

SUMMARY

Bruce Smith has over 35 years of research, academic, industry, and consulting engineering experience in semiconductor device materials, IC (integrated circuit) processing, microelectronics, microlithography, and LCD-TFT technology. He is a Distinguished Professor of Microelectronic Engineering and the Director of the Ph.D. program in Microsystems Engineering at the Rochester Institute of Technology. His industry experience includes manufacturing and R&D and he has worked with companies in the US, Europe, and Asia. Professor Smith is a Fellow of the IEEE, a Fellow of the OSA, a Fellow of SPIE, and a member of AVS, ASEE, and SID. He is the recipient of the IEEE Technical Excellence Award, the RIT Trustees Scholarship Award, the SPIE Research Mentoring Award, the AVS Excellence in Leadership Award, the Rush Henrietta Outstanding Alumni Award, among others, and has been inducted into RIT's Innovator Hall of Fame. Professor Smith has over 200 publications including technical papers, articles, textbooks, and textbook chapters. He holds 27 patents and has licensed his technology both nationally and internationally. Prof. Smith has expertise and is able to serve as an expert witness in semiconductor device processes and fabrication, thin films and patterning processes, optic/photonic systems technology, and flat panel display technology.

PROFESSIONAL EXPERIENCE

- Rochester Institute of Technology, Professor, Kate Gleason College of Engineering, 1988-present
Distinguished Professor, 2019-present
Director and Professor of Microsystems Engineering Ph.D. Program, 2008-present
Intel Professor of Research and Technology, Microelectronic Engineering, 2000-2007
Associate Dean of Graduate Programs, Kate Gleason College of Engineering, 2001-2004
Director, Center for Nanolithography Research, 2004-present
Professor, Microelectronic Engineering Department, 1988-present
- IMEC Microelectronics Center, Leuven, Belgium, Visiting Researcher, 2008
- Lithographic Technology Corp / Amphibian Systems, President, 1998-2012
- IMEC Microelectronics Center, Leuven, Belgium, Visiting Researcher, 2001
- International SEMATECH, Austin Texas, Visiting Researcher, 1997
- Rutherford Appleton Laboratories, Oxford, U.K., Visiting Scientist, 1995
- Digital Equipment Corp., Hudson, Mass., Advanced Development Center, 1986-1988
- Gould AMI Semiconductor, Santa Clara, Calif., Process Development Group, 1983-1986

EDUCATION

- B.S., M.S. Rochester Institute of Technology, College of Science, Imaging Science, Thesis: "Optically Transparent Heat Mirror Thin-Films of ZnS-Ag-ZnS," 1988.
- Ph.D., Rochester Institute of Technology, Center for Imaging Science, Thesis: "Excimer Laser Semiconductor Microlithography at 193nm," 1994.

LITIGATION SUPPORT EXPERIENCE

Date:	2020-	Bartlit Beck LLP, Paul Hastings LLP
Case:		3Shape vs. <u>Align Technologies Inc.</u>
Project:		Patent infringement, USDC District of Delaware – Testifying Expert
Field:		Intraoral optical scanner technology
Date:	2020-	Sidley Austin LLP
Case:		Solaria Corp. vs. <u>Canadian Solar Inc.</u>
Project:		ITC patent infringement case – Testifying Expert
Field:		Solar cell substrate laser processing

Date: 2019- Case: Fish & Richardson, P.C. Samsung Electronics v. Greenthread, LLC
Project: Inter Partes Review (IPR)
Field: Semiconductor devices with graded dopant

Date: 2019 Case: Fish & Richardson, P.C. Hanwha Q CELLS. v. Jinko Solar
Project: ITC patent infringement case – Testifying Expert
Field: Photovoltaic solar cell passivation layers

Date: 2019- Case: Covington & Burling LLP Solas OLED Ltd. v. Samsung Display Co. Ltd. et al
Project: Patent Infringement (USDC, E. Texas)
Field: Flat panel display technology

Date: 2018-2019 Case: Hoyng ROKH Monegier (and Wilmer Cutler Pickering Hale and Dorr LLP, see below) Nikon v. ASML
Project: Patent dispute (Netherlands, District Court of The Hague)
Field: Optical-exposure machines for computer chips

Date: 2017-2018 Case: O’Melveny & Meyers LLP Tessera Entities v. Samsung Electronics Co., Ltd. et al
Project: ITC patent infringement case – Testifying Expert
Field: Wafer-level packaging of semiconductor devices

Date: 2017- Case: O’Melveny & Meyers LLP Elm 3DS Innovations, LLC v. Micron Technologies Inc., et al
Project: Patent infringement (USDC Delaware) – Testifying Expert
Field: Three dimensional semiconductor memory structures

Date: 2016-2017 Case: Covington & Burling LLP and Kellog, Huber, Hansen, Todd, Evans & Figel, PLLC MIICS & Partners, America and Goldcharm v. Funai Electric Co. Ltd. and Samsung Display Co. Ltd.
Project: Patent infringement, (USDC Delaware) – Testifying Expert
Field: TFT/LCD flat panel display technology

Date: 2016-2018 Case: Finnegan, Henderson, Farabow, Garrett & Dunner LLP Taiwan Semiconductor Manufacturing Ltd. v. Godo Kaisha IP Bridge
Project: Inter Partes Review (IPR) – Testifying Expert
Field: Semiconductor processing and metal interconnect structures

Date: 2013-2019 Case: Wilmer Cutler Pickering Hale and Dorr LLP ASML Holding NV and Carl Zeiss SMT v. Nikon Corp.
Project: Various including International Centre for Dispute Resolution – Testifying Expert
Field: Semiconductor lithography equipment and processing

Date: 2013-2017 Case: Dentons US LLP (McKenna Long & Aldridge LLP) Eidos Display, LLC v. AU Optronics Corp. et al (AU, Chi Mei Innolux, Chunghwa, Hannstar, and Hannspree)
Project: Patent Infringement (USDC, E. Texas) – Testifying Expert
Field: Thin film transistor (TFT) processing for LCD flat panel devices

Date: 2014-2015 Case: Weil, Gotshal & Manges LLP DSS Technology Management, Inc. vs. Samsung Electronics Co. Ltd.
Project: Inter Partes Review (IPR) petition
Field: Multiple patterning for integrated circuit processing

Date: 2013-2015 Ropes and Gray LLP
Case: Spansion LLC v. Macronix America Co., Ltd. et al
Project: ITC patent infringement case – Testifying Expert
Field: Flash memory chip method and processes

Date: 2013-2014 Mintz, Levin, Cohn, Ferris, Glovsky, and Pepeo PC
Case: Graphics Properties Holdings, Inc. v. Panasonic Corp. of North America et al (Toshiba, Barnes and Noble, Google, Hewlett-Packard, Lenova, and ZTE) – Testifying Expert
Project: Patent infringement (Delaware Federal District)
Field: Wide angle LCD display devices and backlighting

Date: 2012–2015 Bunsow, DeMory, Smith, & Allison LLP
Case: NXP B.V. v. Research in Motion Ltd. et. al. (TriQuint, SanDisk, Hynix, and Qualcomm)
Project: Patent Infringement (USDC, FLA Middle District), IPR (USPTO) – Testifying Expert
Field: Dummy pattern fill for integrated circuit fabrication

Date: 2011 –2012 Mintz, Levin, Cohn, Ferris, Glovsky, and Pepeo PC
Case: Graphics Properties Holdings v. Respondents (RIM, HTC, LG, Apple, Samsung, and Sony)
Project: ITC Patent Infringement – Testifying Expert
Field: LCD stack configuration for display devices

Date: 2011 O’Melveny and Meyers
Case: Samsung Electronics Co. Ltd. v. AU Optronics Corp. et al (Acer, BenQ, and SANYO)
Project: ITC Patent infringement
Field: Flat panel (LCD) display device manufacturing processes

Date: 2010-2011 McDermott Will & Emery
Case: Spansion Inc. v. Samsung Electronics Co
Project: ITC patent infringement case – Testifying Expert
Field: Contact hole processes for flash memory chips

Date: 2011-2014 Keker and Van Nest LLP
Case: STC UNM v. Intel Corp.
Project: Patent infringement (USDC, New Mexico) – Testifying Expert
Field: Lithography techniques and integrated circuit products

Date: 2010-2011 Irell & Manella LLP
Case: Patent re-examination
Project: USPTO re-examination and hearing – Testifying Expert
Field: Flat panel LCD illumination devices

Date: 2010 Keker and Van Nest LLP
Case: STC UNM v. Taiwan Semiconductor Manufacturing Co.
Project: ITC patent infringement
Field: Lithography techniques and integrated circuit products

Date: 2010-2011 McDermott Will & Emery
Case: Spansion LLC v. Samsung Electronics Co. (and counter-claim)
Project: Patent infringement case (USDC, E.D. Va. District) – Testifying Expert
Field: Flash memory device processes

Date: 2010-2011 Irell & Manella LLP
Case: Chi Mei Innolux v. Sony Corporation
Project: ITC patent infringement case
Field: LCD flat panel patterned electrodes

Date: 2010-2011 Ropes and Gray LLP
Case: Samsung Electronics Co. v. Spansion Japan Ltd.
Project: ITC patent infringement case
Field: Lithography and etch processing for flash memory products

Date: 2010 Sidley Austin LLP
Case: Agere Systems Inc. and LSI Corp. v. Xilinx, Inc.
Project: Patent infringement (USDC, S.D. NY)
Field: Metallization of integrated circuits

Date: 2010 McDermott Will & Emery
Case: Samsung Electronics Co. v. Spansion LLC and Spansion Inc.
Project: ITC patent infringement case
Field: Lithography and etch processing for flash memory products

Date: 2010 Standley Law Group LLP
Case: American Panel v. Vertex
Project: Patent infringement arbitration
Field: Flat panel display technology

Date: 2009-2011 Irell & Manella LLP
Case: Apeldyn Corp. v. Chi Mei Optoelectronics Corp. et al (AU, Samsung, Sharp, and Sony)
Project: Patent infringement (USDC, Delaware) – Testifying Expert
Field: LCD flat panel response time

Date: 2009-10 Fish and Richardson P.C.
Case: Semiconductor Energy Laboratory Co. Ltd. v. Eastman Kodak
Project: Patent interference case (USPTO)
Field: Organic light emitting diode (OLED) display devices

Date: 2009 Steptoe and Johnson, LLP
Case: Qimonda AG v. Seagate Technology
Project: ITC patent infringement case - Testifying Expert
Field: Polysilicon and amorphous silicon technology; silicon-oxi-nitride anti-reflection coating deposition technology

Date: 2009 Fish and Richardson P.C.
Case: Sharp Corp. v. Samsung Electronics Co. Ltd.
Project: Patent infringement, (USDC, E.D. TX)
Field: Liquid crystal display polarizers and electro static discharge (ESD) technology

Date: 2008 Steptoe and Johnson, LLP
Case: Neumark-Rothschild v. Toshiba Corp.
Project: ITC patent infringement case
Field: Wide bandgap (II-VI and III-V) semiconductor materials processing for short-wavelength LEDs and laser diodes

Date: 2006 –2012 Wolf Block Schorr and Solis-Cohen, LLP
Bernstein Litowitz Berger & Grossmann LLP
Case: Anvik Corp. v. Nikon Corp., et al (Toshiba, Samsung, LG Electronics, Sharp, LG, Chi Mei, AU, AFPD, Panasonic, IPS, and Hitachi,)
Project: Patent infringement (USDC, S.D. NY District) – Testifying Expert
Field: Lithography method for LCD flat panel manufacturing

Date: 2007-08 Ropes & Gray, LLP
Case: Akrion Inc., v. Solid State Equipment Corp.
Project: Patent infringement
Field: Silicon wafer cleaning and preparation

Date: 2007-08 Fish and Richardson P.C.
Case: Renesas Technology v. Samsung Electronics
Project: ITC patent infringement case – Testifying Expert
Field: Thin film and diffractive elements for photomask mask light blocking

Date: 2005-06 Vinson & Elkins, LLP
Case: Advanced Micro Devices v. Oki Electronics
Project: Patent infringement (USDC, N. CA District) – Testifying Expert
Field: Silicon wafer preparation and coating

Date: 2004-05 Irell & Manella, LLP
Case: Ultratech Stepper, Inc. v. ASM Lithography, Inc.
Project: Patent infringement (USDC, N. CA District) – Testifying Expert
Field: Optical microlithography scanning

Date: 1997-03 Ward Norris Heller & Reidy, LLP – Testifying Expert
Case: IBM Fishkill, NY and Essex, VT, including Union Carbide Corp., Eastman Kodak, J. T. Baker Chemical, KTI, Shipley, Ashland Oil, E. I. DuPont de Nemours and Industri-Chem, suppliers of solvents for the IBM cleanroom operations
Field: Multi-state litigation, allegations regarding various chemicals used in the manufacturing of semiconductor devices

Date: 1997-03 Ward Norris Heller & Reidy, LLP – Testifying Expert
Kasowitz Benson Torres & Friedman, LLP
Steptoe & Johnson, LLP
Cases: San Jose IBM Workers Litigation v. Shipley Company, American Hoechst Corporation, Ashland Chemical Company, Union Carbide Corporation, Fischer Scientific Company, and Eastman Kodak Company; Rubio v. IBM et al.
Field: Allegations regarding various chemicals used in an manufacturing of semiconductor devices

SERVICE

Professional Associations

Fellow, IEEE – the Institute of Electrical and Electronics Engineers, for outstanding technical and educational contributions in the field of semiconductor microelectronics
Fellow, OSA – the Optical Society of America, for the advancement of optics and photonics through distinguished contributions to education, research, and engineering
Fellow, SPIE – the Society for Photo-optical Instrumentation Engineering, for distinguished and valuable technical achievements in the multidisciplinary fields of optics and photonics
Senior Member, National Academy of Inventors
Member, American Vacuum Society (AVS)
Member, American Society for Engineering Education (ASEE)

External Service

2014-2018 SPIE Microlithography Symposium Co-Chairman
2012-2014 OSA Awards Committee
1997-2014 SPIE Optical Microlithography, Program Committee
2010-2014 EIPBN Program Committee
2003-2014 SPIE Zernike Award Committee
2009-2010 Councilor, Optical Society of America (OSA), Rochester Section
2008-2009 Program Chairman, International Symposium on Immersion Lithography Extensions
2004-2005 Conference Chairman, SPIE Optical Microlithography Conference
1997-2002 EIPBN Program Committee
1997-1998 SPIE/ISMA Singapore Program Committee
1995-1997 Chairman, OSA Lithography / Patterning Technical Working Group
1990-1996 Faculty Advisor, SPIE Student Chapter

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