45th Annual
Trenton Computer Festival
The Oldest Personal Computer Show in the World
The College of New Jersey
This year on ZOOM

2021 PROGRAM BOOK

Talks & Forums
Saturday, March 20 - 9:00 am to 5:00 pm
Talks/Forums start at 10:15 am

ADMISSION IS FREE. EVERYONE WELCOME
Students to Expert IT Professionals

Sponsored by: The College of New Jersey (TCNJ) Electrical/Computer Engineering Department – www.tcnj.edu/~engsci/
with the support of
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NYACC – New York Amateur Computer Club – www.nyacc.org
ACGNJ - Amateur Computer Group of New Jersey - www.acgnj.org
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Lenny Wintfeld – Mt. Airy VHF R.C. (Pack Rats) – Flea Market

Pick and choose what interests you - and all online: Go to **WWW.TCF-NJ.ORG** and click on the track with the session you want to participate in. Want to switch to something else? Then go back to **WWW.TCF-NJ.ORG** **and choose from the other tracks.**

TCF Keynote Speaker
Jerry Foster, CTO Plex Systems
"How I Learned to Stop Worrying and Love Artificial Intelligence"
3:40 pm in T-1

Get a Ham Radio License via Zoom in One Day!
Sponsored by the David Sarnoff Radio Club <www.n2re.org>

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 http://www.kb6nu.com/tech-manual/. 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/0B8Kvsw95jCqIeFZrU3E0R1k2TFU/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=0B8LbPwo1XLI3YTBDZlFmTTNBQzA&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, and Rules, Regulations & Definitions. The class will begin at 9:00 am, lunch at 12:30 pm, and end about 2:00 pm. Time permitting, we will run through a few practice exams prior to the actual virtual testing session, which will begin at 3:30 pm. **Advance registration is required for the exam session. Candidates must email nu3e@arrl.net no later than Wednesday, March 17 to register for the exam.** The FCC examination will be given by ARRL-certified Volunteer Examiners (VEs). One does not have to attend the HAM CRAM 101 to participate in the exam session. An exam fee ($15.00) must be paid by each examinee. 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, bring an original and a photocopy of your current license. Results of your test will be provided after exam session is completed.

T-1: Ethical Machine Learning, Prevention is better than cure, Lurdu Reddy, Bank of Montreal.

Abstract: Machine Learning (ML) is making our life more efficient by smart communications, assisting tools, better health diagnostics, personalized education and many more. It is helping businesses to better serve customers. At the same time, very complex models are increasingly violating the basic rights of individual citizens. ML models for everything from loans and insurance underwriting, skill matching to recidivism of crime prediction are showing racial, gender or other protected class bias. It is the time for every ML practitioner to be cognizant of the bias these models can introduce, and put forth their highest ethics when building these models. In this presentation, I will present some of the ideas and principles that can be used as part of the modeling process to produce ethical models. After all prevention is better than cure.

Bio: Lurdu Reddy has over 17 years of experience working with data for industries in Finance, Government, Insurance, Telecom, Media to assure network and application security. He is currently Leader of Data Science at Bank of Montreal (BMO), where he is responsible for innovating business using data and AI solutions. Prior to joining BMO he was Senior manager Data Science at Prudential Financial where he leader for Risk Assessment Models. Earlier he was a Principal Data Scientist with Deutsche Bank where he worked on building collateral and asset management strategy. As part of the job, he built machine leaning and optimization models saving approximately 50 million dollars per annum. He was also a Senior Software Engineer, a Senior Analyst, and an Algorithm Developer.

T-2: How to be Safe in Cyberspace, Thomas Kenny.

Abstract: There is an invisible threat in your home and this cyber threat is coming from inside the house! It is coming from all of your internet connected devices! This cyber threat is getting worse every day. Businesses have teams to prevent and mitigate these attacks but what is an individual to do? Antivirus software and firewalls can only do so much considering that attack methods are constantly evolving to get around known precautions and to exploit new vulnerabilities. Attend this talk to learn how to help yourself and your loved ones to be safe in cyberspace via practicing good digital hygiene. After this talk, you'll never look at your thermostat the same again.

Bio: Thomas Kenny has been an IT professional for decades at several major telecommunications companies. For the past 9 years, he's been specializing in developing Cybersecurity tools. He is currently a DevSecOps champion for 5 software development projects. Architecting and assisting each team to improve their continuous integration/deployment practices to achieve scalable deployments faster with quality and security. This has included the design and implementation of an automated configuration management system to support federal NIST 800-53 security controls. Thomas has a Masters in Mathematics and the (ISC)2 CISSP certification. To stay on top of the ever-changing cybersecurity world, Thomas is an avid cybersecurity podcast listener.

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

Abstract: Whether a blogger, academic, corporate IT staffer or entrepreneur, WordPress skills are becoming more and more important. 2019 brings a new major release and a brand new editor. In addition to the basics, I introduce Divi, a meta theme with nearly infinite possibilities and WooCommerce a platform for selling almost anything online. **(Continues in next session).**

Bio: Lou Judice is Founder of Round Mountain Group and responsible for developing hundreds of WordPress sites. Previously, he was in charge of mobile internet strategy for HP and launched the world's first public mobile website. He has also worked for DEC, GE and RCA Labs. He is a member of the IEEE and the TCF Steering Committee.

T-4: Mystabar2 - How to play at TCF2020 the 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 kick off Mystabar2 for TCF 2020 and will cover, how to play, the technologies used to create Mystabar, and answer any questions participants have. Mystaba2 players 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-5: Flying to the Moon: A View From the Apollo Guidance Computer, Frank O'Brien, NASA and Infoage Science/History Center.

Abstract: A flight to the moon seems impossibly complex, especially given the technological state of the art over 50 years ago. While the details are indeed formidable, the concepts are surprisingly easy to understand. Frank will discuss the three key components used in the Apollo spacecraft to voyage from the Earth to the Moon and back home again. Importantly, these components - the computer, the guidance platform, and the optics system - all worked together to fly the spacecraft with incredible accuracy. He will also answer the basic questions of spaceflight navigation: Which way is up? Where am I? Where am I going? The techniques used by the astronauts all build on these simple ideas in solving the problem of navigating to our nearest celestial neighbor. As a special bonus, he will describe the details of how to land on the Moon!

Bio: Frank O'Brien has been a volunteer for NASA/JPL for 25 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. The last 9 years he has been as a Solar System Ambassador for NASA's Jet Propulsion Laboratory, running events and giving lectures once or twice a month on a wide range of spaceflight topics. During weekends he volunteers and lectures at Infoage, a science museum at the New Jersey shore. 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. No, you can't make this up!

T-6: NJ, NYC, and the Birth of Electronics, Jonathan Allen, RF Consultant.

Abstract: After distinguishing between electricity and electronics, this talk will begin with Edison's discovery of thermionic emission and how it led to practical vacuum tubes and the ingenious circuits that evolved to exploit them. New Jersey and New York City hosted most of that early development, including tubes, amplifiers, radio, and television. It was here, too, that researchers invented the first transistors, thus initiating the next electronics revolution. We will examine the major inventions, and the innovators and organizations that created and commercialized them, such as RCA, Bell Labs, Weston, and Fort Monmouth, and how they advanced the electronic age. Both the rivalry and collaboration between them are also essential parts of the story.

Bio: Jonathan Allen received his Ph.D. in applied physics from Washington University in St. Louis. Most of his career has been in photovoltaic R&D, but he also designs and builds custom RF power systems and instrumentation. He is currently an independent consultant. For the past six years, he has worked as a volunteer restoring and documenting the Sarnoff Collection at TCNJ.

T-7: LoRa: Long Range, Unlicensed Wireless Networking for the Internet of Things, John DeGood, TCNJ.

Abstract: LoRa (short for long range) is a low power wireless platform with over 100 million Internet of Things (IoT) devices connected to networks in 100 countries and growing. LoRa devices operate in unlicensed radio spectrum in the Industrial, Scientific and Medical (ISM) band over distances measured in kilometers and with battery lifetime up to 10 years. LoRa devices and the open LoRaWAN protocol are used for smart cities, smart homes and buildings, smart agriculture, smart metering, smart supply chain and logistics, and more. This presentation will compare LoRa and LoRaWAN to other wireless IoT platforms, e.g. Amazon Sidewalk, Sigfox, NB-IoT, and LTE-M (aka CAT M1). Use cases and requirements of different wireless IoT device classes will be discussed. A live demonstration will be shown using inexpensive ($21 from Amazon) ESP32/ LoRa development boards with opensource software.

Bio: John DeGood is a Senior Lecturer in the Department of Computer Science at TCNJ. John worked 42 years in research and new product development at Hewlett Packard, the David Sarnoff Research Center, and the Lockheed Martin Advanced Technology Laboratories. He is a board member and past chair of the Princeton joint professional chapters of ACM and IEEE Computer Society. John holds an Extra Class amateur radio license with callsign NU3E; his interests include antenna modeling, digital communication modes, and portable operation.

T-8: Create Your Own CentOS Home Lab in About an Hour, Bob Murphy, Linux sysadmin.

Abstract: Need to learn about Linux servers? Get a self-contained CentOS lab up and running in no time. What's required: A host computer with virtualization tools installed, a CentOS (or other RedHat-based) iso file to install, and about an hour. It should interest anyone looking to quickly set up an environment to study Linux, either for an exam like RHCSA/CE or just to learn how it works. It will be interactive, with questions encouraged. If the audience members bring a laptop with a VM host installed, and a Red-Hat based .iso file, they can follow along (quickly). The talk slides are at https://github.com/murphnj/hourlab.

Bio: Bob Murphy is a long-time desktop Linux user, and a current Linux sysadmin, EFF and FSF supporter. He has a BS in Computer Science from Montclair State University, and is currently pursuing a RHCE certification.

T-9: Artificial Intelligence for Real Business Problems, Shon Cade.

<center>ing Applications for Android</center>

Phones and Tablets

Abstract: The long-promised AI revolution has arrived, and now companies in every sector of industry are promising AI solutions for problems in almost every facet of life. The promises seem almost too good to be true, and some of them just might be. In this talk, Shon will explore how AI is being used in industry today, and in the process try to separate the marketing hype from the real ways AI is changing how we do business. Along the way, we will also explore the process, challenges, and pitfalls of delivering real value with AI-driven products in the corporate world today.

Bio: Ja'Shon is a life-long programming hobbyist/enthusiast, turned professional data geek. For over a decade he has made a career designing and building production-grade automated systems that process, consume, and analyze data at scale. Trained as a bioinformatician, he spent years at the NIH funded EupathDB Bioinformatics Resource Center, building products to integrate and represent multi-scalar '-omics' data with epidemiological data to allow parasitology researchers to gain deeper insights into the pathology of a number of diseases, including malaria. As the former Machine Learning Expert for the Platform Architecture Team at Berkadia Commercial Mortgage he brought his knowledge and skills at enabling meaningful insights from complex data to the fintech space, a passion he continues to pursue to this day.

T-10: Introduction to Object-Oriented Programming and Design Principles, Michael Redlich; ExxonMobil Research and ACGNJ.

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 seminar will introduce 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.   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, NJ and a Java Queue news editor at InfoQ (views are his own). He has been a member of ACGNJ since 1996 and has served as a Director of the Garden State Java User Group since 2001. For more details about Mike, please visit http://about.me/mpredli.

<center>*********11:20 am to 12:15 pm*********</center>

T-1: Machine Learning Approaches for Music Information Retrieval, Kai Chen, NRG Energy.

Abstract: This project aims to explore the role of machine learning in the process of analyzing music. Kai currently has three published papers: Music Main Melody Extraction by An Interval Pattern Recognition Algorithm, A model of music perceptual theory based on Markov chains, and Music Style Analysis among Haydn, Mozart and Beethoven: an Unsupervised Machine Learning Approach. He will explain using slides the ideas behind these papers and discuss their significance.

Bio: Kai Chen works for NRG Energy as a Quantitative Risk Analyst. He has a Bachelors Degree of Engineering in Automation from Xi'an Jiatong University and a Masters Degree in Mathematical Finance from Rutgers University. If you would like to know more about him; please see: linkedin.com/in/kaichen0208.

T-2: Ending a Digital Life, Don Libes.

Abstract: We are now dealing with the first generation of lives that have extensive digital footprints. Learn how to clean up a digital life and avoid bequeathing your own mess.

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-3: Workshop on Wordpress, Continued

T-4: Introduction to *Cricut* and Other Home Electronic Cutting Machines, Brenda F. Bell, ACGN.

Abstract: This session will discuss what are home cutting machines are, and their many uses. Brenda will look at some of the models currently on the market. She will focus on the current series of *Cricut* cutters, using *Design Space* software to demonstrate how to design and produce a simple project.

Bio: Brenda Bell has given TCF talks on topics ranging from Internet searching to Connected Medical Devices to special-interest social networks. After acquiring a *Cricut Explore Air*, she spent her first two weeks with the device figuring how to get around its software's limitations using third-party software to create her own designs. Brenda has been leading classes at her local Michaels store since 2017. In her spare time, she is Secretary of ACGNJ, where she organized the Mobile Devices SIG. 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-5: Collecting, Restoring, and Saving Computer History: One Byte at a Time, Steven Matarazzo.

Abstract: Today a generation of adults who grew up in the 1970's, 80's, or 90's are reliving their youth by collecting retro computers, video game systems, and electronics. While it's true "they don't make them like they used to", most of these items require preventative maintenance or risk being lost forever. At the same time vintage games, programs, and websites are being lost to the ages. Floppy disks get moldy, hard drives crash, and Geocities has been unplugged... So what can you do to help preserve the past? This seminar will talk about the basics of collecting old computers, what to look out for, what parts need attention, and how you can help fill in the gaps of history by archiving old documents, software, and multimedia.

Bio: Steven Matarazzo is a retro computer enthusiast and archivist. He creates in-depth historical videos about vintage Apple technology on his YouTube Channel Mac84 (youtube.com/Mac84). He's been visiting the TCF since the early 2000's and owes much of his Macintosh computer and electronics collection to the wonderful vendor market.

T-6: Robots - Beyond Sensors, Actuators & Artificial Intelligence: Emotions, Eva Kaplan; Consultant in Computer Ed., STEM, Photogenetics and Chromotherapy.

Abstract: Get familiar with how robots work. Discover a hands-on meeting with Pleo, the artificial intelligent "dinosaur". Watch how he interacts with another Pleo. "Explore" the world of past, present, and future bots - chatbots as well.

Bio: Eva was inducted into her college's "Hall of Fame" as a "Pioneer in Computer Education." Her Computers and Kids summer camp, which ran from 1982 to 2013, received innumerable media recognitions and, professional accolades. Her educational approach preceded STEAM -, combining science, technology engineering, arts, and mathematics! The arts, element came naturally as Eva is an exhibiting artist, art teacher, and pursued, music studies extensively at The Third Street Music Settlement, privately, as, well as having John Cage as a mentor. Eva has been a speaker for TCF since its, inception in 1976.

T-7: TCNJ Senior Project Engineering Project Poster Presentations:

T-7.1 Autonomous Drone Package Delivery System by Saad Ahmad, Joshua Annandsingh, Parker Revier and Cedric Noel, Adviser: Dr. Ambrose Adegbege.

Abstract: Everyday Drones are becoming more prominent. A prime example being Amazon, who has recently begun to implement drone delivery as a component in their business model. The Autonomous Drone Delivery System senior project aims to create an adaptation of the system down-scaled to fit a smaller college campus. Our drone will have the ability to deliver packages with a payload of up to 5 pounds, autonomously navigate the campus from the mail room to it's final destination and back, and provide a web based application for ease of use in requesting a delivery.

T-7.2 Teleoperation of Humanoid Robot via Exoskeleton Control Scheme, by Jordan Sinoway, Brian Dawson, Advisor: Seung-yun Kim.

Abstract: The goal of this project is to create a novel exoskeleton apparatus that captures the movements of the wearer, and then translates these movements to a humanoid robot, granting approximately real-time teleoperation. The robot utilized for this project is Aldebaran Robotics' Nao, a ⅓ scale humanoid robot. Teleoperation has many practical applications, including hazardous waste disposal, robotics surgery, and tasks in the military, space, sea, and medical sectors. Potentiometers are integrated into the mechanical design at key joints in the wrist, elbow, and shoulder of the exoskeleton. These sensors vary their voltage depending on the joint angle and these values are passed to the Teensy 3.5 microcontroller via a 13-bit ADC. The microcontroller then converts the data into usable angle measurements and passes them to a Python layer, via a serial data line, which in turn converts the angle measurements into commands the robot can interpret. The embedded code in the microcontroller is written in C++ and the Python intermediary layer utilizes Python 2.7 and the NaoQI SDK to control the robot.

T-7.3 Electric Excursion by Keith Garcia and Nick DePaolis, Advisor: Allen Katz.

Abstract: Personal transport vehicles have emerged throughout college campuses and urban areas over the past couple of years. These "Micro Vehicles" are used for both recreation and commuting while providing a clean and simple propulsion (or ride) from destination to destination. Our team chose to create an electric skateboard because of storage and weight advantages as well as the

ability to modify the individual components to allow for increased customization to a wide variety of user requirements. Using a wireless controller, the rider will have control in the palm of his or her hand; this will provide the electronic speed controller, the brain, with information to determine the speed, braking and power consumption of the board during the trip. Sensors and interchangeable wheel sizes will give the user a custom experience to cater the board according to the terrain. The vehicle's main components will consist of: a Lithium-Ion battery, electronic speed controller, belt drivetrain configuration and a brushless motor; mainly concealed on the underside of the board. Our team's goal is to create a portable vehicle of lightweight design capable of holding a maximum of 200 lbs and traveling approximately 15 miles, while being able to reach speeds of 12-20 mph.

T-8: Better Stock Market Prediction Using Neural Networks and Genetic Algorithms, Donn Fishbein, Nquant.com.
Abstract: Timing financial markets is essential in order to maintain a consistent rate of return. Buy and hold strategies work well only when the markets are heading north. Market downturns can be rapid and severe, and take years to recover from. This talk will address 1) the use of technical analysis in timing financial markets, 2) an introduction to artificial neural networks and genetic algorithms, and their application to technical analysis, 3) a practical system for timing the markets using these tools, and 4) the importance of testing and validation of trading systems, especially those whose inner workings may not be apparent.
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. Donn is also a radio amateur, AB8OH.

T-9: New Insights in Quantum Computing, Barry Burd, Drew Univser.
Abstract: In the not-too-distant future, quantum computing will blow away all the algorithms that currently keep our data secure. Quantum computers will do this by performing thousands of computations at once. But how can we sift the correct answer from all these simultaneous calculations? In this talk, Barry will explain how quantum computers find needles in virtual haystacks. he also describe the next frontier: Solving problems that, on one level, are theoretically unsolvable.
Bio: Barry Burd is a professor of Mathematics and Computer Science at Drew University in Madison, NJ. He is the author of several articles and books, including *Java For Dummies*, *Android Application Development All-in-One For Dummies*, and *Java Programming for Android Developers For Dummies*, all from Wiley Publishing. He received an M.S. degree in Computer Science at Rutgers University and a Ph.D. in Mathematics at the University of Illinois.

T-10: Getting Started with Java, Michael Redlich, ExxonMobil Research and ACGNJ.
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 seminar will introduce 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. Since knowledge of OOP is vital in the development of robust applications, the OOP paradigm will also be introduced along with a brief discussion of the advantages of OOP over structured programming. The example Java application will demonstrate how the attributes of OOP are utilized within Java classes.
Bio: Same as one hour earlier in this same room.

*********12:25 pm to 1:20 pm*********
T-1: Deep Learning, Natural Language Processing and the Quest for Understanding, Shamoon Siddiqui, Rowan University.
Abstract: While artificial intelligence continues to pop up as a buzzword doing ever more incredible things, learn why Natural Language Processing can unlock the mysteries of how humans think and reason. Deep Learning methods and models have unlocked a new understanding of how language works. This talk will give an overview of current state of the art methods with a thorough, but not overly technical, explanation of how they actually work.
Bio: Shamoon Siddiqui is a driven visionary turned full time Artificial Intelligence researcher. He earned his BS and MS in Computer Engineering from the New Jersey Institute of Technology and an MBA from Rutgers University. After a long career as a software engineer, system architect and cryptocurrency advocate; he is pursuing his PhD from Rowan University focusing his research at the intersection of Natural Language Processing and Uncertainty.

T-2: TCF@50, Allen Katz, TCNJ.
Abstract: This talk will review TCF's history, discuss the future of computing, and the changes since TCF@40 - the last time this talk was presented. What will the world be like at TCF@50 in 2025? Pictures will be shown from the first and other notable TCFs. Audience participation will be encouraged and suggestions solicited for the future.
Bio: Allen Katz is a professor of E/CE at TCNJ. He founded TCF with Sol Libes 45 years ago and has been continuously involved with the festival since that time. He received a DSc and BS degrees in EE from NJIT and an MSEE from Rutgers University. He has taught course and tutorials on microcomputing back in the *good old days*. In a parallel life, Al is founder and President of Linearizer Technology, Inc, Linear Photonics, LLC and Linear Space Technology, LLC; a Fellow of the IEEE and a past Microwave Society Distinguished Lecturer. He holds 17 patents, has written more than 150 technical papers; and has received numerous awards for his technical contributions. Al is also a radio amateur, K2UYH. [The life and contributions of Sol Libes will be remembered in a special session].

T-3: Artificial Intelligence's (AI) use in Health Care, Viswanatha Reddy Allugunti, Arohak Inc.
Abstract: This presentation will provide an overview of the use of Artificial Intelligence (AI) in health care. AI in health care make use of several algorithms to emulate human health and cognition from Medical data. This session will cover how AI can be applied in health care to solve real-time problems along with the Internet of Things (IoT) Sensors and Machine learning Algorithms.
Bio: Viswanatha Reddy Allugunti has more than 10 years of experience in IT in the fields of Mobility, Supply chain and Robotics, AR/VR, Internet of Things (IoT) and Blockchain. He is presently doing research on the early detection of Diabetes using Machine Learning Algorithms using IOT. He works as a Technical Architect for Arohak Inc. He is passionate about the technology and delivered > 30 lectures, published > 60 papers on Systems, Security and Sustainability, and received 10 best paper presentation awards.

T-4: Internet Job$$$, Donald Hsu, Dominican College.
Abstract: Amazon, Apple, Facebook, Google, IBM, Microsoft, NetFlix, Priceline stocks are up. Yes, the economy is booming. Retirees are working! --- Eighty percent of people got jobs from Internet. Accounting needs 2.1 million (Cyber Security, Forensics, QuickBooks, PeachTree, MS Dynamics); Software Developer/Engineer (Android, C++, Java, C#) - thousands of jobs, but no applicants; Cloud Computing (Amazon AWS, 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, 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 Phoenix, and President Chinese American Scholars Association (CASA). He has trained/taught 70 subjects - Accounting to Unix 13,000+. 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 27 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 8,500+ partners/clients on Linkedin, and 207 public recommendations, https://www.linkedin.com/in/dohsu.

T-5: TCNJ Senior Project Engineering Project Poster Presentations:
T-5.1 TCNJ Parking Lot Live Web Monitor by Jonathan Brito, Connor Dick, Caleb McKinney and Charles Richardson, advisors Orlando Hernandez and Larry Pearlstein.
Abstract: The lots at TCNJ are always quite busy. Students, faculty and visitors are constantly having troubles with finding parking spots, especially at certain rush hours of the day or during days where big campus events are taking place. Multiple cars entering a full parking lot and searching for one empty spot increases the likelihood of a fender bender, and ultimately, increases the consumption of gas and time. A solution to this problem is to let users know whether a lot has available parking before entering to reduce traffic flow and gas emission. This can be accomplished by using PIR and ultrasonic sensors to monitor traffic flow and determine remaining parking spots. An ultrasonic sensor detects the presence of an object, while the PIR sensor determines

thermal signatures of a car. Therefore the amount of spots available recorded by this IoT device will be wirelessly transmitted to a user friendly website where the users can select a specific lot to see if it has slots available. Our project values sustainability, which is why our IoT device will be powered by a solar panel responsible for charging a lead acid battery. The circuit for this project shall be done via 4-Layer PCB.

T-5.2 Wireless Driveway Security System by Alex Benasutti and Sarah Fontana. Adviser: Larry Pearlstein.
Abstract: The home security system market has been growing at a tremendous rate over the past few years, which has stemmed from increased demand for home security and homeowner peace of mind. Current advancements in older technologies have greatly increased the effectiveness and efficiency of this sector, but only in systems that are immediately or relatively near the user's home. Homeowners who have an indirect line of sight or a long driveway may benefit from having surveillance located at the end of their driveway. However, current devices that supply this need lack logs and details on who has entered their property and thus are very susceptible to false alarms. To address this problem, we designed an easily-portable system which will detect and generate a user notification for when any large object, animal, or vehicle has entered a homeowner's driveway. The device uses a PIR motion sensor and NoIR camera system in tandem with image processing techniques to pinpoint and extract the object. All computations are accomplished using a Raspberry Pi Zero board, which will transmit an image of said object to the user via their phone by 4G/LTE cellular HAT. The user will also be able to interact with the security system by SMS message commands, with various functionalities such as pinging for an image and pausing/unpausing notifications. The device is powered by a battery connected with a solar charging system, which removes the need for an external connection to AC grid power.

T-5.3 Handheld Oscilloscope by Brian Worts, Chris Jenson and Shannon Chapter, Advisor: Dr. Larry Pearlstein
Abstract: As a result of the abrupt shift to remote learning in higher education, many engineering courses have had to cut out hands-on learning with electrical hardware in exchange for simulation. To address this problem, this project aimed to create a portable, handheld oscilloscope that could be used by students to conduct hands-on learning with electrical hardware while away from campus. This project utilizes a custom printed circuit board to sample incoming signals, an FPGA to interpret and control data flow, and a microcontroller unit with a touchscreen interface to allow a person to visually interpret data and change control values in the FPGA. Each component presents challenges in various fields of embedded systems such as PCB design, EAGLE CAD, Verilog, hardware interfacing (SPI), and PSoC. Through the team's extensive work, it has been proven that this project serves as both a viable product and a comprehensive learning experience.

T-6: Learn to present: The World is a Stage, Cecilia Jackson, Forte Consulting.
Abstract: The objective of this talk is for the audience to learn how to Present and also be Original. It is all in the presentation. How many times have you heard that? Cecilia Jackson is here to interact with you to bring out the Broadway Star in you. Overcome your fear to be Original. The show must go on! At the end: You will learn *Presentation* techniques - Slideshows for 2020, *Body* Language, *Vocal Variety* and to be *Bold* about your ideas.
Bio: Cecilia Jackson, is the Founder and CEO of Forte Consulting (www.fortellc.biz), a Salesforce Registered Partner, a NJ Certified MWBE SBE organization who provides Salesforce Implementation and Support Services and the Executive Director of the Youth Leadership Development Program (YLDP) that teaches Public Speaking Skills, Mindfulness, LEAN Six Sigma Process Management and Leadership Skills to school age children. She is on a mission to reskill and relaunch our human talent to have sustainable employment for the Fourth Industrial Revolution and prepare our children for workforce development skills through YLDP. Cecilia has an undergraduate degree from Stella Maris College in Chennai India, education HR Management from Cornell University and Entrepreneurship Studies from Wharton.

T-7: An Autonomous Wheelchair for the Physically Challenged, Rajesh Kannan Megalingam, Amrita Vishwa Vidyapeetham University.
Abstract: In hospitals, airports, shopping malls, assisted living communities, etc. people with mobility issues have to depend on wheelchairs and wheelchair pushers for their mobility. This hinders their freedom of movement. For example, if they want to use the wheelchair in a hospital, they might find it difficult to locate the department, ward or doctor's room without the help of wheelchair pusher. Whereas in an airport, people who need wheelchair have to depend on wheelchair pusher to take them to the flight gate. If these people want to go to restaurant or wash room or shopping, they cannot do so as the wheelchair pusher's main job is to take them to the departure gate from the boarding pass counter or from the arrival gate to the airport exit point. At HuT labs, we have developed an intelligent self-driving wheelchair called Self-E with Android based smartphones and Robo Peak Lidar to map the surrounding area, along with static and dynamic obstacles. The user can touch any point on the generated map and Self-E will drive to that place without user intervention.

The hardware system architecture, implementation, algorithms, and the software platform used will be discussed. Test results will be presented.
Bio: Rajesh Kannan is an electronics engineer, leading research on humanitarian technologies with special emphasis on Robotics at HuT (Humanitarian Technology) Labs, and a Professor of ECE at Amrita Vishwa Vidyapeetham University (AVVU). He completed his undergraduate in Engineering at Anna University, Chennai and his masters and PhD at AVVU. His research includes Embedded Systems, Robotics, Semiconductors, and Healthcare, and has focused on autonomous robots, vertical climbing robots, and robots for rehabilitation. He also has seven and half years of industry experience. He worked on VLSI Design STMicro Electronics and Insilicon before joining AVVU. He has published over 150 papers and has 4 patents. He has received AVVU's highest Award of Excellence, the IEEE's 2020 Undergraduate Teaching Award, and the IEEE Outstanding Branch Counselor Award.

T-8: Tricks and Tips for Windows 10, David Soll, Omicron Development, LLC.
Abstract: Windows 10 is extremely flexible and configurable, but how do you get the most out of it. Mr. Soll will be demonstrating many of the features of Windows 10 that allow users to maximize their productivity. This will be a practical talk designed to give the audience the capability of customizing their Windows 10 configuration to their particular liking.
Bio: David Soll is the Chief Technology Officer (CTO) of Omicron Development LLC and its parent company Pimsoft SPA. He is responsible for the overall technical direction and technology solution set provided by Omicron and the Pimsoft Group. David received a BS in Electrical Engineering from Drexel University and has been working in Information Technology for over 30 years, more than 20 of them with Omicron. He is the current Vice Chair for the Princeton / Central Jersey section of the IEEE and is a past Chair of the Central New Jersey chapter of the IEEE Computer Society and is a senior member of the IEEE. David is also the past Chair and current board member of the New Jersey chapter of the ACM and a senior member of the ACM. In 2004 and 2018, David received the prestigious Region 1 award from the IEEE. He also is the founder and current chairman of the IEEE's Information Technology Professional Conference at TCF. David has a long history of innovation working with OSIsoft and Microsoft technologies.

T-9: Develop Apps for iPhone and Android with Flutter, Barry Burd, Drew University.
Abstract: It's a multi-million-dollar problem: How to build an app that works on both iPhones and Android phones. Companies hire two teams of programmers, create two separate code-bases, and maintain two different apps that do essentially the same thing. Google's cross-platform solution, named Flutter, went into Version 1.0 in December 2018. In this talk, I'll show how you can use Flutter to create a single app that runs on both iPhones and Android phones.
Bio: Same as in this room and hour earlier.

T-10: Introduction to Python, Chuck Knight, ExxonMobil.
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 he will 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: Chuck Knight has been working in the IT industry for 37 years; the last 20 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 the Software Engineering Advisor for ExxonMobil's Scientific Computing team at ExxonMobil's Corporate Research Center. Chuck obtained his BS from Michigan State University, and his MS from the University of Houston, both in Computer Science and an MBA.

*********1:30 pm to 2:25 pm*********
T-1: Intro to Machine Learning with Azure, Randall Cole, Vertical Screen.
Abstract: In this lecture, Randall will look at the Machine Learning (ML) options Microsoft Azure has to offer. This presentation will walk through setting up an ML experiment to answer basic questions about a data set. This lecture will cover how to create a data set in Azure, structure the data, split the data, train a model, and test the model.
Bio: See 10:15 am, T-4.

T-2: TCNJ Senior Project Engineering Project Poster Presentations:
T-2.1 Solar Water Purification System by Louis White and Ria Sharma, Advisor: Wudyalew Wondmagegn
Abstract: The mission of this project is to create a proptype of a photovoltaic solar water purification system that is functional and able to purify water as

required. This system takes DC energy from the sun rays and then converts it to AC energy to have usable energy in order to purify any water, in any area. The first semester goal for our group was to demonstrate the water level sensors that are using the arduino software program. The water level sensors have three specific levels that are indicated by the sensor to determine if the sensor is dry, partially submerged, and fully submerged. The sensors will be implemented in two tanks, which will help us cut off electricity supply to prevent overflow of the system. Then, for the second semester our group's goal is to implement the PV cell and demonstrate the system functioning as a whole to purify the water. Overall, it is important for our team to make this system as efficient as possible for areas that do not have readily available water.

T-2.2 NB-IoT for Structural Health Monitoring of Bridges by Erik Hayes, Linh Ngo, Josh Tobia and Sarem Shalforoosh. Advisor: Ambrose Adegbege

Abstract: The deterioration of bridge infrastructure has become a major global concern within recent history. In general, bridge collapses are mainly the result of natural disasters, poor design and construction, or neglected maintenance. This project focuses on how to better inspect the condition of bridges in order to maintain the health of the aging infrastructures. For structural health monitoring, engineers have been using either a visual inspection method or wired sensor systems, neither of which are adequate nor secure ways to inspect a bridge. This project focuses on developing a wireless sensor network (WSN) using narrowband internet of things (NB-IoT) communication to create an automated system that more accurately assesses damages in a cost effective and proactive manner. The system is designed to be used as universal infrastructure for ensuring the structural health of all types of bridges. It also is designed to run on low power, which is expected to have a system operational life of 5 years between maintenance. The project consists of designing the sensor nodes to collect the data and a central database to analyze and store all the information gathered by the system. This data includes strain data from a strain gauge operating at ultra-low power, and accelerometer data used to capture vibration information as the bridge is loaded. This data would be used to estimate the structural health of the bridge, which can then be uploaded to a web application for the benefit of users.

T-2.3 Social Distancing with a Bluetooth Beacon by Dylan Novick and Nick Smith, Adviser: Allen Katz

Abstract: Within the modern context of COVID 19, and the social and behavioral restrictions in place to try to mitigate exposure, the need for smart solutions becomes ever more necessary. Our project attempts to, within the application of a high foot traffic business setting, solve the issue of ensuring a safe distance of 6 feet is met, as specified by the CDC. Using beacon technology as our foundation, our system will use received signal strength indication (RSSI) as a method of reading distance between two interacting devices. Our components involve using the nRF51 DK beacon, capable of RSSI recording with BLE implementation. Using the respective software development kits, the embedded system will perform central and peripheral based tasks to both receive and transmit data simultaneously between established devices. The intention is to alert the user that the perimeter has been breached by using methods of visual and vibration-based indications, in the hopes that safe distance is re-established and exposure is kept to a minimum.

T-3: Technology as Applied to the Investigation and Reconstruction of a Vehicle Collision, Justin P. Schorr, DJS Associates, Inc.

Abstract: Technology is expanding exponentially in all areas of our everyday lives from being able to "speak commands" to units that unlock our doors; create shopping lists; and actually order goods and services for us; to units that provide diagnostics to keep our house, office and vehicles properly serviced. The wave of new technology will not be dissipating anytime soon. Even in the world of forensic engineering, every year things progress. This seminar will provide an overview of some of the newer technologies that have been, and/or are just being used to help evaluate vehicular collisions and other failure events. Topics like 3D demonstrative evidence; Event Data Recorders, Telematics and Infotainment; the Epidemic of Distracted Driving; Autonomous and/or Driver Assisted Vehicles; Drones; 3D Laser Scanners; and the engineering analysis of surveillance video are just some of the topics covered in this fast moving, dynamic presentation. Real word case examples will provide a context of how this technology is properly applied so it can be accepted into evidence.

Bio: Justin Schorr earned his undergraduate degree in Civil Engineering from Northwestern University and his Master's and Doctorate degrees in Civil Engineering from the George Washington University (GW). He has also completed specialized training in Collision Reconstruction, Event Data Recorders, and is a certified drone pilot licensed by the Federal Aviation Administration. Also, valuable training comes from his father and grandfather – both of whom were industry leaders in Collision Reconstruction. Justin has published four peer-reviewed journal articles and eight refereed conference papers in the field of transportation safety and driver behavior. While at GW, "Dr. J" (as he is referred to by his students) delivered Keynote Addresses in 2013, 2014, and 2015 for GW's Science and Technology Engineering Day and in 2013 for Schools Without Walls. He continues to serve as an adjunct professor and the lead researcher at the Vehicle Instrumentation and Driver Simulation Laboratory at GW. In addition, Justin has offered CE and CLE seminars on topics including Automated Vehicles, New Technology in Collision Reconstruction, and Driver Distraction.

T-4: Social Media Opportunities: From Intern to VP of Strategy, Don Hsu, Dominican College.

Abstract: Social Media sites are hot: Chive, Facebook, Foursquare, Google+, Instagram, Linkedin, Pinterest, Reddit, Tumblr, Twitter, WhatsApp, YouTube and hundreds of new ones being created every week, if not every day! You got 400 friends on Facebook, 500 followers on Twitter, 300 on Linkedin; can you monetize this friendship? Yes, you can. ---- Companies are hiring in Social Media as: Intern, Associate, Coordinator, Analyst, Consultant, Mobile Marketing, Client Manager, Community Manager, Relation Manager, SEO Specialist, Strategist, Director, Vice President, or CEO. Salary ranged $35,000 to $120,000 per year. --- Using 10001 zip code, CareerBuilder.com got 300+ openings, Monster.com gave 1000+ jobs, Simplyhired.com with 13,480 and Indeed.com with 14,732 jobs in Social Media. --- Speaker will give you specific details on how you can join the corporation as Social Media experts.
Bio: See last talk in this room.

T-5: Emerging Virus Inactivation Technology, Joe Jesson, RFSigint

Abstract: This relevant talk outlines a new technology employed to fight the war on COVID-19. Historically, virus inactivation, bacterial, fungal, and bacterial decontamination in hospitals was accomplished through applying a combination of heat, chemicals, and ultraviolet light. Hospital Operating rooms typically use a portable intense source of ultraviolet light at 254 nm to reduce levels not only of viruses, but common hospital pathogens such as Methicillin resistant Staphylococcus aureus, Clostridium difficile and Vancomycin resistant enterococcus. A major vector of COVID-19 infections in New York City was found to be associated with the subway system. As an Metropolitan Transport Authority consultant, Joe Jesson was invited to recommend solutions. A patented virus defense was found to be an effective solution; and is currently in piolet test throughout the subway system. It is applied inside of locked cars without any people present, between 1:00 and 4:00 am. Joe will discuss details of the test and the newest research in people-safe, upper-air Ultra Violet LED development at General Electric Labs and other approaches.
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. Joe was awarded over 15 patents and worked on the original TEMPEST signals intelligence program in the 70's. Currently TCNJ Adjunct Electrical Engineering Lecturer since 2013, IEEE Princeton Life Chair, holds graduate degrees from DePaul University in Chicago, and is currently a doctoral candidate at NJCU. Joe is also a radio amateur W2JEJ.

T-6: Simple AI Programs to Engage CS Students, Edwin Torres.

Abstract: A major challenge for educators is to keep students engaged in the classroom. This makes learning more effective and fun. This talk presents three engaging and challenging programming assignments that introduce computer science students to AI in programs. Students compete against simple AI opponents in competitive game programs. In Tic-Tac-Toe, students develop a Java class that competes against several AI opponents that increase in difficulty. In Halloween, students develop HTTP clients that move player characters to escape AI villains. In Gobble, students develop Python classes to go head-to-head against AI opponents to gather fruit on a board. In the past several years, students exhibited high enthusiasm for completing these programming assignments. The opportunity to match human vs. computer AI led to a surprisingly high level of engagement and enthusiasm by CS students.
Bio: Ed Torres is a principal software engineer at the MITRE Corporation. He has over 28 years of programming experience in the telecommunications, finance, and government industries. Ed currently leads the development of ACE Direct, an open-source software project that provides direct video communications to people who are deaf or hard of hearing. Ed is a part-time computer science professor at Monmouth University and Brookdale Community College. He has a Doctor of Engineering in Engineering Management from George Washington University, Master of Science in Computer Science from New Jersey Institute of Technology, and Bachelor of Arts in Computer Science from Rutgers University. He is also the author of *The Super Simple Programming Book.*

T-7: Building Computer Systems for IoT using Arduino, Evan Williams.

Abstract: 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. But, IoT, in which actual devices can *reorder* their world, such as a refrigerator that can automatically restock itself, or a weather station that reports back on its status, is still new. This presentation will show how to enable embedded devices to send and receive information and instructions, and make

decisions themselves. Evan has on-the-job experience with LInux and Unix and has built a portable hotspot called "LocalPOD."

Bio: Evan Jan Williams began his career in 10th Grade at Princeton University's Microprocessor Lab run by the Department of Mechanical and Aerospace Engineering. This laboratory taught students how to interface 8-bit computers to real-world devices. After graduating with a degree in Literature from Thomas Edison State College, he worked for 25 years in Computer Software and Servers. After spending 10 years developing websites, his career came full circle at AT&T Middletown, where he worked on three large web dashboard projects. He also holds a degree from Rutgers University in Computer Science. He likes to bicycle and garden and in addition to enjoying writing and photography is a ham radio operator.

T-8: **Arduino Tutorial for beginners, Katalin Frolio, Lockheed Martin in Moorstown.**
Abstract: The goal of this tutorial 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. It is ideal if participants can 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.
Bio: Katalin Frolio has a BS from TCNJ and an MS from Villanova in Electrical Engineering with a concentration in High Frequency Systems. She is an Electrical Engineer at Lockheed Martin in Moorstown, NJ, and is the chair of the IEEE Young Professionals Princeton/Central Jersey Section.

T-9: OpenVPN, Douglas Ferguson, DellEMC _
Abstract: How to setup and use an OpenVPN to provide security in an open WiFi hotspot like a hotel or coffee shop. You can also get access back your home network. Doug will cover setup and use while using off the shelf routers and software based solutions.
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
Abstract: Object-Oriented Programming is a widely used concept to write powerful applications in many languages. In this talk he will tackle the basics of Object-Oriented Programming in Python: exploring classes, objects, instance methods, attributes and much more!
Bio: See talk in this room one session earlier**:**

*********2:35 pm to 3:30 pm*********
T-1: Sol Libes Remembered, Allen Katz, Hank Kee and Don Libes.
Abstract: This special session will discuss the life and contributions of Sol Libes, founder of the Amateur Computer Club of NJ (ACGNJ), Co-founder of TCF, Professor/mentor, Author, Publisher, Visionary, and Husband and Father. Contributions from the audience will be encouraged.
Bio: Allen Katz see T-2 at 12:25 pm. Don Libes see T-2 at 11:20 am. Hank Kee has a long history dating back to the 60's of involvement with computers. He is Treasurer and a past President of the NY Amateur Computer Club (NYAC), a long time WBAI radio host of the PC show, a magazine and book author, and winner of numerous awards in personal computing, broadcasting and publishing, including the ACGNJ's Computer Hobbyist of the Year.

T-2: Blockchain and the Next Generation Battlefields, Cody Hofstetter, IT/Cybersecurity firm.
Abstract: Most people believe future conflicts will be fought covertly in cyberspace. A deceivingly correct statement. In this talk, we will be discussing what future battlefields fought in the open by covert actors looks like, and the influence blockchain technologies have.
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. His main focus is as the Founder and CEO of an IT/Cybersecurity firm specializing in penetration testing, vulnerability & physical assessments, exploit development, forensic investigation, and advanced data recovery/destruction. Some of his other ventures include owning a finance/day-trading firm, a community focused health oriented restaurant, presenting talks nationwide, is a certified personal trainer, in addition to being a lyricist & songwriter for several musicians. If you'd like to hear about other endeavors or have specific

questions, he loves engaging and meeting interesting new people at any event.

T-3: New 5G IOT Offerings: Low-Power, Long Distance and Low-Cost Connectivity, Joe Jesson, RFSigint and TCNJ.
Abstract: Joe will present the latest Internet of Things (IoT) 5G communications offerings. While 5G is promoted primarily for the 1Gb high-speed data access, two other protocols, NB-IoT and LTE-M (aka CAT M1) are of most interest to the communications and embedded engineer. These two protocols are part of the LPWAN (Low-Power, Wide-Area Networks) offerings are optimized for IoT connectivity. While this 5G base station connectivity options are much slower (200Kb vs 1Gb) than the touted 1Gb data rates, the near-Shannon narrowband limit optimization offers the IoT/Telematics engineer a much greater (1000x) distance, at much less power (operates up to 3-10 years on one small primary battery), all at 1/12th the cost! He predict, based upon my many years of commercializing IoT applications that NB-IoT will soon be the new IoT network of choice for the upcoming Smart Cities network architecture! Adding intelligence at the edge allows the engineer to send identified video classified objects instead of sending HS video over a much shorter and greater power communications link. Joe's TCNJ Sr. EE student Joel Rivera, a Bonner Community Scholar and College Ambassador for the Office of Undergraduate Admissions, will demo his Sr. Project which enables remote meters and instruments to be monitored over the long-distance, low-power NB-IoT link (in the LTE 700 MHz spectrum offered by T-Mobile).
Bio: See T-5 at 1:30 pm.

T-4: Reskill and Reinvent your career in CRM Technology - Get Prepared for the Fourth Industrial Revolution, Cecilia Jackson, YLDP.
Abstract: The World Economic Forum 2020 has clearly articulated that the Fourth Industrial Revolution is geared toward an increase in tech jobs with soft skills. What are you waiting for? Come explore the opportunity to reskill yourself from a business user to a CRM business analyst. According to an article in the WEF, the Managing Director, Global Services, BT Group write that by 2022 alone, 75 million jobs will probably be displaced across 20 major economies, while 133 million new ones will spring up in industries that are only just gaining traction. At the same time, it's estimated that nearly two-thirds of children who started school in 2016 will go on to have jobs that don't yet exist.
Bio: See T-6 at 12:25 pm

T-5: Electronic Devices You Never Knew You Really Needed for Your Car!, Paul Bergsman, independent consultant
Abstract: There is an inexpensive alternative to Low-Jack. 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 Bill Cosby made a TV 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-6: A Custom Low-Power Networked Mobile Health Device, Larry Pearlstein and Jordan Sinoway, TCNJ.
Abstract: At The College of New Jersey, we have an interdisciplinary team composed of faculty and students in engineering, healthcare, communications and economics, building a system for increasing the efficacy and decreasing the costs of smoking cessation therapy. We envision a tele-health system that combines a number of proven modalities for treatment. At the core of our system is the T-COM, a low-cost, low-power mobile device, which is capable of measuring the concentration of exhaled carbon monoxide (CO). Our device includes a wireless 3G modem that permits access to a cloud database and cloud applications. The system will provide the user with motivational games and messaging. These interactive media will be customized to the needs of the patient, based on their progress as measured by CO readings, and based on their level of engagement with the system. This talk will focus on the microcontroller, the touch-screen display, the Open Source graphics library used, and MySQL Connector code adapted from an Arduino library, to mate with a ublox 3G modem via an AT command set.
Bio: Larry Pearlstein is a professor of Electrical and Computer Engineering at TCNJ. He teaches courses in embedded systems, digital signal processing, video compression and deep learning. His primary research area involves the use of deep learning for robotic vision. He also performs research in video processing, video compression and mobile embedded systems. Prior to joining TCNJ he was a Technical Director for Broadcom, where he architected chips for digital television sets. He served as Chairman of the ATSC Specialists Group on Video

Coding, which helped develop the ATSC Digital Television Standard. He received a BSEE degree from Drexel University, and MS & PhD degrees from Princeton University. He is a Senior Member of the IEEE. Jordan Sinoway is a junior Computer Engineering student at TCNJ. His primary interests are in robotics, embedded systems, and sensors. He is a member of two research laboratories at TCNJ: Dr. Larry Pearlstein's IMPL Lab, and Dr. Seung-yun Kim's CRoIS Lab. His primary research projects include the PCB design for the T-COM Project, a novel m-health device for smoking cessation (IMPL Lab), and lead design and development for the Robotic Teleoperation Exoskeleton Project (CRoIS Lab). After graduating, he intends to pursue a career in the field of robotics, and to continue his education in a related graduate program.

T-7: Intro to Switch Mode Power Supplies, Manuel 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 through the historical developments of this technology.
Bio: Manuel C. Blanco is a Sr. Electrical Design Engineer at ITW where he develops and directs new strategic product designs initiatives, and market design requests that directly impacts his company's portfolio. He has a B.S. in Physics from Seton Hall University, and both a BS and MS in Electrical Engineering from NJIT. He is a senior member of the IEEE and active in its Power Electronics and Industrial Electronics societies.

T-8: An Introduction to GNU Screen - or How to Make the Command Line Work for You, Bob Murphy.
Abstract: GNU Screen is part of the GNU project, and is an overlooked utility that can make working on the command line much easier. Screen is a terminal multiplexer that allows for disconnecting remote sessions, multiple ways to enhance viewing of your command line sessions, and better ways to capture data from those sessions. I'll show you how to more effectively use Screen, as well as how to install it under several GNU/Linux distributions. The talk is targeted at beginner or intermediate UNIX users. Those attending are encouraged to bring a laptop with GNU/Linux or another UNIX to install Screen and work along during presentation. It will be interactive, with questions encouraged.
Bio: See T-8 at 10:15 am.

T-9: TCNJ Senior Project Engineering Project Poster Presentations:
T-9.1 Search Online Tutors on Demand by Andre Le, Advisor: Anthony Deese.
Abstract: In the era of COVID-19, many students are not able to access tutoring resources on campus. Online tutoring resources are decentralized, and it can be difficult to find tutors for specific subjects. The Online Tutors on Demand Web Application will allow students to instantly search and schedule tutoring sessions via Zoom in one place. Tutors can set availability times, and students are able to search for tutors by subject and availability. This application is designed using a progressive app framework to work on both mobile and web browsers and is implemented using Ruby on Rails. It uses a model-view-controller architecture and organizes data through a PostgreSQL database. During this time of uncertainty, students will be able to find the academic help that they need.
T-9.2 Macro Keypad for Content Creation by Luke Zambella, Advisor: Orlando Hernandez.
Abstract: This project aims to create an affordable human input device for a personal computer that is marketed towards the creative kind. Many devices already exist but are either constrained by their smaller size or are very expensive. The key component of this device is its use of rotational input via encoders which can be mapped to a variety of actions. A significant advantage to this rotary input is the speed at which inputs can be registered and is useful for actions that are incremental/decremental in nature, a common paradigm in the kind of software this is aimed at. This device has a total of six of these inputs. The device additionally contains plenty of binary switch input, twelve in total with an additional optional six from the encoders secondary switch input. This gives the user plenty of room to add all the actions they may want to perform. The device aims to be compact enough to complement the side of a tablet device or a keyboard/mouse allowing for comfortable use in an already familiar position. Computer software will be used to give the user freedom to program the device however they want without having to modify code. The ultimate goal of the project is to streamline creation by giving the user customization and intuitive input.
T-9.3 Tunable Bandpass Filter, Dan Poracki, Advisor: Anthony Deese
Abstract: This project involves the construction of a Biquadratic Bandpass Filter using switched capacitors to control the bandpass. The biquadratic filter has been simulated usin within PSpice and displaying proper performance with a center frequency at 2.0 kHz. An initial design using the switch capacitors on a breadboard has ben fabricated and a PCB in design.

T-10: Using Design Patterns in Java Application Development, Mike Redlich, ACGNJ and ExonMobile.
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 seminar will introduce 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. Example Java source code will be reviewed to demonstrate the features of OOP and design principles.
Bio: See T-10 at 10:15 am.

*****3:40 pm to 4:35 pm*****
T-1: KEYNOTE: How I Learned to Stop Worrying and Love Artificial Intelligence, Jerry Foster, CTO and one of the founders of Plex Systems.
Abstract: There is much talk these days about machine learning and artificial intelligence (AI), and for good reason. AI is the enabler that drives exponential value from all other technologies; for any process that generates data, it is no longer optional, but a requirement. This keynote provides an overview of Artificial Intelligence, from its humble beginnings to disruptive force, with an eye towards the significant positive impact on our world.
Bio: Jerry Foster is the CTO and one of the founders of Plex Systems, which today helps more than 600 manufacturers worldwide run their businesses. Jerry earned his degree in computer science at Liberty University, and used his education first as a programmer at a Michigan metal former, where he built a custom innovative ERP system, before taking that solution to other businesses, eventually building a SaaS manufacturing company that today employs more than 500 employees globally. Jerry continues to set the pace of the innovation in the cloud, leading the company's technology strategy and research initiatives that drive the industry forward.
We are fortunate to have Jerry bring his expertise and vision to TCF 2021 on this vital topic, and excited to have him join us!