



The Marconi
Society

2016 PNT SYMPOSIUM

Invited Speaker Bios



Marconi - SCPNT Symposium on Advances in Communications

Agenda Version '11' - November 2nd & 3rd - Kavli & Panofsky Auditoriums, SLAC

Day / Date	~ Start Time	~mins w/ Q&A	Invited Speaker	Affiliation	Title of Presentation
<i>Wed</i> 11/2/16	8:00am	45	<i>Reception & Coffee Service at SLAC's Panofsky Auditorium Lobby</i>		
1	8:45am	15	Payne, David - Spilker, Jim	Chairman of the Marconi Society - Founder SCPNT	Welcome & Introductions
2	9:00am	45	Parkinson, Brad	Stanford University - Marconi Prize Recipient 2016	Radio Waves - Marconi to GPS. A short history of the evolution to their use for Positioning Navigation and Time.
3	9:45am	30	Jacobs, Irwin	Founding Chairman and CEO Emeritus, Qualcomm - Marconi Prize Recipient 2011	Position Location at Qualcomm: pre-GPS to SoC + Panel Discussion Participant
	10:15am	30	<i>Morning Break</i>		
	10:45am	90	Panel Discussion: Moderated by Brad Parkinson Panelists: I. Jacobs, V. Cerf, J. Cioffi, M. Cooper & D. Payne		Radio Navigation and Radio Communication Synergy and Conflicts
4	10:50am	10	Cerf, Vint	Internet Pioneer - Marconi Prize Recipient 1998	New Roles for Radio in the Internet + Panel Discussion Participant
5	11:00am	10	Cioffi, John	DSL Pioneer - Stanford University - Marconi Prize Recipient 2006	New Roles for Radio in the Internet + Panel Discussion Participant
6	11:10am	10	Cooper, Martin	Cellphone Pioneer - Marconi Prize Recipient 2013	The Myth of Spectrum Scarcity: How GPS can make us more efficient spectrum users + Panelist
7	11:20am	10	Payne, David	Photonics Pioneer - Marconi Prize Recipient 2008	Light: The Cause of and Solution to Data Overload? + Panel Discussion Participant
	12:15pm	60	<i>Catered Lunch at Panosky Auditorium & Redwood Grove</i>		
8	1:15pm	30	Shields, T. Russell	Ygomi Chair & Member of PNT Advisory Board	Smart Vehicles
9	1:45pm	30	Schroth, Georg	NavVis Founder	Vision based indoor positioning and mobile mapping systems
10	2:15pm	30	Montgomery, Paul	Intelligent Construction Tools (ICT)	POME. A mobile camera system for accurate indoor position.
	2:45pm	30	<i>Afternoon Break # 1</i>		
11	3:15pm	30	van Diggelen, Frank	Google	Much more than lat,lon: A guided adventure through the P,V,N & T in Android
12	3:45pm	30	Blewitt, Geoff	Univ. Nevada, Reno, Geodetic Lab.	Millimeter GPS Imaging of Earth's Flex and Flow
	4:15pm	105	<i>Afternoon Break #2 & Travel Time</i>		
	6:00pm	120	<i>Marconi Prize Reception and Dinner at Computer Museum in Mt. View</i>		
<i>Thu</i> 11/3/16	8:00am	30	<i>Reception & Coffee Service in SLAC's Kavli Lobby</i>		
13	8:30am	30	Grigaliunas, John	Air Force Test Center (AFTC)	PNT Effects in an Electronic Warfare Environment
14	9:00am	30	Iannucci, Bob	Carnegie Mellon University, Silicon Valley	Time Issues in Programming IoT Systems for Smart Cities
15	9:30am	30	Close, Sigrid	Stanford University, Aero Astro	Meteoroids & Space Debris Threats to Orbiting Spacecraft
	10:00am	30	<i>Morning Break</i>		
16	10:30am	30	Goldbogen, Jeremy	Stanford University, Hopkins Marine	Tracking Blue Whales using PNT technology
17	11:00am	30	Enge, Per	Stanford University, Aero Astro	Cyber Safety for Navigation
18	11:30am	30	Whitney, Col. Steven	USAF GPS Directorate	Update on GPS Program
	noon	60	<i>Catered Lunch at Kavli Porch & Panosky Redwood Grove</i>		

1a. and 7. Sir David Payne



Professor Sir David Payne was awarded the 2008 Marconi Prize and currently serves as Chairman of the Marconi Society.

He is a leading Professor at the University of Southampton and Director of the Optoelectronics Research Centre, the Zepler Institute and co-Director of the Photonics Institute in Singapore.

He is a world-class pioneer of technology, his work has had a great impact on telecommunications and laser technology over the last forty years.

The vast transmission capacity of today's internet results directly from the erbium-doped fibre amplifier (EDFA) invented by David and his team in the 1980s.

Currently, his main research interest is high-power fiber lasers; he now holds many fiber laser performance records.

He has published over 650 Conference and Journal papers.

As an entrepreneur, David's activities have led to a cluster of 11 photonics spin-out companies in and around Southampton - helping to boost the local economy.

Among many prizes, he has been awarded the Mountbatten Medal of the IEE (2001), the Kelvin Medal of the eight major engineering institutions for distinction in the application of science to engineering (2004), the IEEE Photonics Award (2007), the Marconi Prize (2008) and the IEEE James Clerk Maxwell Award (2014).

In 2013, Sir David was knighted by Her Majesty the Queen for services to photonics.

Please welcome Sir David Payne.

1b. Jim Spilker



As one of the principal designers and analysts of the Global Positioning System (GPS), James J. Spilker Jr.'s contributions to GPS development have truly benefited billions of people around the world.

Dr. Spilker developed the initial technologies to enable successful GPS operation, and he has continued to provide innovations important to the further growth of the GPS. Dr. Spilker designed the L1 C/A code during the 1970s, which became the GPS civilian signal now used by 2 billion people worldwide. His delay lock loop process for tracking code division multiple access (CDMA) signals is essential to GPS accuracy.

He has since helped develop the new L5 civilian signal, first launched in 2011, which provides higher accuracy and more resistance to the effects of interference, such as space weather, on navigation.

Dr. Spilker also co-invented the split spectrum mode (now called binary offset carrier, or BOC) for modern GPS ranging that will allow civilian and military signals to use separate areas of the spectrum. He also developed adaptive vector tracking for simultaneously tracking ranging signals from multiple satellites while maintaining accuracy and improving performance against interference.

Dr. Spilker's highly cited book *Global Positioning System: Theory and Applications* (American Institute of Aeronautics and Astronautics, 1996) is considered the standard reference for the GPS and won the AIAA Sommerfield Book Award. His popular textbook *Digital Communications by Satellite* (Prentice-Hall, 1977) went through ten printings.

An IEEE Life Fellow and member of the U.S. National Academy of Engineering, Dr. Spilker is currently executive chairman of AOSense Inc., Sunnyvale, CA, USA and Professor (Consulting), Stanford University, Stanford, CA, USA.

Jim was the founder, chairman and CEO of Stanford. One of the co-Founders of Stanford's PNT Center

He has been a generous contributor to Stanford and the new Nanotechnology and Applied Engineering Building has been named in his honor.

Please welcome Professor Jim Spilker.

2. Brad Parkinson



Dr. Bradford Parkinson was the Chief Architect for GPS, and led the original advocacy for the system in 1973 as an Air Force Colonel. Gaining approval, he became the first Director of the GPS Joint Program Office and led the original development of spacecraft, Master Control Station and 8 types of User Equipment.

He continued leadership of the Program through the extensive test validation Program, including being the Launch Commander for the first GPS satellite launches. This original deployment of GPS demonstrated comfortable margins against all PNT (Positioning, Navigation, and Timing) requirements.

Earlier in his career, he was a key developer of a modernized AC-130 Gunship, introduction of which included 160 hours of combat missions. He was an instructor at the USAF Test Pilot School. In addition he led the Department of Astronautics and Computer Science at the US Air Force Academy. He retired from the US Air Force as a Colonel.

He was appointed a Professor at Stanford University in 1984, after six years of experience in industry. At Stanford University, he led the development of many *innovative applications of GPS*, including:

1. **Commercial aircraft (Boeing 737) blind landing using GPS alone,**
2. **Fully automatic GPS control of Farm Tractors on a rough field to an accuracy of 2 inches,**
3. **Pioneering the WAAS augmentation to GPS that allows any user to achieve accuracies of 2 feet and very high levels of integrity assurance.**

He has been the CEO of two companies, and serves on many boards. He is the editor/author of the AIAA Award winning 2 Volumes: “GPS Theory and Applications” and is author or coauthor of over 50 technical papers.

Among his many awards is the **Draper Prize** of the National Academy of Engineering, considered by some to be the “Engineering Nobel.”

And he is this year’s winner of the Marconi Prize for advances in Radio Communication.

Please welcome Professor Brad Parkinson.

3. Irwin Jacobs



Irwin Mark Jacobs is Founding Chairman and CEO Emeritus of Qualcomm, a company he co-founded in 1985 and led as CEO through 2005 and Chairman through 2009.

Qualcomm pioneered the CDMA wireless technology used by all third-generation cellular networks to deliver broadband Internet access to over 3 billion customers, and is the leader in supplying fourth-generation technology. Through continuing innovation, Qualcomm has become the

world's largest semiconductor supplier for mobile devices.

Dr. Jacobs previously served as co-founder, CEO and chairman of LINKABIT Corporation, leading the development of Very Small Aperture Earth Terminals (VSATs) and the VideoCipher® satellite-to-home TV system. LINKABIT merged with M/A-COM in August 1980, and Dr. Jacobs served as executive vice president and a member of the board of directors until his resignation in April 1985. Over 50 San Diego communications companies trace their roots to LINKABIT.

From 1959 to 1966, Dr. Jacobs was an assistant, then associate professor of electrical engineering at Massachusetts Institute of Technology (MIT). From 1966 to 1972 he served as professor of computer science and engineering at the University of California, San Diego (UCSD). While at MIT, Dr. Jacobs co-authored with Jack Wozencraft a textbook on digital communications, *Principles of Communication Engineering*. First published in 1965, the book remains in use today.

Dr. Jacobs received a bachelor's degree in electrical engineering in 1956 from Cornell University and Master of Science and Doctor of Science degrees in electrical engineering from MIT in 1957 and 1959, respectively. He holds fourteen CDMA patents.

Dr. Jacobs has chaired the Board of Trustees of the Salk Institute since 2006, was chair of the National Academy of Engineering from 2008 to 2012, has served on the advisory board of the Tsinghua University School of Economics and Management since 2000, and currently serves on the Cornell NYC Tech steering committee and the Lang Lang International Music Foundation.

He has received eight Honorary Doctorates and numerous industry, education, business and philanthropy awards.

Please welcome Irwin Jacobs.

4. Vint Cerf



Vint Cerf is an American Internet pioneer, who is recognized as one of "the fathers of the Internet", sharing this title with TCP/IP co-inventor Bob Kahn.

His contributions have been acknowledged and lauded, repeatedly, with honorary degrees and awards that include the National Medal of Technology, the Turing Award, the Presidential Medal of Freedom, the Marconi

Prize and membership in the National Academy of Engineering.

In the early days, Cerf was a manager for the United States' Defense Advanced Research Projects Agency (DARPA) funding various groups to develop TCP/IP technology.

When the Internet began to transition to a commercial opportunity during the late 1980s, Cerf moved to MCI where he was instrumental in the development of the first commercial email system (MCI Mail) connected to the Internet.

Cerf was instrumental in the funding and formation of ICANN from the start. He waited in the wings for a year before he stepped forward to join the ICANN Board, eventually becoming chairman.

He was elected as the president of the Association for Computing Machinery in May 2012, and in August 2013 he joined the Council on CyberSecurity's Board of Advisors.

Cerf is active in many organizations that are working to help the Internet deliver humanitarian value in our world today. He is supportive of innovative projects that are experimenting with new approaches to global problems, including the digital divide, the gender gap, and the changing nature of jobs.

Cerf is vice president and Chief Internet Evangelist for Google. He contributes to global policy development and continued spread of the Internet.

Please welcome Vint Cerf.

5. John Cioffi



John Cioffi was born and raised in Illinois. He earned a B.S.E.E. degree from the University of Illinois at Urbana-Champaign in 1978.

From 1978 to 1982, Cioffi worked as a modem designer at Bell Laboratories in New Jersey. While at Bell Laboratories, he also attended Stanford University, where he earned a Ph.D. degree in Electrical Engineering in 1984.

In 1984, Cioffi left Bell Labs to work at IBM as a hard disk drive read channel researcher.

In 1986, Cioffi began his teaching career as an assistant professor of electrical engineering at Stanford University. Cioffi supervised the Ph.D. programs of more than 70 students over the course of more than two decades. His and his students' research into discrete multitone modulation (DMT) became widely adopted in digital subscriber line (DSL) technology, used commonly for Internet access.

In 1991, at the age of 35, Cioffi took a leave of absence from Stanford to found Amati Communications Corporation. His vision was to build DSL modems based on his and his students' research. Many of Cioffi's former and present students followed him to Amati, where they built the Prelude modem, a DSL modem that could transmit 6+ megabits per second over 9,000 feet of telephone line. The Prelude modem would go on to win what has become known as the "Bellcore ADSL Olympics" in 1993 by performing significantly better than modems using single-carrier modulation techniques, such as quadrature amplitude modulation (QAM) and carrierless amplitude phase modulation (CAP), including modems from AT&T and Bellcore.[3] Hundreds of millions of people now use DSL based on Amati's innovations.

In 1993, Cioffi returned to Stanford, although he remained involved with Amati as an officer and director until its 1998 acquisition by Texas Instruments.

Cioffi's research interests then turned to dynamic spectrum management (DSM), an improvement on DSL that mitigates service interruptions and allows DSL lines to run with higher and more reliable data rates.

In 2003, Cioffi founded Adaptive Spectrum and Signal Alignment, Inc. (ASSIA) to help service providers realize improvements in the performance and profitability of their DSL networks. Today ASSIA's customers collectively provide DSL service to more than 70 million subscribers worldwide.

In 2009, Cioffi assumed emeritus status at Stanford, as the Hitachi Professor Emeritus of Engineering.[2] He is now CEO and Chairman of ASSIA.

Please welcome John Cioffi.

6. Martin Cooper



Martin "Marty" Cooper is a pioneer and visionary in the wireless communications industry.

With eleven patents in the field, he is recognized as an innovator in radio spectrum management.

While at Motorola in the 1970s, Cooper invented the first handheld cellular mobile phone (distinct from the car phone). In 1973 he led the team that developed it and brought it to market in 1983.

He is considered the "father of the cell phone" and is also cited as the first person in history to make a handheld cellular phone call in public.

Cooper is co-founder of numerous communications companies with his wife and business partner Arlene Harris; also known as the "first lady of wireless."

He is co-founder and current Chairman of Dyna LLC, in Del Mar, California.

Cooper also sits on committees supporting the U.S. Federal Communications Commission and the United States Department of Commerce.

Please welcome Marty Cooper.

7. Sir David Payne (See #1a)

8. T. Russell Shields



Russ Shields is Chair of Ygomi LLC. Businesses that Mr. Shields has founded and/or led include Shields Enterprises International, Cellular Business Systems, Inc. (later Convergys), Navigation Technologies (later Navteq, now HERE), and the current Ygomi companies – SEI, Connexis, and ArrayComm.

Mr. Shields is a Board Member of the ITS World Congress and Co-Chair of the ITU Collaboration on ITS Communications Standards. He is also a member of the National Space-Based Positioning, Navigation and Timing Advisory Board, a Presidential advisory committee.

Mr. Shields is an SAE Fellow and recipient of the SAE-Delco Electronics ITS Award. He was inducted into the inaugural class of ITS America's Hall of Fame and named the first U.S. member of the ITS World Congress Hall of Fame.

In 2008, Mr. Shields received the University of Chicago Booth School of Business Distinguished Alumni Award in Entrepreneurship. In 2013, the Hotchkiss School awarded Mr. Shields its Alumni Award.

Please welcome Russell Shields.

9. Georg Schroth



Georg Schroth is co-founder and Managing Director at NavVis, a Munich based Start-Up focusing on indoor mapping and positioning.

As a Postdoc at Technische Universität München (until 2015), he managed federally funded research projects in the area of computer vision based localization.

He holds a B.Sc. degree (2007), a M.Sc. degree (2008), and a Ph.D. (2013) in Electrical Engineering and Information Technology from Technische Universität München.

Georg graduated with an Honors Degree in the Master-level graduate program on Technology Management of the Center for Digital Technology and Management (a joint venture of both Munich Universities), which is part of the Elite Network Bavaria.

As a Graduate Visiting Researcher he joined the Global Positioning System Laboratory in 2007 and the Information Systems Laboratory in 2010 at Stanford University.

Please welcome Georg Schroth.

10. Paul Montgomery



Paul is currently director of Engineering at Intelligent Construction Tools, a joint venture between Trimble Navigation and Hilti A.G.

In this role, his objective is to bring accurate and practical indoor positioning to the construction market.

Paul Montgomery received a Ph.D in Aeronautics and Astronautics from Stanford University in 1996 and was subsequently a founding member of Novariant.

At Novariant he worked on GPS receiver technology for aircraft landing, automatic farming and pseudolite systems.

Please welcome Paul Montgomery.

11. Frank van Diggelen



Frank van Diggelen has been doing navigation his entire career.

At age 19, he became a navigation officer in the South African Navy before going on to college.

Since then he has worked on GNSS for Navsys, Ashtech, Magellan, Global Locate, Broadcom and Google.

When not designing receivers he is navigator & tactician on a racing yacht in Santa Cruz, California.

He has a Ph.D. (EE) from Cambridge University,

He is also the author of “A-GPS: Assisted GPS, GNSS, and SBAS”, the bestselling text-book on A-GPS.

He has taught numerous mathematics, navigation and GPS classes, and last year taught the MOOC course AA272C “Global Positioning Systems”, here at Stanford.

Frank is currently a Consulting Assistant Professor at Stanford and a Principle Software Engineer at Google.

Please welcome Frank van Diggelen.

12. Geoff Blewitt



Geoff Blewitt graduated with Ph.D. in Physics from Caltech in 1986, with Richard Feynman on his committee.

In 1985 he joined the NASA Jet Propulsion Laboratory and was a leader in the development of the GIPSY software for high precision geodesy using GPS, including modeling GPS orbits, atmospheric delay, and ambiguity resolution on the global scale, for which he won numerous NASA awards.

He is now Professor of Geosciences at University of Nevada, where he founded the Nevada Geodetic Laboratory, using data from 15,000 geodetic-quality GPS stations to image how the Earth changes its shape with time.

He is a winner of the American Astrophysical Society's Brunno Rossi Prize for "The Detection of Neutrinos from Supernova 1987A".

Bluett has also won the European Geosciences Union Vening Meinesz Medal for "...for his pioneering developments in geodetic theory, for advancing the Global Positioning System (GPS) for scientific research and applications, and for his outstanding contributions in applying geodesy to study geophysical and climate processes.

Please welcome Geoff Blewitt.

13. John Grigallunas

John Grigaliunas is the Electronic Warfare & Survivability Technical Expert in the 771st Test Squadron, Edwards AFB, CA.

He earned a master's degree in systems engineering from the Air Force Institute of Technology (Wright Patterson AFB, OH), and a bachelor's degree in computer engineering from the University of Illinois Urbana Champaign (Champaign, IL).

He has experience supporting the F-15, F-16, F-22, F-35, B-1B, B-2, B-52H, ABL, C-17, C-130, Global Hawk, Predator, Reaper, and other systems.

Please welcome John Grigallunas.

14. Bob Iannucci



Bob Iannucci is a Distinguished Service Professor in the Electrical and Computer Engineering department at Carnegie Mellon University where he leads the CyLab Mobility Research Center. His current research focuses on wireless networks as the platform for the next generation of computing.

Prior to joining CMU, Bob served as Chief Technology Officer of Nokia and Head of Nokia Research Center in the days when Nokia was at the top of the industry. During his tenure, Nokia Research Center delivered fundamental contributions to the LTE standards.

Bob has led engineering teams at startup companies focused on virtualized networking and computational fluid dynamics, creating systems that offered order-of-magnitude improvements over alternatives.

He also served as Director of Digital Equipment Corporation's Cambridge Research Laboratory that created some of the earliest multimedia indexing technologies, and these became part of Alta Vista.

Bob was a founder of Exa Corporation, and led the engineering team that created and delivered its first generation of high performance fluid flow simulation CAD tools. Exa went public in 2012.

Bob earned his Ph.D. from MIT in 1988 and is a proud member of the team of pioneers of dataflow computer architecture.

Please welcome Bob Iannucci.

15. Sigrid Close



Sigrid Close is an Associate Professor in the Department of Aeronautics and Astronautics at Stanford University, where she heads up the Space Environment and Satellite Systems laboratory.

Prior to joining Stanford, she was a project leader at Los Alamos National Laboratory, and a technical staff member at M.I.T. Lincoln Laboratory where she led a program to characterize meteoroids and meteoroid plasma using high-power radars.

Her honors and awards include the following: Presidential Early Career Award for Scientists and Engineers, NSF CAREER Award, DOE CAREER Award, Hellman Scholar, featured on the cover of IEEE Spectrum, Joe D. Marshall Award given by AFTAC for Outstanding Technical Briefing,

She was a panel member of the National Research Council's Aeronautics and Space Engineering Board and Space Studies Boards.

She was also a co-host of the TV program "Known Universe" in 2011, which aired on the National Geographic Channel, and has been featured as a guest expert on PBS in 2013 and 2014 and the Weather Channel in 2015.

Please welcome Sigrid Close.

16. Jeremy Goldbogen



Jeremy Goldbogen is a comparative physiologist who studies the biomechanics, functional morphology, and energetics of locomotion and feeding.

Jeremy earned his Ph.D. in zoology from the University of British Columbia in Vancouver, Canada, and is now assistant professor of biology at the Hopkins Marine Station of Stanford University in Pacific Grove, California.

Current research integrates data from multi-sensor tags, remote sensing, and advanced bio-imaging to understand the mechanisms of foraging in the world's largest whales, such as humpback whales, fin whales, and blue whales.

Awards include a Young Investigator Award from the Office of Naval Research and Stanford's Hoagland Award for Teaching Innovation.

Please welcome Jeremy Goldbogen.

17. Per Enge



Professor Per Enge was born in Bergen, Norway and raised outside of Boston, Massachusetts. (He is a Patriot's fan.)

In 1975, he received his Bachelor's Degree from the University of Massachusetts.

After that, he designed the fire suppression system for a MegaWatt Loran transmitter, and he has been working on navigation safety ever since.

In 1979 and 1983, he received his Masters and PhD Degrees from the University of Illinois.

Since 1993, he has been at Stanford University, where he is the Vance and Arlene Coffman Professor in the School of Engineering.

He is also the Director of the Stanford Center for Position Navigation and Time. This laboratory pioneers satellite-based navigation systems for civilian air, rail and maritime use.

One of these systems came on line for aviation in the United States in July of 2003. Today, over 100,000 civilian aircraft carry this Space Based Augmentation System, and similar systems have been deployed in Europe, Japan and India.

For his work, Professor Enge was elected to the National Academy of Engineering; and the U.S. Air Force inducted him into the GPS Hall of Fame.

Please welcome Per Enge.

18. Col. Steven Whitney



Colonel Steve Whitney is the Director of the Global Positioning Systems (GPS) Directorate, Space and Missile Systems Center, Air Force Space Command, Los Angeles Air Force Base, California.

He is responsible for a multiservice, multinational systems directorate, which conducts development, acquisition, fielding and sustainment of all GPS space segment, satellite command and control (ground) and military user equipment.

The \$38 billion GPS program, with an annual budget over \$1 billion, maintains the largest satellite constellation in the Department of Defense.

Colonel Whitney graduated in 1992 from the University of Minnesota with a Bachelor's degree in Electrical Engineering and completed the university's Air Force Reserve Officer Training Corps program as a distinguished graduate.

Through the years, he has served in a wide variety of space system acquisition and operations leadership positions within the Air Force, Joint Staff, and the National Reconnaissance Office.

His assignments include serving as a Crew Commander, Spacecraft Engineer, Program Office Engineer, Senior Flight Commander, Program Element Monitor, Division Chief, Director of Engineering, Squadron Commander, Staff Officer, and Senior Materiel Leader.

Please welcome Col. Seven Whitney.