

IEEE Journal of Microwaves Best Paper Award

*Recognizes, on an annual basis, the most significant contribution
in a paper published in the IEEE Journal of Microwaves.*

The 2023 IEEE Journal of Microwaves Best Paper Award is awarded to C. T. Rodenbeck, P.I. Jaffe, B.H. Strassner II, P.E. Hausgen, J.O. McSpadden, H. Kazemi, N. Shinohara, B.B. Tierney, C.B. DePuma, A.P. Self for their paper entitled "*Microwave and Millimeter Wave Power Beaming*," IEEE Journal of Microwaves, Vol. 1, Issue: 1, pp. 229-259, January 2021.

Christopher T. Rodenbeck, Paul Jaffe, Bernd H. Strassner II, Paul E. Hausgen, James O. McSpadden, Hooman Kazemi, Naoki Shinohara, Brian B. Tierney, Christopher B. DePuma, Amanda Self



Christopher T. Rodenbeck

Christopher T. Rodenbeck (S'97 – M'04 – SM'09 – F'22) received the B.S. (summa cum laude), M.S., and Ph.D. degrees in electrical engineering from Texas A&M University, College Station, TX, USA, in 1999, 2001, and 2004, respectively. His graduate studies were supported by fellowships from NASA, the State of Texas "to advance the state of the art in telecommunications," Texas A&M, and TXTEC in addition to grants from Raytheon, TriQuint Semiconductor, the Office of the Secretary of Defense, NASA Jet Propulsion Lab, NASA Glenn Research Center, and the US Army Space Command.

He is currently an Office Head with U.S. Naval Research Laboratory (NRL) in Washington, DC, where he heads the Advanced Concepts Group in NRL's Radar Division. He leads multiple research programs in microwave power beaming and serves as the principal investigator for the Air Force Research Laboratory's Arachne power beaming spacecraft. His programs at NRL have resulted in the development of multiple first-in-class millimeter-wave airborne radar systems for the US Navy and Department of Defense. From 2004 to 2014, he led a multidisciplinary advanced/exploratory technology development program for radar and sensor applications at Sandia National Laboratories in Albuquerque, NM. The success of this work was twice the subject of Congressional testimony by Sandia's President.

He has authored or coauthored 42 refereed journal papers, 24 patents and patent applications, 31 conference papers, and 29 government reports. He is responsible for numerous radar technology innovations in short- and long-range

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airborne millimeter wave radar systems and antennas, ultrawideband pulsed power amplifiers, CMOS radiation hardening by design, highly sensitive radar digitizers, advanced RF modules, electro-optical inspection of RF circuits, solid-state device modeling, electrically small antennas, and software-defined fusion of radar and telemetry. Dr. Rodenbeck has twice won the NRL E.O. Hulburt Publication Award. He was the recipient of the 2016 Texas A&M University Outstanding Early Career Professional Achievement Award from among more than 100,000 engineering alumni. He received the IEEE MTT-S Outstanding Young Engineer Award in 2015, was the Principal Investigator for an R&D program receiving the prestigious 2012 NNSA Award of Excellence, received a Sandia Innovator Award in 2013, and a Sandia internal citation for “Excellence in Radar Technology Leadership” in 2011. He was an Associate Editor of the Encyclopedia of Electrical and Electronics Engineering (New York, NY, USA: Wiley) from 2011 to 2020, and currently is the Editor-in-Chief of the Encyclopedia of RF & Microwave Engineering, 2nd ed. (New York, NY, USA: Wiley).



Paul I. Jaffe

Dr. Paul Jaffe is an electronics engineer and researcher with nearly 30 years of experience at the U.S. Naval Research Laboratory (NRL). He has led or held major roles on dozens of space missions and on breakthrough technology development projects for civilian, defense, and intelligence community sponsors, including SSULI, STEREO, TacSat-1, TacSat-4, ORS, MIS, PRAM, CARINA, RSGS, PTROL, S2FOBs, and LEctenna. He was responsible for electrical system and spacecraft computer hardware development. He served as coordinator and editor of two seminal solar power satellite study reports and was the principal investigator for a ground-breaking space solar research effort. His current roles include program management and systems engineering of a portfolio of projects. He serves as a lecturer for the Aerospace Engineering Department at the University of Maryland. He has over 60 journal, conference, and patent publications and is the recipient of numerous awards. Dr. Jaffe has made many international speaking and media appearances, including as a TEDx speaker, on MSNBC, CuriosityStream, and the Science Channel's “Through the Wormhole with Morgan Freeman.” He is also active in educational and STEM outreach.

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Bernd H. Strassner II

Bernd H. Strassner II received the B.S. degree in electrical engineering from the Rose-Hulman Institute of Technology, Terre Haute, IN, in 1995, and the M.S. and Ph.D. degrees in electrical engineering from Texas A&M University, College Station, in 1997 and 2002, respectively.

Since July of 2002, he has been with Sandia National Laboratories, Albuquerque, NM, where he designs a variety of wideband antenna arrays for synthetic aperture radar and communication systems. From 1998 to 2002, he was a Research Assistant at Texas A&M University's Electromagnetics Laboratory, where his research focused on passive-backscatter RFID tags for tracking pipe in oil drill strings, rectifying antenna arrays for microwave power reception, and reflecting antenna arrays for space platforms. From 1996 to 1997, he was with

Sandia National Laboratories, Albuquerque, NM, where he was involved with the study on how harmonic load-pull terminations affect power-amplifier performance.



Paul E. Hausgen

Paul E. Hausgen received a B.S. degree in Mechanical Engineering from Louisiana Tech University, Ruston, LA, in 1993, graduating with honors (summa cum laude). In 1993, he was selected for the Air Force Palace Knight graduate intern program, which funded his graduate education and research. In 1994, he received an M.S. degree in Mechanical Engineering from the Georgia Institute of Technology, Atlanta, GA. After conducting research in thermal-to-electric energy conversion technologies for the Air Force Phillips Laboratory, he returned to the Georgia Institute of Technology in 1996 and was awarded a Ph.D. in Mechanical Engineering in 2000.

Dr. Hausgen is currently the Deputy Chief Scientist for Air Force Global Strike Command. He has over 20 years of experience researching and leading teams of researchers in technology development to meet Department of Defense future force needs. Technology development areas have included spacecraft power, thermal, structures, electronics, communication, guidance/navigation/control, decision support systems, and power beaming. He has led multiple spacecraft technology flight experiments that include the Experimental Solar Array on the Air Force

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Research Laboratory's TacSat 2 spacecraft, multiple experiments on the International Space Station, and the Space Solar Power RF Integrated Transmission Experiment (SSPRITE). Prior assignments include Principle Investigator for the Space Solar Power Incremental Demonstrations and Research Program (SSPIDR), Technical Advisor for Spacecraft Component Technology Center of Excellence, and Deputy Branch Chief for the Missile Warning / ISR Branch in the Space Vehicles Directorate of the Air Force Research Laboratory.

Dr. Hausgen holds one U.S. patent in spacecraft power technology, and one pending patent in the area of spacecraft-to-spacecraft power beaming. He has authored or coauthored 34 research publications and one book chapter in spacecraft power related technologies. He has received multiple awards for R&D in spacecraft technology development that include a team RNASA Stellar Award in 2018, an R&D 100 team award in 2016, the Federal Laboratory Consortium Excellence in Tech Transfer in 2016, and the Air Force Civilian Achievement Award in 2013.



James O. McSpadden

James O. McSpadden (Senior Member, IEEE) received his B.S.E.E, M.S.E.E, and Ph.D. diplomas, all from Texas A&M University, in 1989, 1993, and 1998, respectively.

He is an expert in microwave power transmission systems and rectenna design. Working for over 25 years in industry, he has led projects performing system analysis and technology development for various power transmission projects. He has been a Raytheon Technologies consultant on power beaming studies for the DoD, DARPA, NASA, universities, and private companies.

Dr. McSpadden has over 30 presentations and published papers in journals, conferences, and magazines on microwave power transmission.

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Hooman Kazemi

Hooman Kazemi (Senior Member, IEEE) received his B.S, M.S and Ph.D. from the department of electrical and electronic engineering at University of Leeds, U.K. He is an Engineering Fellow at Raytheon Technologies in the Intelligence and Space System business unit. He is part of the advanced concepts and technology systems department and focus on developing advanced microwave and millimeter wave technologies. Key focus areas is high power directed energy portfolio systems including high power transmitters and high sensitivity receivers to provide new capabilities such as non-lethal repel effects, advanced biometrics, see thru clothing imaging. Another area of work has been high data rate communication using millimeter wave frequency range for multi-Gbps links on moving platforms towards ultra-low size weight and power (SWAP) systems. His recent focus is on developing millimeter wave wireless power systems including high power sources and high efficiency receivers delivering power at long range for a variety of applications. He is currently developing high power Rectenna circuits and systems together with a variety of sources to enable stand-off wireless power beaming in various modalities of ground, air and space. He has published numerous times and has received multiple patents in the areas discussed.



Naoki Shinohara

Naoki Shinohara received the Ph.D (Eng.) degrees in electrical engineering from Kyoto University, Japan, in 1996. From 2010, he has been a professor in Kyoto University. He has been engaged in research on Solar Power Station/Satellite and Microwave Power Transmission system. He was IEEE MTT-S Distinguished Microwave Lecturer, and is currently AdCom member, Technical Committee 25 former chair and member, IEEE MTT-S MGA Region 10 regional coordinator, IEEE WPT Initiative Member, and URSI commission D chair. His books are "Wireless Power Transfer via Radiowaves", "Far-Field Wireless Power Transfer and Energy Harvesting (ed)", and some books of WPT.

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Brian B. Tierney

Brian B. Tierney (S'11-M'16) received the B.S. degree in electrical engineering from Kansas State University, Manhattan, KS, USA, in 2011 and the M.S.E and Ph.D. degrees in electrical engineering from the University of Michigan at Ann Arbor, Ann Arbor, MI, USA, in 2014 and 2016, respectively.

Since 2016, he has been with the Radar Division of the U.S. Naval Research Laboratory in Washington, DC, USA. His current research interests include advanced radar concepts, microwave circuits, wireless power transfer, electromagnetic theory, and digital signal processing.



Christopher B. DePuma

Christopher DePuma is an electronics engineer in the Spacecraft Electronics branch of the U.S. Naval Research Laboratory (NRL) where he is the program manager for the Photovoltaic Radiofrequency Antenna Module (PRAM). This experiment, currently flying on the Air Force X-37B, is a prototype of a future Solar Power Satellite that aims to convert solar energy in space to a microwave transmission that can be sent back to earth for terrestrial use. Mr. DePuma has also supported the DARPA-funded, NRL-led Robotic Servicing of Geosynchronous Satellites (RSGS) program on tasks including the environmental test campaign and harness design efforts. In addition to the previously mentioned space efforts, Mr. DePuma leads demonstration activities for the Safe and Continuous Power Beaming – Microwave (SCOPE-M) program.

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Amanda P. Self

Amanda P. Self received B.S. and M.S. degrees in Aerospace Engineering from the Georgia Institute of Technology, Atlanta, GA, USA in 2009 and 2012.

Since 2011, she has been with the Air Force Research Laboratory in the Space Vehicles Directorate. She is currently the Directorate's deputy Chief Engineer, working to ensure systems engineering rigor across all research efforts. From 2019 to 2022, she was the Chief Engineer of the Space Solar Power Incremental Demonstrations and Research (SSPIDR) Project, which is a series of integrated demonstrations and technology maturation efforts to develop space-based solar power collection and transmission capabilities.