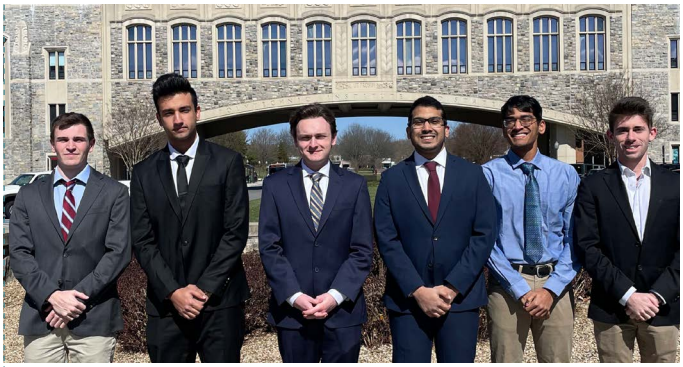
Aspirations: I want to build a huge mecha one day.

Course Comment: This course helped me to work collaboratively with others towards a shared goal; enhanced my communication, leadership, and problem-solving abilities; and honed my engineering skills.

CUSTOMERS: ISRAEL JORDAN, ANDRIAN JORDAN

Wireless Sensor Platform

S23-09



LEFT TO RIGHT: Tyler McCulloch, Arshia Zolghadr, Ethan Dingus, Preetham Kyanam, Arjun Nachiappan, Thomas Ramos
SME: Alkan Soysal

CHALLENGE

Design a portable, real-time wireless sensor platform capable of monitoring temperature and vibration sensor readings anywhere within the fleet of H53-E helicopters. The platform must transmit data wirelessly once every second to the ground station at a distance of 20 feet or more. The ground station can access and analyze the sensor data using a custom GUI that displays both past and real-time data.

Ethan Dingus Bristol, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: My aspiration is to work within the IT field for a large established industrial company and eventually move into software engineering.

Course Comment: Senior design has been a valuable learning experience, taking a year long project from design to completion.

Preetham Kyanam Ashburn, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: My aspirations involve gaining experience in both hardware and software, and ultimately developing my own AI solutions to address real-world problems in Computer Vision.

Course Comment: I developed skills working with embedded hardware and developing software. I also got experience collaborating with my teammate to combine our strengths.

Tyler McCulloch Bristow, Va.

Bachelor of Science in Electrical Engineering
Communications and Networking

Aspirations: I want to create schematics and design custom PCBs to solve unique problems. I would eventually like to design cutting edge communication systems.

Course Comment: Senior design taught me how to establish effective communication between a team of engineers and a customer, and how to concisely present schematics and PCB layouts during design reviews.

Arjun Nachiappan Chantilly, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My career aspiration is to become an integral software engineer on a large project, where I'd oversee the development of software systems.

Course Comment: Senior design has shown me that creating a schedule and being timely is very important, especially when it comes to large projects. Communication and planning are important.

Thomas Ramos Purcellville, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My aspiration is to work as a computer engineer, with the goal of possibly branching more into software and video game design as my career progresses.

Course Comment: Senior design has prepared me for my future as a computer engineer, incorporating skills in teamwork, time management, and summarizing project work in a digestible way.

Arshia Zolghadr Falls Church, Va.

Bachelor of Science in Electrical Engineering
and Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy and Networking
& Cybersecurity

Aspirations: I want to design and develop technology in communication networks and medical applications to enhance quality of life for everyone.

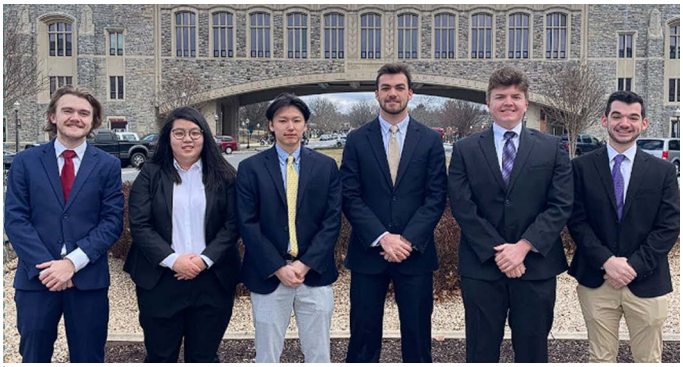
Course Comment: I learned how to apply theoretical concepts to real-world problems; design systems that are efficient, reliable, and cost-effective; collaborate; communicate; and manage my time.

CUSTOMERS: JASON KLOK, LILY KAMPHASOOK

NAVAIR

Virginia Tech EV Charging Infrastructure

S23-10



LEFT TO RIGHT: Billy French, Ramida Theeravachirakul, Jeffrey Kedda, Charles Rabena, Chris Albrecht, Jonathan Perry
SME: Kelley Dunning-Andrews

CHALLENGE

Analyze and meet the current and future needs for EV chargers on Virginia Tech's campus and deliver a full report on present and future EV charger technology, general selection of charger prototypes, load flow studies to quantify required infrastructure changes, site plans, and cost estimates for multiple locations on campus. This report feeds into Virginia Tech's Climate Action Commitment on their path to carbon neutrality by 2030.

Chris Albrecht Fairfax, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My goals include refining my abilities as a software developer and engineer in the areas that pique my interest, and eventually guide and supervise others as a project manager.
Course Comment: This course reinforced topics that I had previously learned during my internships, thus better preparing me for my transition into the professional world.

Billy French Red House, Va.

Bachelor of Science in Electrical Engineering
Space Systems

Aspirations: My goal is to be an electrical engineer at a company specializing in developing satellites or launch vehicles. I hope to be an integral contributor to a major satellite/telescope launch.
Course Comment: This class provides a fantastic opportunity to gain experience working with industry professionals to solve tough, current problems. I particularly benefited from learning how to use PSSE to simulate power grids and test for faults in networks.

Jeffrey Kedda Vienna, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: My career goal is to be a software developer at a company specializing in virtual reality.
Course Comment: I appreciate the hands-on industry experience in communicating and working with a customer's needs and improvements to the overall project.

Jonathan Perry Tinton Falls, N.J.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I want to be able to combine my skills learned in both CPE and EE to work at a large scale power transmission company.
Course Comment: Along with software-aided Power System simulation and analysis, this course has shown me the importance of structure and communication when working with an engineering team.

Charles Rabena Ashburn, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: To work in software development.
Course Comment: MDE has given me a great insight on working closely with a team of engineers on a long term project.

Ramida Theeravachirakul Bangkok, Thailand

Bachelor of Science in Computer Engineering
Computer Engineering (general)

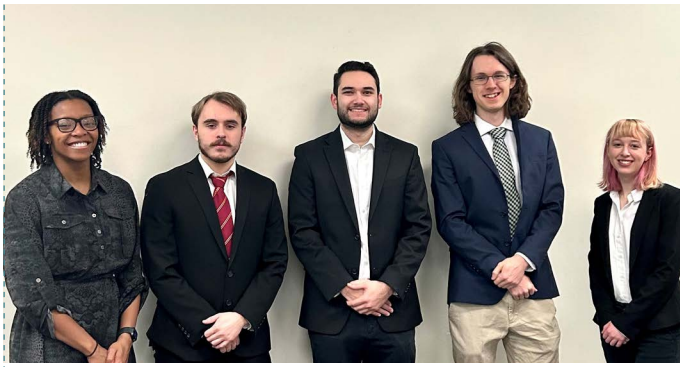
Aspirations: I want to study at the graduate level and work for a cybersecurity or AI company. Ultimately, I want to build a cybersecurity startup company in my home country.
Course Comment: This course gave me a chance to work as a team and work with a real company. I learned to manage my time wisely to handle both meetings and work.

CUSTOMERS: GARY LI, DAN MORTON, CHUCK MIEDERMAYER, MARK ATKINSON

Wiley|Wilson® Constant Progress

Lester Labs Automated Grading Service: Morgan Silver Dollar

S23-11



LEFT TO RIGHT: Zymmorrah Myers, Philip Johnson, Matthew Donlon, Jasper Emick, Lizzie LaVallee
SME: Creed Jones

CHALLENGE

Create a machine learning algorithm that uses image processing techniques to obtain features for grading Morgan Silver Dollar collectible coins on the Sheldon Scale. Also create a web page where the user can input images of their coin and receive a Sheldon Scale grade along with additional information about the coin, and a database of coins to train the machine learning algorithm on.

Matthew Donlon Freehold, N.J.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I hope to develop my own software that I can eventually turn into a business and sell.

Course Comment: This course was helpful in showing our team what it is like to work on an industry project. This is by far the largest project I have ever worked on.

Jasper Emick Roanoke, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: My goal is to continue developing my skills in the AI and machine learning fields so that I can bring about technological advances.

Course Comment: From taking this course I've gained a lot of experience with how to handle working in a team over a long period of time. I've gained greater confidence in my own abilities.

Philip Johnson Gaithersburg, Md.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My goal is to help developments in space travel technology to one day help people set foot on Mars.

Course Comment: This course taught me how to work on a team in an engineering setting. This project taught us determination and perseverance.

Lizzie LaVallee Denville, N.J.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I want to have a career in software where I can utilize the many different skills I have learned working on a variety of projects during my time at Virginia Tech.

Course Comment: I enjoyed working with my peers from different ECE disciplines on a project we were able to develop using an industry-like process.

Zymmorrah Myers Chesapeake, Va.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: My goal is to have a career in the United States Air Force Cyber Department where I can learn and grow and one day be a part of something great.

Course Comment: I appreciate this course and how it incorporates teamwork on a real world level. This has helped us all to understand what is important for an engineering team.

CUSTOMERS: LUKE LESTER

Lester Labs Automated Grading Service: Lincoln Head Cent

S23-12

LEFT TO RIGHT: Nate Kliewer, Mason Zeo, Anthony LaConte, Nicholas Mason, Seth Cooper, David Peterson
SME: Creed Jones

CHALLENGE

Develop and implement state-of-the-art image processing and machine learning techniques for grading Lincoln Head Cent coins. The project resulted in a web-hosted application that accurately and efficiently identifies the color, toning, and condition of these coins based on professional evaluations from major coin grading services.

Seth Cooper Chesapeake, Va.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: After graduation, I look forward to applying my skills as an electrical engineer in meaningful and fulfilling ways.

Course Comment: This class has given me an opportunity to learn effective strategies and communication skills to facilitate a long-term project, in addition to Python and collaborative coding using Git.

Nate Kliewer Earlysville, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to continue learning and growing as an engineer to be able to provide solutions to the challenging problems of the world today and in the future.

Course Comment: Major Design Experience gave me the opportunity to work on an interesting challenge with a group of talented people, and be led by knowledgeable and experienced mentors.

Anthony LaConte Roanoke, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: After graduation, I will finish my Masters in Computer Science here at Virginia Tech. I then hope to apply the skills I have learned to improve technology and have a positive impact.

Course Comment: This class allowed us to focus on a real-world problem. I learned a lot about working with teammates, creating a codebase that builds upon itself, and communicating results.

Nicholas Mason Alexandria, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I aspire to develop skills working with embedded systems and to utilize these skills to retain an in demand job that prevents me from having to worry about remaining employed.

Course Comment: My Major Design Experience allowed me to develop useful skills, including working with customers without an engineering background, leadership, communication, and project planning.

David Peterson Malvern, Pa.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I aspire to apply my skills and knowledge as a cybersecurity engineer, with the goal of eventually starting my own business in the private cybersecurity sector.

Course Comment: I expanded and honed my skills as this course pushed me to surpass my expectations and achieve my goals, providing insight into the project development cycle.

Mason Zeo Philadelphia, Pa.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My aspirations are to help solve society's biggest problems through technology and communication, in a way that is both scalable and sustainable.

Course Comment: This class provided experience with being managed as a team and communicating with superiors, along with becoming comfortable with real-world workflow and documentation.

CUSTOMERS: LUKE LESTER

Lester Labs Automated Grading Service: Indian Head Cent

S23-13

LEFT TO RIGHT: Tucker Ward, Jonathan Tyler, Adam Pratte, Vedant Patel, Milind Gupta, Rojo Ramiandrisoa
SME: Creed Jones, Jianzhu Chen

CHALLENGE

Develop image processing and machine learning techniques to classify U.S. Indian Head Cents (1859-1909) by their color, toning, and condition. The goal is to maintain and curate a database of coin images from public sources such as David Lawrence Rare Coins (DLRC), and the output will provide a score for the coin's color, toning, and condition. The goal of this project is to reduce reliance on human factors for coin classification and grading using the Sheldon Scale.

Milind Gupta Muzaffarnagar, India

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: My long-term career goal is to become a leader in the field of technology management and to contribute to the development of innovative solutions that will improve lives.

Course Comment: This course gave me industry experience involving working with a customer, leading the project from ideation to product delivery, and collaborating with team members with diverse skills.

Vedant Patel Rajkot, Gujarat, India

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: My career aspirations are to work on groundbreaking projects that aid the development of humankind, and later become an entrepreneur—creating solutions to meaningful problems.

Course Comment: This course has given me industry experience working directly with a customer to provide a robust product. The most important parts were brainstorming and working with the product life cycle.

Adam Pratte Stafford, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I hope to apply the image processing and machine learning skills that I've developed during this project in a career in software engineering.

Course Comment: This course gave me an appreciation for the Requirements Analysis portion of the project lifecycle. Dedicating time to establishing concrete goals and workflows really pays off.

Rojo Ramiandrisoa Annandale, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I want to pursue a career in Software Engineering or a related field. I look forward to creating ideas and products that help solve real world problems.

Course Comment: This is a class where we have to apply what we've learned throughout our academic career. It's enjoyable knowing that we are making a product that could potentially be used commercially.

Jonathan Tyler Henrico, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I intend to pursue a career in machine learning applications for artificial intelligence, and am interested to see how some of my experience with this project can help shape my growth.

Course Comment: This course was very beneficial in helping me experience a full product lifecycle including the design, production, development, and testing.

Tucker Ward Chester, N.J.

Bachelor of Science in Electrical Engineering
Radio Frequency & Microwave

Aspirations: I would like to pursue a career in radio wave propagation, but one day I hope to combine my interest in electrical engineering with my passion for sound design and music.

Course Comment: The MDE course provided me with an opportunity to develop important professional skills, such as project management, communication, and teamwork.

CUSTOMERS: LUKE LESTER

Photovoltaic Cell Fabrication

S23-14

LEFT TO RIGHT: John Paradise, Siddhartha Das, Todor Popov, Hristo Ignatov
SME: Joshi Rutwk, Amrita Chakraborty

CHALLENGE

Design, fabricate, and integrate photovoltaic cells utilizing GaAs and InGaAsSb that can harness solar energy and convert it into usable electrical output as per customer specifications. These solutions are useful as more sustainable energy generation options than what is widely used today, and can be compared to currently available solar panels.

Siddhartha Das Apex, N.C.

Bachelor of Science in Electrical Engineering
Micro/Nanosystems

Aspirations: I hope to establish myself in an innovative company where I have growth potential and ample learning opportunities.

Course Comment: This project has been an immense learning process, and has exposed me to fabrication and photovoltaics. It has been a privilege to take part in a once-in-a-lifetime learning experience.

Hristo Ignatov Pleven, Bulgaria

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I hope to make my friends and family proud.

Course Comment: This would've been impossible without Dr. Lester, Rutwik, Amrita, Dr. Ransbottom and Professor Schulz.

John Paradise Virginia Beach, Va.

Bachelor of Science in Materials Science Engineering
Materials Science Engineering

Aspirations: I hope to further expand my knowledge by pursuing my Master's of Science before beginning a job in engineering.

Course Comment: This course provided me with a new appreciation for working with a team to solve real-world problems.

Todor Popov Virginia Beach, Va.

Bachelor of Science in Electrical Engineering
Communications and Networking

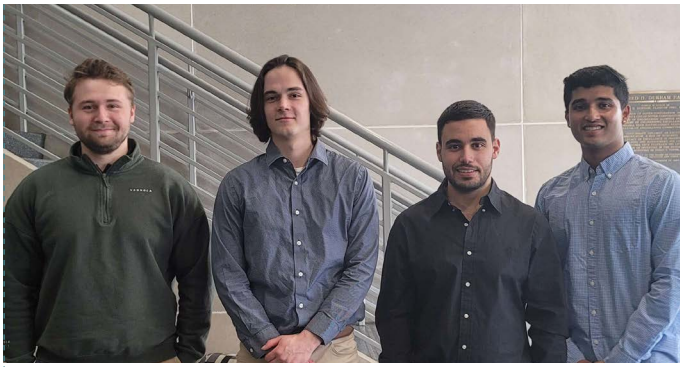
Aspirations: I aspire to contribute to the Department of Defense. I would like to further my knowledge in satellite communications, signals and systems, and RF engineering.

Course Comment: This course allowed me to understand the physics of semiconductor materials. It is fascinating that from basic elements like silicon, we can build a device that can convert solar energy.

CUSTOMERS: LUKE LESTER

Kronos Fusion Fuel Simulator

S23-15



LEFT TO RIGHT: Nolan Somer, Dillan Mccauley, Dylan Ron, Rajat Nilakhe
SME: Shelley Stover

CHALLENGE

Create a system that implements machine learning metrics to optimize outputs by adjusting the inputs of a system. This outcome will be achieved by employing different machine learning methods to allow the system to produce the most accurate outputs. The project will have the ability to interface with different simulator environments, making it modular, and will include a web-based interface that will allow a user to see the information produced from the attached simulator display.

Dillan Mccauley Lynchburg, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: My career goal is to work on application development for automated systems and web applications. I hope to discover new ideas and techniques for optimizing automated systems.

Course Comment: The industry experience I have gained has been beneficial to my development as an engineer, and I will use my knowledge of developing web applications in future projects.

Rajat Nilakhe Downingtown, Pa.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: It is my dream to utilize machine learning and artificial intelligence in a way that is impactful to human and vehicle experience.

Course Comment: The project planning process and being able to collaborate with multiple individuals in order to tackle a multidimensional problem was a really great learning experience.

Dylan Ron Tel Aviv, Israel

Bachelor of Science in Electrical Engineering
Micro/Nanosystems

Aspirations: I aspire to utilize my skills to make meaningful contributions at a company that specializes in Automotive control modules and to conduct innovative research and development in this field.

Course Comment: Being paired with an industry sponsor and tackling engineering challenges has been a valuable experience. I have gained essential systems engineering skills that have already proved useful.

Nolan Somer Ashburn, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronics System

Aspirations: My goal is to develop technology that produces green energy. One of my biggest dreams is to help create a vehicle that changes the whole electric car field.

Course Comment: This course gave me a lot of insight into developing a project. It really taught me how to adapt quickly. It also showed me that every project has a place where you can apply your skills.

CUSTOMERS: PRIYANCA FORD, MICHAEL LAUGHLIN, BOBBY WEGGEL, CARL WEGGEL

5G mmWave Up/Down Converter FPGA Mezzanine Card

S23-16

LEFT TO RIGHT: Robert King III, Nick Goradia, Alex Rhee, Anton Tyapkin, Michael Punaro, James Deats
SME: Jeffrey Walling

CHALLENGE

Extend the communication capabilities of a Field Programmable Gate Array (FPGA) operating as a Software Defined Radio (SDR) to the Ka band (26.5 - 40 GHz). This is accomplished by designing, manufacturing, and testing a block up and down converting daughter card. With the proliferation of mobile devices and the increasing demand for high-speed connectivity, the need for faster and more reliable mobile networks has become more urgent. This has led to the development of 5G technology, which promises to deliver faster data speeds, lower latency, and better network reliability. However, the implementation of 5G technology requires extensive upgrades to existing infrastructure and technologies, which is a significant challenge for many platforms.

James Deats Jacksonville, Fla.

Bachelor of Science in Electrical Engineering
Radio Frequency & Microwave

Aspirations: I want to continue to learn more about RF circuit and PCB design as well as the testing of these designs.

Course Comment: I enjoy how I get to work with things I find interesting in a course context while learning more practical engineering skills.

Nick Goradia Richmond, Va.

Bachelor of Science in Electrical Engineering and Bachelor of Science in Math
Communications and Networking

Aspirations: I want to contribute to the improvement of communications networks.

Course Comment: This class gave the opportunity to work on real problems relevant to the current industry in my field of interest.

Robert King III Dumfries, Va.

Bachelor of Science in Electrical Engineering
Control, Robotics, & Autonomy

Aspirations: My career goal is to engineer solutions in the digital signal processing of unmanned aerial vehicle (UAV) signals of interest to support the intelligence community.

Course Comment: This course provided a welcoming environment where I could apply what I had learned to solve a real-world problem while getting to use premier industry equipment.

Michael Punaro Richmond, Va.

Bachelor of Science in Electrical Engineering
Radio Frequency & Microwave

Aspirations: I want to gain greater experience in designing and testing RF hardware.

Course Comment: I enjoy how this class enabled me to work within my fields of interest on a project with practical and real-world implications.

Alex Rhee Annapolis, Md.

Bachelor of Science in Electrical Engineering and Bachelor of Science in Computer Engineering
Energy & Power Electronics Systems and Controls, Robotics, & Autonomy

Aspirations: I want to further my understanding of digital communications and apply my skills to future endeavors.

Course Comment: This class has allowed me to get real world experience working through engineering challenges while also navigating budgets, timelines and setbacks.

Anton Tyapkin Burke, Va.

Bachelor of Science in Electrical Engineering
Communications and Networking

Aspirations: I want to continue designing RF and high speed PCBs for communications applications.

Course Comment: I appreciated how much freedom is given to the students while working on the project, especially during the second semester. It is up to the students to get the most out of this class.

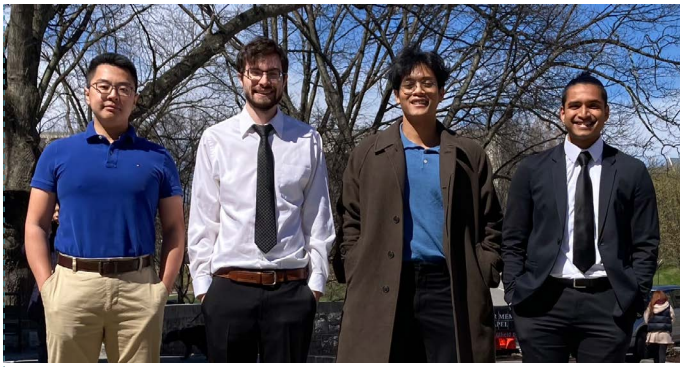
CUSTOMERS: JEFFREY WALLING

ASPIRE CAPSTONE

DEVCOM C5ISR CENTER

5G mmWave Software Defined Radio Transmitter/Receiver

S23-17



LEFT TO RIGHT: Zeyan Wu, Mark Maurer, Baiquni Iman-Santoso, Tushar Patel
SME: Jeffrey Walling

CHALLENGE

Simulate a field-programmable gate array (FPGA) acting as a 5G modem to transmit and receive data following the 3GPP standards for 5G-NR. The synthesizable code can then be used to program a physical FPGA to conduct 5G testing, and potentially research cybersecurity related to 5G communications.

Baiquni Iman-Santoso Rockville, Md.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: My aspiration is to master the intricacies of FPGA and RTL design, pioneering cutting-edge applications. I aim to enrich the world and elevate the human experience.

Course Comment: Throughout this course, I have gained valuable insight into collaboration and the design process, and expanded my understanding of prototyping, SDR design, and FPGA programming.

Mark Maurer Fairfax, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I want to work closely with both hardware and software design and use my knowledge of both to achieve important solutions for complex problems.

Course Comment: The structure of the course gave me more time to spend on the project than normal, which allows for a deeper understanding of the design process.

Tushar Patel Newfield, N.J.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to help people, and I hope that my future contributions in the computer engineering field will push the boundaries of technology to help others live better lives.

Course Comment: This course put a lot of emphasis on teamwork and leaving us free rein to tackle a problem to the best of our abilities. I've gained experience leading a team.

Zeyan Wu Inner Mongolia, China

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My career goal is to become an expert in digital circuits, computer architecture, and FPGAs. I want to tackle more difficult problems in the future, and push myself out of my comfort zone.

Course Comment: This course gave me an opportunity to work on a complex problem with other students and professionals for a longer period of time. I learned a lot about working as a team.

CUSTOMERS: JEFFREY WALLING

ÂSPIRE CAPSTONE

DEVCOM C5ISR CENTER

Safe Lock Hacking Device

S23-18

LEFT TO RIGHT: Top row: Aniketh Pranay, Shane Johnson, Austin Robinson
Bottom row: Jihoon Park, Luke Tchalekian, Danielle Reale
SME: Joe Adams, Thomas Weeks

CHALLENGE

Construct a product that can be effectively employed in capture-the-flag (CTF) challenges. It is imperative that this product is portable and has the durability to withstand frequent transportation as well as being handled by any and all CTF participants. The primary goal of this product is to create a platform for conducting computer security exercises and challenges. The finished version of our product is composed of five flags that need to be met in order to complete the challenge.

Shane Johnson Mount Airy, Md.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My career goal is to work as a software engineer for a cybersecurity company to further my knowledge in cyber defense as well as defend others against attacks.

Course Comment: This course helped strengthen my knowledge, skills, and abilities. Specifically, this growth was in hardware design whereas my background was primarily in software.

Jihoon Park Fairfax, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My goal is to learn and apply safe practices to every project I work on in the Computer Engineering industry. I find work to be most enjoyable and worthwhile in a team environment.

Course Comment: This course has allowed me to revisit knowledge obtained from prior courses. It has allowed me to experience the engineering design process and what is required to succeed.

Aniketh Pranay Ashburn, Va.

Bachelor of Science in Computer Engineering
Control, Robotics, & Autonomy

Aspirations: My career goal is to work as a computer engineer at a company specializing in autonomous bodies or products and robotics related work.

Course Comment: This course helped me by introducing me to hands-on experience regarding product timeline, from creating the product to troubleshooting and presenting to the customer.

Danielle Reale Commack, N.Y.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My goal is to always grow my knowledge and love for all aspects of computer engineering. I want to continue to push myself and others around me to develop the best solutions.

Course Comment: This course has pushed me and tested the knowledge I have learned over the past 4 years. It has allowed me to work with others to develop my strengths and understand my weaknesses.

Austin Robinson Matthews, N.C.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My goal is to further my knowledge in computer engineering and cybersecurity through working in the industry to help protect others from malicious attacks.

Course Comment: This course has provided me with a great experience in working with small teams and helped teach me how to be a better problem solver and the process of engineering projects.

Luke Tchalekian Fairfax, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My career goal is to be a well respected computer engineer in cybersecurity, to grow within my company, and to be a great asset throughout my career.

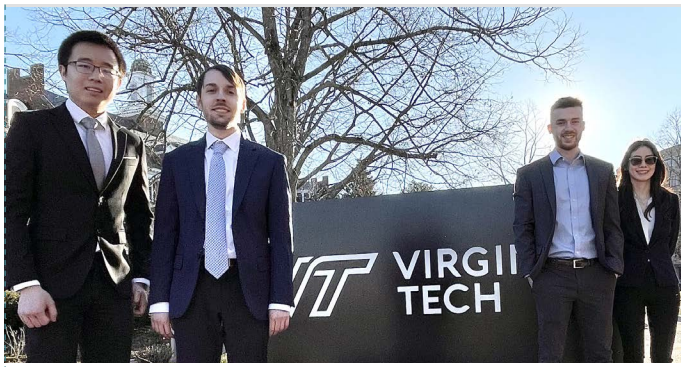
Course Comment: This course grew my skills. I pushed my technical ability and developed additional skills, including project planning, specific requirements, and technical documentation.

CUSTOMERS: DAVID RAYMOND, THOMAS WEEKS

VIRGINIA CYBER RANGE

Sensor Fusion Trade Studies

S23-19



LEFT TO RIGHT: Lim Zhan Qing, Nathan Morgan, Luke Wilson, Dayan Martinez
SME: Shelley Stover, Nektaria Tryfona

CHALLENGE

This project utilizes machine learning to counteract the effects of GPS jamming. Using a feed-forward neural network, the model acts as a filter removing jamming noise. The model is scaled to run on Small Weight and Power (SWaP) devices to be deployed in the field.

Dayan Martinez Roanoke, Va.

Bachelor of Science in Electrical Engineering
Space Systems

Aspirations: My career goal is to work in the space industry, utilizing my skills to contribute to projects that push the boundaries of space exploration and technology.

Course Comments: I appreciate that the course provided me with an industry-like experience and an opportunity to improve my communication skills while working as a team player.

Nathan Morgan Doylestown, Pa.

Bachelor of Science in Electrical Engineering
Communications and Networking

Aspirations: I aspire to use my engineering background to pursue a career I am excited about every day, where I can grow as a leader and gain lots of knowledge along the way.

Course Comments: This course was helpful by introducing a real-world problem, and all the challenges that come along with it as a team member, leader, or communicator.

Luke Wilson Malvern, Pa,

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My career goal is to continue my passion for LiDAR in a fast-paced environment where I can be challenged on a daily basis.

Course Comments: This course was a great way to get hands-on experience in a corporate environment. I was able to learn about some very exciting emerging technologies along the way.

Lim Zhan Qing Kedah, Malaysia

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: I aspire to be an electrical engineer specializing in renewable energy, using my skills to help communities in my home country access affordable, reliable, and clean energy.

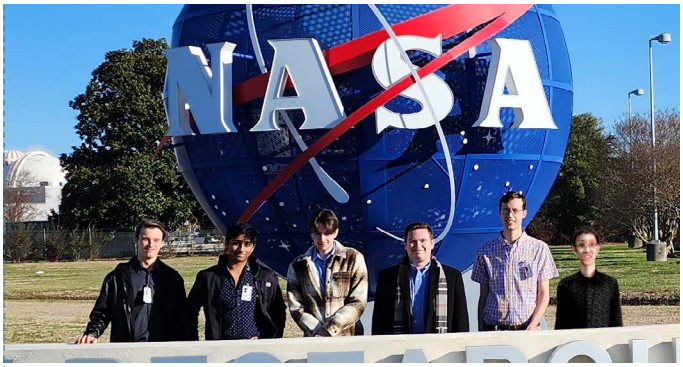
Course Comments: This course offers the opportunity to work on a project that represents a real engineering project experience. It is rewarding to come up with a solution by working as a team.

CUSTOMERS: ROB FLEISHAUER, JEFF MONACO

PSIONIC.

Extendable Mast Gimbal Controller for NASA Artemis Solar Arrays

S23-20



LEFT TO RIGHT: Kaden Marlin, Kavin Thirukonda, Max Wiecek, Matthew Lustig, Luke Schofield, David Chen
SME: Carl Mills

CHALLENGE

Work with NASA Langley Research Center and Science Systems and Applications, Inc. (SSAI) to develop and validate reliable hardware capable of self-leveling vertical solar array technology (VSAT) for lunar applications. This project is in support of the NASA Artemis program (NASA's effort to establish the first long-term presence on the Moon and eventually send astronauts to Mars). The hardware we created is capable of autonomously controlling the VSAT to level the boom arm holding the solar panels to be level with the lunar surface through a Mast Assembly Controller (MAC). This will allow for the greatest possible energy capture by the solar panels. In addition, power electronics hardware was created to convert and distribute power to the system such that it would be self-sustainable on the lunar surface before, during, and following deployment. This system will enable reliable energy creation and delivery for use in the effort to create a permanent lunar presence and eventually a Martian presence. NASA provided a Simulink model of the VSAT gimbal assembly that the team used, along with the Speedgoat hardware specification to develop a digital twin of the VSAT mast assembly and allow for Hardware In the Loop (HIL) testing. The MAC is hosted on a Field Programmable Gate Array (FPGA) that has traceability to a space-qualified FPGA.

David Chen Chapel Hill, N.C.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy
Aspirations: I plan to design and build next generation robotic systems.
Course Comment: Good course overall, great technical real-world challenges.

Matthew Lustig Alexandria, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems
Aspirations: I will be working at Northrop Grumman as an Associate Electronics Engineer in their Mission Systems business sector. I also hope to work in engineering management in the future.
Course Comment: This course allowed me to gain insight into the engineering workplace, learn more about what I want, and gain hands-on experience and overcome challenges.

Kaden Marlin Fairfax, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy
Aspirations: I aspire to contribute to the expanding field of hardware-software integration as it relates to digital design, robotics, and autonomous systems.
Course Comment: This course was an excellent networking opportunity. I really enjoyed being part of a serious group project involving real professionals in the engineering industry.

Luke Schofield Chincoteague, Va.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy
Aspirations: My goal is to work as a controls engineer on the east coast.
Course Comment: This was a great exposure to real industry experience.

Kavin Thirukonda Ashburn, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration and Machine Learning
Aspirations: I hope to work on developing high speed computing hardware.
Course Comment: The course was a very good window into a thorough design process as it will be in a real job setting.

Max Wiecek Leesburg, Va.

Bachelor of Science in Computer Engineering
Software Systems
Aspirations: After I graduate, I plan on working with embedded systems and hardware design in industry while pursuing a masters degree.
Course Comment: I enjoyed working with my teammates and our customer, and gaining real-world experience in engineering.

CUSTOMERS: JERYL HILL, JACQUELINE KENDALL

SSAI

NASA SSAI Machine Learning Whistler Detection

S23-21

LEFT TO RIGHT: Top row: Josh Heath, Zach Lee, Jinfei Su
Bottom row: Mia Olson, Dennis Chiu
SME: Chris Wyatt

CHALLENGE

Pioneer a machine learning algorithm compatible with a Coral Board that is capable of analyzing 20 second records of electromagnetic signals as WAV files and return any records containing whistlers. This will conserve limited resources by reducing transmission and reception of noise.

Dennis Chiu Los Angeles, Calif.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I aspire to be a Digital Design Engineer in the United States.

Course Comment: This class provided me an opportunity to work on a large team project for about 8 months. This was my first time to work on such a large project.

Josh Heath Winston-Salem, N.C.

Bachelor of Science in Computer Engineering
Machine learning

Aspirations: I aspire to promote security and prosperity in the United States.

Course Comment: This course provided me with invaluable experience solving an important problem and helped me foster lasting professional relationships.

Zach Lee Williamsburg, Va.

Bachelor of Science in Computer Engineering
Machine learning

Aspirations: I aspire to become more proficient and develop a better background in machine learning to help me with pursuing work in this field.

Course Comment: I appreciate being able to develop relationships with professional companies.

Mia Olson Alexandria, Va.

Bachelor of Science in Computer Engineering
Software System

Aspirations: My goal is to build the necessary skills to pursue a career in cybersecurity for the government.

Course Comment: This class helped me better understand how to work as a team with people with different skills and academic backgrounds.

Jinfei Su Hohhot, China

Bachelor of Science in Computer Engineering
Machine learning

Aspirations: My aspiration was to have more experience with machine learning models so I could be more confident about my major.

Course Comment: This class promoted working on realistic projects outside of our regular school work.

CUSTOMERS: JACKIE KENDALL, CHRISTOPHER GREEN, MAKHAN VIRDI, BRANDON SMITH

A Vision for Christiansburg Middle School Auditorium

S23-22

LEFT TO RIGHT: Mariam Singer, Jackson Pittman, Greg Brinson, Frank Shay and Fatima Alkaabi
SME: Kelley Andrews, Araoz Gustavo

CHALLENGE

Design and construct a short throw rear projection system that seamlessly integrates software-based control of projection and settings, as well as a motorized screen with retractable capabilities. This system comprises two key subsystems: the projector and the screen. The projector is fitted with a 3D-printed 3 axis adjustable mount that houses a wide angle lens, which enables the system to project a large image at a short throw distance. This subsystem is drilled into a concrete wall high up, to remove any interference shadows. The projector was then connected to a computer via serial connection that is dedicated to control the settings and manage the projected content. The second subsystem involves a screen that is hung in the middle of the stage where it can be retracted into the ceiling using a motor connected to a spool of wire in order to fly the screen up and out of the way. This feature allows the screen to be stored above the stage when not in use, adding functionality to the overall system. The system allows the user to easily project a large image on the screen through a seamless computer program. The user also has the ability to raise the screen up towards the ceiling when not in use so that the stage is clear.

Fatima Alkaabi AbuDhabi, UAE

Bachelor of Science in Computer Engineering
Computer Engineering (general)
Aspirations: I hope to create technologies that help people and inspire the next generation of engineers.
Course Comment: This course has given me the skills and experience I need to excel as an engineer after leaving Virginia Tech.

Greg Brinson Springfield, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)
Aspirations: I aspire to become a Senior Software Developer and innovate customer experience with software.
Course Comment: The course is beneficial and definitely an eye opener for balancing projects. It has been a rollercoaster of emotions, but I will take away so much from this experience.

Jackson Pittman Ellicott City, Md.

Bachelor of Science in Electrical Engineering
Photonics
Aspirations: I want to do research on photonic integrated circuits in order to make them a common circuit in modern electronics. I also want to make advances in non-invasive medical applications.
Course Comment: This course gave me experience in a real-world problem and has given me insight into how to work through issues when they arise.

Frank Shay Chesapeake, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)
Aspirations: My career goal is to contribute as an electrical engineer to a company that allows me to grow as a business leader and one day start my own business.
Course Comment: My favorite part of this course was the freedom we were given to mess things up, recognize our problems, and find solutions that lead us to being better engineers.

Mariam Singer Fairfax, Va.

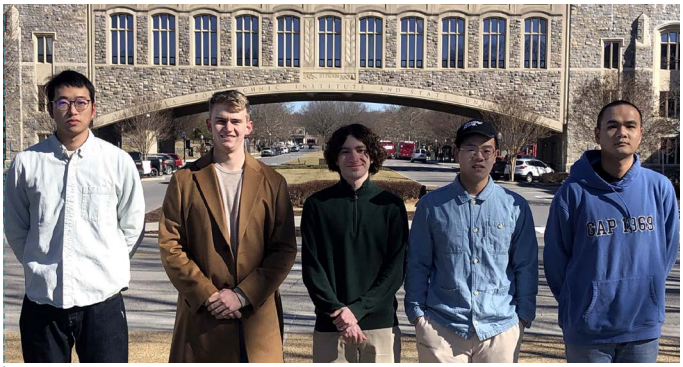
Bachelor of Science in Computer Engineering
Computer Engineering (general)
Aspirations: I aspire to use my computer engineering skills to advance medical technology and transform the way we approach healthcare.
Course Comment: This course has allowed me to explore various areas of my major, work on a functioning team, and develop a working solution for a valuable customer.

CUSTOMERS: VALERIE RANSBOTTOM

Montgomery County Public Schools

Automated Stage Lighting System

S23-23



LEFT TO RIGHT: Ruiyang Jiang, Hampton McGrath, Jared Beller, Yuwei Wang, Jin Zhang
SME: Gustavo Araoz

CHALLENGE

Evaluate and define the requirements for an automated, color and white lighting system to be installed in the Christiansburg Middle School auditorium. This system needs to be flexible for the school's various public presentations and theatrical and musical performances throughout the year.

Jared Beller Richmond, Va.

Bachelor of Science in Electrical Engineering
and Bachelor of Science in Computer Engineering
Photonics and Chip-Scale Integration

Aspirations: I want to design products that bring joy. My dream is for everyone to enjoy a simpler world where technology enhances our lives without demanding our focus.

Course Comment: This course gave me the opportunity to help create a real impact on the surrounding community. I am excited to see what the students will make with our system.

Ruiyang Jiang Hangzhou, China

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to apply what I've learned to practical life and solve practical problems for people.

Course Comment: This class taught me how to solve a practical problem with a team. We provide customers with different solutions to make customer choices and plan implementation.

Hampton McGrath Charlotte, N.C.

Bachelor of Science in CPE
Networking & Cybersecurity

Aspirations: My passion lies in creating solutions that make people's lives easier and more efficient. I hope to make a positive impact on people's everyday experiences.

Course Comment: Taking part in the community project as part of this course has been an enriching experience that has taught me valuable skills in leadership and community engagement.

Yuwei Wang Harbin, China

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: I am eager to take on projects that challenge me and push my boundaries. I aspire to use my skills and knowledge to impact the local community positively.

Course Comment: This course emphasized the importance of collaboration, problem-solving, and innovation. By applying these skills, I am confident in my ability to tackle complex projects.

Jin Zhang Fujian, China

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My goal is to learn more professional knowledge and apply it to life and work.

Course Comment: This course allowed me to learn more about teamwork and communication skills and gave me some basic understanding of lighting control.

CUSTOMERS: VALERIE RANSBOTTOM

Magnetic Levitation Team 1

S23-24

LEFT TO RIGHT: Noah Vaneman, Kyle Carskadden, Katherine Pajares, Michael Neller, Alex Kelleher
SME: Campbell Lowe

CHALLENGE

Design and build a multi-solenoid system that can suspend a 3D printed car using a microcontroller to generate a digital PWM, that is capable of vertical and horizontal movement, and that can suspend an object unsupported for over 5 minutes.

Kyle Carskadden Pittsburgh, Pa.

Bachelor of Science in Electrical Engineering
and Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy and Machine Learning

Aspirations: In my future career I hope to work at an Aerospace company focusing on space exploration.

Course Comment: This course provided me with the opportunity to work on a fascinating project that has taught me how to approach difficult problems in a systematic, reproducible manner.

Alex Kelleher Newburyport, Mass.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: My career goal is to work with robotics and AI. I want to work in a fast-paced, cutting edge environment.

Course Comment: This course taught me some different technical skills as well as how to handle working on a long term project. I have appreciated all the feedback and learned a lot.

Michael Neller Richmond, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: To become a part of the Power Transmission, distribution, or generation field.

Course Comment: This course has taught me a lot about the practical application of engineering principles, and more about what it truly means to be an engineer.

Katherine Pajares Woodbridge, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: After graduation, I hope to work in cybersecurity and continue to gain knowledge within my field.

Course Comment: This course has taught me about the application of the engineering process from start to finish, and has helped me improve my communication skills within a team.

Noah Vaneman Haymarket, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

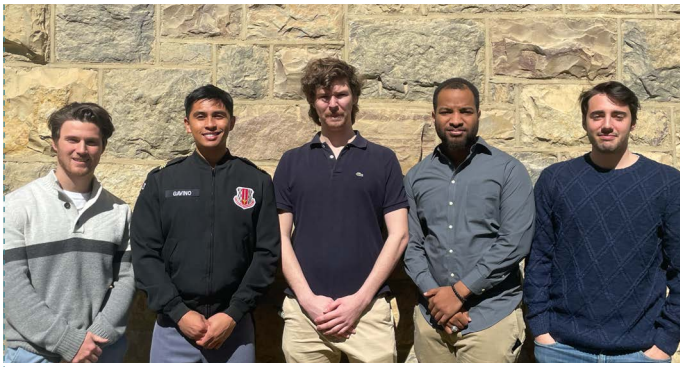
Aspirations: I want to work in electrical product testing and implementation.

Course Comment: This course has given me the opportunity to truly think about the final user of the products I'm working on. It has also allowed me to get feedback for business practices.

CUSTOMERS: DAN SABLE

Magnetic Levitation of a Permanent Magnet Object with Analog and Digital Systems

S23-25



LEFT TO RIGHT: Anthony Mancini, Brandon Gavino, Luke Vallincourt, Quinton Holmes, Ferdinando Sansone
SME: Strehle Mattew

CHALLENGE

Design and demonstrate a magnetic levitation system whereby an object attached to a permanent magnet will be suspended vertically in the air through the use of an electromagnet. This was achieved by designing a compensator that would stabilize an inherently unstable system. Multiple solenoids are to be employed in order to move the object horizontally while suspending it vertically.

Brandon Gavino Burke, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My short term goals are to fly jets for the Air Force. In the long run, I plan on getting a degree in software engineering to become an astronaut for NASA.

Course Comment: This course presented great experiences that required a lot of communication and coordination within and between the team, SME, Mentor, and Customer.

Quentin Holmes Chesapeake, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: My goal is to work in the Video Game or App Industry and make my own games or apps. It would be great to work at Microsoft, Sony, MadDog or others in that Field.

Course Comment: Going into this course I didn't have much experience in projects, especially in electrical engineering. I learned a lot from this and my partners are happy about how it turned out.

Anthony Mancini Dumfries, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: My aspiration is to be part of an engineering team that develops intergenerational solutions that benefit humanity, such as renewable energy technologies or medical devices.

Course Comment: This course gave me knowledge beyond what my course work has taught me. This team-based course has also redefined what I thought it meant to be a leader.

Ferdinando Sansone Naples, Italy

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: My goal is to grow a career in Controls Engineering. I would like to complement my career with project management as I thrive under pressure and enjoy responsibility.

Course Comment: This course was an excellent opportunity to test my problem solving skills. A lot of theory was involved, but the challenging part was coordinating a team of five.

Luke Vaillancourt Hamilton, Va.

Bachelor of Science in Computer Engineering
Software Systems

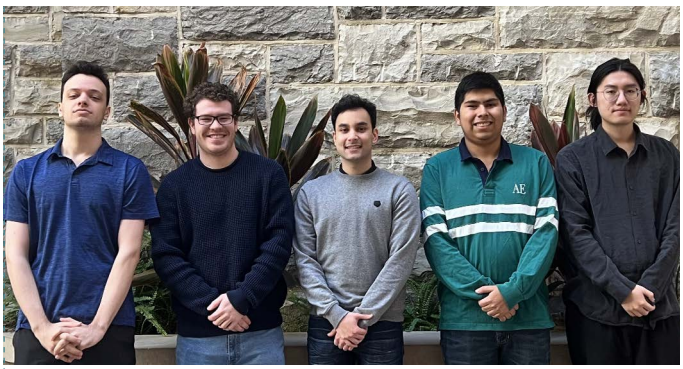
Aspirations: I'm aiming to work for a tech company as an Embedded Systems Engineer or a Computational Technician. Ultimately, I see myself transitioning into philanthropy and political offices.

Course Comment: I'm enjoying this project-based class where we're working as a team to achieve levitation using an electromagnet. I'm finding this class to be a great opportunity for growth.

CUSTOMERS: DAN SABLE

ATSDA

S23-26



LEFT TO RIGHT: Sean Stolburg, Josh Amberg, Zach Cruz, Matthew Reyes, Qianyi Zhang
SME: Paul Plassman

CHALLENGE

Design and code a data analysis system that can be used to analyze the data for trends and report those trends through a GUI and through email. This system can be used to identify possible future failures that may occur and correct them before a product failure occurs. A user can utilize a front-end interface to perform an analysis on a specified product and get an immediate response. There is also an automated analysis that runs weekly analyzes all products and emails the test results.

Josh Amberg Harrisonburg, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I want to grow my knowledge horizontally before picking a speciality and growing my knowledge vertically to become an industry expert and principal engineer.

Course Comment: This course was a good experience working on a team and doing design work of my own, compared to internships where I was working on things that someone else designed.

Zach Cruz Fredericksburg, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: I want to work in an industry that is at the forefront of technology and also use new technologies to entertain people.

Course Comment: This course gave me insight on how a project may be completed in a professional setting and also helped me prepare for engineering tasks outside of the classroom.

Matthew Reyes Fairfax, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I want to have what it takes to be successful in this industry and to continue learning and expanding my knowledge, whether through school or a workplace environment.

Course Comment: This course was able to simulate a real-world project experience, and I learned plenty of necessary information to prepare me for career experiences I may have.

Sean Stolburg Vienna, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I want to be a leader in the video game design industry. I want to design and program gameplay mechanics that engage players.

Course Comment: This course showed the degree of planning that is required in real-world engineering projects. It was also our first glance at giving presentations in a professional setting.

Qianyi Zhang JiangSu, China

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to leverage my programming skills to design and build the infrastructure that powers technology products, with the goal of benefiting end users by solving complex problems.

Course Comment: Working with a team and doing design work in this course allowed me to develop important collaboration skills and apply theoretical concepts to real-world scenarios.

CUSTOMERS: MICHAEL LIN

GaN FET Semiconductor Wafer Characterization and Analysis

S23-27

LEFT TO RIGHT: Jacob Di Girolamo, Tyler Guthrie, Tomas Gan, David Amasi, Ji Wu Hong
SME: Yifan Wang, Qihao Song, Ming Xiao

CHALLENGE

Measure 4 key parameters of 126 GaN (gallium nitride) HEMT (high electron mobility transistors) devices on a 6 inch wafer. The key parameters that we are measuring are the on resistance between the gate and the source, the threshold voltage of the transistor, the drain to source leakage current, and the gate to source leakage current. The measurements will be repeated at 150 degrees celsius. After measuring and collecting all of the parameters of each of the devices, the statistically relevant information from the curve tracer output files are going to be taken and turned into a wafer map of the measured devices.

David Amasi Abuja, Nigeria

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My goal is to become a leading figure in my field and make a good impact.

Course Comment: This course allowed me to get an in-lab experience with semiconductors and work with talented minds.

Jacob Di Girolamo Purcellville, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I hope to complete a masters degree next year and then start a career in embedded systems or digital design.

Course Comment: This class allowed me to see a project from start to finish. I gained a lot of technical knowledge and professional skills while working on a talented team of engineers.

Tomas Gan Lima, Peru

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My goal is to gain more experience in the subject field through graduate school. Then, I plan to use this knowledge to join the industry and show what I am capable of.

Course Comment: This course helped me gain experience with a long term team based project. It also helped expand my knowledge of power devices and how to characterize them.

Tyler Guthrie Woodbridge, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My aspirations for the future are to join industry and gather diverse experience and knowledge that will set me up for success in my long-term career, wherever that may take me.

Course Comment: This course allowed me to gain experience working with a team of individuals with diverse skills in a long-term project atmosphere.

Ji Wu Hong Gwacheon, South Korea

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: My goal is to expand my knowledge through graduate school, then pursue a job which will allow me to explore power electronics and utilize my skills in the field of renewable energy.

Course Comment: This course showed me how a team-based project works. It gave me a full R&D cycle experience in the semiconductor field and enhanced my knowledge of power device physics and characteristics.

CUSTOMERS: YUHAO ZHANG

CPES Center for Power Electronics Systems

Planar High-Power Density Transformers: Analysis and Fabrication

S23-28

LEFT TO RIGHT: Tyler Cook, Sam Brown, Fasil Gebreab, Anthony Buchman
SME: Shelley Stover, Nektaria Tryfona

CHALLENGE

Analyze and fabricate high-frequency transformers (HFTs) for 500 kHz 18 kW chargers used in next-generation refrigerated electric vehicles. This transformer is designed to step down 750 V from renewable energy sources to 375 V for truck battery storage systems. HFTs are key components in solid-state transformers (SSTs), providing galvanic isolation and voltage conversion ratio between primary and secondary. This project aims to investigate proper winding configurations to ensure equal current sharing between parallel windings, which is essential to cope with high currents, high-frequency currents, and thermal stress. The project consists of four tasks, including HFT design, fabrication and testing, current sharing strategy development, and testing of various current sharing strategies. The project also includes technical specifications, limits, and outcomes.

Sam Brown Staunton, Va.

Bachelor of Science in Electrical Engineering
Communications and Networking

Aspirations: I will pursue a master's degree in wireless communications at Virginia Tech after interning at MIT Lincoln Laboratory. I aspire to contribute to the future of humanity in some way.

Course Comment: The Major Design Experience has taught me that communication is the key to achieving success in engineering, especially taking a complex topic and boiling it down.

Anthony Buchman Fairfax Station, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: I hope to pursue an advanced degree in power electronics. I hope to one day create a successful startup company to innovate in this field.

Course Comment: This course has shown me the importance of simplicity for all aspects of engineering. I learned critical engineering lessons to become an innovative and perceptive engineer.

Tyler Cook Callaway, Va.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: After graduation, I want to help solve the world's problems through efficient engineering. I hope to work in hardware and software, in power electronics or other sectors.

Course Comment: This course has helped me understand the importance of good communication and teamwork in engineering. I gained experience in overcoming obstacles.

Fasil Gebreab Arlington, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My aspiration is to pursue a career in Energy & Power Electronic Systems, with the ultimate goal of contributing to sustainability in the renewable energy sector.

Course Comment: This course provided me with a preview of what it means to be an electrical engineer. I gained hands-on experience in project management, improving my communication and teamwork skills.

CUSTOMERS: DONG DONG

CPES Center for Power Electronics Systems

Tool for Power Converter

S23-29

LEFT TO RIGHT: Brady Alexander, Matei Constantinescu, Rubas Khalid, Justin Williams
SME: Eric Hsieh, Adhistria Naradhipa

CHALLENGE

Update existing DC/DC converter hardware used in a CPES summer course offered for professionals. The input perturbation circuit is to be updated to increase the accuracy of measurement to half of the converter's switching frequency. This will allow for theoretical approximations to better match the experimental results.

Brady Alexander Littlestown, Pa.

Bachelor of Science in Electrical Engineering
Energy & Power Electronic Systems

Aspirations: I want to work in the power industry, contributing to projects focused on renewable energy.

Course Comments: I appreciate being given the opportunity to close out my college career with a class that gives industry-like experience. It was fun to work and collaborate with so many people.

Rubas Khalid Ashburn, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: I want to contribute to the power or analog electronics fields.

Course Comment: This course was a great addition to my curriculum, as I not only understood the industry specifications, but I learned more about power electronics.

Matei Constantinescu Dunn Loring, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronic Systems

Aspirations: I hope to work with renewable energy and play a key role in development of the modern power system, in distribution, transmission, and generation.

Course Comments: This course was a good application of the skills I have learned. It involved critical thinking and teamwork, and was a good showcase of the skills I have acquired with my degree.

Justin Williams Haymarket, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronic Systems

Aspirations: I hope to work in renewable energy generation.

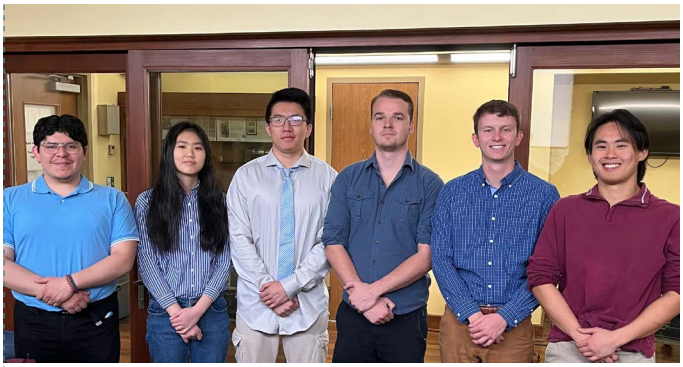
Course Comments: This course provides a nice way to get real-world experience troubleshooting and problem solving with DC/DC converters.

CUSTOMERS: QIANG LI

CPES Center for Power Electronics Systems

Embedded Wireless Human Machine Interface for Monitoring and Controlling Power Electronics Building Blocks

S23-30



LEFT TO RIGHT: Santiago Solis, Chau Le, Xuan Zhao, Christopher Garrison, Tommy Dalrymple, Vincent Tay
SME: Vladimir Mitrovic

CHALLENGE

Design and implement an embedded Human Machine Interface (HMI) to seamlessly operate Power Electronic Building Blocks (PEBBs). The system uses Message Queuing Telemetry Transport (MQTT) to communicate with a PEBB's local controller, then provides monitored values and controls to a user-interactive touch display through a Raspberry Pi. A custom designed front panel enclosure houses all the HMI hardware and attaches to the front of a PEBB.

Tommy Dalrymple Huntingtown, Md.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I am excited to get into the real world! I aspire to work my way up within my career so that I can make a long-lasting difference in the industry.

Course Comment: This course has taught me a lot about how to work with a team. I have now experienced and understand the importance of communication as well as technical skills.

Christopher Garrison Dahlgren, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: I look forward to being an engineer for the US Department of Defense, as well as using what I have learned in school to design my own guitar amplifier and effects circuits.

Course Comment: Through this course I have had a taste of how the design process works in the real world and have bridged the gap between school and my professional life.

Chau Le Ho Chi Minh City, Vietnam

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I want to expand my knowledge as a software engineer and create products that will have a positive impact on society.

Course Comment: I really enjoyed working on the project and learned a lot since the beginning of the year.

Santiago Solis Burke, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My aspiration is to use my programming skills in my everyday life to help me sustain myself and enjoy the rest of my life.

Course Comment: I am very content with the progress that everyone has put in to the project. I have grown so much academically and professionally, and I have honed my skills in coordination, communication, and trust.

Vincent Tay Lahaina, Hawaii

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I will create a life where I can spend most of my time doing things I have passion for. Also, I want to have the ability to financially and emotionally support my family and loved ones.

Course Comment: I have enjoyed my experience with my team creating our project. Luckily, I got a team that I enjoy working with and look forward to delivering a great project.

Xuan Zhao Shanghai, China

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to be a professional software engineer and develop some software that can be beneficial in daily life.

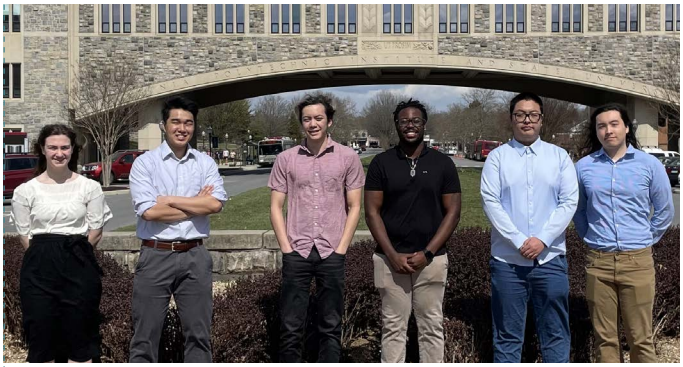
Course Comment: I enjoyed working with a team and this course has given me hands-on experience in Internet of Things (IoT).

CUSTOMERS: DUSHAN BOROYEVICH

CPES
Center for Power Electronics Systems

ECE/NOAA — Fault Detection for Autonomous Underwater Vehicle

S23-31



LEFT TO RIGHT: Gwyneth Steel, Trevor Lew, Stephen Welch, Jefferson Chesson, Tongyuan (Tony) Qian, Matthew Sherwood
SME: Dan Stilwell

CHALLENGE

Research and develop fault detection algorithms for Autonomous Underwater Vehicles (AUVs).

Jefferson Chesson Ashburn, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I would like to work on innovative AI and space exploration systems.

Course Comment: This project has helped me develop my team and technical skills as well as shown me the process of developing a project in the real world.

Trevor Lew Gainesville, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: I would like to be a software engineer doing high performance computing or machine learning and artificial intelligence.

Course Comment: I liked the freedom we had in this course.

Tongyuan (Tony) Qian Shanghai, China

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I would like to be a computer engineer doing high performance signal processing, data science, and machine learning.

Course Comment: The course provided me with a good environment for teamwork and career experience.

Matthew Sherwood Stafford, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I hope to join the workforce as a software engineer, using my skills to help improve the lives of others through the projects I work on.

Course Comment: This class has exposed me to the professional engineering environment, and helped me improve a number of important skills that will aid me in future projects.

Gwyneth Steel Jarrettsville, Md.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I would like to be a computer engineer working in robotics and autonomy.

Course Comment: I enjoyed working on a multidisciplinary team where different team members were able to contribute in their areas of expertise.

Stephen Welch Gainesville, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I wish to apply controls & reinforcement learning to cutting-edge robots.

Course Comment: Working on an open-ended problem with like-minded teammates was a great experience.

CUSTOMERS: TONY KEITH

LOCKHEED MARTIN

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

ThermoFlyAi

S23-32

LEFT TO RIGHT: Karim Said, Aaryan Mehra, Sefunmi Ashiru, Sofie Wong
SME: Joe Adams, David Gray

CHALLENGE

Design, develop, and test a machine learning model used to control a user's home temperature. The model will aim to set the temperature to what the user prefers based on the time of day and current internal and external temperature. The model will also take into consideration home insulation and the rate at which external temperature affects internal temperature.

Sefunmi Ashiru Durban, South Africa

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I hope to learn more about all sorts of tech and apply that knowledge to research in history, physics, and art.

Course Comment: This course was a good experience in teamwork and collaboration. We each brought new perspectives to the problem and helped each other along the way.

Aaryan Mehra Kolkata, India

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I would like to contribute to research and development in cutting-edge technologies like artificial intelligence, machine learning, and robotics.

Course Comment: This course has given me the opportunity to expand my knowledge regarding systems, how they are integrate, and work together to perform efficiently. It honed my technical skills and my soft skills. The most exciting part of this project was trying out new and innovative solutions to improve the Nest.

Karim Said Cairo, Egypt

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I would like to be the CEO of IBM.

Course Comment: I appreciate being partnered with an industry sponsor and exposed to engineering problems faced today. The systems engineering skills I have learned have already proven valuable.

Sofie Wong Hong Kong, China

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: My career goal is to grow as a software engineer and work in the field of machine learning.

Course Comment: This course gave me an opportunity to utilize skills I learned in class to solve a real world problem.

CUSTOMERS: DAVID GRAY

Personal Locator Beacon Team

S23-33

LEFT TO RIGHT: Brenden Duffy, Brandon Battista, Samantha Frietchen, Michael Policarpio, Yuxiang (Jerry) Dong
SME: Thomas Krauss

CHALLENGE

Create a beacon, receiver, and user interface (UI) system that will allow communication between emergency services and those in remote locations, such as hikers. The beacons will be designed to transmit beacon ID, GPS location, and panic state (used to indicate an emergency). The receiver shall demodulate and decode the signal captured by the SDR and parse the message to be sent to the UI. The UI will take the data from the receiver and display the user's location on a map and indicate the panic state.

Brandon Battista Ashburn, Va.

Bachelor of Science in Electrical Engineering
Communications and Networking

Aspirations: I want to become an expert in the field of digital signal processing. I hope to gain technical expertise, then move into leadership positions and do meaningful work in the defense industry.

Course Comment: This course has been an excellent experience for working on a team, creating a project from scratch. We have had to learn the functions of a team.

Yuxiang (Jerry) Dong Xi'an, China

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: I want to cultivate my coding abilities, and improve my communication and teamwork skills. This will equip me with the necessary skills for the future.

Course Comment: By contributing to the project and collaborating with the team to ensure the seamless functioning of the entire system, I improved my coding proficiency, collaboration, and communication.

Brenden Duffy Fairfax, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I am looking to work into the field of computer architecture to contribute to the constant innovation happening "under the hood" of the CPU for performance enhancement.

Course Comment: The course has been a great experience in learning what it will be like to work as a team in the future. I'm lucky to have a great team and a project we could all contribute to.

Samantha Frietchen Sterling, Va.

Bachelor of Science in Electrical Engineering
Communications and Networking

Aspirations: My career goal is to have a meaningful contribution to the field of digital signal processing by working to ensure secure communications.

Course Comment: Through this course, I have been able to strengthen my technical skills contributing to the project and some soft skills of coordinating with my team. Overall a great experience!

Michael Policarpio Springfield, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to engineer futuristic solutions that improve our lives. Being in a cutting edge field with like-minded peers and mentors gives me a fantastic opportunity to achieve this goal.

Course Comment: This major design project showed me that engineers are stronger together. It was refreshing to review hardware topics that I was interested in but had not experimented with.

CUSTOMERS: MICHAEL DRESCHER, NIC ROHR, JARED DESAI

ZETA ASSOCIATES

Heartbeat Collection & Classification System

S23-34

LEFT TO RIGHT: Andrew Caylor, Tom Anders, Yasser Hassan, Braeden Muir, Jeremy Kraisser
SME: Jaime De La Ree

CHALLENGE

Develop and assemble a complete system capable of obtaining synchronized ECG and stethoscope recordings from a patient in the field, performing a preliminary screening of data using a Machine Learning model, and providing an offsite cardiologist access to recordings via the cloud.

Tom Anders Leesburg, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My career goal is to work at the intersection of hardware and software and eventually move into an engineering project management role.

Course Comment: I thoroughly enjoyed this class, and the strengths of my teammates allowed me to focus on the area where my skills were most applicable, which resulted in a successful experience.

Andrew Caylor Orlando, Fla.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My career goal is to become a research scientist in the field of Machine Learning.

Course Comment: I enjoyed the freedom that we were given to design our own solutions.

Yasser Hassan Ashburn, Va.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: My career goal is to work at a robotics company. I am very interested in the concept of mechatronics and robotics, and hope to start my own robotics company in a few years.

Course Comment: This class has given me experience in PCB design and soldering, in addition to the professional aspect and getting a sense of the real world.

Jeremy Kraisser King George, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My career aspiration is to do research and development work that I can test in the field. I want to apply machine learning to improve models and pattern recognition, and develop video games.

Course Comment: It was a challenging and fun experience to work with a talented team on such an engaging and potentially life-saving problem.

Braeden Muir Alexandria, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: My career goal is to design and test circuits and sensory technology. I enjoy being given a problem and having the liberty to accomplish the task in the best way I can.

Course Comment: I think this class provided an excellent atmosphere to students to get a taste of what life in the workforce is like.

CUSTOMERS: JAIME DE LA REE

Solar Compute Migration

S23-35

LEFT TO RIGHT: Saksham Goyal, Michal Gumulak, Alex Santiago-Anaya, Muhua Zhou
SME: Jaime De La Ree

CHALLENGE

Design and build a system of nodes, each consisting of a solar panel and a computing device with the ability to handle a process, transferring it based on the available power from the panels.

Saksham Goyal New Delhi, India

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My career aspirations are to work on cutting-edge technologies, develop innovative solutions, and continuously learn.

Course Comment: This class allowed me to experience real-world projects and learn how to operate outside of the normal classes.

Michal Gumulak Midlothian, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My career goal is to design automation systems with AI integration in order to make the world more efficient.

Course Comment: This course gave me the opportunity to experience how a project team interacts with a customer to create proper documentation and a final product according to their specifications.

Alex Santiago-Anaya Cayey, Puerto Rico

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: My aspiration is to develop systems to modernize the electrical grid.

Course Comment: MDE provided me with a way to experience customer interaction and define specifications.

Muhua Zhou Huizhou, China

Bachelor of Science in Electrical Engineering,
Bachelor of Science in Computer Engineering,
and Bachelor of Science in Business Marketing Management
Energy & Power Electronics Systems, Computer Engineering (general), and Professional Sales

Aspirations: I want to put a solar panel on every roof.

Course Comment: I enjoyed working on something that resembles the real world.

CUSTOMERS: MATTHEW GARDNER

Dominion Energy®

OT Device Software Asset Extractor

S23-36

LEFT TO RIGHT: Keaton Boodlal, Henry Trochlil, Jack Benning, Samuel Stewart, Anthony Lee, Simple Gomez
SME: Joe Adams, Colin Grant

CHALLENGE

Design a Windows executable which takes in an Operation Technology (OT) device's backup file and outputs a JSON list of all installed software, along with vendors & version numbers. This executable can be used to quickly identify and perform relevant security patches on these devices.

Jack Benning Charlottesville, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I would like to be a lead engineer on a project within my industry.

Course Comment: I have enjoyed the friendly & helpful industry advice from our SME, mentor, and customer.

Keaton Boodlal Sterling, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I would like to become a Senior Software Engineer.

Course Comment: I think this course has taught me valuable lessons about working with a team, mainly the drawbacks and advantages of working as a team. With the main advantages being that you can divide up work and separate workload, with the drawbacks being that you might not have a full understanding of what you are working on if you did not do that part specifically.

Simple Gomez Virginia Beach, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I would like to own a cafe someday.

Course Comment: This was a good experience working with others.

Anthony Lee Hillsdale, N.J.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I would like to become a Network Engineer at a top tech company.

Course Comment: This course has been a great experience of what it is like to work in the industry.

Samuel Stewart St. Petersburg, Fla.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I would like to work my way up in a company and learn more about cybersecurity in national defense.

Course Comment: This course has given me good experience with working and communicating with a customer on the project.

Henry Trochlil Hamilton, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I would like to become a subject matter expert in the field of computer forensics.

Course Comment: This course has given me a lot of exposure and experience in the engineering design process, especially in the aspects of managing a project and working with a customer.

CUSTOMERS: COLIN GRANT

FOXGUARD SOLUTIONS®

FPGA Network Clamping Device

S23-37

LEFT TO RIGHT: Matthew Enzinna, Hunter Graf, Chris Maksimowicz, Evan Lander
SME: Jason Thweatt, Joe Adams

CHALLENGE

Design and build a device that will immediately shut down network traffic if any malicious activity is detected. It will be used for a network node's cybersecurity.

Matthew Enzinna Ashburn, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I want to develop embedded systems for use in satellite systems to improve our understanding and utilization of the space sector.

Course Comment: This course has given me invaluable experience adapting to a changing project environment while also helping me develop my teambuilding skills.

Hunter Graf Flemington, N.J.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I plan to utilize skills obtained through my coursework to minimize cybersecurity threats in the future.

Course Comment: The experience I gained through this course, working with a team to accomplish a shared goal, will serve me well once I begin working in the industry.

Evan Lander Norwalk, Conn.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I want to provide cutting-edge computer solutions to real world problems in an efficient manner.

Course Comment: This course has given me new insights into what it is like to work with a team, and taught me how to dive into a new topic head first.

Christopher Maksimowicz Nokesville, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I hope to use my knowledge, skills, and moral obligations to create a more unified and safer world through FPGA and Computer Security Design.

Course Comment: Throughout this course I have learned a lot about FPGA design, network communications, security, and how to integrate work alongside a team.

CUSTOMERS: COLIN GRANT

FOXGUARD SOLUTIONS®

Stacked Benefits of Battery Energy Storage System

S23-38

LEFT TO RIGHT: Ryan Oehling, Eric Wilson, Liang Xiao, Juriani Idris
SME: Scott Dunning

CHALLENGE

Simulate the additional benefits of adding a Battery Energy Storage System (BESS) into a grid. The BESS would be used in tandem with a solar plant to help the grid properly manage its power consumption. Using simulation tools, the BESS is tested in several ways to see how it can positively impact the grid.

Juriani Idris Sarawak, Malaysia

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: I hope to pursue a career in the power systems industry, with the aim of making a meaningful contribution towards the advancement of renewable energy and power electronics technology.

Course Comment: This class pushed me out of my comfort zone and equipped me with valuable problem-solving skills to tackle diverse challenges in the industry.

Ryan Oehling Knoxville, Tenn.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: I simply want to enjoy my life and spend my free time as I see fit. It just so happens that making money makes that easier.

Course Comment: This course has brought me closer to my peers, and allowed me to see the benefit of teamwork.

Eric Wilson Charlottesville, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronic Systems

Aspirations: My career goal is to make a positive impact in the power industry.

Course Comment: This course has taught me many real world skills that aren't taught in lecture-based classes.

Liang Xiao Nanning, China

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: I want to learn practical knowledge and apply it to my future life, get a deeper understanding of electrical engineering, and make some contributions to society.

Course Comment: This course introduced me to the area of power systems, which I was not familiar with. I learned from the experience and was glad to meet my three teammates.

CUSTOMERS: AKANSHA JAIN

Sustainable Optimization for Agrivoltaic Power

S23-39

LEFT TO RIGHT: Spencer Smith, Gavin Rosenberger, Alejandro Garcia, Siraj Syed, Evin Varghese
SME: Kelley Andrews

CHALLENGE

Investigate the feasibility of a grid connected agrovoltaic system that incorporates cattle or sheep along the I-81 corridor. The agrovoltaic system must not hinder the daily operations of the cattle farm and must produce utility scale energy. Such a system would allow for dual purpose use of land resources.

Alejandro Garcia Great Falls, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I want to develop software for cloud security.

Course Comment: I have learned a lot about teamwork, planning, and project management throughout the course. I have also learned to prepare better software for clients.

Gavin Rosenberger Warrenton, Va.

Bachelor of Science in Electrical Engineering
Electrical Engineering (general)

Aspirations: I want to help bring wider availability and acceptance of renewable energy resources to ensure a more sustainable future.

Course Comment: This course has pushed me to get out of my comfort zone by working with requirements and constraints from multiple disciplines.

Spencer Smith Bristol, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: I hope to design and improve the electrical infrastructure that millions depend on.

Course Comment: This course has provided the opportunity to work with a customer. We gained experience in communicating requirements, providing progress updates, and implementing our subsystems.

Siraj Syed Short Pump, Va.

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: I want to help improve the cybersecurity of the power grid and contribute to the growth of the field by innovating new protection strategies.

Course Comment: Over the span of this course, my project management skills, self-learning skills, and ability to handle various real-time deadlines for clients improved significantly.

Evin Varghese Thrissur, India

Bachelor of Science in Electrical Engineering
Energy & Power Electronics Systems

Aspirations: My goal is to design and enable the transition to a microgrid-based renewable energy infrastructure and provide cleaner energy.

Course Comment: This course has taught me to self-learn from reliable sources. Furthermore, I have learned a lot about teamwork, communication skills, planning, and project management.

CUSTOMERS: LUKE HENRY

ENERGIX RENEWABLES

Automated Target Recognition System

S23-40

LEFT TO RIGHT: Dylan Longest, Dylan Morris, Patrik Kaufman, Benjamin Gross, John Shamory
SME: Joe Adams, Tim Talty

CHALLENGE

Produce an automatic target recognition (ATR) system for identifying coastal threats such as drug smugglers and human traffickers. This system will capture images in a very low earth orbit (VLEO) and relay the location and classifications of targets for further assessment.

Benjamin Gross Arlington, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to be a lifelong learner.

Course Comment: I learned how to interface with international corporations to form strategic partnerships.

Patrik Kaufman Chicago, Ill.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: My goal is to work on the next generation of high speed computing in the quantum space.

Course Comment: Through this course I have gained important experience with teamwork and team management while working with a paying customer.

Dylan Longest Chantilly, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: My goal is to design mixed signal integrated circuits.

Course Comment: I have learned a lot about the practical side of deploying code/hardware onto a third party board/microcontroller.

Dylan Morris Baltimore, Md.

Bachelor of Science in Computer Engineering
Chip Scale Integration

Aspirations: I want to develop future innovations in the consumer hardware space.

Course Comment: In addition to gaining technical knowledge developing for mixed FPGA/ARM platforms, I've taken away lessons in project management and perseverance.

John Shamory Selinsgrove, Pa.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I want to work in a large consumer electronics company, helping to write software to improve the daily life of its users.

Course Comment: This course gave me hands-on experience with designing "You Only Look Once (YOLO)" object detection models, along with developing on a Xilinx embedded platform.

CUSTOMERS: ADAM ESTRADA, NICK THOMPSON

ROYCE GEO

Project Hermes — Wireless Mesh Network for Herd Tracking

S23-41

LEFT TO RIGHT: John Phung, Robbie Platt, Noah Sweilem, Cole Roof, Spencer Beery, Jack Greer
SME: Cameron Patterson

CHALLENGE

Design and build a solar-powered wireless mesh network and graphical user interface (GUI) for tracking and displaying real-time sheep movement data, including GPS location and relative distances between nodes.

Spencer Beery Lewisburg, W.Va.

Bachelor of Science in Electrical Engineering and Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I want to use my skills to develop commercial hardware devices.

Course Comment: This course introduced me to many new topics and helped me expand my technical and personal skill set!

Jack Greer Fairfax, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I want to use my software and hardware design skills to solve interesting technical challenges and make the world more beautiful.

Course Comment: Without this course, I don't think I ever would have wrestled with sheep.

John Phung Arlington, Va.

Bachelor of Science in Computer Engineering
Machine Learning

Aspirations: I want to use the skills I gained in my future career in software engineering.

Course Comment: This course was a great introduction to the real-world projects, and I enjoyed working on a 6-person team.

Robbie Platt Warrenton, Va.

Bachelor of Science in Computer Engineering
Software Systems

Aspirations: I would like to use my skills in engineering to design cutting-edge software systems in order to make people's lives easier.

Course Comment: This course allowed me to see all different aspects of the engineering process. I was introduced to new concepts and learned how to be a meaningful member of a team.

Cole Roof Gainesville, Va.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I want to innovate in the Internet of Things (IoT) and robotics fields.

Course Comment: This course gave me a great experience working with a team of my peers on an in-depth engineering project.

Noah Sweilem Phoenix, Ariz.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I want to use my skills to make a lasting impact in the world of cybersecurity and computing.

Course Comment: This course was a good reinforcement of the teamwork strategies I've learned during my time in various engineering internships, and an opportunity to solve an interesting problem.

CUSTOMERS: JONATHAN BALLAGH, NEIL STEINER

BetaPrime CONSULTING, INC.

Data Acquisition Device

S23-42

LEFT TO RIGHT: Timothy Ciavolella, Zachary Krough, Will Katz, Alex Miller, Maximilien Engel
SME: Peter Han

CHALLENGE

Design and build a system capable of capturing, processing and storing humidity, temperature, vibration and sound data. The system shall wirelessly transmit said data to a handheld device in real time.

Timothy Ciavolella Sayville, N.Y.

Bachelor of Science in Electrical Engineering
Controls, Robotics, & Autonomy

Aspirations: My career goal is to work in the robotics industry, working towards a more automated future.

Course Comment: This course allowed me to make the connection between the theoretical and the practical. It also provided experience in many issues that can happen in a real-world project.

Maximilien Engel McLean, Va.

Bachelor of Science in Computer Engineering
Chip-Scale Integration

Aspirations: I want to develop embedded software for instrumentation and use it for good.

Course Comment: It was a pleasure working with Virginia Tech faculty and our customers at NAVAIR. We had a lot of smart guys on our team—but none of us were as smart as all of us.

Will Katz Williamsburg, Va.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I want to have a career working in the semiconductor industry, helping to create new cutting-edge chips.

Course Comment: This course gave me the opportunity to work on a project at all stages: design, build, and test. I have learned a lot of valuable lessons from this that will help me in my career.

Zachary Krough Pennsville, N.J.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: My goal is to have a career in robotics development to help create the cutting edge of technology.

Course Comment: I believe that there is no better teacher than a problem at hand and infinitely creative ways to solve it. This course provides that experience, and it has been my best teacher thus far.

Alex Miller Mechanicsville, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I hope to find a career in which I can use my skills in software development to improve connectivity between people worldwide.

Course Comment: Working with a fantastic team of engineers in a truly challenging engineering environment has been easily the greatest learning experience of my career so far.

CUSTOMERS: DYLAN GOOCH, GREGORY TURNEY, DANIEL MORAN

Experimental Cellular Positioning System

S23-43

LEFT TO RIGHT: Daniel Majikes, Miles Martiska, Sean-Dre Benjamin, Colin Lawson, Justin Potter
SME: Carl Dietrich

CHALLENGE

Design and build a positioning system that wirelessly tracks an object's location, taking advantage of cellular communications standards. Messages are sent over the air between software-defined radios on the object and on no fewer than 3 observation points (OPs). These wireless messages provide data to calculate path losses between the object and the OPs, which then allows a central computer to estimate the object's position using a custom-made positioning algorithm. This system will ideally be able to scale up to support tracking several objects in a large warehouse.

Sean-Dre Benjamin Virginia Beach, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: I hope to have a career in cybersecurity for autonomous vehicles.

Course Comment: This class was helpful to prepare for a real-world job.

Colin Lawson Silver Spring, Md.

Bachelor of Science in Computer Engineering
Computer Engineering (general)

Aspirations: I hope to have a career in cybersecurity, networking, and Cloud computing.

Course Comment: This was a great experience with hands-on work.

Daniel Majikes Richmond, Va.

Bachelor of Science in Electrical Engineering
Communications and Networking

Aspirations: I hope to have a career in either communications engineering or project engineering somewhere on the East Coast.

Course Comment: The class gave valuable experience in how to do research on new topics.

Miles Martiska Newtown, Conn.

Bachelor of Science in Computer Engineering
Controls, Robotics, & Autonomy

Aspirations: I hope to have a career within Robotics while also being able to apply my AI skills. I also hope to work in photonics and computer vision.

Course Comment: I was able to get good experience while also learning about technology that is being used in the industry.

Justin Potter Springfield, Va.

Bachelor of Science in Computer Engineering
Networking & Cybersecurity

Aspirations: My goal is to have a career in embedded software engineering for devices such as Internet of Things (IoT) devices, home security systems, and ECUs in automobiles.

Course Comment: This course provided a great hands-on experience for understanding how a real engineering project would be planned, prototyped, and implemented.

CUSTOMERS: CARL DIETRICH

Bradley Department of Electrical and Computer Engineering

Best in Course Recognition for Base Course performance

Fall 2022

ECE 1004 — Introduction to ECE Concepts

- Mohammed Kattoa
- Emre Ramiz

ECE 2024 — Circuits and Devices

- Abby Dillard
- Dawson Schraiber

ECE 2214 — Physical Electronics

- Jia Xue Kow

ECE 2514 — Computational Engineering

- Nick Eastman
- Connor Kadel
- Theo Norledge
- Richard Martinez

ECE 2544 — Fundamentals of Digital Systems

- Nolan Attreed
- Peter Costecu
- Jacob Kawada
- Thomas Lu

ECE 2564 — Embedded Systems

- John Riley Gagnon
- Jivitesh Kukreja
- Jenny Li

ECE 2714 — Signals and Systems

- John Gagnon
- Emerson Rodriguez

ECE 2804 — Integrated Design Project

- Evelyn Chua
- Jia Xue Kow

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