



## **Dr. Krishna Shenai**

*USTAR Professor*

*Department of Electrical and Computer Engineering*

*Utah State University*

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### ***EDUCATION***

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- 1986 Ph.D. Electrical Engineering, Stanford University.  
1981 MS Electrical Engineering, University of Maryland.  
1979 B.Tech. (Electronics) - Indian Institute of Technology, Madras, India.

### ***PRINCIPAL POSITIONS HELD - ACADEMIC***

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- May '06 - Utah Science, Technology, and Research (USTAR) Professor  
Department of Electrical and Computer Engineering,  
Utah State University, Logan, UT.
- Aug '95 - May '04 Associate Professor,  
Founding Director of Microsystems Research Center,  
Founding Director of Power Electronics Research Center,  
Department of Electrical and Computer Engineering,  
University of Illinois, Chicago, IL.
- Aug '93 - Aug '95 Assistant Professor,  
Founding Director of VLSI Research Center,  
Department of Electrical and Computer Engineering,  
University of Wisconsin, Madison, WI.

### ***PRINCIPAL POSITIONS HELD - INDUSTRIAL***

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- Jun '96 - Co-Founder and Vice President,  
LoPel Corporation, Naperville, IL.
- Oct '03 - Jun'04 Co-Founder, Director and Chief Technology Officer,  
Zeus Semiconductor, Inc., Vancouver, WA.
- Jul '02 - Mar '03 Founder, Chairman and Chief Executive Officer,  
Shakti Systems Inc., Lisle, IL.
- Jan '91 - May '93 Senior Staff Engineer,  
Intel Corporation, Beaverton, OR.
- Jun '86 - Dec '90 Device Physicist,  
General Electric Corporate R&D Center, Schenectady, NY.



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### EDITORIAL ACTIVITIES

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### JOURNALS

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- Editor, *IEEE Trans. Electron Devices* (1990-2002).
- Editor-in-Chief, *IEEE Electron Devices Society Newsletter* (1995-2002).
- Associate Editor, *J. Circuits, Systems and Computers* (1996-2000).
- Guest Editor, Special Issue of *J. IETE, India* (invited) on "Submicron Metallization Technologies," March 1991.
- Guest Editor, Special Issue of *IEEE J. Solid-State Circuits* (invited) on "High-Speed IC Design," October 1994.
- Guest Editor, Special Issue of *IEEE Trans. Electron Devices* (invited) on "Submicron Bipolar/BiCMOS Devices and Technologies," March 1995.
- Guest Editor, Special Issue of *IEEE J. Solid-State Circuits* (invited) on "High-Speed IC Design," January 1996.

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### CONFERENCE DIGESTS

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- Co-Editor, *High-Frequency Power Conversion Conference*, Intertec Communications, Ventura, CA, 1989.
- C. McConica, R. Blewer and K. Shenai, *MRS Proc. Tungsten and Other Refractory Metals for ULSI V*, Materials Research Society, Pittsburgh, PA, 1989.
- Selvarajan, B. S. Sonde, K. Shenai, and V. K. Tripathi, Eds., *Proc. Conf. Emerging Optoelectronic Technologies (CEOT)*, Tata-McGraw Hill, ISBN 0-07-462397-4, New Delhi, India, 1992.
- T. Kwok, T. Kikkawa and K. Shenai, Eds., *SPIE Proc. Submicron Metallization*, SPIE, Bellingham, WA, 1993.
- Selvarajan, B. S. Sonde, K. Shenai, and V. K. Tripathi, Eds., *Proc. Conf. Emerging Optoelectronic Technologies (CEOT)*, Tata-McGraw Hill, ISBN 0-07-462397-4, New Delhi, India, 1994.

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### BOOKS

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- K. Shenai, Editor, *VLSI Metallization Technologies*, Artech House, Norwood, MA, 1990.
- Selvarajan, K. Shenai, and V. K. Tripathi, Eds., *Optoelectronics: Technologies and Applications*, SPIE Press, Bellingham, WA, 1993.
- Selvarajan and K. Shenai, Eds., *Optoelectronics: Current Trends*, Tata McGraw Hill, 1996.



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### CONFERENCE ACTIVITIES

### CONFERENCE ORGANIZATION

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- Founder and Organizer, *First IEEE Int. Conf. Emerging Optoelectronic Technologies (CEOT)*, Bangalore, India, December 1991.
- Organizer, *SPIE Symp. Submicron Metallization*, San Jose, CA, 1992.
- Organizer, *First Workshop on Custom Design of Application-Specific Power Semiconductor Devices and Circuits*, Madison, WI, April 13-14, 1994.
- Organizer, *Second Int. IEEE/SPIE Conf. Emerging Optoelectronics Technologies (CEOT)*, Bangalore, India, July 18-21, 1994.
- Founder and Organizer, *IEEE Int. Workshop on Integrated Power Packaging (IWIPP)*, Chicago, IL, April 1998.

### CONFERENCE MANAGEMENT

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- Chairman, *First IEEE Int. Conf. Emerging Optoelectronic Technologies (CEOT)*, Bangalore, India, December 1991.
- Chairman, *SPIE Symp. Submicron Metallization*, San Jose, CA, 1992.
- Chairman, Process Technology Subcommittee, *IEEE Bipolar/BiCMOS Circuits and Technologies (BCTM)*, Minneapolis, MN, October 1993.
- Co-Chairman, *First Workshop on Custom Design of Application-Specific Power Semiconductor Devices and Circuits*, Madison, WI, April 13-14, 1994.
- Co-Chairman, *Second Int. IEEE/SPIE Conf. Emerging Optoelectronic Technologies (CEOT)*, Bangalore, India, July 18-21, 1994.
- Vice Chairman, Technical Program Committee, *IEEE Bipolar/BiCMOS Circuits and Technologies (BCTM)*, Minneapolis, MN, October, 1994.
- Chairman, Poster Sessions, *1994 IEEE Int. Integrated Reliability Workshop (IRW)*, Lake Tahoe, CA, October 16-19, 1994.
- Vice Chairman, Process/Device Subcommittee, *1995 IEEE Int. Reliability Physics Symposium (IRPS)*, Las Vegas, NV, April 3-6, 1995.
- Chairman, Technical Program Committee, *IEEE Bipolar/BiCMOS Circuits and Technologies (BCTM)*, Minneapolis, MN, October 1995.
- Chairman, Finance Committee, *International IEEE Conference on Power Electronics, Drives and Electrical Systems*, New Delhi, India, January 1996.
- General Chairman, *IEEE Bipolar/BiCMOS Circuits and Technologies (BCTM)*, Minneapolis, MN, October 1996.
- Chairman, Exhibitions and Vendor Show, *IEEE Bipolar/BiCMOS Circuits and Technologies (BCTM)*, Minneapolis, MN, October 1997.
- Vice Chairman, *Int. Conf. Microelectronics (MIEL)*, Nis, Yugoslavia, September 15-17, 1997.



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- General Chairman, *IEEE Int. Workshop on Integrated Power Packaging (IWIPP)*, Chicago, IL, April 1998.
- Vice Chairman, *Int. Conf. Microelectronics (MIEL)*, Nis, Yugoslavia, 1999.
- General Chairman, *IEEE Int. Workshop on Integrated Power Packaging (IWIPP)*, 2000.
- Organizer and Chairman, Special Session on Recent Advances in Power Electronics, *IEEE Antennas and Propagation Society, URSI B and D Int. Symp.*, Boulder, CO, 2001.
- Vice Chairman, *Int. Conf. Microelectronics (MIEL)*, Nis, Yugoslavia, 2002.
- Vice Chairman, *Int. Conf. Microelectronics (MIEL)*, Nis, Yugoslavia, 2004.
- Vice Chairman, *Int. Conf. Microelectronics (MIEL)*, Nis, Yugoslavia, 2006.

### CONFERENCE COMMITTEE MEMBERSHIP

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- *High-Frequency Power Conversion Conference*, Intertec Communications, Ventura, CA, 1989.
- *Workshop on Tungsten and Other Advanced Metals for ULSI*, Materials Research Society (MRS) and the University of California, Berkeley, CA (1989-1991).
- *IEEE/SPIE Conference on Advances in Packaging*, Boston, MA, 1990.
- Solid State Devices Subcommittee, *IEEE International Electron Devices Meeting (IEDM)* (1990-1991).
- *IEEE Device Research Conference (DRC)*, Boulder, CO, June 1991.
- *Third IEEE Int. Symp. Power Semiconductor Devices and IC's (ISPSD)*, Baltimore, MD, 1991.
- International Advisory Committee, *Int. Symp. Semiconductor Modeling & Simulation*, March 1993.
- Process/Device Subcommittee, *IEEE Int. Reliability Physics Symposium (IRPS)*, San Jose, CA, April 11-14, 1994.
- International Steering Committee, *1995 International Power Electronic Conference (IPEC)*, Yokohama, Japan, April 3-7, 1995.
- International Steering Committee, *International IEEE Conference on Power Electronics and Drive Systems (PEDS'95)*, Singapore, February 21-24, 1995.
- Power Device Sub Committee, *IEEE Applied Power Electronics Conf. and Exposition (APEC)*, February 23-27, 1997, Atlanta, GA.
- *Int. Conf. Power Semiconductor Devices*, Prague, Czech Republic, 1999.
- *Int. Conf. Power Semiconductor Devices*, Prague, Czech Republic, 2001.
- *Int. Conf. Power Semiconductor Devices*, Prague, Czech Republic, 2003.
- *Int. Conf. Power Semiconductor Devices*, Prague, Czech Republic, 2005.
- *Int. Conf. Power Semiconductor Devices*, Prague, Czech Republic, 2006.
- *NanoUtah'06*, Salt Lake City, Utah, 2006.



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### **HONORS AND AWARDS**

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- Fellow of Institute of Electrical and Electronics Engineers (IEEE)
- Fellow of American Association for the Advancement of Science (AAAS)
- Fellow of Institute of Electrical and Telecommunication Engineers (IETE-India)
- Member, Yugoslavian Academy of Engineering, (2003- ).
- William Brown Award, Space Studies Institute, Princeton University, NJ, 1999.
- FINDS Award, Space Studies Institute, Princeton University, NJ, 1999.
- University Scholar, University of Illinois, 1998.
- Dean's Engineering Faculty Research Excellence Award, University of Illinois at Chicago, 2002.
- Best Paper Award, IEEE BCTM Conference, 1998.
- Distinguished Lecturer, IEEE Electron Devices Society, (1998).
- National Merit Scholarship, Government of India (1972-1979).

### **AFFILIATIONS - PROFESSIONAL SERVICES**

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- Elected Member, *IEEE Electron Devices Society AdCom*, (1998-2000).
- Elected Member, *IEEE Electron Devices Society AdCom*, (2001-2003).
- Vice Chairman, *IEEE MTT Chapter*, Schenectady, NY, (1989-1990).
- Founding Chairman, *IEEE EDS/MTT/LEOS Chapter*, Oregon Section, Portland, OR, (1991-1994).
- Member, Chapter Committee, *IEEE Electron Device Society (EDS)*, (1998-2002).
- Member, Standards Committee, *IEEE Power Electronics Society*, (1997-2002).
- Member, Packaging Committee, *IEEE Power Electronics Society (PELS) - IEEE Industry Applications Society (IAS) -- Power Sources Manufacturers Association (PSMA)*, (1997 - 2002).
- Member, Model Validation Committee, *IEEE Power Electronics Society (PELS) - IEEE Industry Applications Society (IAS)*, (1996-2002).
- Member, Power Semiconductor Devices, *IEEE Electron Devices Society (EDS)*, (1998-2002).
- Member, Modeling Committee, *IEEE Electron Devices Society (EDS)*, (2000-2002).
- Member, US NSF SBIR Panel on Solid-State and Microstructure Sciences, 1990.
- Organizer, "Power Semiconductors: A User's Perspective," *Third IEEE Int. Symp. Power Semiconductor Devices and IC's (ISPSD)*, Baltimore, MD, 1991.
- Organizer, "Frontiers in Silicon Devices for the 1990's," *IEEE Device Research Conference (DRC)*, Boulder, CO, June 1991.
- Organizer, "Frontiers for Indo-US Collaboration in Optoelectronics," *First IEEE Int. Conf. Emerging Optoelectronic Technologies (CEOT)*, Bangalore, India, December 1991.
- Member, US NSF SBIR Panel on Solid-State and Microstructure Sciences, 1994.



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### ***AFFILIATIONS - ACADEMIC SERVICES***

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#### ***University of Wisconsin at Madison, Madison, WI.***

- Undergraduate Scholarship Committee, ECE Department (1993-1994).
- Fab Advisory Committee, College of Engineering (1993-1994).
- Fab Advisory Committee, College of Engineering (1994-1995).
- Salary Committee, ECE Department (1994-1995).

#### ***University of Illinois at Chicago, Chicago, IL.***

- Member, Graduate Committee, EECS Department (1995-1996).
- Member, Electronics Instruction Lab Committee, EECS Department (1995-1996).
- Member, Graduate Faculty, UIC Graduate School (1995-Present).
- Chairman, Electronics Instructions Lab Committee, EECS Department (1996-1997).
- Member, Colloquium & Research Committee, EECS Department (1996-1997).
- Member, EE Curriculum Sub-Committee, EECS Department (1996-1997).
- Member, College of Engineering Shop Committee (1997-2002).
- Member, College of Engineering Environmental Sciences Program (1997-2002).
- Member, TA Subcommittee, EECS Department (1997-1998).
- Chairman, Electronics Instructions Lab Committee, EECS Department (1997-1998).
- Member, Colloquium & Research Committee, EECS Department (1997-1998).
- Member, Faculty Search Committee, EECS Department (1998-1999).
- Member, ECE Faculty Search Committee (1999-2002).
- Member, ECE Head Search Committee (2000-2001).
- Member, College of Engineering Research Committee (1998-2002).



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### PUBLICATIONS

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Author or co-author of over 300 peer-reviewed papers and 10 book chapters (see detailed publications list).

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### PATENTS

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Principal inventor of twelve issued US patents.

- "Method of forming a semiconductor device with a junction termination layer," US 6,844,251, January 18, 2005.
- "DC-DC converter with resonant gate drive," US 6,819,088, November 16, 2004.
- "Current derivative sensor," US 6,791,341, September 14, 2004.
- "Monolithic battery charging device," US 6,791,298, September 14, 2004.
- "Logic state transition sensor circuit," US 6,714,049, March 30, 2004.
- "Hybrid comparator and method," US 6,608,503, August 19, 2003.
- "Monolithic DC to DC converter," US 5,959,439, September 28, 1999.
- "Electronically tunable capacitor," US 5,914,513, June 22, 1999.
- "Small cell, low contact resistance rugged power field effect devices and method of fabrication," US 5,234,851, August 10, 1993.
- "Small cell low contact resistance rugged power field effect devices and method of fabrication," US 5,119,153, June 2, 1992.
- "Power field effect devices having small cell size and low contact resistance," US 4,998,151, March 5, 1991.
- "Power field effect devices having low gate sheet resistance and low ohmic contact resistance," US 4,985,740, January 15, 1991.

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### GRANTS AND CONTRACTS

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**Principal Investigator** Utah State University, Logan, UT (2006-).  
Agency - Utah Science Technology and Research Initiative (USTAR), Salt Lake City, UT  
Amount - ~\$2 million

**Co Investigator** General Electric Corporate Research and Development Center, Schenectady, NY (1986-1990).

Title - Synchronous Rectifier for High-Density Power Supplies

Agency - Wright Patterson Air Force Labs, Dayton, OH

Amount - ~\$ 15 million

Title - Radiation Hard VHSIC Power Supplies

Agency - Naval Ocean Systems Center, San Diego, CA

Amount - ~\$ 10 million



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***Principal Investigator*** Shakti Systems, Lisle, IL (2001-2003).

Raised \$4 million Series-A venture equity financing for a startup company to develop revolutionary power management IC for battery-operated handheld devices.

***Principal Investigator*** Zeus Semiconductor, Vancouver, WA (2003-2004).

Raised \$225,000 Series-A venture equity financing for a startup company to develop disruptive SiC high-power switches and sensors.

***University Research***

Between 1993 and 2004 raised nearly \$50 million in cash, equipment donation, and intellectual property donation. Founded and built world-class research centers to perform advanced research on Micro Systems, Power Semiconductors, RF and Mixed-Signal VLSI, and Power Electronics.

### ***EXPERTISE***

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Primary research is in power semiconductors and power electronics, mixed-signal VLSI, RF and microwave communication technologies. Intend to utilize my extensive prior experience in material technologies and systems engineering to develop next generation of Microsystems with on-chip power generation and power management, high-power conditioning devices and systems, and advanced communication and computing devices.