

Prof. Bruce W. Smith, Ph.D., 2017 AVS Excellence in Leadership Award

Director of Microsystems Engineering and Professor of Electrical and Microelectronic Engineering

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Scientific/engineering accomplishments in an area relevant to the AVS

With significant accomplishments in both technology innovation and engineering education, Professor Smith has been instrumental in the advancement of semiconductor device and materials technology. Through pioneering accomplishments in nanolithography, patterning materials, thin films, and process innovation, he has played a significant role in the enablement of semiconductor devices at the nanometer scale. His interdisciplinary approach to research and education has led to unique opportunities for students, impacting the semiconductor community for nearly three decades. Professor Smith has made significant contributions in semiconductor nanolithography – the subject of most of his 150+ publications, 30 patents, textbook, and several book chapters. His ground breaking advances include world-record nanolithography resolution using methods he and his students first introduced. Among other things, Professor Smith and his students were the first to experimentally demonstrate water as a lithography immersion fluid at wavelengths below 200nm, leading to the dominant nanolithography approach today. As limitations have been predicted, his group has demonstrated how technology advances and innovation could allow limits to be exceeded.

Description of outstanding mentoring and effective guidance

Professor Smith's research success has been enabled to a large extent by the large number of diverse students he has involved. By devoting efforts to educate the next generation of leaders, Professor Smith has ensured that their impact will extend well into the future. Over the years, Professor Smith has developed first-of-a-kind courses in semiconductor lithography, materials, and processing that have been used as the basis for classes at universities throughout the world. Additionally, he has created unique engineering experiences for high school, graduate and undergraduate students that otherwise would not have had opportunities to explore the field of semiconductor materials and engineering. Through support from industrial partners, he has created research experiences for extended student assignments in the US, Europe, and Asia, providing direct support to students of over \$1M (30% women). Through the US Dept. of Education, he created a program receiving over \$500K to fund targeted students (50% women) for graduate study in micro- and nano-technology. Professor Smith has also created industrial educational programs for professional student involvement. He has received several awards for his student mentoring including an SPIE Student Mentoring Award and an IEEE Technical Excellence Award for Education. Additionally, Prof. Smith has been a long-time teaching and research mentor for junior faculty entering and progressing through their academic careers.

Short biography

Prof. Bruce Smith has been a Professor of Electrical and Microelectronic Engineering at RIT for thirty years. He is currently also the Director of the Microsystems Engineering Ph.D. program and has held other positions, including the Associate Dean of Graduate Programs in the College of Engineering. He received PhD, MS, and BS degrees from RIT and has worked in research groups at AMI Semiconductor, Digital Equipment, SEMATECH, IMEC (Belgium), and Rutherford Appleton Labs (UK). He is a 17 year member of the AVS, a Fellow of the IEEE, a Fellow of SPIE, and a Fellow of OSA. He has published over 150 technical papers, he holds 30 patents, and has authored several textbooks and textbook chapters. He has received numerous awards for his teaching, research, student mentoring, and innovations.