TCF	***49th Annual*** **Trenton Computer Festival** **The Longest Running Festival for Computing and Tech in the World!** **The College of New Jersey**

Talks & Forums **Saturday, March 29 - 9:00 am to 5:00 pm ET** Talks/Forums start at 10:15 am Vendor Faire - 9:00 am to 3:00 pm	**Admission: $20. Children under 12 Free; Free Parking & Wi-Fi** **Tickets must be purchased online – see** **TCF-NJ.ORG**
TCF Banquet **Saturday, March 29 - 6:30 pm** **Requires Advance Reservations ($45, email** **pearlstl@tcnj.edu by March 23)**	**Sarnoff Tours in Roscoe West Hall (11:30 am – 2:00 pm)** **Spring Smash, Battle of the Robots (10:00 am – 5:30 pm)** **Ham Cram Session (9:00 am – 3:00 pm)** **Amateur Radio License Exam at 3:30 pm**

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 – njmakersday.org

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2024 PROGRAM

Track / Talk Links

Keynote Presentation: After Twenty Years, the Maker Movement is Still Fun – Dale Dougherty, Founder of Make: magazine, and the worldwide Maker Faires

Abstract: Make: Magazine was first published in the spring of 2005 and it featured DIY technology projects. It was more about playing with technology than working with it. The first Maker Faire started a year later and brought together all kinds of people who make and create things -- we called it "the Greatest Show (and Tell) on Earth" and it is nothing if not fun.

Both Make: and Maker Faire served to give recognition and a name to the kinds of creative and technical projects that people do, just because they are curious and enjoy doing them. Makers have an idea of their own that they want to develop and make into something that they can share with others. This year is the 20th anniversary of the start of the maker movement, although it is also true that we've always had makers. I'll reflect on what I've learned about makers and their role in innovation, education and creative culture.

Bio: DALE DOUGHERTY is President of Make Community, LLC, which publishes Make Magazine along with technical books and also produces Maker Faires. He founded Make: Magazine in 2005, and first used the term "makers" to describe people who enjoyed "hands-on" work and play. He started Maker Faire in the San Francisco Bay Area in 2006. Dougherty is the author of "Free to Make: How the Maker Movement Is Changing our Jobs, Schools and Minds" with Adriane Conrad. You can follow Make at makezine.com.

Plenary Presentation: A Glimpse into the World of Immersive Technology at Otherworld – Matthew Schenck and David Skovron, Otherworld Philly

Abstract: Otherworld Philadelphia is an award-winning, world-class, interactive and immersive art experience that boasts 40,000 sq ft. of groundbreaking technology, and has welcomed over 250,000 guests in its first two years. Join Technical Director, Matt Schenck and Technical Supervisor, David Skovron as they walk you through the team's journey to success and what it takes to keep the show running year-round. This presentation will focus on some of the key exhibits at Otherworld Philadelphia and the different applications of technology to create a mixed-reality universe. Additionally, hear about the team's latest venture into concerts and live events.

Bios:
Matt Schenck specializes in using technology to translate an artistic vision into a tangible and consumable experience. Schenck has been in entertainment technology for more than two decades. He began his

journey in the recording studios of Philly, NYC and Nashville, then discovered the traveling circus that is live concerts. After mixing bands for audiences in venues across the country, Schenck then pivoted into Immersive and Interactive Experiences. This has opened an entirely new chapter to his career full of possibilities and chances to tread ground never explored.

David Skovron is a creative technologist and audio engineer based in Philadelphia, PA. With a passion for blending art and technology, his work has reached over half a million people across the world. As the Technical Supervisor at Otherworld Philadelphia, Skovron specializes in crafting immersive, multisensory experiences.

Track 1: Fun With Technology

The State of Self-Hosted Entertainment – Tim Arnold

Abstract: The last 20 years has seen an exponential growth of pay media streaming solutions for both audio and video. In that time we have also seen the demise of user owned digital and physical media. What is the state of self hosted media and how are users navigating the post modern media landscape. This will be an open discussion that begins with an overview of several open source home video and audio solutions as well as ideas for "cutting the cord".

Software covered:
- The SnakeOil Server - Running Lyrion and MPD for Audio
- Kodi and Plex for video streaming
- Several containerized tools for "ripping and hosting media content"
- Linux and open source for the development of media solutions.

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

How to Get Started in Combat Robotics – Adam Cunard

Abstract: You've seen them on TV, but now take a look into how to get started with Combat Robotics on a smaller scale! From hobbyists looking for a new pastime, to educators looking to breathe new life into their classroom, find out how to start rumbling with robots!

Bio: Adam Cunard, is a 22 year old Sr. Technology and Engineering Education major at The College of New Jersey who has been building combat robots like the ones seen on TV since 2014. Adam is also an acting board member of the Garden State Combat Robotics League, which focuses on bringing robotic combat to the greater New Jersey area.

FUBAR Labs, The Makerspace Where Your Projects Talk Back to You – Rick Anderson

Abstract: Over the last twelve years, our makerspace has added to traditional making to integrate generative AI into many of our robotic and IoT projects. I will showcase how we've combined combat robotics design principles with AI to develop Foocars 2.0, our autonomous vehicle platform, highlighting our expanded capabilities. Fubar Labs now has a functional metal shop, CNC machining, high-temperature 3D printing, and woodshop that enable projects of many sizes and materials. We've created an ecosystem where traditional fabrication skills and advanced AI development can be compatible, empowering makers to tackle increasingly complex challenges. This fusion of physical craftsmanship, electronic design, and artificial intelligence represents the future of community innovation spaces, where autonomous vehicles, combat robotics, and other ambitious projects become accessible to enthusiasts of all ages and all skill levels.

Bio: Rick Anderson is the Director of Virtual Worlds at Rutgers University and co-founder of FUBAR Labs.

Al Katz's Professional Life Story: How to have fun every day with your hobby while building a thriving high-tech company – Joe Jesson

Abstract: This presentation is to be more than a list of all Al's significant accomplishments as an educator, microwave expert, electronics business owner, amateur radio and EME hobbyist ,but more of what I learned from Al as his friend who shared interest in many of his hobbies. It became clear to me over the 25+ years we were friends and colleagues, that Al's motivation was to have fun with EME (Earth-Moon-Earth) by counting microwave EME contacts made across the globe. EME contests drove both his theoretical and practical knowledge. This presentation attempts to explain Al's fascination with EME by presenting the technical opportunities and challenges of EME, and how this knowledge is connected with his Electromagnetics engineering classes and successful business ventures. Al's proudest moment: https://www.ok2kkw.com/next/eme1976wac.htm

Bio: The speaker, Joe Jesson, W2JEJ, co-founded & was CTO of a General Electric business, Asset Intelligence, a GE business which designed and sold remote IoT smart sensors for the logistics and energy sectors.   Joe is currently CEO of RF Sigint Group and has over 25+ years of engineering and management experience. Masters degree from DePaul University & working on a PhD.(soon he may challenge Karl Marx for the time it takes to obtain his PhD).

Track 2: Fun With Technology

Economically Creating Your Custom and Prototype Electronics – Jonathan Allen, RF Electronics Consulting

Abstract: Construction of a one-of-a-kind electronic device, whether for hobby or business, is quite different from that of a production item. Although not suitable for commercial manufacture, it should still be safe, rugged, reliable and a working verification of the design. This talk will discuss the choice and procurement of components, the structures, and the techniques for assembling the circuits economically with readily available materials.

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.

Fun with Pixicade, Quickly Create Cool Platform Games From Line Drawings – Ivy Pearlstein

Abstract: This presentation will introduce you to the fun and creative possibilities of this platform to create complex real-time games and puzzles, limited only by your imagination. . Simple cartoons can be transformed into challenging one and two player games that can be shared with family and friends. A game is created by using paper, colored markers and a tablet device with a camera. You will see a demonstration of the speaker's prior game designs, and will create online games together that you can play on your smartphone!

Bio: Ivy Pearlstein has been a Nurse for 45 years and a Nurse Practitioner for 26 years. She currently works at Henry J Austin Health Center in Trenton, NJ and has been an adjunct Professor of Nursing at the College of New Jersey since 2017. Although healthcare was relatively late in its adoption of technology, Ivy has embraced its advantages, which have proved indispensable to practitioners. She is married to Larry Pearlstein, a Professor of Electrical Engineering at TCNJ, for 43 years. She has also been an avid, enthusiastic amateur doodler and cartoonist for over 60 years. These educational, occupational and matrimonial interests coalesced during the lockdown days of the pandemic and found creative expression in an online platform called Pixicade, which she will enthusiastically present to anyone interested!

Building a 26 MHz to 1.7 GHz RF Spectrum Monitor and AM/FM/Digital Demodulators on a Tiny Raspberry Pi Zero 2W – Joe Jesson

Abstract: This amateur radio project was the most rewarding project I built recently and it is based upon the OpenWebRX+ Linux project found on github (https://luarvique.github.io/ppa/). This is a web-based SDR, which consists of a RF.server, which sends I/Q sampled data, at a typical 2,4 Mb rate (USB limits), via a TCP/IP connection to any HTML5 browser. The browser user-agent can be anywhere in the world that an internet connection can be had as long as you have an open port you can define on your router to pass through to your RF server.

This project evolved into four phases - first phase installing the code on an i5 multicore Ubuntu-based laptop. and configuring the system for a $30 V3 SDR hardware dongle, Second phase was to add an improved hardware SDR, one with tracking RF bandpass filters, larger sampling instead of an 8-bit width to a 12-bit ADC which gives improved RF dynamic range overload protection when the Airspy HF+ Discovery hardware SDR was added. Third phase was to move the RF server code to a Ras Pi 3. While this worked well for 1-2 online users, it was nowhere near the 15-20 simultaneous internet users I obtained with an i5 processor. The fourth phase was the port to a tiny, and very cute, Ras Pi Zero 2W. To give an idea how cute, the optional metal housing comes with a lanyard so you can wear it around your neck!. Architecturally, the Pi Zero 2W, with 4 cores, is software compatible with the Pi 3.

All 4 phases will be shown during the presentation and the installation, configuration. and the detailed operational manual may be found at https://fms.komkon.org/OWRX/

Bio: See above talk by Joe Jesson.

Computer Graphics Film Show from the ACM SIGGRAPH Conference – Dennis Mancl

Abstract: The Computer Graphics Film Show features the latest and greatest computer animations direct from the ACM SIGGRAPH conference held in summer 2024. It will be an entertaining overview of recent advances in computer graphics. You can find links to all of the videos we will be showing at https://princetonacm.acm.org/downloads/acm_siggraph_talk_2024.html

Bio: Dennis Mancl is the Chair of ACM Princeton Chapter (our local computer professional organization). He retired not too long ago from Alcatel-Lucent in central New Jersey.

Track 3: AI

The history of Artificial Intelligence in Society – Bill Degnan

Abstract: Artificial Intelligence has been the subject of science fiction and philosophical debate since the dawn of the computer age. This talk explores perception of artificial intelligence as it has evolved from its inception through modern times.

Bio: Bill Degnan is the president and founder of Kennett Classic, a non-profit dedicated to the preservation of computing history.

Researching the NY Drone Mystery – Joe Jesson

Abstract: NJ Congressman Jeff Van Drew announced December 11th, 2024 that drones over NJ are from an Iranian "mothership" stationed off the U.S. East Coast, reportedly launching drones now flying over New Jersey. The White House press insisted they had no information on the drones and that Jeff Van Drew was a bit off. Since this statement is clearly not logical, many NJ mayors demanded a Homeland Security briefing. During the briefing, the NJ mayors were given the same nonsense - "we have no idea on the origin of the drones but they present no danger.". The briefing was not received well and mayors stormed away and told reporters that the briefing was a joke as no answers were given. In the meantime, many theories were presented, such as the drones were searching for a missing nuclear warhead or another theory was they were gathering information over NJ military bases, and finally, the drones are aircraft in a holding pattern and incorrectly identified as a drone. Finally, on January 29th, the President announced, "The drones that were flying over New Jersey in large numbers were authorized to be flown by the FAA for research and various other reasons … this was not the enemy,"

Late December I have been researching the NJ done sightings and found a stunning admission by the Pentagon: "Maj. Gen. Pat Ryder, the Pentagon press secretary, said the military was providing 'active and passive detection capabilities' and 'counter-drone capabilities' to Picatinny Arsenal and Naval Weapons Station Earle." The Pentagon sent counter-drone weapons from the corporation, dzyne.com. So, the NJ

base commanders had serious reasons to be concerned. My research into drones in the Ukraine battleground found that advanced drones from China, Iran, and Russia are being tested for the next world war. The details of what I found will surprise the audience and I will detail the specific drone technology the Pentagon addressed and what is being tested in the real world battlefield of Ukraine.

Bio: Please see the above talk from Joe Jesson.

Workshop: Putting Gen. AI to Work Creating Art & Literature – Louis J. Judice, The Round Mountain Group

Abstract: Great minds from Henry Kissinger to Elon Musk have debated if AI is society's salvation or downfall. Forget the deep thought and just learn how to use it and what you can create. We'll cover Adobe Firefly, ChatGPT, Dall-E and many more tools with practical and sometimes just insane applications.

Bio: Louis Judice runs the Round Mountain Group, voted Hunterdon's best web agency many years in a row and a member of the TCF Steering Committee. He is a passionate photographer, historian and always ready to get down and dirty with the latest technology trends. And that means using it, not just thinking about it. Born in New York City he has resided in rural Hunterdon County for over 30 years, served as an elected Mayor and one of the leaders of the farmland preservation movement. His wife of 30+ years is a vice president at a major software company and his two grown sons are a software development manager and commercial real estate analyst respectively. He is a member of the IEEE, Sigma Xi and was named a Guardian of History by the famous Red Mill Museum in Clinton, NJ. RMG is a TCF Sponsor.

Track 4: Electronic Design for Fun & Profit

Introduction to Switch Mode Power Supplies – Manuel C. Blanco, Sr.

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 and evolving software A.I. tools.

Bio: Manuel C. Blanco, Sr. Electrical Design Engineer at ITW where he develops and directs new strategic product designs initiatives from market design requests that directly impacts the company's portfolio. Education: B.S. in Physics-Seton Hall University, B.S. and M.S. in Electrical Engineering from New Jersey Institute of Technology.
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Temperature Logger Using a Low-cost Raspberry Pi Single-Board Computer – Don Arrowsmith, Philadelphia Area Computer Society, President

Abstract: We present the design and construction of a standalone unit to log ambient temperature at a regular interval to a CSV file. We explain how this file can be transferred to a PC and then populate a spreadsheet for analysis. To control the logger remotely, we describe how the RPi can be accessed from anywhere, as long as the RPi has a Wi-Fi or wired network connection. Our project illustrates how easy it is to set up and utilize a Raspberry Pi for sensing applications like this and many other uses.

Bio: Don Arrowsmith has a BSEE from Lehigh University and worked for 36 years as a civilian for a US Naval field activity. He's the current president of the Philadelphia Area Computer Society and loves to tinker with his network of computers.

Putting Sense into Artificial Intelligence – Ed Herceg

Abstract: TBD

Bio: Ed Herceg is currently Chief Technology Officer of Alliance Sensors Group, a division of H. G. Schaevitz LLC. With a distinguished career in the sensors industry spanning more than half a century, he is highly regarded both for his applications engineering expertise and for his technical innovations. Before joining ASG, he held senior technical and marketing positions at Everight Sensors Corp., AST Macro Sensors LLC (now part of TE Connectivity), Massa Products Corp., and Schaevitz Engineering (now also part of TE Connectivity), and is well known in the industry as the author of the Schaevitz Handbook of Measurement and Control.

Use your PC to Understand, Evaluate, and Verify Analog Circuit Designs Before You Build Them: LTSPICE – David Fiori, Jr.

Abstract: LTSPICE is an analog circuit simulation system available free from the Analog Integrated circuit manufacturer Analog Devices. Because it works, is easy to use, and is free it has become the most popular analog circuit simulation tool there is. The simulator's popularity has also been reinforced by the many component and integration circuit models that are now available for it.

Starting with a quick introduction of how to get started with LTSpice, key features of the software will be identified and shown. A variety of analog and mixed analog and digital circuit simulations will be shown with a view to demonstrating many of the capabilities LTSpice has to offer. LTSpice will be shown to evaluate key circuit performance measures such as harmonic distortion, temperature sensitivity, sensitivity to component values, and circuit operating conditions in a variety of example circuits.

For Analog circuit examples, LTSpice will be shown comparing and contrasting between a simple two transistor audio amplifier circuit and the Texas Instruments LM386 analog (low) power amplifier integrated circuit in application as a headphone amplifier. LTSpice will also be shown comparing and contrasting a variety of common mode analog electrical noise cancellation circuits, including the speaker's own patented synthetic analog signal isolation circuits. A Colpitts oscillator will also be used as

an example to illustrate LTSpice capabilities in characterizing the performance of analog radio frequency (RF) circuit applications.

Examples incorporating a mix of analog and digital circuits will also be shown being explored using LTSpice. The venerable LM555 timer IC, which is a simple mixed analog and digital integrated circuit, will be compared to the use of digital logic gates in application to a model rocket launch warning alert system. A shift register random number generator based earthquake sound effect generator developed and actually used by Universal Studios for their feature film "Earthquake" will also be shown being explored and evaluated in LTSpice. Finally, LTSpice will be shown exploring and evaluating the speaker's own patented frequency to analog converter which develops its analog output from a digital time domain analog technique.

Little known tips and techniques in LTSpice will be noted as time permits.

Bio: Successful Inventor & Entrepreneur. Founder of Sensor Technologies, Inc. now a unit of TE Connectivity. Founder and president of Anamir Electronics, a manufacturer of high performance automotive audio interface and electronic noise eliminating products. Named Inventor in 24 patents in Frequency Modulation (FM) non contact rotary and linear position sensors, pulse width modulating (PWM) based ratio-metric Digital to Analog Converters (DAC) and Analog to Digital Converters (ADC), small signal synthetic analog isolation transformers and related electrical interference and electrical noise eliminating devices.

Track 5: All About Tech

Monitoring Aircraft Communications and Directly Track Aircraft with an Innovative Software Defined Radio System - Joe Jesson

Abstract: Aircraft transmit the location and status using many digital and analog RF protocols and this low-cost and tiny radio receiver monitors most, if not all, of the aircraft-based transmissions. This system's architecture is illustrated on slides but also the entire system is demonstrated in real-time and we can watch all airplanes within ~50 miles from my discone antenna. We can select messages transmitted based on ACARS, ADSB, ADL2, HFCGC protocols, and hear cockpit voice transmission audio! The heart of this is a software defined radio and the transmission signal is labeled so you can select the protocol and signal on a waterfall (signal frequency over time and selected by an on screen menu selection). The SDR RF amplifier and mixer is in a small module generating an I/Q signal which is sent via the USB port - at a sample rate of 2.48 Mbits/sec - and the Openwebrx+ application software (hosted on a tiny RPi Zero 2W quad-processor) and a Javascript app generates the FFT visualization and user interface. The browser user-agent can be anywhere in the world where there is an Internet connection, as long as you have an open port you can define on your router to pass through to your RF server Openwebrx+.

I promise you will find this demo and project design to be the coolest and the most fun project (based on advanced communications technology) that you will see today! Also a great project to learn Software

Defined Radio technology and to pursue how to write an FFT for fun. While I was testing this I noticed an airplane had sent an equipment failure ID message and I watched the airplane make an emergency landing while the speed and altitude graph showed a turbulent landing. What an adventure!! I have logged this data and will visually show this airplane by ID, flight plan and landing rate. Also I have configured the receiver to monitor the Air Force emergency message frequencies so maybe we can catch activity on these nuclear bombers. From Google: "The US Air Force's High Frequency Global Communications System (HFGCS), also known as the 'HF network,' is a crucial component of the nuclear command and control infrastructure, using single-sideband shortwave transmitters for secure, global communications, including Emergency Action Messages (EAMs)."

How about that for a fun project? I will post the plans for replicating this project at TCF. The RPi Zero 2W quad-core board is available for $15 and the DSP V4 dongle for about $30. The Openwebrx+ open source and Linux/Raspi image files are free but I have spent hours configuring the bands, many other configuration parameters, and getting it to function on multiple SDR receivers.

Bio: Please see the above talk from Joe Jesson.

AI and Robotics - Eva Kaplan

Abstract: How the evolution of robotics and AI has infiltrated our lives.

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. Eva also received a Master's Degree in Interrelated Arts from New York University. Of special note 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.

Project SPARC: Igniting Student Passion for STEM and Space for More Than 60 Years - Burt Dicht

Abstract: Project SPARC (Space Research Center) has been inspiring students in space and STEM (Science, Technology, Engineering, and Math) careers for more than 60 years. Founded in 1962 by Northeast High School (Philadelphia) physics teacher Robert Montgomery, SPARC was designed to excite students about science—particularly as it relates to space research and development. Recognized by NASA as the first high school space program in the United States, SPARC has provided hands-on, immersive learning experiences long before STEM education became a national priority.

In this engaging session, Burt Dicht, a former SPARC astronaut and now the director of the SPARC Boosters, will take you on a journey through the program's rich history, from its groundbreaking student-led space simulations to the lasting impact it has had on thousands of students who have pursued successful careers in STEM and beyond. Through alumni stories and historical insights, Burt will showcase how this pioneering after-school program continues to evolve, preparing and inspiring the next generation of scientists, engineers, medical professionals, and technology innovators.

Join us to celebrate SPARC's enduring legacy and explore how it remains a model for immersive STEM education in today's rapidly advancing technological landscape.

Bio: Burt Dicht is dedicated to advancing STEM education and inspiring future generations to pursue careers in science, technology, engineering, and mathematics. As the Managing Director of Membership for the National Space Society (NSS), he oversees NSS operations at the Kennedy Space Center, working to connect and engage individuals passionate about space exploration.

Prior to joining NSS, Burt led student and academic programs at the Institute of Electrical and Electronics Engineers (IEEE), where he developed initiatives to support engineering students, faculty, and pre-university educators. His career began in the aerospace industry at Northrop Grumman, contributing to major aircraft programs, including the F-5E/F, F-20A, YF-23A, and F-18E/F, and later at Rockwell International's Space Transportation Systems Division on the space shuttle program. As an engineering student, he participated in NASA's Summer Employment Training Program at the Kennedy Space Center, further deepening his passion for space and engineering.

Beyond his professional work, Burt has remained a tireless advocate for STEM education. He has written extensively on aerospace history, served as an Exhibit Explainer at the Intrepid Sea, Air & Space Museum, and continues to mentor and educate as a Major and Aerospace Education Officer in the Civil Air Patrol.

A former SPARC astronaut, Burt's commitment to STEM outreach is exemplified by his leadership in forming the NEHS Project SPARC Boosters in 2014, an organization dedicated to sustaining Project SPARC as a premier after-school STEM program. Through this effort, he continues to ensure that students have access to immersive, hands-on experiences that ignite their curiosity and prepare them for future careers in STEM fields.

Burt holds a B.S. in Mechanical Engineering from Temple University and an M.A. in History from California State University, Northridge. He is an ASME Fellow and a member of the IEEE-HKN Honor Society.

Using Generative AI to Predict Machine Behavior - Vincent Perlowin and Dr. Mohammed Alabsi

Abstract:

Bio:

Track 6: The MicroDome Planetarium

The MicroDome – A Catbird Seat On the Known Universe - Aram Friedman

Abstract: Our software is designed to simulate the entire Universe (amazing, but true). We can use it to visualize the classic *Sky Tonight* or the *Cosmic Zoom*. Sky Tonight starts with an Earth-bound view of the

night sky with emphasis on the basics of the Earth, Moon, and Sun relationship. This covers Moon phase, Seasons, Day & Night, Planets, Planetary Motion, Moons, Orbits, Asteroids, and Comets.

Cosmic Zoom demonstrates our place in the Universe. We examine the true size, scale and distances of the Solar System. We introduce and discuss the concepts of the Astronomical Unit, Light Year, Stars, Exo-Planets, Galaxies, Quasars, Nebula, alternate views of the sky (Infrared, Ultra Violet, Radio) and a flight to the edge of the known universe (13.5 billion light years). We can mix the two programs in response to requests by the attendees of each session.

Bio: Aram Friedman began his career working at his uncle's camera repair shop refurbishing the first generation of audio cassette and 8 track tape players. While attending CCNY, NYIT & NYU at at night, he studied computer science, machine language and the first generation of microprocessors. He worked during the day fabricating microwave components, repairing bank passbook machines and eventually working full time building recording studios in NYC.

He migrated to building video post-production facilities just as quad videotape was being replaced with 1" helical. His computer science and hardware fabrication skills proved invaluable when PDP-11s became the mainstay of video editing. Seeking adventure, he accepted a position with CBS Sports traveling on a mobile unit and eventually joining CBS News doing international broadcasting. Returning to post-production, he joined R. Greenberg Associates building the first truly digital facility in NYC specializing in the first generation of 3D computer rendering. He then joined with Douglass Trumbull in the production of an immersive motion ride installed at the Luxor Hotel in Las Vagas.

In 1998 he was recruited to manage the upgrade of the Hayden Planetarium in NYC. His experience with dome projection, real-time rendering, automation and sound resulted in the opening on millennium night of a world class immersive theater. After several years as their director of engineering, Mr. Friedman joined Evans & Sutherland building planetariums worldwide. Using spare parts, he built a small 24" portable planetarium for his children. He brought the crude machine into their classroom and was soon asked to present formal programs for other schools. During a conference on science education, he met the late Prof. Jay Pasachoff of Williams College who asked to have a 4' version of the "Micro Dome" installed at the Old Hopkins Observatory. Through his association with Dr. Pasachoff he built a 5' dome for Northrop Grumman, the prime contractor for JWST. Mr. Friedman taught astronomy for Northrop at conferences and science events for a decade. It was at the National Space Symposium that Mr. Friedman met the late Al Katz of TCNJ.

Mr. Friedman recently retired from broadcasting in 2024 but will continue to teach with his new 4k dome.

Track 7: ITPC1

UX of Politics and the Politics of UX – Becky Reid

Abstract: Becky Reid will walk you through the recent (and still developing!) history of primary ballot design in New Jersey, centering on Andy Kim's 2024 lawsuit to eliminate the "county line" grid based layout. Drawing on work from the Center for Civic Design, we will examine how politics shape the user experience, how the user experience for voters can shape political outcomes in turn, and how we as UX professionals and civic-minded citizens can get involved.

Bio: Becky Reid is a musician and UX designer working with performing arts groups and businesses to better serve and connect with their audiences. With a Master's in Music from NYU in percussion performance, she continues to perform and teach throughout the tristate area. Becky has also worked for the Burlington County Board of Elections as a poll worker since 2020, leveraging her UX experience to assist her peers and the voting public as voting technology and our election process continues to evolve.

UX Strategic Leadership – Josephine Giaimo

Abstract: Complexity isn't just complicated, it's actually complex. The old-school command-and-control style of leadership is no match for our volatile times, increasing uncertainty, increasing complexity, and high levels of ambiguity. Do you have the skills to lead through complexity? Learn how to use all the resources at your disposal to lead your project team through uncertainty and complexity to success, using proven methods. You will learn how to make the most of differences of opinion, making them work to drive discussions towards resolution in a supportive, nonjudgmental fashion. Learn how much time successful teams spend on developing a shared understanding. Learn about the many valuable strategies and resources on leading through complexity that are available to leaders in 2025 and beyond. Understand the mess that generative AI is creating, and how the future provides opportunities for UX professionals to be uniquely qualified to lead the clean-up. Bring your burning questions, examples of thorny, wicked problems that you currently are facing, and seemingly intractable situations for a lively discussion.

Bio: Josephine M. Giaimo has been working as a UX leader, strategist, and researcher since the 1980s. Her original research in non-generative AI proposed a framework for evaluating the performance of neural networks and statistical approaches in predicting project profits. Her research at NJIT was funded by IBM, the Office of Naval Research, the State of New Jersey, and the Annenberg Foundation. She is Founder of User Experience Research, LLC and a team lead of the New Jersey chapter of the User Experience Professionals Association. She holds a Bachelor of Arts degree in psychology from Montclair State University, and a Master of Science degree in Industrial Engineering, specializing in Human-Computer Interaction, from the New Jersey Institute of Technology. She has consulted for AT&T, ADP, Google, Medidata, Sarnoff Corporation, and others. In 2025, she completed the Henosis Partners certification program, "Leading through Complexity."

Privacy in Learning Analytics: Designing Ethical and Trustworthy EdTech - Vivian Xiaotian Li

Abstract: As education technology becomes increasingly integrated into daily teaching and learning, concerns about data privacy are rising. The rapid development and adoption of AI in educational tools

further amplify these challenges, making it essential for institutions, educators, and students to stay informed and proactive about data privacy. In this session, I will discuss the current landscape of data privacy in education, highlight key areas of privacy risks that educators and UX practitioners should address, and explore practical solutions for preserving privacy in EdTech. Join me to uncover actionable strategies for building trust and safeguarding data in the evolving educational ecosystem.

Bio: Vivian Xiaotian Li is a PhD candidate in Human-Computer Interaction at Penn State, specializing in EdTech with a focus on creating inclusive and efficient digital environments. Her research explores critical areas such as data privacy and tools for educators, and her work has been published in major technology conferences. With a strong foundation in both Computer Science and Education, Vivian is now seeking opportunities in the industry as a UX researcher to apply her expertise in designing impactful, user-centered solutions.

Anticipatory Design – Sarah Doody

Abstract: As technology becomes more innovative, companies want to save money, and managers want to maximize output and value of their teams, what is the impact of automation and anticipatory design?

As designers and technologies, what is the ethical line of making decisions on behalf of the people who use our products? As a society, what happens if more of our roles are automated? And what is the impact of AI on trust that users and consumers have for products and brands?

This talk explores four cautions and four design principles to consider as automation inserts itself into the products we create and use.

Bio: Sarah Doody is the Founder & CEO of Career Strategy Lab, job search accelerator that helps UX and product professionals position themselves for 5-figure salary increases without applying to hundreds of jobs. People who've worked with Sarah have landed jobs at Amazon, Apple Blue Origin, Home Depot, IBM, Microsoft, Salesforce, Wells Fargo, and more. On average, they increase their salaries by 40%. Sarah is also the host of the Career Strategy Podcast.

She is also a User Experience Researcher & Designer. Having worked in the UX industry for more than 18 years, she began her career by working at large corporations and startups before launching her own product design consultancy in 2012. For more information on Sarah please visit https://www.careerstrategylab.com or https://www.sarahdoody.com.

Track 8: ITPC2

Using SysML to model a hospital blood analyzer – Brian Berenbach

Abstract: Many software engineers have some understanding of SysML, using it to make sketches of system software. In this talk, Brian will walk the audience from requirements, thru design using SysML as the diagram repository. There will be illustrations of diagrams showing requirements, analysis and the

design of a high capacity (thousands of samples per hour). Brian will also show a short video of the actual analyzer in operation.

Bio: Brian has been teaching both undergraduate and graduate courses in computer science and systems engineering since 1980. He recently retired from lecturing at Georgia Tech, where he taught graduate courses in the systems engineering program.

Brian previously was a senior systems engineer at first ABB and then Siemens, where he designed systems for modeling the behavior of nuclear power plants and medical systems. While working at Siemens he received 5 patents, and wrote a book on requirements engineering.

He has graduate degrees in chemical physics and nuclear engineering, and has been given the ACM Distinguished Engineer Award, and the INCOSE Expert Systems Engineer certification. Brian is also an IEEE senior life member.

Spreadsheets as a Wide-Spectrum Computing Environment – Enzo Alda and Daniel Andres Pinto Alvarado

Abstract: VisiCalc was released on October 17, 1979, and instantly became the killer app that ignited the personal computing revolution. 45 years later, spreadsheets are still the most popular computing tool in the world, yet practitioners don't think of themselves as doing "programming work". Computer science researchers, however, have long recognized spreadsheet modeling as a form of programming. Our talk illustrates the virtues of spreadsheet computing along with some unfortunate choices made at the inception and during the evolution of that paradigm. We show how a relatively minor extension to Christopher Strachey's traditional model of computation replicates the behavior of spreadsheets and paves the way to extend their expressiveness. The result is a computing environment amenable to a wide-spectrum of users, from K-12 students to spreadsheet practitioners and software engineers.

Bio: Enzo Alda is the founder of Lakebolt Research, a firm focused on end-user computing. Formerly, he held roles at technology startups and large organizations like Oracle, Bloomberg, and Google. Before coming to the U.S., Mr. Alda lectured courses in compiler construction and programming language design. He holds degrees in Software Engineering, Computer Science, and an MBA. Mr. Alda joined the IEEE in 1999 and the ACM in 2013.

Daniel Andres Pinto Alvarado is a software engineering student at Universidad Simón Bolívar. His areas of research are functional programming, domain specific languages, and type-driven software development. As an expert in Haskell with experience in Web Assembly, he leads the implementation of ZenSheet in the browser.

Working With Legacy Software – Dennis Mancl

Abstract: Most software developers spend a lot of time on bug fixes, modifications, and extensions of existing software systems. "Green-field" software development is one thing, working with existing legacy software is another. Professional programmers develop a number of useful strategies to build applications

based on existing code: leveraging legacy software. This talk will outline some key practices in code reading, encapsulation, porting, and refactoring to extend old applications code.

Bio: Dennis Mancl is a New Jersey-based software process and software design expert. He worked for many years at AT&T, Lucent, and Alcatel-Lucent, where he was involved in object oriented designs, design patterns, software architecture, and agile development practices for over 20 years. Dennis has M.S. and Ph.D. degrees in computer science from University of Illinois.

Information Architecture Case Study: The UX & SEO Informed Restructuring of the Living Beyond Breast Cancer Website – Ben Swofford

Abstract: This talk will explore a website design story. A nonprofit group, Living Beyond Breast Cancer (LBBC) [a locally-headquartered, national nonprofit offering trusted information and community support], redesigned its complex website to better serve users while maintaining crucial SEO (Search Engine Optimization) traffic. This case study will explain how strategic brand and UX considerations can motivate a unique approach to menus and user flow. The redesign was able to boost KPIs without sacrificing brand messaging. The talk will also briefly explore the technical side of a seamless SEO transition. It is especially useful for anyone tasked with reshaping a content-heavy site, and you will walk away with practical takeaways and ideas to implement in your own work.

Bio: Ben Swofford is a UX & Product Strategist at FourFront, where he has 8 years of experience spanning digital strategy and innovation. In addition to working with clients of regional, national, and international scope, he is also an Adjunct Professor teaching UX and Innovation fundamentals to graduate students at Jefferson University. He previously served on the board of PhillyCHI, a local UX community group, and believes that authentic, non-transactional networking can be a beautiful thing! Ben holds an M.S. in User Experience & Interaction Design from Jefferson University, and a B.A. in Architecture from Miami University (OH).

Track 9: How To ...

Arduino Workshop – Katalin Frolio

Logic for Computer Nerds – Barry Burd
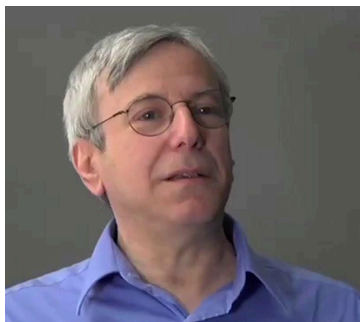
Abstract: Logic is more than just idle chatter. Logic can be made rigorous with symbols and rules of inference. Besides being rigorous, proving logical assertions can be fun. It's the ultimate form of puzzle-solving. Come to this presentation to learn about Logic and its tricks.

Bio: Barry Burd is a professor in the Department of Mathematics and Computer Science at Drew University in Madison, New Jersey. He's a director of the Garden State Java User Group and a leader of the

NYJavaSIG. In 2020, he was honored to be named a Java Champion. He's the author of several Java books including Java For Dummies, Quantum Computing Algorithms, and (with Michael McCarthy and Ian Pollock) Concise Guide to the Internet of Things. It feels strange for him to about himself in the third person.

Smart Devices and the Internet of Things – Barry Burd

Abstract: The number of smart devices worldwide is expected to reach 27 billion this year. (Just Google it!) Applications include healthcare, fleet management, environmental management, smart homes, smart cities, and more. This presentation describes the way smart devices communicate with the cloud. The talk also includes cool demos with real live equipment.

Bio: See above.

Track 10: TCNJ Electrical & Computer Engineering Senior Project Presentations

Autonomous Race Car – Michael Brown, Nathan Klinger, Dylan McBride, Thomas Zajchowski

Abstract: We describe the design of a model vehicle that sustains autonomous navigation on an ambiguous course. The vehicle must sustain a maximum speed of 20 km/h (12.43mph), along with steering and speed control functionality. The vehicle must have some corrective method to resolve speed and steering control responses, and can be remotely controlled(RC) for design purposes.

Bios:
Michael Brown is Electrical Engineering senior at The College of New Jersey. He expects to graduate in May, 2025 taking an engineering position with PSEG Inc.. His collegiate interests in Wireless Communications paved the way as a research assistant for the MWCL of TCNJ. Michael is also an active member of the IEEE and Theta Tau chapters of TCNJ, previously serving as Secretary and Regent respectively.

Nathan Klinger is an Electrical Engineering senior at The College of New Jersey expecting to graduate in May, 2025. He has an interest in power systems engineering and is an active member of TCNJ's professional engineering fraternity, Theta Tau.

Dylan McBride is an Electrical Engineering senior at The College of New Jersey. He expects to graduate in May, 2025 and is very interested in the field of digital signal processing. He has been active with the TCNJ chapters of the IEEE-HKN and Theta Tau, and he hopes to pursue his passion for learning about Electrical Engineering in the future.

Thomas Zajchowski is an Electrical Engineering senior at The College of New Jersey, graduating in May 2025. He is currently seeking opportunities in the automotive and power engineering industries.

Autonomous Wheelchair – Andrew Radwan & Harold Araya

Abstract: The autonomous wheelchair project aims to develop a prototype chassis capable of navigating its environment, detecting and avoiding obstacles, and reaching a determined destination. Prior to construction, the robot chassis is simulated in a virtual recreation of the semiconductor lab through Gazebo and ROS programming. This allows us to observe how the simulated result will later apply to the physical aspect of the robot. The physical aspect of the project will consist of an embedded raspberry pi system featuring three main subsystems: a Microsoft Kinect v2 for sensor input, simultaneous localization and mapping (SLAM) algorithms to detect and map obstacles in the wheelchair's surroundings as well as a motorized wheel system to propel the chassis.

Bios:
Andrew Radwan is a Computer Engineering student at TCNJ and is in his final semester. Upon graduation he will be pursuing a Master's Degree with research interests in System on Chip design and computer vision.

Harold Araya is a Computer Engineering Student at The College of New Jersey. He expects to graduate in Spring of 2026, and plans on expanding his knowledge for hardware engineering. He is mostly interested in circuit design and hardware implementation. Harold carries the ability of speaking two languages, as well as working part time while studying at The College of New Jersey.

Micromouse Competition – James Wingard & Micaela Jeffers

Abstract: The Micromouse competition is an event where competitors build small, autonomous robots in order to solve a square maze. While the rules vary somewhat between individual events, the rules we will reference are for the competition during the 2025 instance of the Applied Power Electronics Conference, which we plan on entering. This sets a hard deadline on our project, as the competition takes place on March 17th, 2025.

The maze is a 16x16 grid of cells, with each cell being 18cm x 18cm. Each robot is given seven minutes to navigate the maze, and can complete multiple runs within the time limit. The robot is not allowed to exceed 25cm x 25cm, has to remain grounded at all times, and cannot separate into parts during its run. The robot also cannot destroy the maze as it navigates. Additionally, the layout of the maze is not revealed until the robots are already built and programmed. Because of this, the robot must be able to determine the fastest route autonomously.

We intend on using a flood-fill algorithm for navigating the maze. This algorithm will find the path distance to the center for each cell, and then choose the shortest path to the center. In order to maximize speed while turning, we will add a fan to the base of the mouse. We will also be restricting the size of the robot even further to 11cm x 11cm to minimize time spent on turning. A smaller robot can turn corners faster, since it can squeeze through small gaps between the maze's walls without needing to turn a full 90 degrees. We are aiming to reduce the weight and size of the robot by carefully choosing small, yet powerful parts. The chassis will be custom built to handle both the size constraints and the parts we choose. On March 17th, 2025, we expect to have built a robot that can quickly traverse any maze within the previously mentioned contest regulations. It should be able to accelerate, turn, and navigate the maze

without getting stuck or crashing. It should also be able to map the layout of the maze, and choose the shortest path to the center.

Bios:

James Wingard - 23 y/o Senior Computer Engineering Major from Spring Lake, NJ. I chose this project because the autonomous aspect of it aligns with my interest in AI.
Micaela Jeffers - A 22 year old Electrical Engineering major from Marlboro, New Jersey, Micaela chose to work on the micromouse competition due to previous experience with building a maze-solving robot from a kit during high school.

Physics-Simulating HDMI-Based Primitive Graphics Processing Unit – Francis Aldridge, DJ Landau, Talha Murad, Nicholas Terrano-Ramey

Abstract: This project involves the design and implementation of a primitive graphical processing unit (GPU) tailored for simulating the n-body gravitational problem. The developed GPU can simulate over 1,000 objects in space, each defined by unique properties such as mass, initial velocity, color, and dimensions. To validate the GPU's accuracy, a MATLABbased simulation was developed as a baseline model for comparisons with results from the hardware simulation and implementation. The system incorporates a user-friendly host interface for setting initial parameters, controlling the simulation, and visualizing outputs via an HDMI connection. The hardware architecture consists of a CY8CKIT-050 PSoC 5LP as the host controller and an Artix-7 FPGA (Xc7a200t-1sbg484-1) as the primary computational engine. Together, these components demonstrate a high-performance and scalable solution for n-body gravitational simulations, providing a foundation for further advancements in computational astrophysics and hardware-accelerated physics modeling.

Bios:

DJ Landau is a senior Computer Engineering major with a Mathematics minor at The College of New Jersey. He has strong interests in computer architecture and FPGA/ASIC design. He is expected to graduate in May of 2025 and is interested in pursuing a Master's degree in Computer Engineering. He is an active member of the campus radio station, 91.3FM WTSR.

Francis Aldridge is a senior Computer Engineering student at TCNJ, expecting to graduate in August 2025. On campus, they're an active member of TCNJ's IEEE HKN and Theta Tau chapters, and has undertaken multiple research projects advised by Dr. Larry Pearlstein and Dr. Ambrose Adegbege. Their interests include system control, artificial neural networks, and FPGA hardware design.

Talha Murad is a senior in Electrical Engineering at The College of New Jersey, set to graduate in May 2025. He has a passion for microstrip antenna design, with two research papers published in IEEE, showcasing his contributions to the field. Upon graduation, he will be joining SRI International in a full-time role, where he aims to further his expertise in cutting-edge RF and antenna technologies. Beyond academics, Talha is an active member of IEEE Eta Kappa Nu, demonstrating his commitment to professional growth and leadership in the engineering community.

Nicholas Terrano-Ramey is a Computer Engineering senior at The College of New Jersey, expecting to graduate in May 2025. He is particularly interested in Digital Signal Processing and Computer Architecture. He is a member of Beta Theta Pi - Eta Psi chapter and serves as the Treasurer on the IEEE board.

Using a NAO Robot to Autonomously Navigate a City Environment – Sean Waksmundski, Alex Powers, & Shane Perez

Abstract: NAO is a programmable robot which excels in wide ranges of application including education, healthcare, research, entertainment, and social interaction. Our senior project aims to program a NAO robot to operate a motor vehicle in a simulated traffic environment in order to reach a given destination. This environment will include stop signs, traffic lights, lanes, and various other obstacles. Subsequently, great levels of time and resources must be allocated towards upgrading the sensory capabilities of our vehicle and expanding the number of functions our NAO driver will have access to. Thanks to the previous senior project group, we will start out with a vehicle that already has a set of working parts such as an Arduino Mega microcontroller, a Nema 17 stepper motor, an RS 775 DC motor, and many more more useful components. We plan to make best use of this head start by placing less emphasis on redesigning fundamental aspects of the project and more emphasis on improving the existing system. The magnitude of these improvements will be the determining factor when it comes to achieving these traffic-related ambitions for our iteration of the project.

Bios:
Sean is a senior computer engineering student at The College of New Jersey with an interest in digital design and artificial intelligence. He is graduating in Spring 2025 and plans to obtain a position as a hardware designer. He is excited to work with the NAO Robots as their intelligent systems make them a gateway into the future of robot technology.

Alex is a senior electrical engineering student at The College of New Jersey with an interest in control systems and electronic design.

Shane is a senior electrical engineering student at The College of New Jersey with an interest in electrical power systems and elevator technology.

Confi/o – Jasmine Ocasio, Chris Toala, Rebecca Kimmick, Shawn Kushner

Abstract: In the realm of commercial product development, efficiency in terms of cost, time, and resource utilization is paramount. This project, Confi/o, introduces a novel approach to circuit board design through the development of an Input/Output (I/O) focused Printed Circuit Board (PCB) leveraging the versatile ESP32 chip. This initiative aims to significantly enhance the feasibility of creating custom electronic devices for startups and small businesses. By employing the ESP32 on a custom PCB, Confi/o minimizes unnecessary functionalities prevalent in traditional development boards. This tailored approach not only optimizes energy efficiency and space utilization but also reduces costs, making it an ideal solution for resource-conscious developers. The core of this innovation lies in the custom Android application that facilitates seamless user configuration of the PCB via Bluetooth Low Energy (BLE)

connection, thereby simplifying tech design for a variety of applications and users. The anticipated outcome is a highly customizable and I/O-focused PCB that streamlines product development, offering a tailored solution that aligns with the specific needs of emerging businesses in technology. This project aims to redefine the standards of PCB design with Confi/o, making it more accessible and adaptable for rapid prototyping and specialized manufacturing.

Bios:
Shawn Kushner is a Computer Engineering senior at The College of New Jersey. He expects to graduate in May 2025 and has accepted a position at Lutron Electronics. He is particularly interested in embedded system design and 3D printing. Furthermore, he has been active with the TCNJ chapters of the IEEE and Eta Kappa Nu, and currently serves as Captain for the TCNJ Men's Swim Team.

Chris Toala is a senior Computer Engineering student at The College of New Jersey, minoring in Economics. As a Sustainability Analyst at TCNJ, he tracks energy consumption and implements data-driven solutions to improve efficiency and reduce waste. As former President of IEEE Eta Kappa Nu, he led his chapter to win the Outstanding Chapter Award in 2024. A recipient of the Jonathan J. & Barbara Belding Engineering Scholarship, Chris is passionate about applying technical solutions to real-world challenges.

Track 11

Ham Cram – John DeGood

To the Moon and Back – A Tribute to Dr. Allen Katz

Dr. Allen Katz
K2UYH SK
1942 - 2024

Retrospective by Rebecca Mercuri, Ph.D., IEEE Senior Member and Distinguished Contributor

In the early morning of June 20th, at the setting of the full moon on Summer Solstice day, the IEEE and PCJS communities lost our treasured Life Fellow, Allen Katz, to metastatic cancer. Dr. Katz held three degrees in Electrical Engineering -- B.S.E.E. and D.Sci. from the New Jersey Institute of Technology, and an M.S.E.E. from Rutgers University. At the time of his passing, he was a full-time Distinguished Professor of Electrical and Computer Engineering at The College of New Jersey (TCNJ), and also the school's longest-serving faculty member, having taught and mentored some 2,000 students over the course of 50+ years. As a master of multi-tasking, Al was also concurrently a Distinguished Technical Fellow at MACOM, the successor company to Linearizer Technology, which he had founded and served as Board President from 1991 to 2023. His technical work spanned the frequency range from UHF through Ka-band, E-band, Q-band, and the EHF V and W bands, and involved both hybrid, MMIC, and photonic circuits, including the design of the first practical MMIC linearizer. He was the current and long-time chair of the Antennas and Propagation Society / Electron Devices Society / Microwave Theory and Technology Society (AP/ED/MTT) joint chapters in IEEE PCJS.

Dr. Katz was also a co-founder, with Sol Libes, of the Trenton Computer Festival (TCF), https://tcf-nj.org, which is noted as the oldest personal computer show world-wide. At its peak, in 1988, TCF filled a convention center with approximately 30,000 attendees. Keynote speakers each year were a veritable Who's Who of Computing, including: John and Kay Mauchly, David Ahl, Adam Osborne, Gary Kildall, Bill Gates, Phil Zimmerman, Emmanuel Goldstein, and Richard Stallman, to name but a few. The recent TCF2024 (co-sponsored by PCJS's ACM/IEEE Computer Society) had the theme of Generative AI, and featured 50 speakers with 10 tracks of lectures on a wide range of topics, a Ham Cram & Exam, banquet, and a battlebot competition. The abstract for Al's talk, Computer Generated Lifeforms, in the Tutorial and Tech Track, stated: "Many people are not aware that my doctorate involved artificial neural networks at a time before this topic was not yet popular. Although not deeply involved with computers, I taught microcomputers for several years because there was no one else around to teach these courses. As a result, I started thinking about: *Could computers think in a way like humans? Is an electronic (computer) life form possible? Would such life forms want to communicate with us because of the huge difference in the speed of the processing elements that make up these systems?*"

As a personal aside, Al later enlisted me to teach that same microcomputers course at TCNJ, so he was actually "my boss" for a while, in his role as E.C.E. Department Chair. It was typical for him to identify talented people and engage them in various creative ways. He hired numerous of his TCNJ students to work at Linearizer, and involved them at IEEE, through the Student Chapter and also (following graduation) in leadership roles with the Princeton / Central Jersey Section. His enthusiasm for the accomplishments of others was as great, if not even greater than his own! In November of 2023, when I

was (unexpectedly) presented with a Region 1 award "for training women and youth in engineering concepts involving amateur radio" Al stood proudly beside me at the ceremony, with a beaming smile. He was always available to answer questions, and if there was a disagreement, it would eventually blow over and there were no hard feelings attached. His countless impromptu or scheduled meetups at the Uno's restaurant in Hamilton were legendary. For myself, often after what I had thought was just a social hang, I left with some challenging ideas, and it would take me a while to realize that Al had planted them. His beloved wife, Sally, accompanied him to conferences world-wide, and many IEEE folks also got to know her through attendance at our annual banquets and awards ceremonies. Also cherished in Al's life have been his two daughters Alisha and Tova, and their husbands and children.

The breadth of Dr. Katz's knowledge and expertise is noted by the courses he taught at TCNJ, including: Circuit Analysis, Communications Systems, Electronics Laboratory, Engineering Electromagnetics, RF/Microwave Engineering, and Wireless Communications. He was also a popular Senior Project Advisor, encouraging students to incorporate radio into their research, and promoting their accomplishments. See: <www.youtube.com/@TrentonComputerFestivalTCF/videos>. In 2000, Dr. Katz was elevated to IEEE Fellow, and was also elected as a Distinguished Microwave Lecturer with the IEEE MTT Society. He received the William Randolph Lovelace II Award from the American Astronautical Society in 2002 for "technical leadership and contribution to significantly increase satellite communications payload performance through the development of microwave linearizer technology." Other recognitions included: the ARRL Technical Merit Award in 1976, the John Chambers Award in 1983, the IEEE Centennial Medal in 1984, the GE ASD Technical Excellence Award in 1990, the IEEE Region I Achievement Award in 1992, the Martin Marietta Astro Inventor of the Year award in 1993, and the IEEE Region 1 Technology Innovation Award in 2007.

Al presented and published over 50 papers (often with other authors), including many for IEEE Conferences and Journals, such as: IEEE Microwave Magazine, IEEE Transactions on Electron Devices, IEEE Radio and Wireless Symposium, IEEE International Vacuum Electronics Conference, IEEE Conference on Power Amplifiers for Wireless and Radio Applications, IEEE/MTT-S International Microwave Symposium, IEEE Benjamin Franklin Symposium, and the IEEE Military Communications Conference. Professional affiliations in addition to IEEE include the American Institute of Aeronautics and Astronautics, and the American Society of Engineering Education. Also was a long-time member of the Delaware Valley Radio Association. Dr. Katz is a listed inventor or co-inventor of 21 patents, for Lockheed Martin, Martin Marietta, GE, and RCA. Some of his linearizers are on Telstar 1 and 2.

Radio technology was always a constant thread in Al's life. His younger sister, Joan, recalled that when her brother was 13, she would hear him calling on voice or tapping out Morse Code for CQ CQ CQ KN2UYH (his original callsign) well into the night, to make radio contacts. In 1958 he upgraded to General, as K2UYH. FCC records show that Al took advantage of the 1999 rule change to upgrade from Advanced to the highest license level, Amateur Extra, on June 10, 2000. As a Charter Member of the SETI League, http://www.setileague.org, an "international grass-roots organization dedicated to privatizing the electromagnetic Search for Extra-Terrestrial Intelligence," Al also served as their long-time EME (Earth-Moon-Earth) Committee Chair, where he helped their "members use signals reflected off the lunar surface to validate and calibrate their SETI receiving systems." Al's fascination with EME led to him installing a 28-foot dish antenna (obtained at a surplus sale) in the back yard of the family

home. His achievement of the first-ever Worked All Continents with Moonbounce on 432 MHz credential on July 29, 1976, after week-long operations, was featured as the September 1976 cover story of QST magazine <www.ok2kkw.com/next/eme1976wac.htm >. Allen's 2019 tutorial "Getting Started on EME using Digital Techniques" is at <www.youtube.com/watch?v=hRwDWHNjPL4 >. As Al was preparing to host the 20th EME Conference <eme2024trenton.org> at TCNJ, life took a final turn. The EME organizers and IEEE PCJS ensured that the event would be held in his memory.

Thank you, Dr. Allen Katz, for sharing your knowledge and giving us the Moon to remember you by.