

B. JAYANT BALIGA, Ph.D., FIEEE, NAE Member

Distinguished University Professor of Electrical Engineering
Founder & Director, Power Semiconductor Research Center
North Carolina State University, Raleigh, NC 27695-7924
Tel: 919-515-6169; Email: bjbaliga@ncsu.edu

Education:

Ph. D. Rensselaer Polytechnic Institute, Troy, NY, 1974 (4.0 GPA, Dumont Prize)
M. S. Rensselaer Polytechnic Institute, Troy, NY, 1971 (4.0 GPA)
B. Tech Indian Institute of Technology, Madras, India, 1969 (Valedictorian, Philips India Prize)

Experience:

2003-2010 Founder and CTO, Silicon Semiconductor Corporation, RTP, NC.
2000-2003 Founder and CTO, Silicon Wireless Corporation, Raleigh, NC.
1998-2010 Founder and CTO, MicroOhm & Giant Semiconductor Corporation, Raleigh, NC.
1997-Now Distinguished University Professor, NCSU
1991-2001 Founder & Director, Power Semiconductor Research Center, NCSU
1988-1997 Full Professor, NCSU
1974-1988 Coolidge Fellow and Manager, Power Device Group, GE Research Laboratory, NY

Selected Awards and Honors:

2016 *National Inventors Hall of Fame*, (Highest recognition for an Inventor)
2015 IEEE EDS Celebrated Member (1 of only 6 Legendary Individuals)
2015 *Global Energy Prize* (President of Russian Federation)
2014 *IEEE Medal of Honor* (Highest recognition by IEEE)
2012 *North Carolina Award for Science* (Governor of North Carolina)
2011 *National Medal of Technology and Innovation* (President of the United States)
2011 *Alexander Quarles Holladay Medal of Excellence* (Highest recognition by NCSU)
2010 Inducted into *Engineering Hall of Fame* (Electronic Design Magazine)
2004 *IEEE-ISPSPD Contributory Award* for Establishing and Chairing New Int. Conference
1999 *IEEE Lamme Medal* for Invention and Development of the IGBT (IEEE BoG)
1998 *IEEE Ebers Award* for technical contributions to Electron Devices (ED Society)
1998 *O. Max Gardner Award* by UNC Board of Governors for 'greatest contribution to human race'
1997 Scientific American Magazine 'One of the Eight Heroes of the Semiconductor Revolution'
1993 Elected into U. S. *National Academy of Engineering*
1993 *IEEE Liebmann Award* for contributions to 'Smart Power Technology' (IEEE BoG)
1991 *IEEE Newell Award* for technical contributions to power electronics (PE Society)
1984 Science Digest Magazine's '100 Brightest Young Scientists in America'
1983 *IEEE Fellow* for contributions to Power Semiconductor Devices
1983 *GE Dushman Award* for 'The Insulated Gate Bipolar Transistor'
1983 *GE Coolidge Award* (Highest Scientist Designation)

Contracts and Grants received at NCSU:

2015-Now *PowerAmerica*, U.S. DoE & Industry: **Sponsorship of \$ 140 Million over 5 years.**
2008-Now *Future Renewable Electric Energy Delivery and Management Systems*, NSF-ERC:
Sponsorship of **\$ 35 Million** plus Industry Support of **\$ 15 Million** over 11 years.
1991-2001 *Power Semiconductor Research Center Sponsorship of \$ 6 Million:*
Corporate Membership: ABB, CP Clare Corp., Daimler-Benz Corp., Digital Equipment Corp.,
Fairchild Semiconductor Corp., Ford Motor Co., Fuji Electric Co., General Semiconductor
Co., Hitachi Ltd., IBM Corp., Mitsubishi Electric Corp., Motorola Corp., Philips Laboratories,
Rockwell International Corp., Sanken Electric Comp., Shindengen Electric Manufacturing
Co., Sundstrand Aerospace Corp., Toshiba Corp., Toyoda Automatic Loom Works
1988-2001 *Contract Sponsorship of \$ 4 Million:*
Sponsoring Agencies: Office of Naval Research, Electric Power Research Institute, Army
Research Office, Semiconductor Research Corporation, DARPA, National Science
Foundation, Corporations (GE, TI, Allied Signal, etc).

Teaching and Research at NCSU:

1988-2015 Undergraduate Course on EE (Average Class Size = 100 students)
1988-2015 Graduate Courses on Power Devices (Average Class Size = 15 students)
1988-2015 Supervised and Sponsored to completion 25 M.S. Theses and 27 Ph.D. Theses

Books:

2015 Author: "The IGBT Device: Device Physics, Design, and Applications", Elsevier Press.
2011 Author: "Advanced High Voltage Power Device Concepts", Springer-Science.
2010 Author: "Advanced Power Transistor Concepts", Springer-Science.
2009 Author: "Advanced Power Rectifier Concepts", Springer-Science.
2008 Author: "Fundamentals of Power Semiconductor Devices", Springer-Science.
2006 Author: "Silicon Carbide Power Devices", World Scientific Publishing Company
2005 Author: "Silicon RF Power MOSFETs", World Scientific Publishing Company
1998 Co-Author: "Cryogenic Operation of Silicon Power Devices", Kluwer Press
1998 Co-Editor: "Power Electronics Technology and Applications", IEEE Press
1996 Author: "Power Semiconductor Devices", PWS Publishing Company
1993 Co-Editor: "Power Electronics Technology and Applications", IEEE Press
1988 Editor: "High Voltage Integrated Circuits", IEEE Press
1987 Author: "Modern Power Devices", John Wiley and Sons
1986 Editor: "Epitaxial Silicon Technology", Academic Press
1984 Co-Editor: "Power Transistors", IEEE Press

Selected Book Chapters (out of 20):

1999 "Electric Refractory Materials", Editor: Y. Kumashiro, Marcel Dekker Inc.
1998 "Modern Semiconductor Device Physics", Editor: S. M. Sze, John Wiley and Sons
1997 "Encyclopedia of Applied Physics", American Institute of Physics
1996 "Power Electronics Technology and Applications", Editor: B. Bose, IEEE Press
1992 "Encyclopedia of Science and Technology", McGraw Hill Company
1990 "Encyclopedia of Physical Sciences and Technology", Academic Press

Selected Refereed Journal and Conference Digest Publications (out of 550+):

- (1) "Power Devices for reducing Energy Usage and Carbon Dioxide Emissions", GaN Consortium Conference, **Invited Keynote Address**, October 14, 2015, Nagoya, Japan.
- (2) "Social Impact of Power Semiconductor Devices", IEEE International Electron Devices Meeting (IEDM), **Invited Focus Session Paper**, Abstract 2.1.1, pp. 20-23, December 15, 2014, San Francisco, California.
- (3) "Enabling an Industrialized Society with Power Semiconductor Devices", IEEE Industrial Electronics Society Annual Conference (IECON), **Invited Plenary Paper**, October 30, 2014 – attendance of 1500
- (4) "Role of Power Semiconductor Devices in Creating a Sustainable Society", **Invited Plenary Paper**, IEEE Applied Power Electronics Conference (APEC), Long Beach, CA, March 18, 2013 – attendance of 3800
- (5) "Analytical Modeling of IGBTs: Challenges and Solutions", **Invited Paper**, IEEE-TED, pp. 535-543, 2013.
- (6) "GaN Devices for Power Electronic Applications", **Invited Paper**, Semicond. Sci. Technol. 28 (2013).
- (7) "FREEDM System: Role of Power Electronics and Power Semiconductors in Developing an Energy Internet", **Invited Plenary Paper**. IEEE ISPSD, Barcelona, Spain, pp. 9-12, June 2009.
- (8) "Future of Power Semiconductor Technology", **Invited Paper**, Proc. IEEE, pp. 822-832, 2001.
- (9) "Trends in Power Discrete Devices", **Invited Plenary Paper**, IEEE ISPSD, pp. 5-10, 1998.
- (10) "Trends in Power Semiconductor Devices", **Invited Paper**, IEEE T-ED, pp. 1717-1731, 1996.
- (11) "Power ICs in the Saddle", IEEE Spectrum, **Invited Paper**, pp. 34-39, July 1995.
- (12) "Power Devices for Variable Frequency Drives", **Invited Paper**, Proc. IEEE, pp. 1112-1122, 1994.
- (13) "Smart Power Technology", IEEE IEDM, **Plenary Invited Paper**, pp. 3-6, 1990.
- (14) "Power Devices for the 1990s", IEEE APEC, **Invited Paper**, 1989.
- (15) "Evolution of MOS-Bipolar Power Technology", Proc. IEEE, **Invited Paper**, pp. 408-418, 1988.
- (16) "Innovations in Power Discrete Devices", IEEE IEDM, **Invited Paper**, pp. 102-105, 1986.
- (17) "Temperature Behavior of IGBTs", Solid State Electronics, pp. 289-297, 1985.
- (18) "Fast Switching Insulated Gate Transistors", IEEE EDL, pp. 452-454, 1983.
- (19) "The Insulated Gate Rectifier", IEEE-IEDM, pp. 264-267, 1982.

Issued U. S. Patents: 120 Total