AMW51

The Fifty-First Asilomar Microcomputer Workshop

April 23-25, 2025

We believe that no A1 was used in the creation of this program

Wednesday, April 23 (All Times Pacific!)

01:30PM: Welcome to AMW #51 - Tim Požar, *TwoP LLC*

- *on-site* Welcome to AMW! - Tim Požar, *TwoP LLC*.

01:45PM: Space is the Place - Brian Berg, *Berg Software Design*

- *on-site* Going To Orbit Without Software - Nathan Saichek, *Longshot*.
- *on-site* Servers, Compute, and Laser Communications in Space - Dennis Wingo, *Spacebilt*.
- *on-site* Alien Worlds and Our Place in the Universe - Peter Smith, *Arizona State University*.

03:15PM: Break

03:30PM: Plowshares into Swords - David Rosenthal *(retired)*

- *on-site* Precise Positioning Using Real-Time Kinematics (RTK) - Bill Woodcock, *Packet Clearing House*.
- *on-site* Evolution of Drones in the Ukraine War - Chuck McManis, *Ronin-at-large*.
- *on-site* "Slaughterbots": Friend or Foe? - Nicholas Weaver, *UC Davis*.
- *on-site* Robotics Panel Discussion - Chuck McManis, Nicholas Weaver.

05:00PM: Meet the New Minds!

- *on-site* Please welcome these 17 in-person first-timers: Brian Behlendorf, David M. Burwen, Richard Chuang, Henry Cook, Gary Friedman, Alexis Hancock, John Lampe, Dinesh Maheshwari, Paul McGill, Falcon Darkstar Momot, Parama Pal, Alexandra Ramadan, Anna Shebanow (wife of past attendee Mike Shebanow), Dominik Ślęzak, Scott Small, Peter Smith (son of past attendee Bennett Smith), and Madisen Taylor.
- *remote* Please welcome these 3 remote first-timers: Malcolm Hendricks, Calum MacRae, and Marcela Melara.

05:15PM: Welcome Reception & Room Check-In

06:00PM: Dinner

07:30PM: Athematic Short Talks #1 - Ken Shoemaker, *Intel Corp. (retired)*

- *on-site* Remembering Dewayne Hendricks - Brian Berg, *Berg Software Design*; Malcolm Hendricks (remote); Michael Cheponis (remote).
- *on-site* Scaling Wisdom: Building a Brand for the Future of Intelligence - Madisen Taylor, *Prime Intellect*.
- *on-site* Future Directions in AI Infrastructure - Parama Pal, *Vital Statistics, Inc.*.
- *on-site* OSDB: Turning the Tables on Kernel Data - George Neville-Neil, *Yale University*.
- *on-site* Tech and Policy - Flattening the Privilege Layers - Brian Behlendorf, *Apache (Co-Founder)*.
- *on-site* The Open-Source Problem - Brandon Holland, Joel Holland, *Cyber Security*.

- *on-site* Whirlwind Software Restoration Demo - Guy Fedorkow, *Juniper Networks / MIT Museum*.
- *on-site* Automatic CAPTCHA Solving with Local, In-browser LLMs: The Unethical Engineer's Guide to Event Ticket Acquisition - Karl Koscher, *NVIDIA*.
- *on-site* Computing at 6000 psi - Paul McGill, *Monterey Bay Aquarium Research Institute*.
- *on-site* AI for Root Cause Analysis in Test Failures - David Shier, *DIT-MCO International, LLC*.
- *remote* AI as a Collaborative Partner: Artificial Actors in Artistic Drawing - Zoya Slavina, *University of Białystok*.
- *on-site* Rayhunter: Recording PCAPs from Stingrays With a $20 Hotspot - Cooper Quintin, *EFF*.

Thursday, April 24 (All Times Pacific!)

08:30AM: Don't Just Adapt to Climate Change, Fix It! - Brian Berg, *Berg Software Design*

- *on-site* Climate Restoration Using Natural Processes - David M Snyder, *42TEK*.
- *on-site* Working on the Climate: What's Possible/What Does It Take? - DV Henkel-Wallace, *Bennu Climate*.

09:30AM: Break

09:45AM: Nuclear, Solar, and Grid Integration for a Sustainable Future - Christine Cockey, *enGen*

- *on-site* Next-Generation Nuclear: The Promise of SMRs and Fusion Reactors - Christine Cockey, *enGen*.
- *on-site* The Grid We Need from the Utility We Have - John Lampe, *World Wide Technology*.
- *on-site* Solar Power: Thoughts on the Energy Situation + Update on NovaSolix's R&D - Bob Cousins, *NovaSolix*.
- *on-site* When is a grid not a grid? - Brad Templeton, *robocars.com*.

11:45AM: Lunch

01:30PM: Security and Assurance by Construction - Thaís "barbie" Hamasaki, *Intel Corp.*

- *remote* Using TEEs to Attest the CI/CD Platform for Next-Level Supply Chain Integrity - Marcela Melara, *Intel Labs*.
- *on-site* Pre-Installed Android Malware and the Case for Firmware Transparency - Alexis Hancock, *Electronic Frontier Foundation*.
- *on-site* High Assurance Computing - John Baldwin, *Ararat River Consulting, LLC*.

03:00PM: Break

03:15PM: Microprocessors and Multicore - Thaís "barbie" Hamasaki, *Intel Corp.*

- *on-site* My History of Multicore Programming - Shevek.
- *on-site* SIMT: How GPUs Run Fast - Mike Shebanow, *SiliconBee, Inc.*.
- *on-site* Designing Silicon at the Speed of Software: From Circuits to Microprocessors - Henry Cook, *SiFive*.
- *remote* Auditing RISC-V CPUs - Kristin Paget, *Intel Corp*.

05:05PM: Reception

06:00PM: Dinner

07:30PM: Open Discussion: A Rich Asilomar Tradition - Kathleen Tuite, *ODK*

- *on-site* RATS - Kathleen Tuite, RAT Patroller, *ODK*.

Friday, April 25 (All Times Pacific!)

08:30AM: Athematic Talks #2 - Ken Shoemaker, *Intel Corp. (retired)*

- *on-site* My Life as a Geek - Gary Friedman, *MIT Beaver Works Summer Institute*.
- *drive-by* What Does Intel Need to Do to Get Product Back? - Bob Brennan, Ken Shoemaker, *Intel Corp*.
- *remote* Taxonomy of Compute - Dinesh Maheshhawari, *Advisor to Groq, Zinite, alt-r, Blumind, Prospera*.

10:00AM: Break & Room Check-Out (Please, turn in your room key at the front of the meeting room)

10:20AM: AI vs. Human - Spoiler Alert: We Still Pay the Electric Bill - David Shier, *DIT-MCO International, LLC*

- *drive-by* Standing at the Crossroads of Art and Technology in the Dawn of a New AI Inflection - Richard Chuang, *PDI/DreamWorks*.
- *on-site* The Future of AI: Automating the Design of AI Solutions - Dominik Ślęzak, *QED Software / University of Warsaw*.
- *remote* Analog ASIC Design Using AI - Celera Technologies - Calum MacRae, *Celera Technologies*.

11:45AM: Workshop Wrap-Up - Tim Požar, *TwoP LLC*

- *on-site* Workshop Wrap-Up/Thanks/Kudos - Tim Požar, *TwoP LLC*.

Attendee Assistance Needed for A/V Equipment Breakdown!

12:00PM: Outdoor BBQ Lunch (weather permitting)

Organizing Committee

Dennis Allison	Lou Katz
Eric Allman	Robert G Kennedy III
Brian Berg	Chuck McManis
Nancy Blachman	Tim Požar
Christine Cockey	David S H Rosenthal
Mark Cummings	Shevek
Jim Fenton	David Shier
Janet Guns	Ken Shoemaker
Thaís Moreira Hamasaki	Kathleen Tuite

Mark Your Calendars for AMW52: May 6-8, 2026

April 23 Anniversaries:

- 61 years ago – The SEAC (Standards Eastern Automatic Computer) was retired by the National Bureau of Standards. This computer, developed in Washington, DC, was a key tool for testing computer components and setting standards.
- 20 years ago – Titled “Me at the zoo”, the first video was uploaded to YouTube by its co-founder Jawed Karim.

April 24 Anniversaries:

- 35 years ago – The Hubble Space Telescope was launched during the 35th mission of the Space Shuttle Discovery.

Apr 25 Anniversaries:

- 210 years ago – Giovanni Caselli was born. He was the inventor of the pantelegraph, the predecessor of the modern FAX machine. He died at age 75 on June 8, 1891.
- 80 years ago – Negotiations for the founding of the United Nations began in San Francisco.
- 65 years ago – The US Navy submarine USS Triton completed the first submerged circumnavigation of the globe.

Bios of AMW Speakers and Session Chairs

Alexis Hancock works to keep the networks strong and encrypted by managing the Certbot project. As well as ensuring external EFF tools for the public are well supported. She researches an intersection of issues on digital rights, encryption, and consumer technology. She believes in an open and equitable web through encouraging expansion of security by default, bridging engineers and security research, and advocating for better and stronger tech policy and standards. Currently, her research has been focused on expansion of encryption, digital identity, firmware transparency to stop pre-installed malware on Android devices, and standardizing Bluetooth tracker detection. She has worked in web development and application security for over 10 years. She holds a BSc. in Applied Arts and Sciences and a MSc. in Change Management from the Rochester Institute of Technology and the New School university respectively.

Bill Woodcock is Secretary General of Packet Clearing House, the intergovernmental organization which has provided security and operational support for the Internet and other critical communications infrastructure for over 30 years.

Bob Brennan is Vice President of Customer Solutions Engineering for Intel Foundry Services at Intel Corporation. He is responsible for leading the delivery of end-to-end design solutions to help IFS customers use Intel's portfolio of unique IPs and design technology in their product designs. In his previous role, Bob served as Vice President of Emerging Memory & System at Micron, where he managed product, design, and engineering teams to accelerate the delivery of new designs on new technologies. Bob also served as Senior Vice President of Memory Solutions Lab at Samsung. Prior to these roles, Bob spent 22 years at Intel serving in various senior technical positions, including Server Architecture, Laptop Architecture, Mobile SoC Architecture, and CPU Core Design, Verification and Architecture.

Bob Cousins is known as a consultant, a technologist, and an inventor. He currently holds about three dozen patents in a broad range of areas including computer storage, electronic financial transactions, medical imaging, RADAR, anti-jamming, networking, and solar power. He was named Inventor of Year in 2020 by the Silicon Valley Intellectual Property Law Association. Bob has worked with startups for 45 years. He is also a founder of The Mentor Project. He is here today to talk about energy. He was born in Texas near Spindletop – the home of the Texas oil boom in 1901. Bob's first IPO came in the early '80s when he worked on Integrated Energy's IPO in Houston. He is also a founder of NovaSolix, a pioneer in rectenna-based solar power.

Brad Templeton was chair for computing at Singularity U, Chairman Emeritus and Futurist at the EFF, and founded ClariNet, the world's first dot-com. He has advised on robocars and mobility for many leading players, including Waymo, and speaks globally on the topics of the future of technology and transportation.

Brandon Holland Currently a Senior in high school, he has passions in applied mathematics and engineering. His presentation at Asilomar last year, "Deep Learning in the Prisoner's Dilemma," and the accompanying paper marked his most recent accomplishments in the computer science world. He has attended Defcon since the age of 8, won multiple competitions there and, eventually, presented at conferences on his experiences there and with his generation since.

Brian Berg has been consulting for over 40 years, specializing in data storage including flash memory. He is Technical Chair of FMS: the Future of Memory and Storage, held annually at the Santa Clara Convention Center. His AMW attendance and Program Committee work since 1987 has expanded his circle of friends and knowledge base. His IEEE officer activities include IEEE Milestones, and he has been involved in proposing and officiating at dedications for over 2 dozen Milestones including SHAKEY the Robot, the Univ. of Utah's computer graphics and visualization inventions, Pixar's RenderMan, CP/M, USB, Intel 4004, EEPROM, CDMA, Gravitational Wave Antenna, Alto, Laser Printer, Ethernet, TCP/IP, and Google's PageRank.

Calum MacRae is CTO of Celera Technologies, has 25+ years of experience in semiconductor power design for consumer, industrial, and automotive applications. Most recently Mr. MacRae has also been focused on design productivity and automation tools to support the fast development of SoC's. He holds a Bachelor's Degree in Electronic Engineering and 4 patents.

Christine Cockey is a physicist who worked in the nuclear field for GE. She worked on current reactor designs as well as R&D. This included reactors that burned nuclear waste as fuel, the SP100 space reactor, SMRs, as well as other advanced designs. She has also done startups, datacenters, data analytics and ML. Her current project is trying to find a way to get electrical energy from the Earth's magnetic field.

Chuck McManis In the early 2000's a group from the Air Force Research Laboratory demonstrated to the Dept of Defense that a small group, with off the shelf ("COTS") drones, could defeat a much larger and "better" equipped opponent. This set off something of a fire alarm inside the DOD. In 2016 I joined a small startup in Sunnyvale working on Electronic Warfare R&D for the Army's Science and Technology Directorate C5ISR. Over the next 7 years I worked on systems both classified and unclassified that are designed to detect, deflect, and defend against these threats.

Cooper Quintin is a security researcher and senior public interest technologist with the EFF Threat Lab. and board member of Open Archive. He has worked on projects including Privacy Badger, Canary Watch, and analysis of state sponsored malware campaigns such as Dark Caracal. Cooper has given talks about security research at prestigious security conferences including Black Hat, DEFCON, Enigma Conference, and ReCon about issues ranging from IMSI Catcher detection to fem tech privacy issues to newly discovered APTs. He has also been published or quoted in publications including: The New York Times, Reuters, NPR, CNN, and Al Jazeera. Cooper has given security trainings for activists, non profit workers, and vulnerable populations around the world. He previously worked building websites for nonprofits, including Greenpeace, Adbusters, and the Chelsea Manning Support Network. Cooper was also an editor and contributor to the hacktivist journal, "Hack this Zine.".

David Henkel-Wallace is working on climate repair at Bennu Climate. He has a 35-year history of building development teams and deploying advanced products in compilers, artificial intelligence, pharmaceuticals, and solar thermal plants, He's been working in climate and clean energy since 2010.

David M Snyder is a California-registered Civil Engineer (PE), Certified Information Systems Security Professional, Certified Cloud Security Professional, and IEEE Senior Member. As an environmental engineer, he conducted environmental impact studies for power plants, transmission lines, and pipelines and the investigation and remediation of soil and groundwater contamination at industrial sites. He is now working on Climate Restoration. Currently the Board Chair of the IEEE Consultants' Network of Silicon Valley and a member of the IEEE Standard P7100 Environmental Impact of Artificial Intelligence Working Group, he has been the organizer, moderator, or speaker for more than 20 conferences and seminars. He attended AMW 45 and 47.

David Rosenthal is more than seven years into his second career as a full-time grandparent. His first career featured stints on the Andrew team at CMU, as a Distinguished Engineer at Sun Microsystems, as employee #4 at NVIDIA, and nearly two decades at the Stanford Library.

David Shier is president of DIT-MCO International, a leading provider of wiring harness test equipment for the aerospace industry. David's experience in this very niche industry started as what was supposed to be a summer job that resulted in a life-long career (with a couple of entrepreneurial detours along the way). One of those detours into handheld computing led to his introduction to AMW more than 20 years ago.

Dennis Wingo is an engineering physicist, a 47-year veteran of the commercial computer industry, an academic (Univ. of Alabama, Huntsville), and an aerospace engineer. His 4 patents focus on In-Orbit Servicing and In-Space Assembly and Manufacturing. Dennis is the Principal Investigator on multiple flight projects implementing application data and servers in space, as well as laser communications routing. Last month, Dennis and his team sent the world’s first data server to the Moon. The hardware operated successfully until the failure of the lander on the Moon's surface. His AMW talk will discuss implementation of advanced compute technologies in space, on the Moon, and beyond.

Dinesh Maheshhawari is an accomplished C -Level senior executive with ~40 years of successful track record of enabling new TAM/SAM and growing SOM in public firms & startups(10) in Semiconductors, Systems and Software Industry - most recently as CTO of Groq As an entrepreneur & technologist, was part of the revolution in multi-processor systems with multi-threaded UNIX in mid ‘80s; was at the forefront of the EDA revolution from late ‘80s to mid ‘90s; was part of the revolution in optical communications & networking in late ‘90s to early 2000s. From 2004 to 2015, as a technologist and CTO, focused on enabling new TAM/SAM at Cypress Semiconductor by enabling new product lines & revitalizing existing ones. Was the founding partner of Silicon Catalyst and have advised 30+ startups in ML HW, ML SW, ML applications, Materials, Devices, HPC etc Has been awarded 104 US patents in EDA S/W, Optical comm & ICs for networking, consumer devices, memories & MEMs.

Dominik Ślęzak has a lifetime goal to connect academia and industry, conduct scientific research and deploy its results in business. In 1999, I co-founded QED Software at which I co-designed machine learning automation platform called BlueQuail. In 2005, I co-founded Infobright at which I co-designed analytical database technology based on rough sets and information granulation. In 2021, I co-founded OnstageAI at which I co-designed automatic concert video production technology based on sound understanding and uncertainty modeling. I cooperate or cooperated also with other companies including Arahub, DeepSeas (whereby Infobright technology is extended to support approximate analytics and anomaly detection applications), OvuFriend and QED Games. I am co-inventor in over 20 US patents and patent applications.

Gary Friedman is a former rocket scientist for NASA's Jet Propulsion Laboratory, where he worked on the Voyager and Galileo interplanetary spacecraft, and patented the image authentication system used in high-end digital cameras from Canon and Nikon. Gary published the book "Control the World with HP-IL, a technical book showing how to interface Hewlett Packard handheld calculators to the outside world. Currently, Friedman is working with MIT's Beaver Works Summer Institute, a STEM program on steroids for high school students, and is on a mission to help the program scale so more students nationwide can participate.

George V. Neville-Neil works on networking and operating system code for fun and profit. He also teaches courses on various subjects related to programming. His areas of interest are computer security, operating systems, networking, time protocols, and the care and feeding of large code bases. He is the author of The Kollected Kode Vicious and co-author with Marshall Kirk McKusick and Robert N. M. Watson of _The Design and Implementation of the FreeBSD Operating System_. His software not only runs on Earth but has been deployed, as part of VxWorks in NASA's missions to Mars. He is an avid bicyclist who currently lives in New York City. He is currently a PhD student at Yale University working with Robert Soulé, Avi Silberschatz and Peter Alvaro.

Guy C. Fedorkow received his BASc and MASc in Engineering Sciences at University of Toronto, and went on to develop both communications and high-throughput parallel computer architectures at Bolt, Beranek and Newman in Cambridge, MA, Cisco Systems and Juniper Networks, where he has served as system architect for a number of communications products. Guy currently works on history-of-computing in collaboration with colleagues at the MIT Museum, Computer History Museum and Heinz Nixdorf MuseumsForum. Other interests include network infrastructure security and trusted computing topics at Juniper Networks, the Trusted Computing Group and IETF.

Henry Cook is a Senior Principal Engineer at SiFive, where he works with a team that contributes to the open source Chisel hardware language. SiFive uses Chisel to design microprocessor architectures that implement the open source RISC-V instruction set. Henry completed his doctoral thesis "Productive Design Of Extensible On-Chip Memory Hierarchies" in 2016 at the University of California Berkeley, under the advisement of Krste Asanovic and Dave Patterson, and while there he was a primary contributor to the Rocket Chip SoC Generator.

Joel Holland is CTO from DeepSeas. 30+ years of painful experience. Started as a Nuclear Engineer on submarines. Multiple(s) software positions in database technology and AI before the rest of the world could spell it. CISO for 10 years in fintech. And recently 13 years as CTO in the cyber security space.

John Baldwin is a systems software developer. He has directly committed changes to the FreeBSD operating system for over twenty years across various parts of the kernel (including x86 platform support, SMP, various device drivers, and the virtual memory subsystem) and userspace programs. In addition to writing code, John has served on the FreeBSD core and release engineering teams. John has also contributed to the GDB debugger where he was recently appointed as a global maintainer.

John Lampe has the ability to synthesize market and technical information led him to create new products and markets for more than thirty years. He has been an IoT thought leader since 2001 and is currently Utility Advisor, AI at World Wide Technology (WWT). Previously, he was Head of the Global DA Line of Business at Itron, and Director of DA Business Development at Silver Spring Networks prior to Itron's acquisition. His utility experience also includes helping Southern California Edison lead smart grid design, and roles as VP Strategic Engagements at Trilliant Networks and CEO of IAP Solutions, Inc. He holds a B.A. degree in Mathematics from UC Berkeley.

Karl Koscher is a technology and security generalist with an emphasis on wireless and embedded systems security. As part of his dissertation work at the University of Washington, he and his collaborators were the first to demonstrate a complete remote compromise of a car over cellular, Bluetooth, and other channels. He is a multi-time F5 day winner and has obtained all tickets to multiple events ethically without the use of bots or other tools.

Kathleen Tuite has a PhD from University of Washington where she connected citizen science and 3D computer vision via the games Foldit and PhotoCity. She now works for GetODK, architecting the open source mobile offline data collection platform ODK, which is used for humanitarian purposes around the globe. Kathleen inherited the RAT timekeeper position from Mary Eisenhart in 2018. She kindly surrenders her RAT session gavel to Fred Coury this year, but she will assist in scheduling speakers for their 10 minutes of fame. She is a member of the AMW Program Committee.

Ken Shoemaker spent nearly 40 years at Intel where he had the privilege of developing the microarchitectures of some of Intel's famous microprocessors (e.g., the Pentium) and some infamous ones (e.g., the Itanium). He had the honor of being recruited into Intel by AMW's long time chairman, John Wharton, who then invited Ken to attend his first AMW in 1985 where he presented the architecture and microarchitecture of the (then new) i80386. Since retiring in the midst of the Covid pandemic at the end of 2020, his brain has turned to mush but he still relishes every opportunity to mingle with folks in the real world doing cool stuff. He is a member of the AMW Program Committee.

Kristin Paget is a security researcher at Intel, with a focus on low-level hardware security. She's perhaps best known for her work on cellular and RFID security, but more recently she's been hacking on PCI Express, USB Type-C, and an infrared blaster that really got out of hand.

Madisen Taylor leads ecosystem, culture and brand at Prime Intellect, bringing expertise from AI policy, open-source ecosystems, and global governance. Previously, she was Chief of Staff and Special Operations at Hugging Face (2022-2024), participated in the inaugural White House AI Insight Forum, and developed case studies with Oxford (2021) and Harvard Business (2022) on open-source AI.

Malcolm Hendricks is a Japanese-to-English translator, editor, and writer turned software engineer. A graduate of Saint Albans School and Earlham College, he participated in three study-abroad programs to Japan during his academic career before ultimately relocating to the country to live and pursue a career. He is relatively new to the world of programming and computer science, but his passion for tinkering has been around since his adolescent years. His other passions include musical composition and martial arts. The late Dewayne Hendicks was his uncle.

Marcela Melara, Dr. is a research scientist in the Security and Privacy Research group at Intel Labs and serves on the Technical Advisory Council of the OpenSSF. Her current work focuses on developing solutions for software/AI supply chain integrity and datacenter security. Prior to joining Intel, she received her PhD in Computer Science from Princeton University.

Michael Cheponis attended Culver Military Academy, MIT, and CMU. He worked at GRiD, Apple, EO/Pen Point, Tesla, and NovaSolix, and then as a consultant. His background is in EE, CS, and RF. He met Dewayne Hendricks when he came to the Valley in 1987. More info is at http://Culver.Net/

Mike Shebanow is an expert in high-performance computer hardware, with four decades of experience. At NVIDIA, he led the shader core (SM) architecture group developing the first CUDA-enabled GPU (Fermi). He has held leadership roles as CTO/VP at companies including Cadence (Tensilica), Samsung, and HAL Computer Systems. More recently, he has focused on AI-specific processors, including NPUs and TPUs, shaping the future of AI and high-performance computing. He holds 50 patents/applications in computer hardware. He has a PhD in Computer Science from UC Berkeley and is an IEEE Fellow.

Nathan "Nato" Saichek has been an engineer in the Bay Area for the last 15 years, working at a variety of hardware startups on mechanical, electrical, and software projects, as well as a few brief stints in manufacturing and construction. He recently took the plunge to co-found Longshot Space, a small company aiming to change the way humanity accesses space by dropping the cost of orbital access from thousands of dollars per kg to less than ten dollars per kg.

Nicholas Weaver is a lecturer in computer science (currently at Davis), a researcher at the International Computer Science Institute, and the Chief Mad Scientist of his one-man (now technically defunct) startup designing control systems for cheap autonomous drones.

Parama “Pia" Pal is founder and CTO at Vital Statistics Incorporated, an AI infrastructure startup, following her role as CTO at Stem.ai. A machine learning engineer with deep expertise in theoretical AI and performance engineering, she architected Credit Karma's recommendation system, serving 100M users, and built platforms for deploying high-performance ML models at scale. Her MIT graduate research on novel learning network architectures enhances efficiency in modern ML infrastructures. An early contributor to d3.js (now the internet's most widely used visualization library), Pia's work bridges theoretical foundations and practical implementations. At MIT, she pursued degrees in EECS and Brain and Cognitive Sciences, and was mentored by AI pioneers Marvin Minsky and Patrick Winston during her graduate studies.

Paul McGill After serving in the US Air Force, he received a B.S. in Electrical Engineering degree from Stanford University in 1987, and a M.S. in Electrical Engineering degree from Stanford University in 1991. As a student, and then later as a Research Associate, he worked at Stanford's Space, Telecommunications, and Radioscience Laboratory (STARLab) designing, building, and deploying instrumentation to study ionospheric and magnetospheric low-frequency radio noise. Field work in remote locations took him around the world, including the South Pole, northern Alaska, and Greenland. Mr. McGill came to the Monterey Bay Aquarium Research Institute in 1995, where he has designed and built remotely operated vehicles, autonomous underwater vehicles, and numerous oceanographic instruments including seismometers, cameras, and chemical sensors. His research interests include underwater vehicles, novel sensors for instrumentation, and signal processing.

Peter Smith is currently pursuing a PhD in astrophysics at Arizona State University. His dissertation research centers around the atmospheres of planets outside the solar system, with a focus on measuring their chemical compositions and climates using spectroscopy. When not doing science, Peter loves to be outdoors on a hike, playing the piano, or reading a book.

Richard Chuang, co-founder of PDI/DreamWorks, is a pioneer in digital animation and visual effects. At a time of fast-growing technology, he helped launch one of the first studios to transform computer-generated imagery (CGI). Combining technical skill with creative vision, he helped develop new tools and projects that made digital storytelling more accessible. His work pushed the limits of both art and technology, inspiring future generations to explore the possibilities of digital media.

Thaís "barbie" Hamasaki is a former ballerina, physics researcher, and reverse engineer (maybe this one still applies) who shifted to offensive security research at Intel in order to conquer the world (of CPUs). She spends an unusual amount of time (speculatively) looking at HAS, MAS, microcode, RTL … and powerpoint. She has spoken at all the conferences and seen all the things, and right now she is happy learning how to play bass guitar while not thinking about computers.

Tim Požar works on building infrastructure that enables democratic discourse. He works on SF's Community Broadband Network that provides Internet to low-income folks. Through his company, TwoP LLC, his work includes the design and deployment of High Availability networks at Burning Man for the BLM, Native American tribal lands, etc.

Zoya Slavina is an independent interdisciplinary researcher with a background in the sociology of technology, media production, international relations, and philosophy. She specializes in studying the impact of technological development on contemporary society. Zoya has presented her research on AI ethics in synthetic media production, regulation, and international relations at renowned institutions in the US and Europe.

Abstracts of Many of the Talks

AI as a Collaborative Partner: Artificial Actors in Artistic Drawing - Zoya Slavina As artificial actors become more prevalent as collaborative partners, understanding the sociotechnical dynamics of this interaction is essential. This presentation explores how human-AI collaboration can be quantified and studied, with a focus on the relationship between the user and artificial actors. By examining this partnership within the context of artistic drawing, I aim to contribute to broader discussions on the implications of this study, including issues related to authorship rights within legal frameworks. While this approach opens new perspectives on co-creation across various fields, further research and collaboration are needed to formalize these insights and integrate them into existing legal and knowledge systems.

AI for Root Cause Analysis in Test Failures - David Shier Determining the root cause of failures for low volume production, such as aircraft, presents a unique problem in that there's a low likelihood of repeatability. A method using machine learning to replicate the troubleshooting techniques of experienced technicians allows for better outcomes than previously possible.

Alien Worlds and Our Place in the Universe - Peter Smith Over the past 3 decades, astronomers have discovered almost 6000 exoplanets - planets outside of our solar system. Out of thousands of known planetary systems, it has become clear that our own solar system is actually an atypical outlier, raising fundamental questions about how planetary systems form and evolve. In this talk, I will discuss how astronomers are using the diverse exoplanet population to better contextualize Earth's place in the universe and guide our searches for an "Earth 2.0". I will also give updates and future prospects for the search for extraterrestrial life.

Analog ASIC Design Using AI - Celera Technologies - Calum MacRae Development of fully custom analog ASIC devices is typically a year-long process. Through the use of AI, Mr. MacRae will discuss how to reduce this process to under a week.

Auditing RISC-V CPUs - Kristin Paget RISC-V is an open-source instruction set, designed to be extensible by anyone who chooses to implement it - but these instructions aren't always advertised. In this talk I will discuss techniques for discovering all of the "secret" instructions that are present on a RISC-V chip and the results from doing so on several commercially-available platforms.

Automatic CAPTCHA Solving with Local, In-browser LLMs: The Unethical Engineer’s Guide to Event Ticket Acquisition - Karl Koscher In this fiery talk, we’ll dive into the murky waters of ShmooCon ticket acquisition, exploring a trifecta of techniques against ShmooCon’s anti-bot measures. We’ll first go over how the ShmooCon CAPTCHA generally works, exposing some weaknesses in the system. We’ll then dive into three different exploits for these weaknesses. We’ll cover how an odd quirk of some AWS address spaces led them to be vulnerable to MITM attacks. We’ll also explore how effective LLMs can be by optimizing the time-to-first-token. We’ll examine the power of crowdsourcing CAPTCHAs through a custom browser extension, turning your social circles into ticket-grabbing armies. Finally, we’ll briefly discuss some defenses to these attacks and alternative strategies used by other events, highlighting the challenges in creating a fair ticketing system for high-demand events.

Climate Restoration Using Natural Processes - David M Snyder In parallel with achieving zero net emissions of carbon dioxide, the world needs to reduce current levels in the air of above 420 ppm to historically safe pre-industrial levels below 300 ppm. Atmospheric restoration using ocean iron fertilization to stimulate phytoplankton uptake of carbon dioxide in strategic areas of the ocean appears to be the most effective option to achieve climate restoration to ensure a safe environment for posterity. This is based upon data from natural processes such as hundreds of thousands of years of climate data and what was observed after the 1991 Pinatubo and 2022 Tonga volcanic eruptions. A pilot project conducted with modern measurement, reporting, and verification technologies, including instrument buoys and satellites, will help to confirm the approach and refine its methodology.

Designing Silicon at the Speed of Software: From Circuits to Microprocessors - Henry Cook The end of Moore's law has brought renewed interest to domain-specific processor microarchitectures, yet at the same time design costs have risen significantly. This talk will discuss recent efforts to releverage software techniques from modern programming languages in a hardware design context in order to improve microprocessor development productivity. The open source Chisel hardware language is powered by Scala and applies object-oriented and functional programming techniques to the domain of hardware design and generation. We will cover how Chisel can be applied to circuit generation tasks, and how a growing ecosystem of libraries built on top of it are capable of generating Verilog descriptions of entire system-on-chip microprocessor designs.

Evolution of Drones in the Ukraine War - Chuck McManis In 2022, Russia invaded Ukraine in what they thought would be a 3 day war. Three years later, much has been learned but the most interesting aspect to me has been watching Ukraine 'speed run' up the technology curve on Group 1 drones (0-20kg). I'll walk through the technology development, both offensive capabilities and defensive ones, the use of Electronic Warfare, the current state of the art, and the implications of this war on the wider world.

Future Directions in AI Infrastructure - Parama Pal This talk introduces Probably Approximate Learning (PAL) Networks, a new AI architecture designed for cost-efficient, adaptive learning. Developed by Vital Statistics Inc., PAL Networks dramatically reduce inference time and model size while preserving accuracy, offering a path beyond today’s neural network limits. Grounded in learning theory and compatible with existing frameworks, they enable scalable, explainable, and future-ready AI.

Going To Orbit Without Software - Nathan Saichek Modern space launch systems rely heavily on software for guidance, navigation, and control. However, it's entirely possible for a payload to reach orbit without a single line of code if you radically simplify the approach. This talk describes an enormous pneumatic cannon-based launch system currently in development whch is capable of delivering payloads into orbit without software in the control loops. We’ll examine the physics and engineering challenges of such a system, from high speed gas release systems through the dynamics that govern heatshield design, as well as a brief overview of orbital dynamics. Along the way we'll look at some other inspiring systems that have used analog computing to deliver effective results with simple components.

High Assurance Computing - John Baldwin CHERI uses capabilities to bring memory safety to C and C++. Capability systems have a long history, so can CHERI succeed in ways prior systems have not? CHERI also provides opportunities for fine-grained compartmentalization within an address space. Our group has been pursuing an application of this in our forks of LLVM and FreeBSD to divide individual binaries and shared libraries into distinct compartments.

My Life as a Geek - Gary Friedman "My Life as a Geek" - My decade at NASA and the inventions that got me there, and the useful things I'm applying this experience to now.

OSDB: Turning the Tables on Kernel Data - George Neville-Neil Operating systems must provide functionality that closely resembles that of a data management system, but existing query mechanisms are ad-hoc and idiosyncratic. To address this problem, we argue for the adoption of a relational interface to the operating system kernel. While prior work has made similar proposals, our approach is unique in that it allows for incremental adoption over an existing, production-ready operating system. In this paper, we present progress on a prototype system called OSDB that embodies the incremental approach and discuss key aspects of the design, including the data model and concurrency control mechanisms. We present four example use cases: a network usage monitor, a load balancer, file system checker, and network debugging session, as well as experiments that demonstrate the low overhead for our approach.

Pre-Installed Android Malware and the Case for Firmware Transparency - Alexis Hancock Pre-installed malware is plaguing low-budget Android devices and there's little consumers can do to combat such a threat. Enter firmware transparency and the ability for firmware images to not only be publicly available and observable but push threat actors out of the market. Offering examples of what this ecosystem could look like - going over how Android based OEMs can get started and what SOC manufacturer's roles could be - we can preview how low-budget devices can participate in the market and not be a looming threat to consumers.

Precise Positioning Using Real-Time Kinematics (RTK) - Bill Woodcock Bill will discuss the current state-of-the-art in RTK and NTRIP, the protocols which allow the precision of GPS and other satellite positioning services to be improved to sub-centimeter accuracy, allowing new developments in precision agriculture, automated transit, and other robotic applications.

Rayhunter: Recording PCAPs from Stingrays With a $20 Hotspot - Cooper Quintin What if you could use Wireshark on the connection between your cellphone and the tower it’s connected to? In this talk I will present Rayhunter, a cell site simulator detector built on top of a cheap cellular hotspot. It works by collecting and analyzing real-time control plane traffic between a cellular modem and the base station it’s connected to. We will outline the hardware and the software developed to get low level information from the Qualcomm DIAG protocol, as well as go on a deep dive into the methods we think are used by modern cell-site simulators. We’ll present independently validated results from tests of our device in a simulated attack environment and real world scenarios. Finally, we will discuss how we hope to put this device into the hands of journalists, researchers, and human rights defenders around the world to answer the question: how often are we being spied on by cell site simulators?

Remembering Dewayne Hendricks - Brian Berg (Berg Software Design); Malcolm Hendricks (remote); Michael Cheponis (remote) Dewayne Hendricks (1949-2024) was a longtime AMW attendee, having first attended in 1985, and serving on the AMW Organizing Committee from 1993-2024. This talk will highlight some aspects of his life and career, including his having been mentored by R. Buckminster Fuller and Paul Baran. Dewayne was instrumental in bringing the Internet to locales such as Tonga, Mongolia, Kenya, and Native American reservations. Along with Vint Cerf, Dewayne was an inaugural member of the FCC's Technological Advisory Council (TAC) - which was launched in 1999 and on which he served until 2005. He provided valuable perspective to the FCC on wireless data and Wi-Fi, and was described as "the glue that held the TAC together." With his knowledge about how to hack, saying "it could be" and making it happen, and his approach of "let's try this, and play with it," his influence was enormously important to the growth of wireless communications worldwide. As Dewayne regularly chaired and organized AMW sessions over the years in parallel with these efforts, he taught us all, and is greatly missed. We are also honored to have his nephew Malcolm join us remotely from Japan to provide his own perspective.

Servers, Compute, and Laser Communications in Space - Dennis Wingo In the 1960s. NASA and the US Defense Department consumed fully 50% of all semiconductors made. The most advanced and compact computers in the world were on the Apollo Saturn V and the Apollo lunar lander. However, since at least the late 1970s, there has been a divergence between aerospace semiconductors and computers with their terrestrial counterparts. This talk will explore how the speaker and his company are seeking to bridge this gap by a coordinated campaign of flight projects using some of the most advanced processors, GPUs, and storage to create Applications Data Servers. Such an application - a space laser communications router - will be described to show some of the possibilities of Hybrid Space Architectures.

"Slaughterbots": Friend or Foe? - Nicholas Weaver "Dr Strangedrone, or how I learned to stop worrying and love the slaughterbots": The rise of consumer-derived drone technology is not only advancing rapidly, but there is a significant (and inevitable) push to terminal autonomy; Small, inexpensive armed drones that, in the absence of reliable communication, will still attempt to complete their mission: A control model best described as "human on the loop with fail deadly autonomy". But not only is this inevitable (and, as witnessed in Ukraine, rapidly developing), this is actually a potentially preferable option. For all that people worry about the rise of "slaughterbots", they offer the potential for more precise and more cost/effective warfare. They also can heavily favor a prepared defender, rendering territorial expansion (such as from Russia or China) even less viable. Indeed, the biggest threat posed by the rise of the slaughterbots is to the military industrial complex. After all, why spend $30,000 on ten artillery shells fired from a $3M cannon when a single drone (with a still obscene markup) of $3000, launched from the back of a Helix, can have the same military impact?

Taxonomy of Compute - Dinesh Maheshhawari Given how important Compute today is for (the Individual , Society, Marketplace and Governance), it behoves us to lay down the framework of understand the landscape of compute - what is compute, mathematical approaches, compute paradigms, architectures, units, devices etc. This is so that there is a compute framework from which to guide the research entities, corporations, VCs and governments.

The Open-Source Problem - Brandon Holland, Joel Holland To use Open Source software is barely a choice anymore. No one can afford to write every piece of code themselves. So, most of the time, you have to use Open Source projects. The solution being provided by BCI scores the efficacy and determines the security of open source projects. This allows you to make your work more efficient/effective. It also allows the community to take steps to remediate modules in need of attention.

Using TEEs to Attest the CI/CD Platform for Next-Level Supply Chain Integrity - Marcela Melara Software supply chain integrity today relies heavily on metadata-based verification of software artifacts, but the integrity of the CI/CD platforms that are used to build these artifacts has a big impact on the security of the resulting software. In this talk, I will motivate the importance of enhancing the integrity of CI/CD Platform, and discuss how we leverage trusted execution environments (TEE) to achieve hardware-based, cryptographic attestation of the CI/CD platform's entire stack—from hardware to workload.

What Does Intel Need to Do to Get Product Back? - Bob Brennan, Ken Shoemaker Ken Shoemaker interviewing Bob Brennan - VP, System Foundry Engineering at Intel Foundry Services

When is a grid not a grid? - Brad Templeton Our grid technologies are ancient and going through a big energy transition, with a hoped for switch to renewables, lots of generation at people's houses, declining prices of batteries and solar, electrification of cars, attempts at bidirectional connections, smart homes plus new technologies for both heating and cooling. Can we make a new grid and get all the power we need?

Whirlwind Software Restoration Demo - Guy Fedorkow The Whirlwind computer, built at MIT in the late 1940's, was one of the early von-Neumann-inspired machines, the first designed specifically for real-time operation, and probably the fastest computer around at the time. The machine operated at MIT for a decade until 1959, and during that time, became the prototype for proving out concepts for the much-larger Semi-Automatic Ground Environment (SAGE) air defense system. While the Whirlwind hardware was disassembled and dispersed in the 1970's, numerous reports, plus tapes containing software remain. In a collaborative project with the MIT Museum and the Computer History Museum, we've built a simulation environment, and have recovered some of the Whirlwind software from that decade. This demo talk will give a brief overview of the machine and an introduction to the state of the art of programming at the cutting edge in the 1950's.

Working on the Climate: What's Possible/What Does It Take? - DV Henkel-Wallace Dealing with climate change requires far more than just the necessary abandonment of fossil fuels. Various schemes have been proposed to intervene in climate change, some hare-brained, some sensible, and some even discussed at AMWs past. Some of these ideas have been piloted, and some are even in the early stages of deployment. Making a meaningful change in the climate requires significant work. Obviously, you need to get the science right (though how do you know)? And you have to get the engineering right too in order to grow to planetary scale. And that planet is full of people, who are the whole point of the effort. How do you keep them safe, and how do they know? Are there sacrifices people will have to make? So is it hopeless? Not at all! The panelists are both working in this area, and will draw on their experience to talk about the kind of path it takes. We'll also talk about how some approaches have made it to deployment, with some discussion of what it took.