

Phil Kaszuba receives the 2026 EDFAS President Award



The **EDFAS President's Award** recognizes those who provided an exceptional amount of effort in their service to the Society. The 2026 awardee **Phil Kaszuba, FASM**, is a retired Senior Member of the Technical Staff for Globalfoundries. He holds a B.S.E.E. from the University of Vermont with concentrations in

semiconductor device physics and optics. He has worked in various roles in the semiconductor industry since 1980; Automated Test Equipment (ATE) engineering, ATE programming, semiconductor base technology research and development, competitive technology analysis, and founder and lead engineer of IBM's first fully integrated scanning probe microscopy (SPM) lab. His career in Scanning Probe Microscopy began in 1993 on an IBM prototype Atomic Force Microscope with Dr. James Slinkman, co-inventor of the Scanning Capacitance Microscope (SCM). A collaborative project was established with Dartmouth College (Dr. Todd Hochwitz) where Phil and the team were instrumental in developing Scanning Kelvin Probe Microscopy (SKPM) as an applied method for profiling dopant distribution on individual semiconductor field effect transistors. As a result of this pioneering work, SKPM became the industry accepted method for high accuracy carrier profiling on semiconductor devices. Shortly thereafter, Phil started the SPM Laboratory in the Analytical Services organization at IBM's Essex Junction, Vermont semiconductor fabrication facility. He led that laboratory since its inception in 1993. This state-of-the-art lab has been in continuous operation for over 30 years, providing support to IBM (now Globalfoundries) semiconductor fabs worldwide. His lab provides critical data in support of semiconductor research, device development, manufacturing operations, and failure analysis. His vision and pioneering work are known throughout the industry by virtue of his publications, presentations, and patents.

For most of his career, Phil's work centered on applied SPM for nanoscale semiconductor technology analysis and nano-instrumentation development. Phil has worked in SPM for over 28 years and his influence has been key in the SPM's acceptance as a mainstream, workhorse analytical instrument throughout the semiconductor industry. After developing the method for routinely using SKPM for carrier profiling, Phil, as a member of a 5-person team (Hochwitz, Kaszuba, Slinkman – IBM, Erickson, Adderton – Digital Instruments) co-developed the first functional, manufacturable, user-friendly Scanning Capacitance Microscope in 1996 (based on the original design of Slinkman, et al.). Digital Instruments used that design and went on to put the system into production as their highly successful flagship SCM. This original system is the basis for most, if not all SCMs in use today. As a result of this work, along with Kaszuba's development of sample preparation and device analysis techniques, SCM became the mainstream method for nanoscale carrier profiling in semiconductors. It still is today; evidenced by Phil's 2019 ISTFA paper "Scanning Capacitance Microscopy and Spectroscopy for Root Cause Analysis on Location Specific Individual FinFET Devices" which won the Best Paper Award in 2019 at the International Symposium for Testing and Failure Analysis.

Phil has been directly involved with the initial development of many of the SPM based analytical techniques and instruments used in the semiconductor industry today (AFM, SKPM, SCM, C-AFM, MFM). Over the course of his career, he has continually developed novel, state of the art SPM based analytical techniques for nanoscale semiconductor applications. For example, in 2004 at ISTFA, he was the first to present results on his novel use for Conductive-AFM (C-AFM); using it to analyze local inhomogeneities in Field Effect Transistor gate dielectrics. To quote an industry expert (at the 2004 event) regarding Kaszuba's method, "You just put Conductive-AFM on the map!" His methods for sample preparation and dielectric analysis using C-AFM are still in use today. In 2010, Phil successfully analyzed the doping profile of doped silicon nanowires in support of research that was being conducted at

Penn State University; this pioneering work was published in Nano Letters. In 2013, under the request and support of the Defense Advanced Research Projects Agency (DARPA), Phil led the team that showed it is possible to detect sub-surface, invisible anomalies in semiconductor device wiring levels using Magnetic Force Microscopy (MFM). This strategic work was presented at ISTFA in 2013.

Kaszuba has authored numerous articles and papers, including the SPM chapter in the Failure Analysis Desk Reference 7th Edition (2019). Phil has had many invited speaking engagements at universities and industry seminars (see CV). He was a special guest invited speaker at the grand opening of the Park Nanoscience Center on the campus of the College of Nanoscale Science and Engineering at SUNY Albany. On the education side, Phil conceived and taught the full-day Scanning Probe Microscopy class for ASM (which was held in conjunction with ISTFA) for a number of years in the mid-2000s.

He holds 9 U.S. patents and a number of international patents in the field of Scanning Probe Microscopy. Of noteworthy significance in his patent portfolio are the following:

- Silicided Silicon Conductive Probes (US 6,198,300 B1): Sharp, durable, conductive probes which are used primarily for SCM and other electrical techniques. These probes are currently manufactured by multiple manufacturers worldwide and are the probe of choice throughout the world for dopant analysis using SCM.
- Critical Dimension Measurement Method (US 7,507,591 B2): A highly accurate method for measuring the critical dimension (CD), of FETs using Atomic Force Microscopy. This simple, accurate, data-rich method for analyzing planar FETs is currently in widespread use throughout the semiconductor industry.
- Scanning Surface Photo Voltage Microscope (US 7,944,550 B2): A novel microscope, based on the SPM platform that enables groundbreaking nanoscale stress analysis on semiconductor devices.

Phil has served as a nanotechnology review panel member for the National Science Foundation (NSF) for 15 years, evaluating research projects for potential Federal Government funding. Additionally, he was a technical advisor to the Defense Advanced Research Projects Agency (DARPA), having served for 13 years.

Phil was elected an ASM Fellow in 2021. In 2023, he was elected to the Electronic Device Failure Analysis Society (EDFAS) Board of Directors and is currently serving. He has also served as an ISTFA session chair for 25 years. He was the first SPM user group moderator for ISTFA in 2004 and is also a regular contributing author to the International Symposium for Testing and Failure Analysis.

In his most recent endeavor, as part of the Student and Young Professionals group in EDFAS, Phil initiated and piloted the EDFAS Mentorship program in 2024 with the goal of connecting individual college students and early career professionals with highly respected industry professionals who would mentor and guide the students and young professionals in their latter college and early professional years. The highly successful program has continued with other ASM groups following Kaszuba's initial model.

Phil is also on the editorial review board for the Nanoscientific journal.

On the commercial side, Phil is a Technical Advisor for Xallent Inc., a nanotechnology company specializing in Nano Electrical-mechanical Systems (NEMS).

Lastly, Phil is a nationally recognized homebrewer, a National Level beer judge, and a Co-founder and Managing Partner of Queen City Brewery LLC, a highly successful craft brewery in Burlington, VT.