



47th Annual
Trenton Computer Festival
 The Oldest Personal Computer Show in the World
 The College of New Jersey

2023 PROGRAM

<p>Talks & Forums Saturday, March 18 - 9:00 am to 5:00 pm ET Talks/Forums start at 10:15 am</p>	<p>In-Person Admission: \$15 (advance), \$20 (at door). Children under 12 Free; Free Parking & Wi-Fi Free Streaming through: www.TCF-NJ.ORG</p>
<p>TCF Banquet Requires Advance Reservations (\$40, email Al Katz: alkatz@tcnj.edu by March 13)</p>	<p>Sarnoff Tours in Roscoe West Hall (10:00 am - 3:00 pm) EV Car Show and EV Ride & Drive (10:00 am - 2:00 pm)</p>

Sponsored by: The College of New Jersey (TCNJ) Electrical/Computer Engineering Department – www.tcnj.edu/~engsci/

with the support of

IEEE Princeton/Central Jersey Section (PCJS) – site.ieee.org/pcjs

ACM/IEEE-CS – Joint Princeton/Chapters of ACM and IEEE Computer Society – princetonacm.acm.org

NYACC – New York Amateur Computer Club – www.nyacc.org

ACGNJ – Amateur Computer Group of New Jersey – www.acgnj.org

GSJUG – Garden State Java User Group – www.gsjug.org

Member of the New Jersey Makers Day Partnership

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- Lenny Wintfeld – Mt. Airy VHF R.C. (Pack Rats) – Flea Market

TCF Keynote Speaker

Lee Goldberg, author of “Green Electronics”, and a
 Contributing Editor of Electronic Design Magazine;
 speaking on “Evolving EVs”
3:40 pm in ED 115 Track-1
 (EVs and Related Technologies)

TCNJ

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******* Keynote Event: Evolving EVs *******



**Keynote Speaker:
Lee Goldberg, 3:40 pm ET**

Contributing Editor of Electronic Design Magazine
Author of the book "Green Electronics"

Bio: Lee began a second career as a tech journalist after spending the first 18 years of his career in electrical and aerospace engineering. Three decades later, he's still writing, currently serving as the Power Management editor at Electronic Design, where he focuses on the technologies, products and design practices that are helping build a vibrant, sustainable, low-carbon economy. His coverage includes renewable energy, energy efficiency, and electric transportation. When he's wearing his "freelance hat" Lee also writes about aviation and aerospace, 3D printers, open-source hardware, and other Maker/Hacker technologies. He also continues his coverage of sustainable technologies and various environmental and social issues within the engineering community which he began in 1996.

Lee holds a BSEE in Electrical Engineering from Thomas Edison University, and is a recipient of the Mesa Refuge Writer's fellowship. Lee's book, "Green Electronics/Green Bottom Line - A Commonsense Guide to Environmentally Responsible Engineering and Management" was published by Newnes Press.



See Other Speakers info below (Still being edited)

***** 10:15 am to 11:10 am *******

T-1: How Green Is an Electric Vehicle? Jonathan Allen, RF Electronics Consulting



Abstract: This talk will analyze the energy, “green” and otherwise associated with an electric vehicle, from manufacturing through its service life. We will include efficiencies and regenerative braking. The talk will give some consideration to end-of-life salvage. We will compare these energy budgets with those of a comparable fossil fueled vehicle. The analysis will also consider the power sources used for charging, once again comparing renewable with conventional electric generation.

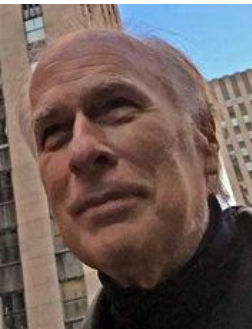
Bio: Jonathan Allen received his Ph.D. in physics from Washington U. in St. Louis with an emphasis on environmental science and a dissertation in the measurement of atmospheric aerosol particles. Since then his career has been mainly in research and development of solar photovoltaics and industrial electronics. He is now semi-retired and working as an independent consultant.

T-2: How the Electric System Works, Donald Benjamin, Princeton Senior Resource Center

Abstract: Most of us take electricity for granted and expect the lights to stay on. In this presentation, we’ll explain the parts and pieces that make our electricity grids reliable, review the present fuel sources for generating electricity, and consider where we may be headed. Along the way, we will focus on managing our expectations. This presentation covers: 1. How electricity is generated in the U.S. and Canada. 2. The primary fuels we use to produce electric power. 3. Fuel use projections through 2050. 4. The electric transmission system in the U.S. and Canada. 5. Daily variations in electricity demand. 6. How our electric system can accommodate electric vehicles.

Bio: A native of Jacksonville, Florida, Don graduated from the University of Florida with a BS degree in computer science and ME in electric power systems in 1973. He began his career as an operations engineer at the Florida Reliability Coordinating Council in Tampa, which is a consortium of the electric utilities in the state. In 1983, he moved to Princeton, New Jersey, to assume the role of operations director and then vice-president of operations at the North American Electric Reliability Council (NERC), the electric reliability organization that writes the rules for operating the electricity grids in the U.S. and Canada. In 2007, he left NERC and helped form the North American Transmission Forum, an organization of electricity transmission line owners, and became its executive director. The Forum, created as a result of the 2003 Northeast blackout, enables its utility members to share best operating practices and conducts peer reviews of utility operations. Don retired in 2013 and has been a computer tech volunteer at the Princeton Senior Resource Center ever since. He joined the PSRC board of trustees in December 2014.

T-3: WordPress Bootcamp, Louis J. Judice, The Round Mountain Group, LLC



Abstract: WordPress is by far the most widely used platform for building websites, blogs or whatever else you can imagine on the web. It is used in education, corporate, government environments as well as by individuals. Back by popular demand, the TCF WordPress Bootcamp gives a solid introduction - and answers many questions for novice, intermediate and experts alike.

Bio: Louis Judice has designed and built hundreds of WordPress sites for business, government and non-profit clients since founding The Round Mountain Group, LLC in 2004. He is the creator of the TCF website and a member of the TCF board. Previously Judice worked for the RCA Solid State Technology Center in Design Automation software development; Digital Equipment Corporation in UNIX engineering and telecom system architecture; and Hewlett Packard as Worldwide Product Manager of mobile internet technology and Director of Mobile E-Services. He received a BE in Electrical Engineering degree from Manhattan College and is a member of the IEEE. [Lou is also the TCF webpage designer and a Hunterdon Happening List Finalist - Best Web Designer - 2019].

T-4: Financial Cybersecurity: Your Retirement Investments Aren't As Secure As You Thought, Cody Hofstetter, Consultant

Abstract: This presentation covers a brief overview of how our current financial systems came to be; the security (or lack thereof) found within our financial institutions, and what an individual should look for to safeguard the security of their investments. The information provided pertains to every individual that participates in our economy and allows the entire audience to leave the presentation with practical, immediately applicable knowledge. In addition, we will cover the presently available and upcoming federal and state tax credits/rebates for assisting purchasers of EVs.

Bio: An entrepreneur at heart, Mr. Hofstetter’s background is originally in finance and he has been forming and buying companies since the age of 19. As Founder and CEO, the two projects occupying the majority of time include his IT/Cybersecurity firm and Wealth Management Financial Advisory firm. The cybersecurity business is specialized in enterprise security training and red teaming while

the advisory firm focuses on creating, growing, and maintaining personal and generational wealth for clients to live the lifestyles they dream of. Some of his other current and past ventures include owning a finance/day-trading firm, a community focused healthy restaurant, being a national speaker, certified personal trainer, lyricist & songwriter for several musicians, TV series, and films in addition to acting credits as well. If you'd like to hear about more endeavors, have a specific question, or hope to work together, come talk to me at our next event.

T-5: The Most Important Computer You Never Heard Of, Frank O'Brien, Infoage Science Museum and NASA



Abstract: Imagine a nationwide network of computers, each housed in a building nearly the size of a city block, all interconnected with high-speed data links, radars and countless other devices. They are part of the military's system of air defense, monitoring the skies for Russian bombers heading for the United States. If a bogey is spotted heading for US airspace, a quick check of all known flight plans verifies that it is an unknown. With a few clicks on the radar screen, fighters are scrambled to intercept and identify the intruder. Hopefully the target is friendly; if not, it's a bad day for everyone.

This isn't an excerpt from a dystopian graphic novel, or a cut 'n paste from a current aerospace magazine. In truth, this is all ancient history. The system was called SAGE, and was implemented in 1958. We will be talking about the computer behind SAGE, how it made IBM into a powerhouse, and became a pop culture icon.

Bio: Frank O'Brien has been at the Infoage Science Museum for 16 years, contributing to their history/education/public outreach mission. His original focus was as one of the editors of the Apollo Journals, now considered the definitive resource for those interested in mankind's greatest voyage of exploration. Over the last decade he has been a NASA Solar System Ambassador, running events and giving lectures once or twice a month on a wide range of spaceflight topics. Frank graduated from Rutgers University with a degree in Computer Science, and later returned to earn his MBA. Notably, he lives just down the road from where the Martians landed at Grovers Mill in 1938.

T-6: Exploring STEM Competitions, Bill Wong, Endeavor Business Media



Abstract: There are a host of science, technology, engineering and math (STEM) competitions that students can enter every year. They cover challenges like building robots and provide a way to highlight the students work and interests. These competitions require a bit of effort to coordinate and run and almost all are run by volunteers. In this session we take a look at the variety of competitions and the challenges of running them as well as how people can become involved in helping out. We will also take a look at the differences in competition and the challenges that students, teachers and groups have to contend with when considering entering a competition.

Bio: Bill Wong is Senior Content Director with Endeavor Business Media and Editor of Electronic Design. He was the first Director of PC Labs with PC Magazine. He earned a Bachelor of Electrical Engineering at the Georgia Institute of Technology and a Masters in Computer Science from Rutgers University.

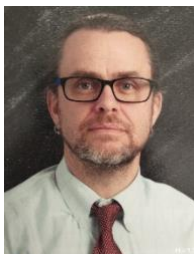
T-7: Ending a Digital Life, Don Libes, Author



Abstract: We are now dealing with the first generation that have extensive digital footprints. Hear practical advice and lessons learned on cleaning up your parents' digital messes and leaving your children without one of your own.

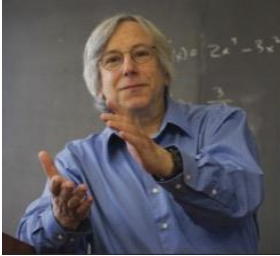
Bio: Don Libes is a computer scientist. He has published many scholarly papers and written three books: *Life with UNIX*, *Obfuscated C and Other Mysteries*, and *Exploring Expect*.

T-8: Personal Digital Audio Servers: The DIY Digital Audiophile, Tim Arnold, Educational Consultant - Coacharnold



Abstract: The rise on digital streaming services and the resurgent popularity of records have made our personal CD and media collections obsolete; that doesn't need to be the case. The wealth of exciting open source media servers can breath new life into your audio enjoyment. In this talk we will look at several linux centered servers that create some very exciting home audio listening options.

Bio: Timothy Arnold has been working in education and computer audio for 20+ years. He is an avid computer audio enthusiast and DIY builder.

T-9: Writing Tech Books and Articles, Barry Burd, Drew University

Abstract: How do you write a computer book? How do you propose an idea? What should you send to a publisher? What are publishers looking for? How do you evaluate a writing contract? What are the stages of the authoring process? How much time does the process take? What should you do once the book is published? As an experienced computer book author, I'll answer these questions and many others during this question-and-answer session.

Bio: Barry Burd is a professor of Mathematics and Computer Science at Drew University in Madison, NJ. He's the author of several books, including *Java For Dummies*, *Flutter For Dummies*, and *Java Programming for Android Developers For Dummies*, all from Wiley Publishing. In 2020, he was honored to be named a Java Champion.

T-10: Introduction to Object-Oriented Programming and Design Principles, Michael Redlich, Garden State Java User Group (GSJUG).

Abstract: Object-Oriented Programming (OOP) is a programming paradigm that models real-world objects. The most well-known and widely-used OOP languages are C++ and Java, but some languages, such as Simula-67, were around much earlier. The advantages of OOP over structured programming include modularity and code re-use. As OOP has evolved over the years, things like design patterns and design principles have guided developers to write applications that are more adaptable to modification.

This presentation will provide an introduction to OOP, its basic attributes (encapsulation, abstraction, inheritance, and polymorphism), the class mechanism, and some design principles that have led to the development of design patterns. An example Java source code will be reviewed to demonstrate the features of OOP and design principles.

Bio: Michael Redlich is a Senior Research Technician at ExxonMobil Research & Engineering in Clinton, New Jersey with experience in developing custom scientific and web applications. His technical expertise includes object-oriented design and analysis relational database design and development, Java, C++, Python, Matlab and other programming/scripting languages. Mike has been an active participant in the Java community for over 20 years having facilitated the Garden State Java User Group since 2001 and writing Java news for InfoQ since 2016. He has contributed to open-source projects and serves on the leadership council of the Jakarta EE Ambassadors.

*****11:20 am to 12:15 pm*****

T-1: Clearing up Common Misconceptions about Electric Cars, Liz Najman, Recurrent Auto



Abstract: Working in electric vehicles, we hear a lot of patently false propaganda about EVs. But, we also get a lot of honest questions from our well-intentioned friends. We weigh the facts about battery degradation, thermal management, the environmental cost and benefit of electric motors (regardless of local electricity generation), effects on the electric grid, and local air quality benefits.

Bio: Liz Najman is the Content Marketing Manager at Recurrent, a science-driven startup that focuses on bringing data and transparency to the electric vehicle market. She studied climate modeling at Stony Brook University, Russian at Columbia University, and mathematics at Reed College.

T-2: Program your EV using Python and OBD-II, Chuck Knight, ExxonMobil's Corporate Research Center

Abstract: With Python and a simple \$20 Bluetooth device you can gain access to your electric vehicles real-time sensor data using its OBD-II vehicle ports. During this seminar we'll show you how to:



- Setup and configure your python environment
- Access your vehicles trouble codes
- Access real-time data about your vehicle
- Perform simple hacks to the operation of your vehicle

Bio: Chuck Knight has been working in the IT industry for 42 years; the last 24 years with ExxonMobil. He has spent his career working on various scientific and high performance computing platforms for applications including NASA's space shuttle thermal analysis, reservoir simulations and seismic imaging, as well as many other proprietary and commercialized efforts.

Chuck is currently a Principal Scientific Computing Engineer for ExxonMobil's Scientific Computing team at ExxonMobil's Corporate Research Center. Chuck obtained his BS in Computer Science from Michigan State University. Chuck also has an MS in Computer Science as well as an MBA from the University of Houston.

T-3: WordPress Bootcamp continued from last session

T-4: Stock Trading Using Neural Networks and Genetic Algorithms, Donn Fishbein (AB80H), Nquant.com



Abstract: Many algorithmic trading systems use combinations of indicators, each which may have one or more parameters. Selecting the best way to combine indicators, and the optimal parameters to use for each indicator, in order to produce a buy, hold or sell signal, can present a challenge. Artificial neural networks and genetic algorithms are mathematical techniques that can assist in arriving at the best formula for combining indicators with the optimal parameters to maximize trading profit. This talk will review the basics of these techniques, and demonstrate their usage in the development of a trading system for stocks or indices.

Bio: Donn Fishbein, MD, PhD, is a physician and scientist who has investigated and traded the financial markets for 25 years. His particular area of interest is mathematical systems with biological roots. For the past fifteen years, his focus has been on hybrid artificial neural network and genetic algorithm systems, both for end-of-day trading and more recently for day trading systems. He has lectured on these subjects, describing profitable systems for trading equities, exchange traded funds, and index futures. He contributes trading signals to a neural net trading website and offers consulting services and private development of trading systems based on these technologies.

T-5: High Fidelity Sound: A Rational Approach to Achieving Excellence in Speech and Music Analog and Digital Recording and Reproduction, Scott Marshall, Author and Audio/Video Consultant

Abstract: The history of sound recording and reproduction will be summarized along with how frequency response, noise, and distortion were handled in the past and up to the present day's digital technology. The special problems of movie and video sound will be covered, along with stereo and multichannel surround and subwoofers. We will discuss both the colloquial and technical meaning of what is called "High Fidelity," dispel some of its myths, and discuss useful approaches to improving a system that "just doesn't sound quite

right.” Psychoacoustics (the scientific study of sound perception) and the importance of double-blind and triple-blind listening tests will also be emphasized.

Bio: Scott Marshall was the lead programmer and architect of cinema sound at the David Sarnoff Research Center under contract with Hollywood’s Technicolor Corporation. He has also been contracted to develop sound and music for video games and has always been interested in high end audio systems past and present. He has lectured and written about movie technology, past and present. He is retired and an active member of the New Jersey Antique Radio Club, where a particular interest is obtaining the best possible sound quality from vintage electronics. Scott’s recent talk on the history of movie sound was called a “home run” by the organizers and received the comment, “I’ll never think about stereo the same way again.”

T-6: Conscloous, Eva Kaplan, Intelligent Systems, Consultant in Computer Education and STEAM



Abstract: My talk will be on ANIMAL & PLANT "CONSCIOUSNESS" and BIO ROBOTICS.

Bio: Eva has been a presenter for TCF since its inception. Hunter College inducted her into its Hall of Fame for her contributions to Computer Education. In 1964, Eva received a Master’s Degree in Interrelated Arts from New York University. Also, to be noted is that in 1961, she established Computers and Kids Summer Camp - often attributed as among the first and longest running computer/technology/STEM summer programs.

T-7 TCNJ ECE Senior Project Student Presentations

T-7a: Autonomous Navigation Robot Guide Dog, Nicole Lim and Elizabeth Lopez; Adviser Dr. Kim

Abstract: Guide dogs, also known as seeing-eye dogs, have been depended upon and used to assist the blind and/or the visually impaired for almost a century now. The aid of a loyal and well-trained companion can be beneficial to a person with visual impairments; however, the accessibility and maintenance of these dogs pose a significant issue. As there exists various places that prohibit animals, we propose a device that can be taken to all indoor spaces (tested in Armstrong Hall) and perform similar actions to that of a guide dog. Through the utilization of the TurtleBot3 WafflePi, a programmable robotic operating system, ROS, mobile robot, implementations of characteristics guide dogs possess can be incorporated. This allows for the decrease in the typical limitations guide dogs pose. With the use of computer vision, the robotic dog should effectively be able to detect and avoid obstacles with depth estimation and with the use of stereo camera methods in lieu of the Light Detection and Ranging, LiDAR, sensor. With this, the guide dog will be able to safely escort the visually impaired to the respective classrooms by invoking text identification Python scripts.

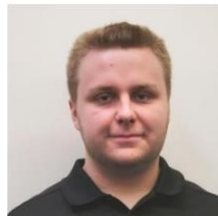
T-7b: Autonomous Rover for Aid in Disasters; Nia Harish, Nithya Nalluri and Matthew Bohr; Adviser Dr. Adegebe

Abstract: In the event of a natural disaster, affected areas may contain individuals who are trapped without access to food, water, medical supplies, and proper access to communications networks. Our team proposes a solution to this issue in the form of an autonomous rover, which is designed to navigate rough terrain and deliver materials and supplies to those who are awaiting rescue from emergency services. The main goals for the rover design include using control systems for speed control, and cameras and computer vision for obstacle detection. The main objective for the first part of our project, is to have the rover in a tele-operated mode, where the user will use a laptop with keyboard controls to navigate the robot from a distance. We have been able to successfully control the rover in teleoperated mode, and are currently working towards designing the mechanism for wireless power supply, which will allow us to operate the rover for at least 30-60 minutes continuously in tele-operated mode. The goal for the end of the project is to use computer vision and machine learning with live camera feed to allow for the rover to navigate autonomously from point A to B, and can thus be “deployed” by the user.

T-7c: Electric Power-Train for Two-Passenger EV ATV; Chris Quilan and Jake Stephan; Adviser Dr. Sepahpour



Christopher Quilan



Jacob Stephan

Abstract: In this project, members were tasked with designing an electric power-train that serves to replace the internal combustion engine typically found in All-Terrain Vehicles (ATVs). This power-train will be capable of switching between all-wheel drive, front-wheel drive, and rear-wheel drive; while also achieving a top speed of no less than 27 mph. To accomplish this, research was conducted to select ideal components for the system as well as how to configure those components to design a cohesive drive-train. Analysis was conducted to determine the amount of electrical power required to supply the four independent motors with an overall goal of generating range of 9-12 HP. As a proof of concept, a 1/4-1/6 scaled prototype is to be built in order to demonstrate the reliability and effectiveness

of the design to operate at full scale. All components in the scaled model must be within relative distance of the required 1/4 scaled range while also being able to demonstrate functionality through propulsion and smooth operation. By going through the engineering design process, this project will prove fruitful and lay a foundation for all future teams at TCNJ that plan on utilizing electric drivetrains.

Bio: Chris Quinlan, the project lead, is a senior mechanical engineering student. His main focus for the project includes all of the drive system components, including the selection of motors, motor configuration and motor control within the full scale model and prototype, along with the prototype suspension system. Jake Stephan, the webmaster, is a senior engineering science major with a specialization in mechanical engineering. Jake's technical specialty within the project is in regards to the power supply system which includes all batteries as well as battery management systems. In addition, Jake is in charge of the control components including the throttle in the full scale model and controller/receiver in the prototype model.

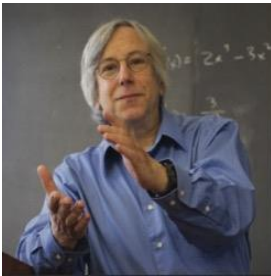
T-8: Creating Bug-Free Embedded Code: Programmers, Tools or ChatGPT? Bill Wong, Endeavor Business Media



Abstract: Programmers want their code to do the right job but that is harder than most people think. It is critical these days given the level of connectivity that most applications encounter, even those designed for embedded applications. Applications for critical and safety environments like automotive, medical and avionics have methodologies that must be followed to deliver solutions that meet certain requirements. There are many ways to improved code quality and reduce the number of errors in a program. Compilers help. Languages like Rust and SPARK force programmers to provide more detail that compilers can check. We even have artificial intelligent tools looking over our shoulders with tools like Copilot and ChatGPT. All this and more will be discussed during this session.

Bio: See 10:15 am to 11:10 am time at T-6.

T-9: Airline Pricing: A Computer Programmer's Worst Nightmare, Barry Burd, Drew University



Abstract: If you've struggled to find a good price for a flight, you're not alone. The airlines' websites show you dozens of options, restrictions on fares appear everywhere, and last-minute fees add to your total cost. Each travel site claims that its software finds the best prices. But how reasonable is that claim? Is flight shopping merely confusing, or is there something inherently challenging about the airfare optimization problem? Researcher Carl de Marcken studied this question and came to some surprising conclusions. De Marcken showed that a simple version of the optimization problem is what specialists call NP-hard or intractable. The scale of the problem grows too quickly for any hardware to keep up. So solving the problem with our best systems isn't feasible. De Marcken went further and proved that solving the fully-formed flight optimization problem is theoretically unsolvable. No matter how much computing power is available, you can't find the best flight from home to Atlanta. Booking a flight isn't merely a big problem -- It's an impossible problem.

Bio: See 10:15 am to 11:10 am time at T-9.

T-10: Getting Started with Java, Michael Redlich, USJUG



Abstract: Java is an object-oriented programming (OOP) language created by James Gosling at Sun Microsystems that was first introduced to developers in 1995. It is one of the most popular programming languages for client/server web applications and there are many scripting languages (Clojure, Groovy) that seamlessly interact with Java. Much of Java's language syntax was derived from the C++, but as James Gosling once stated, "Java is C++ without guns, knives, and clubs." This presentation will provide an introduction to the Java programming language, provide a brief overview, how to get started, review some Java keywords, introduce the Java class mechanism, and review a small, working Java application. The example Java application will demonstrate how the attributes of OOP are utilized within Java classes.

Bio: See 10:15 am to 11:10 am time at T-10.

*****12:25 pm to 1:20 pm*****

T-1: The Future of Electric Cars: How do they charge them up? Do they really bring benefits? Philip T Krein, Prof. Emeritus University of Illinois



Abstract: The shift to more electric cars and transportation brings opportunities for control, extreme performance, energy reduction and flexibility, cheaper operation, and lower emissions. Customers see limited range, battery performance limits, slow refueling, and lack of charging facilities as big drawbacks. This presentation shows how the energy needs of most electric and plug-in hybrid cars can be met with the conventional electrical outlets most of us have. Safety protection, metering, billing, and other functions can be supported by a car to turn a “dumb” electrical outlet into a smart vehicle charge point. Actual driver needs are discussed, showing how more advanced chargers fit in. Survey results on the University of Illinois campus help to support the ideas. The talk explores how to think differently about electric cars and energy. Flexibility can make electric vehicles important partners for the future of electricity.

Bio: Philip Krein has been working on electric and hybrid cars for almost 30 years. He works on high-performance motors, circuits and systems for chargers, and interconnections to the power grid. He is the Grainger Endowed Chair Professor Emeritus in Electric Machinery and Electromechanics at the University of Illinois at Urbana-Champaign and was the founding Executive Dean of the Zhejiang University / University of Illinois at Urbana-Champaign Institute in China. His startup company, SolarBridge Technologies, Inc., developed long-life integrated inverters for solar energy. He holds 42 U.S. patents and is a past President of the IEEE Power Electronics Society and a past Chair of the IEEE Transportation Electrification Community. He is a Fellow of the IEEE, a Fellow of the U.S. National Academy of Inventors, and a member of the U.S. National Academy of Engineering.

T-2: Role of Embedded Computing in modern day Battery Electric Vehicles (BEV), Sharan Kalwani, DataSwing LLC



Abstract: The role of computers has grown steadily over the last 30-years in the automotive world. With the recent advent of Battery Electric Vehicles (BEV), it has jumped even higher. We will take a good look at all the various parts of the BEV where embedded computing plays a critical role, such as battery monitoring, battery management, kinetic power conversions, braking energy recovery, etc. We will summarize the BEV architecture and the key embedded systems as well.

Bio: Sharan Kalwani is an industry technology specialist with over 25+ years of experience. He has degrees in both Engineering and Computer Science. He has worked in many diverse areas. Sharan is a senior member of IEEE and participates in the IEEE Computer/Education/Power Energy and Vehicle Tech Societies respectively. He is also a member of SAE and ASME, is an emeritus member of Michigan! user group (mug.org), the oldest of the *NIX user groups based in Michigan (1985). He enjoys teaching, holds an Adjunct Faculty position at several local educational institutions. He also serves on the advisory board for the Computer Science

Department at Loyola University-Chicago. Sharan has published one book "Linux and Internet Security", and is now working on his second. He is a recipient of the IEEE MGA Achievement award for his contributions to IEEE activities in 2018. Recently in January 2022, he was awarded the IEEE Region 4 Jack Sherman Outstanding Member award for 2021.

T-3: Wearable Synthesizer (Live Computer Music Concert & Discussions), Don Slepian, Electronic Music Education and Preservation Project



Abstract: Noted local Electronic Musician and instrument designer Don Slepian will demonstrate "Marching Electronica", a digital sound enhancer designed for marching bands. He will show a wireless rechargeable-battery-powered musical application of mobile microprocessors with a commercially available synthesizer model from WearableSynths.com.

Bio: Don Slepian sold many copies of his first LP record, "Computer Don't Breakdown", from the tailgate of his car at the TCF outdoor electronics marketplace in 1982.

T-4: Internet Job\$\$\$, Donald Hsu, Dominican College.

Abstract: Amazon, Apple, Facebook, Google, IBM, Microsoft, Netflix, Tesla stocks are up. Yes, the economy is booming. Retirees are working! --- Eighty percent of people got jobs from the Internet. Accounting needs 2.1 million (Cyber Security, Forensics, QuickBooks, PeachTree, MS Dynamics); Software Developer/Engineer (Android, C++, Java, C#, Python) - thousands of jobs, but no applicants; Cloud Computing (Amazon AWS, Cisco Webex, Dropbox, IBM, Microsoft Azure, Salesforce, VMware, Zoom); Big Data (MS Sql server, MongoDB, Oracle, SAP, Data Warehouse), starting at \$85,000; Networking (Cisco, Info Security, A+, Network+, CIEE, CISSP); Systems (Unix, Linux, Window 10); Analytics (IBM RSA, IBM SPSS, SAS, R, Python, Hadoop), Social Media Manager (Facebook, Instagram, LinkedIn, Pinterest, Snapchat, Tiktok, Twitter), Artificial Intelligence, Deep Mining, Quantum Computing, Project/Product Manager, Global Finance, Sales/Marketing of Tech Product/Services --- Computer majors are down 40 to 70% in US universities. This means more jobs for you and me. --- Bring a resume and get a free critique from the speaker.

Bio: Donald Hsu, PhD., Professor Dominican College, Dissertation Chair University of Phoenix, and President Chinese American Scholars Association (CASA). He has trained/taught 70 subjects - Accounting to Unix 14,000+. Clients/students work at Amazon, Apple, AT&T, Bank America, Facebook, Goldman Sachs, Google, IBM, JPMChase, Mercedes Benz, Microsoft, Morgan Stanley, New York Presbyterian, Oracle, Salesforce, Siemens, Sony, Toyota, UPS, Verizon and other Global 500 firms. CASA ran 28 successful E-Leader conferences in Asia and Europe, <http://www.g-casa.com>. He traveled to 90 countries in Africa, Asia, and Europe for international business. Don's profile is here, with 9,000+ partners/clients on LinkedIn, and 266 public recommendations, <https://www.linkedin.com/in/dohsu>.

T-5 TCNJ ECE Senior Project Student Presentations**T-5a: Lightning Detection & Early Warning System, Claude Lund, Charles McBride, Brian Puccio; Adviser Dr. Khan**

Abstract: Lightning detection and early warning systems established at sports complexes and campsites can be extremely useful tools when it comes to the safety of the general public. Lightning is an extremely dangerous natural phenomenon that can put people's lives at risk if they are participating in outdoor activities such as swimming in a large body of water or playing sports on a wide open field. Knowing that lightning is occurring within a certain area can keep disasters from happening. With our system we can detect lightning within a specified range and notify a user of the situation. Our approach involves a two input detection system that can detect the RF signal generated by lightning as well as the light flash emitted by cloud-to-cloud lightning as well as cloud-to-ground lightning occurrences. These signals are then validated using a microcontroller, which notifies our website that lightning has occurred within the detectable range of our system. Current progress includes our RF detection circuit has been simulated using LTSpice and tested on a breadboard. Our electrically small loop antenna has been fully simulated using FEKO resonating at the correct frequency. Interfacing between our photodetector and microcontroller is currently underway and our webpage has been established with information regarding our project. The GPS module for our microcontroller has been debugged and sending accurate data and interfacing between our microcontroller and webpage is currently still in progress.

T-5b: High Altitude Weather Balloons, Nicholas Cappello, Justin Mazzitelli, Tyler Schaberick, Zain Shaikh, Joseph Stahl; Adviser Dr. Wondmagegn

Abstract: High-altitude weather balloons or HABs, are used to analyze weather and atmospheric patterns as well as collect photos and data at high altitudes. Meteorologists and scientific communities make use of HABs to assist them in predicting periods of extreme weather, or to conduct research in regards to the atmosphere. The high-altitude weather balloon will be responsible for collecting data at the target altitude of 60,000 feet including location, temperature, humidity, and video capture. The main objective of this senior project is to create, launch, collect data and recover the HAB. After analyzing the data, the data will be graphed and a map that follows the balloon's flight path will be displayed.

T-5c: Bouncing LoRa Signals Off the Moon, Benjamin Winkler, Wally Lizardo, Jacob Ringers and Patrick Murphy; Adviser Dr. Katz

Abstract: The main goal of this project is to establish Earth-Moon-Earth communication with LoRa modulated signals. There are three main goals that this project is trying to accomplish. The three goals of our project are to reflect a signal off the Moon and receive it back here in New Jersey, transmit a signal from here in New Jersey, bounce it off of the Moon, and then receive the signal on a dish located in Alaska, and our final goal for this project is to establish two way communication between New Jersey and Alaska. Our initial approach to this project is to use SDRAngel to modulate and demodulate our signal. SDRAngel is a free, open-source software that we can use to transmit and receive signals via SDR (Software Defined Radio). Our modulation technique, LoRa, uses Chirp Spread Spectrum modulation that allows for low power, long range transmissions at the cost of a low data rate. The peripheral of choice for this project is the HackRF One, a SDR peripheral that allows us to send and receive signals.

T-6: Mystabar2 – A New Educational Adventure Game, Randall Cole, Vertical Screen

Abstract: Mystabar is an adventure game in which players solve a series of puzzles using strategy, hints, internet research, and clues found within the hosting establishment. This talk will discuss Mystabar2 and will cover how to play the technologies used to create Mystabar, and answer any questions players may have. Mystabar2 players may log into a cloud-based mobile-first website using

smartphones, tablets, or laptops. Information from the site is combined with information from the establishment to solve puzzles and score points. This is an “escape the room” type of experience.

Bio: Randall Cole is Vice President of Information Technology for Vertical Screen, a background check company. He has been in IT for more than 20 years, specializes in enterprise networking and security, and has managed all aspects of an IT department. He is a Microsoft CSE, CPMP, ITIL Certified, CISSP and CEH. Randall has an MS in Information Science from Pennsylvania State University and a Bachelor's degree from Temple University. He is an adjunct instructor for Gwynedd Mercy University, teaching Computer networking and security. He has also competed for the last ten years in various competitive hacking contests at DEF CON, as well as a volunteer for the convention.

T-7: Autonomous Multipurpose Service Robot “Sudha”, Rajesh Kannan Megalingam, Amrita Vishwa Vidyapeetham University, Kerala, India



Abstract: The physically challenged and elders with mobility issues face difficulties in carrying out their daily activities at their residences. They need personal assistants to help them with their actions. But labor scarcity and cost are significant problems in many countries. Sudha was developed to assist and interact with people by receiving voice commands. Sudha can help them with a glass of water, picking up a book, opening the doors, replying to their queries, etc. In addition, Sudha can be used for cleaning toilets, stacking and sorting objects, etc. Highly sophisticated navigation, speech, and image recognition software modules are integrated with Sudha. It has six DoF robotic arm with a gripper of maximum payload 1kg and Intel real sense camera attached to it. Sudha has LiDAR, Rotary Encoders, and a 9-axis IMU (Inertial Measurement Unit) for mapping, localization, and autonomous navigation. Sudha has advanced speech recognition module and deep learning based object recognition module.

It can answer any query from the user on any topic. With integrated sensor system Sudha can autonomously navigate the facility by using the map of the facility. Sudha performing tasks including stacking and disposal, toilet cleaning, interaction with customer etc. will be presented. In first part of the talk, the problems associated with the people with mobility issues and several existing robotics and automation solutions will be discussed. This is followed by the presentation on the design and implementation and simulation tests. It will be concluded with a case study in real time scenarios to perform tasks including stacking and disposal, toilet cleaning and interaction with customer.

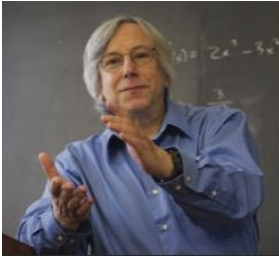
Bio: Dr. Rajesh Kannan Megalingam is the Director, leading research on humanitarian technologies with special emphasis on Robotics at HuT (Humanitarian Technology) Labs, and Amrita Center for Advanced Robotics, Amrita School of Engineering, Amrita Vishwa Vidyapeetham University, Kerala, India. He holds Professor position at Department of Electronics and Communication Engineering at the same school. He completed his undergraduate in engineering from College of Engineering, Anna University, Chennai in 1997 and masters and PhD at Amrita Vishwa Vidyapeetham University in 2010 and 2015 respectively. His research focuses on agriculture robots, healthcare robots, medical robotics, disaster management robots, IOT for healthcare etc. He has published more than 180 research papers reputed journals, conferences, and book chapters. He is the founder of Megara Robotics, which was adjudged one of the top 30 startups in India in 2020. He has won several awards including the Award of Excellence, two times from Amrita University, the highest award by the university, Best Paper awards, Best Design awards etc. He is the IEEE student branch counselor which has won several national and international recognitions, awards, project funding etc. under his leadership which includes the Outstanding Branch Counselor and Advisor award from IEEE, NJ, USA and Outstanding Branch Counselor Award from IEEE Kerala Section. In addition, he won several best paper awards at IEEE international conferences. Recently he won the IEEE Undergraduate Teaching Award for the year 2020 from IEEE, New Jersey, USA.

T-8: Hands on Arduino Workshop for Beginners, Katalin Frolio, Lockheed Martin in Moorestown, NJ / Consultant; Workshop, ends 2:25 pm.



Abstract: The main goal of the workshop is to introduce participants to electronic devices and basic circuit theory. The Arduino is an affordable, flexible, open-source microcontroller platform using a simplified C programming language, and it is designed to make it easy for hobbyists to create homemade projects. Participants are expected to have a PC, and in order to save some time, they are also encouraged to download the Arduino software ahead of time. Step by step instructions can be found at the website: <https://www.arduino.cc/en/Main/Software>. **Things to have:** A laptop computer with a USB port. **Background Required:** Basic algebra for solving simple equations. **Intended Audience:** Anybody who is interested in electronics is welcomed.

Bio: Katalin Frolio has a BS from TCNJ and an MS from Villanova in Electrical Engineering with a concentration in High Frequency Systems. She currently works as an Electrical Engineer at Lockheed Martin in Moorestown, NJ, and is the chair of the IEEE Young Professionals Princeton/Central Jersey Section. She is also an adjunct professor with the Rowan ECE Department.

T-9: The Secrets of Quantum Computing, Barry Burd, Drew University

Abstract: These days, programming a laptop is no big deal. But what about programming quantum computers? Many quantum computers are available in the cloud, and you can learn to write code for these quantum machines. In this session, you can watch while we code or bring your own laptop and code along with us. We'll connect to the IBM Quantum Lab and perform experiments with real qubits. While we work, we'll explore some basic ideas behind quantum computing.

Bio: See 10:15 am to 11:10 am time at T-9.

T-10: Introduction to Python, Chuck Knight, ExxonMobil's Corporate Research Center

Abstract: Python is a very powerful programming language used in a variety of engineering and scientific settings. Its popularity has spread in recent years mainly due to its ease of use and large collection of support libraries. In this talk I'll provide a gentle introduction to the language using a hands on, demonstrative approach. By the end of this talk, attendees should know how to get started with writing simple scripts in Python, and have a general understanding of the Python ecosystem.

Bio: See 11:20 am to 12:15 pm time at T-2.

*****1:30 pm to 2:25 pm*****

T-1: Will You Buy a Tesla? Donald Hsu, Dominican College.



Abstract: Tesla has been #1 with Elon Musk \$204 billion. \$46,999 to \$138,000, Tesla 3, S, X, and Y, it is a showoff car on your block. Factories in China, Germany, USA, Wall Street loved Tesla, stock price was up in 2021. But competition from GM, Ford, VW, and ten Chinese electric car makers, Tesla 2023 is unknown. Speaker will talk about the pro/con, battery issues, charging station, China competition, for world electric car industries. Your inputs are welcome. Join us in person!

Bio: See 12:25 pm to 1:20 pm time at T-4.

T-2: Electric Bikes: Past, Present, Future, Russ White, Princeton Electric Bike Association

Abstract: Russ White will introduce and then discuss the history of ebikes and how they relate to the environmental crisis. He will next cover what they are, the different types, and end with their advantages and future.

Bio: Russ White has a great deal of experience in the publishing and was President of Elsevier Science, Thompson Corporation and Warren Gorham and Lamont. He has BS Engineering Physics from the University of Illinois and an MS Operations Research from Stanford University. After retirement he served as a non profit volunteer and was a Board Member for the Children's Home Society and the Mercer County Special School District, a Court Appointed Special Advocate for Children and worked for Counselors to Small American Businesses. He also started and sold Firehouse Cycles in Yardley, PA; started Boys & Girls Club Bike Exchange; the BEX collects that repairs and sells used donated bikes, started and sold Sourland Cycles in Hopewell, NJ; and started Princeton eBikes. All profits from these venture were donated to the Trenton Boys & Girls Club.

T-3: Opportunities and Challenges for Electric VTOL and Advanced Air Mobility Aircraft, Todd Quackenbush, Co-CEO, Continuum Dynamics, Inc.

Abstract: The rapidly growing electric Vertical TakeOff and Landing (eVTOL) sector – often called the “eVTOL Revolution”...and mis-called “Flying Cars” - has opened up new potential markets for vertical flight aircraft, both for passenger and cargo missions. This development has been enabled by new technologies – in motors, batteries, flight control, structures and configuration design – and changing attitudes, policies, and priorities. However, these aircraft face some major challenges in vehicle design, operations and community acceptance as they seek to make the transition to commercial use. This talk will describe some of the challenges we at CDI have observed in supporting and maturing eVTOL and Advanced Air Mobility Aircraft (AAM) – and things to look for in concepts coming to market in the near future.

Bio: Dr. Todd Quackenbush received his Ph.D. in Mechanical and Aerospace Engineering from Princeton in 1986, and since that time has worked at Continuum Dynamics, Inc. (CDI) in Ewing, directing a wide range of projects in the analysis and design of vertical lift aircraft, including helicopters, tiltrotors, and, most recently, several eVTOL aircraft. His work has included multiple sponsored R&D projects for NASA, the US Department of Defense, and as well a wide array of design support projects for leading eVTOL and AAM aircraft developers.

T-4 TCNJ ECE Senior Project Student Presentations

T-4a: Autonomous Drone for Thermal Imaging, Darion Parks, Jack DelVecchio, Sean Burtnett and Michael Bond; Adviser Dr. Deese

Abstract: Unmanned Aerial Vehicles are an appealing option for search and rescue applications due to their versatility and potential to reduce human labor and risk in navigating uncertain environments. A quadcopter drone will be assembled to search an indoor environment while sending data from an infrared camera to a computer through the drone's telemetry module. This is intended to model a search and rescue application in which a target is located by exploring an unknown environment. Ultrasonic sensors will be utilized in various directions to identify and avoid obstacles as the drone navigates its environment. A Raspberry Pi 4 will be programmed to take in sensor readings and autonomously maneuver within its environment, while a Pixhawk 4 flight controller will be used to send signals to the electronic speed controllers on how to drive the motors.

T-4b: Autonomous Race Car, Derek Dancsecs, Michael Franco-Garcia; Adviser Dr. Adegbege

Abstract: The goal of the autonomous racecar project is to redesign a standard remote-controlled car and implement it with two different driving modes. The car will be able to be controlled via a mobile tablet containing an Android application in which the user specifies a certain speed and steering angle to be communicated directly with the controller. A Bluetooth module will be used to establish the communication between the tablet and the computing board, which is connected to the car's internal components. The car will also be able to drive autonomously with the addition of a camera and ultrasonic sensors to train a convolutional neural network (CNN). Manual control of the car will utilize programming in Python for implementation of the Stanley controller model. Both driving modes will be accomplished by utilizing an NVIDIA Jetson Xavier NX development kit and its general-purpose Input Output (GPIO) pins. For the whole system, two separate power supplies will be implemented to power the Microcontroller unit (MCU) and the electronic speed controller (ESC), steering servo and brushed motor.

T-5: Signals in Space: How, Where & What, Steve Bossert, BCC Research

Abstract: There are many man-made satellites which hobbyists can monitor or use to communicate with others. This presentation explores a basic 60-year history of satellite communications along with current examples which can easily be utilized by anyone with a modest budget. Included in this presentation are amateur radio satellites and space station communications, weather observatory and additional targets across a broad spectrum to encourage the marriage of computers and space related communications. Some more advanced use cases and monitoring tips will also be provided with a focus on using open-source software projects.

Bio: Steve currently works for BCC Research, a Boston based global strategic advisory firm focused on disruptive life science, advanced materials, energy and emerging technology topics with a focus on intellectual property and technology transfer. Outside of his corporate role, Steve is active in the electronics hobbyist and maker community with articles published in Hackaday, 2600 among other publications. In 2017 he founded [Hudson Valley Digital Network](#), which caters to a convergence of hobbies that have an interest in wireless technology, including astronomy, computers and aviation along with amateur radio and hiking. Steve currently resides in Poughkeepsie New York and is originally from Long Island.

T-6: Rebooting K-12 STEM Education Amid This Pandemic, Heidi Hudicka and Joe Hudicka, Fizzee Labs Foundation™

Abstract: My Mars Mission is a daughter and father mission where we are dedicated to rebooting K-12 STEM ED. Using the My Mars Mission air quality kit, learners will discover how to solder, code, and collect humidity, temperature, and CO2 data levels in their current locations. This can then be applied to the worldwide issue of the pandemic and will alert students as to when they need to open a window.

Description: The pandemic has completely disrupted the educational experience we all strive to be a part of. This leaves schools scrambling to meet essential standards while melding the in-person world with a new, virtual world. My Mars Mission TM is the newest extension of the Fizzee Labs Foundation™ curriculum, developed in partnership with IOT2Werkstatt, and is centered around an air quality sensor kit. My Mars Mission TM delivers a K-12, hands-on learning experience where students learn to solder, code, read and record data, all while measuring how safe the air they're breathing in all around them is. The students will also become prime data researchers with the NASA GLOBE program. Fizzee Labs Foundation™ has already begun scheduling pilots in New Jersey in collaboration with the US Army Innovation Labs, in Philadelphia collaborating with Legacy Bridges STEM Academy, and are already in conversations for pilots in the San Francisco, CA and Chicago, IL markets. The team is excited to guide more teachers through this process and inspire change around the globe, through GLOBE. We would like to have a 100-minute workshop to truly demonstrate the impact this kit has. For more information, you can watch our kit in action on our website (<http://mymarsmission.fizzee labs.org/>) and register to learn more about the kit itself.

Bio: Heidi Hudicka began her innovation adventure when she was just 4 years old, creating a fashion clothing line for her 18" doll collection, desiring them to enjoy a truly unique experience, unlike the clothes everyone else was buying in stores. Heidi quickly became an expert in design, developing a unique ability to inspire creative experiences that her clients would truly love to be a part of. When Heidi realized how much she was learning about the power of her creativity, she teamed with her sibling Joey to create LAUNCH!, an interactive board game designed to teach grade schoolers the vocabulary and fundamentals of entrepreneurship. It was this special moment that sparked their own launch of Fizzee Labs, and today through a strategic partnership supporting NASA's education goals, these LAUNCH! Party Fun & Learning events are becoming a National Competition Series!

T-7: Electronic Devices You Never Knew You Really Needed for Your Car! Paul Bergsman, Author

Abstract: There is an inexpensive alternative to LoJack. A free app to warn you of all approaching U.S. Red Light, and Speed Cameras. And, there is a free alternative to the Sirius Satellite Music Service. These and other devices/apps will be discussed during this presentation.

Bio: Paul Bergsman has been involved with computers since he saw a sales pitch for people to buy a Texas Instruments Ti994A Home Computer for \$100! Since then, he has obtained a Masters in Computer Science, and wrote a book, "Controlling the World with Your PC (c) 1993", about interfacing, and controlling electronic devices via your computer's Parallel Printer Port. The book remained in print for over ten years. A rather long run for a rapidly evolving technology. Paul also holds a U.S. Patent for an electro-mechanical keyed lock for use in commercial alarm systems, and taught Mathematics, Computer Science and Industrial Arts in high school for 30 years.

T-8: Hands on Arduino Workshop for Beginners continued from last session

T-9: IOS Shortcuts App (for iPhone Users), Douglas Ferguson, DellEMC

Abstract: I will present an overview of the IOS shortcuts app and a few useful shortcuts that I have created. These will help in your use of your iPhone and daily tasks.

Bio: Doug Ferguson is a Senior Advisor and support engineer for converged infrastructure products at DellEMC. He is a graduate of Rutgers University College of Engineering. He is also a computer hobbyist who loves learning about new technologies. Having taught himself to program in high school, he continues to explore numerous areas of computers including video editing, web design, visualization, and robotics. He is the "Network Czar" of his local church. Doug is a radio amateur (KB2JMG), and a TCF presenter since 2002!

T-10: Pythonic Object-Oriented Development, Chuck Knight, ExxonMobil's Corporate Research Center

Abstract: Object-Oriented Programming is a widely used concept to write powerful applications in many languages. In this talk I'll tackle the basics of Object-Oriented Programming in Python: exploring classes, objects, instance methods, attributes and much more!

Jupyter Notebook is here <https://github.com/chuck-a-knight58/Trenton-Computer-Festival>

Bio: See 11:20 am to 12:15 pm time at T-2.

*****2:35 pm to 3:30 pm*****

T-1: Electro Mobility, a Transformation with Challenges, Tobias Ahlgrim

Abstract: Electro mobility is a transformation that does not just impact the automotive industry but the complete electric power industry and infrastructure too. For a driver of an electric vehicle several questions arise to charge his/her electric vehicle. Is the charge station equipped with a plug that fits to my vehicle? How long does the charging take? How much will it cost? How do I pay? These simple questions provide several challenges for the different industry sectors and the more electric vehicles will be around us, the bigger the challenges will become. The presentation will provide insights into challenges for different industry sectors along questions formulated by the fictitious driver.

Bio: Tobias Ahlgrim is a scientist at Siemens Technology, Princeton, New Jersey. He has almost a decade of experience in the domain of electro mobility and software. After several years of work for automotive in Germany he came to the US to drive the topic of electro mobility and energy transformation for a major industry. For the talk he hopes provide insights and curiosity about a topic that is by far bigger than it sounds.

T-2: The Hydrogen House, Vehicles and other adaptations articles, news coverage and videos, Michael Strizki, The Hydrogen House Project

Abstract: The Hydrogen House Project's devotion to clean energies and climate change made it gain international notoriety. Our flagship project is the Solar-Hydrogen Home. In 2006, Mike Strizki completed the conversion of his home to run on a unique solar-hydrogen system. Located in Hopewell, NJ, it is the first inhabited solar hydrogen powered residence in North America. This advanced hydrogen production and storage system provides for all of the home's energy needs while creating zero emissions. The system produces green hydrogen through the process of electrolysis, and is composed of a solar array, electrolyzer, battery bank, inverters, storage tanks and fuel cells. Home appliances that would normally run on natural gas have been retrofitted to run on hydrogen, including the cooking range, BBQ grill, hot water heater and clothes dryer. A geothermal system lowers heating and cooling loads, further increasing efficiency. Excess energy produced is sent back to the electrical utility grid. The system has recently been upgraded to integrate both an EV charging station and a high-pressure hydrogen vehicle refueling station- currently the only privately owned, residential HFCV refueling station on the East Coast. The system has been in continuous, off-grid operation since 2006, surviving two major hurricanes and several "Nor'easter" winter storms without interruption.

Bio: The Hydrogen House Project, a 501c3 nonprofit organization was founded by inventor and engineer Mike Strizki in 2011. Since the launch of the Hydrogen Home, Strizki has designed and installed several solar- hydrogen systems throughout the Caribbean and in California. In 2015, Strizki built a solar- hydrogen system on an 11.1-acre rural property in Pennington, NJ. It is the first commercially available, affordable system of its kind. This state-of-the-art residence and working farm is a remarkable example of modern, net-zero, sustainable living. These projects have proven that we have the technology to safely power our homes, vehicles, and communities with clean, reliable energy from renewable resources.

T-3: Future Methods for Electrification of Airborne Transportation, Gaylord Olson, Consultant



Abstract: To avoid future fossil fuel use in airplanes and helicopters, there is a trend underway towards electric propulsion for both of these. There are two well-funded projects to develop 9 passenger electric powered commercial airliners operating from conventional airports, and many more well-funded projects for the development of smaller electric aircraft capable of vertical takeoff and landing eVTOL's. As with automobiles, most of these aircraft use batteries and electric motors. This talk will describe some fundamental advantages for these new transportation methods.

Bio: Gaylord Olson is an engineering consultant and inventor currently working on non-fossil fuel methods for transportation and also for heating and cooling of buildings. Some of this work may be found at www.sstusa.net. More recent work is in the form of multiple recent U.S. patents and also several patents pending. He has a B.S. degree in electrical engineering from South Dakota School of Mines and Technology and an M.S. degree in engineering from UCLA.

T-4: Global Communication After Power Failure, Joe Jesson (W2JEJ), RFSigint Group and E/CE Département, TCNJ



Abstract: TBA

Bio: Joe Jesson, is CEO of RFSigint, a Wireless Sensor Patent Advisory Company, and Chief Technology Officer (CTO) of Able Devices and Assurenet, wireless telematics/IoT companies. Joe has 25+ years of experience in designing and implementing - through production - Telematics, M2M, and IoT wireless sensors & embedded systems and was awarded General Electric's top Innovation prize, the Edison Award, in 2007. He was awarded over 15 patents, and worked on the original TEMPEST signals intelligence program in the 70's. TCNJ Adjunct Electrical Engineering Lecturer since 2013, IEEE Princeton Life Chair, holds graduate degrees from DePaul University in Chicago, and currently a doctoral candidate at NJCU.

T-5: Getting Started on EME (Earth-Moon-Earth) Communication, Allen Katz – TCNJ

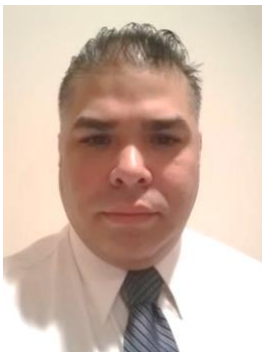
Abstract: One of the biggest challenges in amateur radio is bouncing radio signals off the Moon. This form of propagation is known as “moonbounce” or “EME” for Earth- Moon-Earth. It is considered the ultimate in long-distance 50 MHz and above communications. TCNJ Prof. Al Katz has been a radio amateur since he was 13 years old and has had an interest in EME almost as long. This talk will discuss the history of EME, the technology that make it work, and how to get started in EME.

Bio: Allen Katz is a Prof. of E/CE at TCNJ. He was a co-founder of the Trenton Computer Festival along with Sol Libes in 1976 and has Chaired TCF for many years. Was President and founder of the Linearizer Communications Group, now a part of MACOM. He received his DSc and BS in EE from NJIT and his MS in EE from Rutgers Univ. He holds 17 patents and has written >150 technical papers. He received the IEEE/MTT Application Award in 2015, the Microwave Magazine Best Paper Award in 2010 and the AAS’ William Randolph Lovelace II Award in 2002. He is an IEEE Fellow and a past MTT DML. Al (K2UYH) has also been a radio amateur since he was a teenager with an interest in the UHF/microwave frequencies and Moonbounce.

T-6: Introduction to Cricut and Home Electronic Cutting Machines, Brenda Bell, ACGNJ

Abstract: In this session, we will discuss what home cutting machines are, some of their uses, and look at some of the models currently on the market. We will then focus in on the current series of Cricut cutters, using Design Space software to demonstrate how to design and produce a simple project.

Bio: No stranger to presentations, Brenda Bell has given TCF talks on topics ranging from Internet searching to Connected Medical Devices to special-interest social networks. While working at Michaels, Brenda acquired a Cricut Explore Air in July 2018 and spent her first two weeks with the device bumping her head against its software’s limitations. (She has since figured out how to use third-party software to create her own designs and has taught classes on using Cricut machines.) In her spare time, she is Secretary of ACGNJ, where she has facilitated the Mobile Devices SIG for the past eight years. Brenda is an independent crafter and is not affiliated with, nor authorized by, Cricut or Provo Crafts, nor are her classes and presentations “official” Cricut instruction.

T-7: Introduction to Switch Mode Power Technology, Manuel C. Blanco, ITW

Abstract: All electronic devices require a power supply. The electronics industry is consistently evolving to make these devices more miniaturized, efficient, and customizable. The power engines that drive them are also becoming more integrated and embedded in virtually all applications. This presentation will explore and introduce the fundamentals of switch mode power supply design and its variant topologies, operation and theory, through the historical developments of the technology.

Bio: Manuel C. Blanco received his dual degree, Bachelor of Science in Physics (B.S. PHYS) from Seton Hall University, and a Bachelor of Science in Electrical Engineering (B.S. EE) from New Jersey Institute of Technology, where he also received his Master of Science in Electrical Engineering (M.S. EE), in 1998, 2000 and 2004, respectively.

He has performed research, development, and circuit design analysis in various industries such as: wireless R.F. mobile cellular telemetry, at Anadigics Inc; aviation and aerospace power, at Avionic Instruments LLC (AI2), and LED solid-state lighting, at Dialight PLC. Currently he is the Senior Electrical Design Engineer at Simco-Ion, an ITW Company., where he develops and directs new strategic product design initiatives from marketing requests that directly impacts the company’s portfolio in broad markets such as medical devices, food & beverage, automotive, flat panel displays, semiconductor devices, and material processing & conveyance. He holds four patents in the areas of control and calibration methods of articulated high density switch mode power supplies as applied to the fields of electrostatics neutralizing and charging systems.

He is an active fraternal brother of Lambda Theta Phi, Latin Fraternity Inc, alumni and is a member of the: Society of Physics Students (SPS), Sigma Pi Sigma, Eta Kappa Nu (HKN), Tau Beta Pi, and The Order Of The Engineer. He is a senior member of the IEEE, Region 1, Princeton/Central Jersey Section and member of the IEEE Power Electronics, IEEE Industrial Electronics societies and Consultants Networks. Manuel enjoys designing, building, and repairing vacuum tube and solid state audio amplifiers. He is also an avid tournament chess player as a registered active member of the United States Chess Federation.

T-8: Using Field Programmable Gate Arrays (FPGAs) in Embedded Development, Evan Williams, Consultant

Abstract: The Arduino Uno and its variants has become a defacto standard in embedded development. No other system in embedded development is as easy to learn and use as Arduino. Yet this chipset is already 20 years old. What has come to replace it? In this talk I will discuss two FPGA boards that have the Arduino form factor, the Arty S-7 and the Intel DE-10 Lite and I will talk about how I got them up and running.

Bio: Evan Williams has found Arduino to be the best toolkit for the smart things he builds. The computer hobbyist who attends TCF are generally most interested in practical applications of IOT. They are aware of, may have programmed and used an Arduino microcontroller unit or a Raspberry Pi Small Board Computer. Field Programmable Gate Arrays are a new addition to the hobbyist space. This presentation will explore two FPGA development boards, the Xilinx-based Digilent Artix-7 Arty board and the Intel-based Terasic DE-10. What are these boards and how and why might we want to use them? Are they compatible with standard Arduino shields? Evan has on-the-job experience with Linux and Unix and has built an Arduino-friendly LCD Display Board.

Evan Williams began his career in 10th Grade at Princeton University's Microprocessor Lab. This laboratory taught students how to interface 8-bit computers to real-world devices. After graduating from Thomas Edison State College, he worked for 25 years in Computer Software and developed websites. He obtained a Master's in Data Science from Thomas Edison in 2022 and taught Computer Science at Fordham University in Fall 2022. He also holds a degree from Rutgers University in Computer Science and is a ham radio operator (KC2JQC). His website is www.evanwilliamsconsulting.com

T-9 TCNJ ECE Senior Project Student Presentations**T-9a: Banner Display for the ECE Center for Intelligent Systems, Kristella Lieu, Jianna Nieves, Nicolette Tumas; Advisor Dr. Hernandez**

Abstract: Our project involves designing and developing an advanced LED banner display for the ECE Center for Intelligent Systems located in Armstrong Hall. Many students, faculty, and visitors, especially those outside the bounds of the engineering department, are unaware of the research lab's progress. Designing and implementing this advanced display would solve this issue and make it possible to share information on current news and progress on research work. The system will have a command line interface, which allows the user to customize what is shown on the display with different text, colors, and animations. This interface will then interact with the embedded systems program through the PSoC microcontroller to appear on the banner display.

T-9b: Smart Medicine Dispenser, Argenis Marmolejos, Yoelis Brito, Chris Klemmtz and Nicholas Alvear; Adviser Dr. Pearlstein; and Samuel Akinlolu; Adviser Dr. Yan

Abstract: This project report documents and demonstrates the partial functionality of our Smart Pill Dispenser and Organizer. Many pill organizers fall into one of two categories, a typical seven compartment weekly organizer, or an extremely expensive organizer that is inaccessible to a significant portion of the population, and provides no services other than organizing and dispensing medication. The goal of our project would be to provide a pill dispenser and organizer that is in the middle ground in terms of complexity so it is easy to use, and provide services such as a notification system and quantity tracker. This will be accomplished using a PSoC microcontroller, a cloud database containing user medication information, a modem to access the database, motors to rotate pill holding compartments, a load cell to monitor the taking of medication, and an LCD, LED, and piezo speaker as notification system. These components will be placed and organized on a PCB, to be mounted inside a physical enclosure in the future.

T-10: Special Session: Ask Me Anything, Michael Redlich, Chuck Knight and Barry Burd, Garden State Java User Group (GSJUG)

Abstract: In this special session, Michael Redlich, Chuck Knight and Barry Burd will be available for attendees to ask any question related to programming languages, general programming concepts, the IT industry and anything else that may be of interest. The facilitators will have their laptops running for any real-time demonstrations.

Bio: See Mike Redlich and Chuck Knight at 12:25 pm to 1:20 pm time in T-10. See Barry Burd at 11:20 am to 12:15 pm time in T-5.

*******9:00 am to 5:00 pm*******

HAM RADIO License Exam Preparation Cram Course (Virtual License Testing to begin at 3:30 pm. Advance registration is required for the virtual exam session).

Get a Ham Radio License in One Day! Alan Wolke, W2AEW, Pat Howard, K2PAT and Joe Zaroff, WA3NEQ; David Sarnoff Radio Club.

Abstract: If you wanted to get an amateur radio license but never had the time, now is your opportunity! To obtain the entry-level Technician license, all one has to do is pass a multiple-choice exam. The course will step through the information needed to pass the FCC Technician License exam. Preparation prior to participation in the course and the exam is strongly encouraged. The slide presentation in the class that follows the truly wonderful and free study guide can be found at

https://docs.google.com/presentation/d/1I5YNfv2W_CpECwGHfYIF6i6AfW-SIPDp/edit?usp=sharing&ouid=106676170186069227337&rtpof=true&sd=true

Students are strongly urged to make use of it. Online practice exams are also of great benefit,

<http://qrz.com/hamtest/>.

A PDF copy of the slides can be found here:

<https://drive.google.com/file/d/0B8Kvsw95jCqleFZrU3E0R1k2TFU/view?usp=sharing>.

For further study a comprehensive set of slides that have been used in past classes, along with the complete Technician Class Question Pool material can be found at:

<https://drive.google.com/folderview?id=0B8LbPwo1XLI3YTBdZIFmTTNBQzA&usp=sharing>.

The topic agenda for the Technician Class Ham Cram will be:

- What is Amateur Radio
- Electrical Principles
- Math for Electronics
- Basic Electronics and Components
- Schematics
- Radio Wave Properties
- Propagation
- Antennas & Feedlines
- Amateur Radio Signal/Modulation Types
- Safety Concepts
- RF Exposure
- Station Setup & Operation
- Operating Controls
- Station Equipment
- Common Troubleshooting
- Using a Multimeter or DMM
- Operating Procedures
- Public Service
- Amateur Satellites
- Fun Activities & Internet
- Rules, Regulations & Definitions

The class will begin at 9:00 am, lunch at 12:30 pm. Time permitting, we will run through a few practice exams prior to the actual testing session. At 3:30 pm the FCC examination will be given by ARRL-certified Volunteer Examiners (VEs). One does not have to attend the HAM CRAM 101 or pay for admission to TCF to attend the exam session. An exam fee (\$15.00) must be paid by each examinee. **You must bring**

your FCC Registration Number (FRN). If you do not have a FRN, go to <https://www.fcc.gov/wireless/support/universal-licensing-system-uls-resources/getting-fcc-registration-number-frn>. Two forms of identification (at least one must have your photograph) will be required to take the exam. All license exams will be offered (Technician, General and Extra) at this testing session. If upgrading, have an original and a photocopy of current license. Results of your test will be provided after exam session is completed.

2023 TCF VE Team Members

- =====
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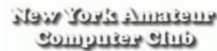
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