

# SHERRA E. (DIEHL) KERNS

## Curriculum Vitae

### **PRESENT POSITIONS AND ADDRESS**

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F. W. Olin Distinguished Professor of Electrical and Computer Engineering  
Founding Vice President of Innovation and Research  
Franklin W. Olin College of Engineering  
Olin Way  
Needham, MA 02492-1200  
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### **EDUCATION**

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Mount Holyoke College - A.B., with honors, distinction, Physics  
University of Wisconsin - M.A., Physics  
University of North Carolina - Ph.D., Physics

### **NATIONAL AND INTERNATIONAL BOARD POSITIONS AND COMMITTEE ACTIVITIES**

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Member, ASEE Term of ASEE Presidency Task Force, 2008-present  
Member, IEEE Hewlett-Packard Harriett B. Rigas Award Committee, 2008  
Member, International Advisory Board (IAB) for the UNESCO Chair in Problem Based Learning in Engineering Education (UCPBL), 2007-present  
Overseer, Thayer School of Engineering, Dartmouth College, 2006-2008  
Director, ABET Board, 2006-2009 (elected)  
Chair, ABET Ad Hoc Outreach Task Group, 2006-2008  
Member, ABET Ad Hoc Outreach Task Group, 2008-present  
Member, ABET Ad Hoc Task Group Board Operations, 2006-2008  
Member, IEEE Educational Activities Board (EAB) Pre-university Education Coordinating Committee (PECC), 2006-2008  
Member, IEEE Computer Society Technology of the Decade Award Board of Judges, 2005-2006  
Member, Advisory Board for E<sup>3</sup> Exploring Ethical Decision-Making in Engineering project), 2005-present  
New England Association of Schools & Colleges, Inc. (NEAS&C), Commission on Institutions of Higher Education, Evaluation Team Chair, 2005-2006  
Chair, ABET EAC Training and Materials Committee, 2005-2006  
Board Representative, ABET International Activities Council (INTAC), 2006-2008  
Member, ABET INTAC (Team Chair, International Programs Evaluations), 2004-2008  
Member, Georgia Tech College of Engineering Advisory Board, 2004-present  
ASEE Immediate Past President, 2005-present

- Chair, Nominations Committee
- Co-chair, ASEE Constitution and Bylaws Committee

- Member, Oversight Committee
- ASEE President, 2004-2005
- Chair, Executive Committee
  - Chair, Oversight Committee
  - Member, Finance Committee
  - Member, Nominating Committee
- Member, National Collaborative Task Force on Engineering Graduate Education Reform Executive Steering Committee, 2004-present
- Member, Advisory Board for the Perceptions and Attitudes toward Cheating among Engineering Students (PACES) Project, 2004-present
- Member, National Academy of Engineering (NAE) Center for the Advancement of Scholarship on Engineering Education (CASEE) Advisory Committee, 2003-2007
- Member, Steering Committee, NAE “The Engineer of 2020” Project, 2003-2005
- ASEE President-Elect, 2003-2004
- Chair, Long-Range Planning Committee
  - Member, Executive Committee
  - Member, Finance Committee
  - Member, Oversight Committee
- Member, ABET Succession Planning Task Group, 2003-2005
- Member, ABET Diversity Task Force, 2003-2005
- Member, ABET Ad Hoc Diversity Task Group, 2004-2006
- Member, ABET Sustainability Task Force, 2003-2005
- Member, IEEE Fellow Selection Committee, 2002-2003
- National Judge Advisor, FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition, 2002-2007
- ASEE First Vice President, 2001-2002
- Vice President of Professional Interest Councils, 2001-2002
  - Chair, ASEE Professional Interest Council I, 2000-2002
- Chair, ASEE ECE Division – 1998-1999; Vice Chair – 1997-1998, Secretary/Treasurer – 1996-1997
- Member, ASEE Councils Organizational Structure Examination Committee, 2001-2002

## **EMPLOYMENT HISTORY**

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September 2007 – Present

- F. W. Olin Distinguished Professor of Electrical and Computer Engineering
  - Founding Vice President of Innovation and Research
- Franklin W. Olin College of Engineering, Needham, MA

September 1999 – September 2007

- Vice President for Innovation and Research
  - F. W. Olin Professor of Electrical and Computer Engineering
- Franklin W. Olin College of Engineering, Needham, MA

May 1989 – September 1999

- Director

University Consortium for Research on Electronics in Space  
Vanderbilt University, Nashville, TN

July 1993 – July 1998

- Chair

Department of Electrical and Computer Engineering  
Vanderbilt University, Nashville, TN

August 1987 – June 2000

- Professor

Department of Electrical and Computer Science  
Vanderbilt University, Nashville, TN

July 1982 – August 1987

- Associate Professor

- Assistant Professor

Department of Electrical and Computer Engineering  
North Carolina State University, Raleigh, NC

Summers 1981, 1983, 1986

- Technical Staff

Microelectronics Directorate  
Sandia National Laboratories, Albuquerque, NM

September 1979 – June 1982

- Assistant Professor

Department of Electrical Engineering  
Auburn University, Auburn, AL

1977 – 1979

- Research Associate, N.I.H. Postdoctoral Trainee

Department of Biomedical Engineering  
Duke University, Durham, NC

## **SIMULTANEOUS APPOINTMENTS**

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September 2007 – Present

- Professor of Technology Entrepreneurship  
Babson College, Babson Park, MA

September 1999 – August 2001

- Visiting Professor

Department of Electrical Engineering and Computer Science  
Massachusetts Institute of Technology, Cambridge, MA

August 1987 – December 1991

- Adjunct Professor

- Adjunct Associate Professor

Department of Electrical and Computer Engineering  
North Carolina State University, Raleigh, NC

March 1985 – 1994

- Adjunct Professor

- Adjunct Associate Professor  
Department of Nuclear Engineering and Engineering Physics  
Rensselaer Polytechnic Institute, Troy, NY

## **AWARDS, HONORS, AND RECOGNITIONS**

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The Gordon Institute of Tufts University Distinguished Speaker Award for “Engineering & Engineering Education in the 21<sup>st</sup> Century” – 2005  
Fellow of the ASEE (American Society for Engineering Education) – 2003  
RCU (Robot Chicks Union – a national society of FIRST (For Inspiration and Recognition of Science and Technology) young women) Illuminary X – 2003  
ECEDHA (Electrical and Computer Department Heads Association) Leadership and Service Award – 2002  
IEEE (Institute for Electrical and Electronics Engineers) Millennium Medal – 2000  
ASEE ECE Distinguished Educator Award – 2000  
IEEE Hewlett-Packard Harriett B. Rigas Award for the Outstanding Woman Engineering Educator – 1999  
Who’s Who in the World – 1998 (and onward until I stopped completing the forms)  
Member, Naval Studies Board, National Research Council, National Academy of Sciences – 1990-1996  
Award for Outstanding Undergraduate Teaching (Vanderbilt University) – 1990  
Fellow of the IEEE – 1990  
ALCOA Foundation Engineering Research Achievement Award – 1986  
Senior Member of the IEEE – 1985  
North Carolina State University’s ASEE Outstanding Research Award – 1984 and 1985  
NIH (National Institutes of Health) Postdoctoral Traineeship – 1977  
Award for Excellence in Teaching (University of Wisconsin) – 1970  
Society of Sigma Xi – 1968  
Sarah Williston Scholar (Mt. Holyoke College) – 1966  
Commissioner, Accreditation Board for Engineering and Technology, Inc. (ABET), Engineering Accreditation Commission (EAC), 2000-present

- Member-at-Large, 2005-2006
- Executive Committee 2004-present
- Engineering Criteria 2000 Team Chair, 2000-present
- Member, Training and Materials Development Sub-committee, 2000-2005
- Evaluator, Accreditation Board for Engineering and Technology, Inc. (ABET), Engineering Accreditation Commission 1993-present

Member, Judge Advisory Board, FIRST Robotics Competition, 2000-present  
Chair, ASEE Sharon Keillor Award Selection Committee, 2000-2003  
Secretary, IEEE Education Society, 2000-2002  
Member, IEEE Education Society, Administrative Committee, 2000-2002  
Member, IEEE Hewlett-Packard Harriett B. Rigas Award Selection Committee, 2000-2004; Chair, 2002

Chair, Frontiers in Education (FIE) Steering Committee, 2000-2002

Trustee, StandardsWork, 2000-present

Member, National Electrical Engineering Department Heads, Accreditation Issues Committee, 1999-2001

Chair, IEEE Education Society Fellow Selection Committee, 1999-2001

- Member, IEEE Education Society Fellow Selection Committee, 1993-2001

Member, ECE Advisory Board, Worcester Polytechnic Institute, 1999-present

Member, IEEE/EAC/APC Committee on Best Practices, 1999-2001

Liaison, IEEE/EAC/ABET Committee on Technology Accreditation Activities, 1999-2001

Member, Semiconductor Research Corporation, University Advisory Board, 1998-2001

Chair, National Electrical Engineering Department Heads Association Committee on Accreditation Activities, 1997-2000

Member, Microelectronics and Photonics Test Bed Working Group, 1997-1999

Member, IEEE/EAC/ABET Committee on Engineering Accreditation Activities, 1996-2001

Member, Board of Directors, Southeastern Center for Electrical Engineering Education, 1996-1999

Member, External Review Committee, Georgia Institute of Technology, 1996-1998

President, National Electrical Engineering Department Heads Association (now named Electrical and Computer Engineering Department Heads Association), 1995

- Vice President – 1994; Secretary/Treasurer – 1994; Jr. and Sr. Past-President – 1996-1998

Member, Naval Studies Board, National Research Council, National Academy of Sciences, January 1990-1996

Member, National Research Council Panel on Research Opportunities in Radiation Sciences, 1988-1992

Member, Superconducting Supercollider Task Force on Radiation Hardened Electronics, 1988-1990

Advisor, Superconducting Supercollider Central Design Group, 1988-1990

Editor, Proceedings of the IEEE, Special Section on “Space Radiation Effects on Microelectronics,” November, 1988

Technical Program Chairman, IEEE Nuclear and Space Radiation Effects Conference, 1987

Chairman, Radiation Hardening Session, Government Microcircuit Applications Conference, 1986, 1987

Advisor, Strategic Defense Initiative Office, SAT-8 and A1104, Electronics Hardening and Vulnerability, SDIO, 1985-1992

Member, Steering Committee, IEEE Nuclear and Space Radiation Effects Conference, 1985, 1987

Organizer, Short Courses, IEEE Nuclear and Space Radiation Effects Conference, 1985

Member, IEEE Nuclear and Plasma Sciences Society Administrative Committee, 1985-1993

Co-Chairman, Organizer, Workshop on Microelectronics for Hazardous and Extreme Conditions, IEEE International Conference on Industrial Electronics, Control and Instrumentation, 1984

Co-Chairman, Advanced MOS Devices and Models, IEEE International Electron Devices Meeting, 1984

Member, Program Committee, IEEE International Electron Devices Meeting, 1983, 1984

Co-Chairman, Low Voltage Monolithic Devices Session, IEEE International Electron Devices Meeting, 1983

Chairman, Single Event Phenomena Session, IEEE Nuclear and Space Radiation Effects Conference, 1983

Member, CRRES (Combined Release and Radiation Effects Satellite) Working Group, 1982-1993

**SPONSORED RESEARCH ACTIVITIES (AS PRINCIPAL INVESTIGATOR OR CO-PRINCIPAL INVESTIGATOR)**

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- “High Performance MOS Technologies for Very Large Scale Integration (VLSI),” Engineering Experiment Station, Auburn University, R. C. Jaeger and S. E. Diehl, Co-Principal Investigators, October 1, 1981 - September 30, 1982, \$80,000.
- “Stability of CMOS RAM Logic Against Effects of High Energy Ionizing Radiation,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, November 12, 1981 - July 12, 1982, \$26,000.
- “Low Pressure Chemical Vapor Deposition Equipment,” National Science Foundation, R. C. Jaeger and S. E. Diehl, Co-Principal Investigators, January 1, 1982 - June 30, 1983, \$60,600.
- “Logic Stability in MOS Memories,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, June 15, 1982 - September 15, 1982, \$12,000.
- “Investigation of Stability Criteria for CMOS Random Logic,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, October 1, 1982 - September 30, 1983, \$40,040.
- “Prevention of Ion-Induced Errors in Integrated Logic Circuits,” Naval Research Laboratories, S. E. Diehl and J. R. Hauser, Co-Principal Investigators, December 1, 1982 - November 30, 1983, \$105,798.
- “Technology for High Performance MOS Analog VLSI,” National Science Foundation, R. C. Jaeger and S. E. Diehl, Co-Principal Investigators, January 1, 1983 - December 31, 1983, \$38,000.
- “Investigation of Stability Criteria for CMOS Random Logic,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, (renewal) through September 30, 1984, \$48,542.
- “CMOS Latch-up Problems,” included in a Plan for Research in Integrated Circuit Manufacturing Technology, Semiconductor Research Corporation, S. E. Diehl, Investigator, April 1, 1983 - December 31, 1983, \$1,259,946.
- “Prevention of Ion-Induced Errors in Integrated Logic Circuits,” Naval Research Laboratories, S. E. Diehl and J. R. Hauser, Co-Principal Investigators, (renewal) through February 18, 1985, \$154,994.
- “A Semiconductor Parametric Analysis System and Preliminary Modeling of Selected Integrated Circuits for the CRRES Microelectronics Package,” NCSU, S. E. Diehl and J. R. Hauser, Co-Principal Investigators, September 17, 1984 - January 31, 1986, \$111,174 and \$70,640.
- “Analog Input Stages for Gate Arrays,” The General Electric Microelectronics Center, J. R. Hauser and S. E. Diehl, Co-Principal Investigators, June 1, 1984 - May 31, 1985, \$17,727.
- “Investigation of Stability Criteria for CMOS Digital Integrated Circuits,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, November 1, 1984 - September 30, 1985, \$58,065.
- “Simulation of Integrated Circuit Upsets,” Computer Sciences Corporation, S. E. Diehl, Principal Investigator, January 1, 1985 - December 15, 1985, \$47,645.
- “Prevention of Ion-Induced Errors in Integrated Logic Circuits,” Naval Research Laboratory, S. E. Diehl and J. R. Hauser, Co-Principal Investigators, May 1, 1985 - March 1, 1987, \$215,000.
- “Studies of Single Event Effects in Microelectronics,” Naval Research Laboratory, S. E. Diehl, Principal Investigator, September 15, 1985 - September 14, 1987, \$418,510.
- “Preliminary Modeling of Selected Integrated Circuits for the CRRES Microelectronics Package,” S. E. Diehl and J. R. Hauser, Co-Principal Investigators, September 17, 1985 - December 17, 1985, \$13,293 (Supplemental Funding).
- “Investigation of Stability Criteria for CMOS Digital Integrated Circuits,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, October 1, 1985 - September 30, 1986, \$59,995.
- “Modeling CRRES MEP SRAMs,” Naval Research Laboratories, S. E. Diehl and J. R. Hauser, Co-Principal Investigators, September 17, 1985 - February 28, 1987, \$50,000.
- “Upset Phenomena in Digital Integrated Circuits,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, October 1, 1986 - September 30, 1987, \$60,000.
- “Studies of Radiation Effects in Microelectronics,” Naval Research Laboratory, S. E. Diehl, Principal Investigator, October 1, 1986 - September 30, 1987, \$395,054.

“Prevention of Single Event Upsets in Microelectronics,” Defense Nuclear Agency, S. E. Diehl and J. R. Hauser, Co-Principal Investigators, November 15, 1986 - July 14, 1990, \$752,897.

“Research Equipment for Computer-Aided Design of Radiation-Hardened Microelectronics,” Sandia National Laboratories, S. E. Diehl, Principal Investigator, January 5, 1987 - September 1, 1987, \$77,007.

“Single Event Upset Studies,” N. C. State University (subcontract), S. E. Kerns, Principal Investigator, July 1, 1987 - November 14, 1990, \$210,326.

“Analyses of Radiation Effects in ICs,” Harris Semiconductor Corporation, S. E. Kerns and L. W. Massengill, Co-Principal Investigators, January 1, 1989 - February 28, 1990, \$75,624.

“IPA Assignment Agreement,” Air Force Weapons Laboratory, S. E. Kerns, Principal Investigator, March 1, 1989 - September 30, 1989, \$66,227.

“PARA,” Harry Diamond Laboratory, S. E. Kerns and B. L. Bhuva, Co-Principal Investigators, March 1, 1990 - September 30, 1991, \$51,455.

“Research Funding for the University Consortium for Research on Electronics in Space (UCRES),” Naval Research Laboratory, S. E. Kerns, Principal Investigator, October 1, 1989 - April 30, 1994, \$5,999,778 (multi-university).

“Single-Event Effects on SOIC,” Naval Research Laboratory, L. W. Massengill and S. E. Kerns, Co-Principal Investigators, March 1, 1990 - February 28, 1991, \$50,000.

“Transient Analysis of Harris RHD1 SOI Devices and Circuits,” Harris Semiconductor Corporation, L. W. Massengill and S. E. Kerns, Co-Principal Investigators, March 1, 1990 - February 28, 1991, \$48,347.

“Reliability and Performance Degradation of Advanced Commercial CMOS Technologies Using X-Ray Lithography,” Semiconductor Research Corporation, D. V. Kerns and S. E. Kerns, Co-Principal Investigators, January 1, 1991 - December 31, 1993, \$600,000 (multi-university).

“Transient Analysis of Harris RHD1 SOI Devices and Circuits,” Harris Semiconductor Corporation, L. W. Massengill and S. E. Kerns, Co-Principal Investigators, March 1, 1990 - February 28, 1991, \$48,347.

“Effects of X-Rays on CMOS,” Defense Advanced Research Projects Agency / Naval Research Laboratory, S. E. Kerns and D. V. Kerns, Co-Principal Investigators, October 1, 1991 - September 30, 1994, \$411,295.

“MOS Device Damage Associated with the SCALPEL Approach,” American Telephone & Telegraph Company, S. E. Kerns, Principal Investigator, March 8, 1993 - December 31, 1994, \$99,968.

“An Integrated Reliability Approach for Advanced CMOS Technologies,” Semiconductor Research Corporation, S. E. Kerns, Principal Investigator, October 1, 1993 - August 31, 1994, \$82,500.

“Research Funding for the University Consortium for Research on Electronics in Space (UCRES),” Naval Research Laboratory, S. E. Kerns, Principal Investigator, May 1, 1994 - November 30, 1998, \$7,262,373 (multi-university).

“An Integrated Reliability Approach for Advanced Deep Submicron Devices and VLSI Circuits,” Semiconductor Research Corporation, S. E. Kerns, Principal Investigator, September 1, 1994 - August 31, 1995, \$204,731.

“MOS Device Damage Associated with the SCALPEL Approach,” American Telephone & Telegraph Company, S. E. Kerns and B. L. Bhuva, Co-Principal Investigators, October 1, 1994 - April 30, 1999, \$110,729.

“Support for Randall J. Milanowski,” Dynamic Research Corporation, S. E. Kerns, Principal Investigator, September 1, 1995 - June 30, 1999, \$42,850.

“An Integrated Reliability Approach for Devices Fabricated Using Plasma Etching Techniques,” Semiconductor Research Corporation, S. E. Kerns and B. L. Bhuva, Co-Principal Investigators, September 1, 1995 - March 31, 1998, \$436,060.

“Reliability of Advanced CMOS Technologies,” Sandia National Laboratories, S. E. Kerns and B. L. Bhuva, Co-Principal Investigators, October 1, 1997 - September 30, 1998, \$50,000.

“Travel for Low-Power SEU Review Team,” Naval Research Laboratory, D. V. Kerns and S. E. Kerns, Co-Principal Investigators, June 1997 - October 1999, \$12,240.

"An All-Silicon Based Optical Interconnect Technology," Semiconductor Research Corporation, D. V. Kerns, Bharat L. Bhuvra and S. E. Kerns, Co-Principal Investigators, May 1997 - March 2001, \$614,314.

#### SELECTED REFEREED PUBLICATIONS

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- J. T. McCown, E. Evans and S. Diehl, "Degree of Hydration and Lateral Diffusion in Phospholipid Multibilayers," *Biochemistry*, pp. 3134-3138, 1981.
- J. T. McCown, E. A. Evans, S. E. Diehl and H. C. Wiles, "The Effects of Hydration on Lateral Diffusion in Egg Lecithin Multibilayers," *Biophysical Journal*, p. A113, 1981.
- W. A. Kolasinski, R. Koga, J. B. Blake and S. E. Diehl, "Soft Error Susceptibility of a CMOS RAM: Dependence Upon Power Supply Voltage," *IEEE Transactions on Nuclear Science*, pp. 4013-4016, December 1981.
- R. C. Jaeger, F. H. Gaensslen and S. E. Diehl, "Efficient Numerical Simulation of MOS Capacitance for a Wide Range of Temperatures, Impurity Profiles and Surface State Densities," *International Solid State Circuits Digest of Technical Papers*, pp. 14-15, February 1982.
- S. E. Diehl, A. Ochoa, Jr., P. V. Dressendorfer, R. Koga and W. A. Kolasinski, "Error Analysis and Prevention of Cosmic Ion-Induced Soft Errors in Static CMOS RAMs," *IEEE Transactions on Nuclear Science*, pp. 2032-2039, December 1982.
- J. Andrews, J. Schroeder, B. Gingerich, W. Kolasinski, R. Koga and S. Diehl, "A Single Event Error Immune CMOS RAM," *IEEE Transactions on Nuclear Science*, pp. 2040-2043, December 1982.
- R. C. Jaeger, F. H. Gaensslen and S. E. Diehl, "An Efficient Numerical Algorithm for Simulation of MOS Capacitance," *IEEE Transactions on Computer Aided Design*, pp. 111-116, April 1983.
- S. E. Diehl, J. E. Vinson, B. D. Shafer and T. M. Mnich, "Considerations for Single Event Immune VLSI Logic," *IEEE Transactions on Nuclear Science*, pp. 4501-4507, December 1983.
- E. L. Petersen, J. B. Langworthy and S. E. Diehl, "Suggested Single Event Upset Figures of Merit," *IEEE Transactions on Nuclear Science*, pp. 4533-4539, December 1983.
- R. C. Jaeger, R. M. Fox and S. E. Diehl, "Analytical Expressions for the Critical Charge in CMOS Static RAM Cells," *IEEE Transactions on Nuclear Science*, pp. 4616-4619, December 1983.
- T. M. Mnich, S. E. Diehl, B. D. Shafer, R. Koga, W. A. Kolasinski and A. Ochoa, Jr., "Comparison of Analytical Models and Experimental Results for Single Event Upset in CMOS SRAMs," *IEEE Transactions on Nuclear Science*, pp. 4620-4623, December 1983.
- L. W. Massengill and S. E. Diehl, "Prediction and Optimization of Transient Radiation Soft Error Thresholds by Computer Simulation," *Proceedings of the 1984 Government Microcircuits Applications Conference*, pp. 430-434, November 1984.
- S. E. Diehl, "A New Class of Single Event Soft Errors," *IEEE Transactions on Nuclear Science*, pp. 1145-1148, December 1984.
- S. E. Diehl, J. E. Vinson and E. L. Petersen, "Single Event Upset Rate Predictions for Complex Logic Systems," *IEEE Transactions on Nuclear Science*, pp. 1132-1138, December 1984.
- A. R. Knudson, A. B. Campbell, P. Shapiro, W. J. Stapor, E. A. Wolicki, E. L. Petersen, S. E. Diehl, J. R. Hauser and P. V. Dressendorfer, "Charge Collection in Multilayer Structures," *IEEE Transactions on Nuclear Science*, pp. 1149-1154, December 1984.
- L. W. Massengill and S. E. Diehl, "Transient Radiation Upset Simulations of CMOS Memory Circuits," *IEEE Transactions on Nuclear Science*, pp. 1337-1343, December 1984.
- L. W. Massengill, S. E. Diehl, T. M. Mnich, T. F. Wrobel and P. V. Dressendorfer, "Transient Radiation Hardening of CMOS LSI and VLSI Memory Circuits," *Journal of Radiation Effects, Technology and Research*, pp. 12-16, Winter 1984.
- L. W. Massengill and S. E. Diehl, "Voltage Span Modeling of Very Large Memory Arrays," in NASECODE IV; *Proceedings of the Fourth International Conference on the Numerical Analysis of Semiconductor Devices and Integrated Circuits*, pp. 396-404, 1985.



- J. R. Hauser, S. E. Diehl, A. R. Knudson, A. B. Campbell, W. J. Stapor and P. Shapiro, "Ion Track Shunt Effects in Multi-Junction Structures," *IEEE Transactions on Nuclear Science*, pp. 4115-4121, December 1985.
- R. L. Johnson, S. E. Diehl and J. R. Hauser, "Approach for Modeling Single Event Upsets on Advanced CMOS SRAMs," *IEEE Transactions on Nuclear Science*, pp. 4122-4127, December 1985.
- T. R. Weatherford, J. R. Hauser and S. E. Diehl, "A Study of Single Events in GaAs SRAMs," *IEEE Transactions on Nuclear Science*, pp. 4170-4175, December 1985.
- L. W. Massengill, S. E. Diehl and T. W. Wrobel, "Analysis of Transient Radiation Upset in a 2K SRAM," *IEEE Transactions on Nuclear Science*, pp. 4026-4030, December 1985.
- A. B. Campbell, A. R. Knudson, W. J. Stapor, P. Shapiro, S. E. Diehl and J. R. Hauser, "Charge Collection in CMOS/SOS Structures," *IEEE Transactions on Nuclear Science*, pp. 4128-4132, December 1985.
- S. E. Diehl and J. R. Hauser, "Improved CMOS SRAM Cell for Single Event Environments," *Journal of Radiation Effects, Technology and Research*, Vol. 4, March 1986.
- R. L. Johnson, A. T. Brown, S. E. Diehl and T. M. Mullen, "GO'- Project Management Software," *Engineering Education*, pp. 117-120, November 1986.
- M. R. Ackermann, R. Mikawa, L. W. Massengill and S. E. Diehl, "Factors Contributing to CMOS Static RAM Upset," *IEEE Transactions on Nuclear Science*, pp. 1524-1529, December 1986.
- W. J. Stapor, R. L. Johnson, Jr., M. A. Xapsos, K. W. Fernald, A. B. Campbell, B. L. Bhuva and S. E. Diehl, "Single Event Upset Temperature Dependence on an NMOS Resistive-Load Static RAM," *IEEE Transactions on Nuclear Science*, pp. 1610-1615, December 1986.
- B. L. Bhuva, J. J. Paulos and S. E. Diehl, "Simulation of Worst-Case Total Dose Radiation Effects in CMOS VLSI Circuits," *IEEE Transactions on Nuclear Science*, pp. 1546-1551, December 1986.
- A. T. Brown, L. W. Massengill, S. E. Diehl and J. R. Hauser, "A Model of Transient Radiation Effects in GaAs Static RAM Cells," *IEEE Transactions on Nuclear Science*, pp. 1519-1523, December 1986.
- T. R. Weatherford, J. R. Hauser and S. E. Diehl, "Comparisons of Single Event Vulnerability of GaAs SRAMs," *IEEE Transactions on Nuclear Science*, pp. 1590-1596, December 1986.
- L. W. Massengill, S. E. Diehl and J. S. Browning, "Dose-Rate Upset Patterns in a 16K CMOS SRAM," *IEEE Transactions on Nuclear Science*, pp. 1541-1545, December 1986.
- R. L. Johnson, Jr. and S. E. Diehl, "An Improved Single Event Resistive Hardening Technique for CMOS Static RAMs," *IEEE Transactions on Nuclear Science*, pp. 1730-1733, December 1986.
- T. R. Weatherford, J. R. Hauser and S. E. Diehl, "Analysis of GaAs SRAMs Response to Single Events," *Natural Space Radiation and VLSI Technology Conference Proceedings*, January 1987.
- B. L. Bhuva, J. J. Paulos, S. E. Diehl, J. H. Moreadith, S. N. Hong and R. W. Waltman, "Statistical Parameter Distribution in Total Dose Environments," *Natural Space Radiation and VLSI Technology Conference Proceedings*, January 1987.
- S. E. Diehl, "SEU Hardening Approaches," *Natural Space Radiation and VLSI Technology Conference Proceedings*, January 1987.
- J. A. Lukanc, R. J. Veres, S. C. Boon, C. H. Boler, R. J. Byrne, S. E. Kerns and L. W. Massengill, "A Fast, Radiation-Hardened VHSIC 2kX9 SRAM Within a Standard Cell Library," *Proceedings of the 1987 Government Microcircuits Applications Conference*, pp. 119-122, November 1987.
- M. A. Xapsos, P. Shapiro, W. J. Stapor, A. B. Campbell, A. R. Knudson, L. W. Massengill, S. E. Kerns and K. W. Fernald, "Static RAM Memory Upsets in a Combined Single Event and Dose Rate Environment," *Proceedings of the 1987 Government Microcircuits Applications Conference*, pp. 123-126, November 1987.
- B. L. Bhuva, R. L. Johnson, Jr., R. S. Gyurcsik, K. W. Fernald, S. E. Kerns, W. J. Stapor, A. B. Campbell and M. A. Xapsos, "Quantification of the Memory Imprint Effect for a Charged Particle Environment," *IEEE Transactions on Nuclear Science*, pp. 1414-1418, December 1987.
- R. S. Gyurcsik, D. W. Thomas, R. H. Gallimore, B. L. Bhuva and S. E. Kerns, "Timing and Area Optimization of CMOS Combinational-Logic Circuits Accounting for Total-Dose Radiation Effects," *IEEE Transactions on Nuclear Science*, pp. 1386-1391, December 1987.
- S. Verghese, J. J. Wortman and S. E. Kerns, "A Novel CMOS SRAM Feedback Element for SEU Environments," *IEEE Transactions on Nuclear Science*, pp. 1641-1646, December 1987.

- M. A. Xapsos, L. W. Massengill, W. J. Stapor, P. Shapiro, A. B. Campbell, S. E. Kerns, K. W. Fernald and A. R. Knudson, "Single-Event, Enhanced Single-Event and Dose-Rate Effects with Pulsed Proton Beams," *IEEE Transactions on Nuclear Science*, pp. 1419-1425, December 1987.
- K. W. Fernald and S. E. Kerns, "Simulation of Proton-Induced Energy Deposition in Integrated Circuits," *IEEE Transactions on Nuclear Science*, pp. 981-986, February 1988.
- B. L. Bhuvana and S. E. Kerns, "Radiation Hardness Assurance for Total Dose Environments," *Proceedings of the 1988 VHSIC/VLSI Qualification, Reliability and Logistics Workshop*, pp. 377-387, April 1988.
- S. E. Kerns, "Simulation Techniques for the Analysis of Single-Event Upset in ICs," *Journal of Radiation Effects, Technology and Research*, pp. 63-77, September 1988.
- T. R. Weatherford, J. R. Hauser and S. E. Kerns, "Basic Mechanisms in GaAs SEU Response," *Journal of Radiation Effects, Technology and Research*, pp. 56-62, September 1988.
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## **SHORT COURSES AND WORKSHOPS DEVELOPED AND PRESENTED**

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- Workshop for Programs Seeking EC2000 Accreditation in 2002, San Diego, CA, March 2001, Co-Developer (with John Orr and David Soldan).
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- Transforming Practice: A Faculty Workshop on Criteria 2000, San Juan, PR, November 1999, Co-Developer (with Karan Watson).
- Getting Faculty Buy-In for Criteria 2000, Sandestin FL, March 1999, Co-Developer (with Karan Watson).
- Workshop for Programs Seeking EC2000 Accreditation in 2000, Richmond, VA, June 1999, (The first in a continuing series), Co-Developer (with John Orr).
- Circuit and Process Design for Radiation-Hardened Integrated Circuits; Analog Devices, Limerick, Ireland, January 3-5, 1990, Co-chair (with David Kerns), Organizer, Speaker.
- Radiation Effects on Electronics: Mechanisms, Models and Hardening; IEEE 1989 Nuclear Science Symposium, San Francisco, CA, January 15, 1990, Organizer, Sole Speaker.
- Circuit and Process Design for Radiation-Hardened Integrated Circuits, 3-Day Short Course, Analog Devices, Limerick, Ireland, January 3-5, 1989 (with D. V. Kerns).
- Information Reliability in Radiation Environments; 1985 IEEE Annual Conference on Nuclear and Space Radiation Effects, Monterey, CA, July 21, 1985, Chairman, Organizer.
- Microelectronics for Hostile and Extreme Conditions Workshop; IECON '84 Tokyo, Japan, October 25, 1984, Co-chairman, Organizer.
- High Performance VLSI: System and Hostile Environmental Limits; Real Time Systems Symposium, Washington, DC, December 8, 1983, Speaker.

## **DNA/VHSIC PROGRAM WORKSHOPS AND TUTORIALS DEVELOPED AND PRESENTED**

National Semiconductor and Westinghouse, Sunnyvale, CA, August 7, 1986; "Hardening CMOS IC's to Single Events."  
Honeywell, Minneapolis, MN, November 16, 1983; "Performance Impact of Single Event Hardening Techniques."  
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## **DESIGN TRAINING PROGRAMS DEVELOPED AND CONDUCTED**

Westinghouse, Baltimore, MD, November 2-3, 1983; CMOS RAM Cell and Combinational Logic Single Event Susceptibility Evaluation.  
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## **SELECTED REFEREED CONFERENCE PRESENTATIONS**

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- T. R. Weatherford, J. R. Hauser and S. E. Diehl, "A Comparative Analysis of GaAs FET Memory Technologies in a Single Event Environment," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1986, Providence, RI.
- A. T. Brown, S. E. Diehl and J. R. Hauser, "Simulation of Transient Radiation Effects in GaAs Static RAM Cells," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1986, Providence, RI.
- W. J. Stapor, A. B. Campbell, M. A. Xapsos, R. L. Johnson, K. Fernald, B. L. Bhuvu and S. E. Diehl, "Single Event Upset Temperature Dependence in MOS Static RAMs," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1986, Providence, RI.
- M. R. Ackermann, R. E. Mikawa, L. W. Massengill and S. E. Diehl, "Factors Contributing to CMOS Static RAM Upset," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1986, Providence, RI.
- L. W. Massengill, S. E. Diehl and J. S. Browning, "Dose-Rate Upset Patterns in a 16K CMOS RAM," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1986, Providence, RI.
- B. Bhuvu, J. Paulos, S. E. Diehl, S.-N. Hong and R. Waltman, "Circuit Simulation of Total Dose Effects," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1986, Providence, RI.
- J. R. Hauser, S. E. Diehl and D. L. Dreifus, "Heterojunction Isolation Technology for Improved Radiation Hardness of III-V Devices," Hardened Electronics and Radiation Technology Conference, July 1986, Newport Beach, RI.



- K. F. Galloway, S. E. Diehl and L. W. Linholm, "Meteorological Challenges in Semiconductor Technology: Electrical Measurements of Dimensions and Material Properties Using Integrated Circuit Test Structures," International Conference on Semiconductor and Integrated Circuit Technology, October 1986, Beijing, China.
- T. R. Weatherford, J. R. Hauser and S. E. Diehl, "Analysis of GaAs SRAMs Response to Single Events," Natural Space Radiation and VLSI Technology Conference, January 1987, Johnson Space Center, TX.
- B. L. Bhuva, J. J. Paulos, S. E. Diehl, J. H. Moreadith, S. N. Hong and R. W. Waltman, "Statistical Parameter Distribution in Total Dose Environments," Natural Space Radiation and VLSI Technology Conference, January 1987, Johnson Space Center, TX.
- S. E. Diehl, "SEU Hardening Approaches," Natural Space Radiation and VLSI Technology Conference, January 1987, Johnson Space Center, TX.
- B. L. Bhuva, R. L. Johnson, Jr., S. E. (Diehl) Kerns, K. W. Fernald, W. J. Stapor, A. B. Campbell and M. A. Xapsos, "Single-Event Upsets in a Total Dose Environment: A Quantification of the Imprint Effect," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1987, Snowmass, CO.
- B. L. Bhuva, J. J. Paulos, S. E. (Diehl) Kerns and J. H. Moreadith, "Failure Mechanisms Introduced by Statistical Variations in CMOS Device Parameters Due to Total Dose Exposure," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1987, Snowmass, CO.
- R. S. Gyurcsik, B. L. Bhuva and S. E. (Diehl) Kerns, "Automated Transistor Sizing of CMOS VLSI Circuits Accounting for Total-Dose Radiation Effects," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1987, Snowmass, CO.
- S. Verghese, J. J. Wortman and S. E. (Diehl) Kerns, "A Manufacturable CMOS SRAM Feedback Elements for SEU Environments," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1987, Snowmass, CO.
- M. A. Xapsos, P. Shapiro, W. J. Stapor, A. B. Campbell, A. R. Knudson, L. W. Massengill, S. E. (Diehl) Kerns and K. W. Fernald, "The Observation and Analysis of Single-Event Upset, Multiple-Event Upset and Dose-Rate Upset with Pulsed Proton Beams," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1987, Snowmass, CO.
- J. A. Lukanc, R. J. Veres, S. C. Boon, C. H. Boler, R. J. Byrne, S. E. Kerns and L. W. Massengill, "A Fast, Radiation-Hardened VHSIC 2kX9 SRAM within a Standard Cell Library," Government Microcircuits Applications Conference, November 1987, Orlando, FL.
- M. A. Xapsos, P. Shapiro, W. J. Stapor, A. B. Campbell, A. R. Knudson, L. W. Massengill, S. E. Kerns and K. W. Fernald, "Static RAM Memory Upsets in a Combined Single Event and Dose Rate Environment," Government Microcircuits Applications Conference, November 1987, Orlando, FL.
- L. W. Massengill and S. E. Kerns, "A Quantitative Description of Upset Mechanisms in a Proton Flux Environment," Single Event Symposium, April 1988, Los Angeles, CA.
- S. E. Kerns and L. W. Massengill, "Comparison of Simulation Approaches to SEP Modeling," Single Event Symposium, April 1988, Los Angeles, CA.
- B. L. Bhuva and S. E. Kerns, "Predictive Failure Simulations for Total Dose Environments," Workshop on Test Structures for Semiconductor Device Radiation Hardening and Hardness Assurance, April 1988, Hawthorne, CA.
- B. L. Bhuva and S. E. Kerns, "Radiation Hardness Assurance for Total Dose Environments," VHSIC/VLSI Qualification, Reliability and Logistics Workshop, April 1988, Los Angeles, CA.
- L. W. Massengill and S. E. Kerns, "General Power Bus Simulations for Dose-Rate Effects Using Conjugate-Gradient Techniques," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1988, Portland, OR.
- W. J. Stapor, P. T. McDonald, S. L. Swickert, A. B. Campbell, T. Palmer, L. W. Massengill and S. E. Kerns, "Low-Temperature SEU on NMOS/CMOS Static RAM," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1988, Portland, OR.
- B. L. Bhuva and S. E. Kerns, "Radiation Hardness Assurance for Total Dose Environments," VHSIC/VLSI Qualification, Reliability and Logistics Workshop, September 1988, Scottsdale, AZ.

- B. L. Bhuvu, N. Kaul and S. E. Kerns, "An Approach to Prediction of Total Dose Failure Modes and Levels," Government Microcircuits Applications Conference, November 1988, Las Vegas, NV.
- L. W. Massengill, S. E. Kerns and M. A. Xapsos, "The Response of Resistive-Load SRAMs to Dose-Rate Environments," Government Microcircuits Applications Conference, November 1988, Las Vegas, NV.
- N. Kaul, B. L. Bhuvu and S. E. Kerns, "Performance Analysis of CMOS ICs in Total Dose Environments," The 1989 IEEE Southeastcon Conference, April 1989, Columbia, SC.
- N. Kaul, B. L. Bhuvu and S. E. Kerns, "Worst-Case Operating Frequency Determination of CMOS Digital VLSI Circuits Operating in Hostile Environments," The 22<sup>nd</sup> Southeastern Symposium on System Theory, April 1989, Cookeville, TN.
- S. E. Kerns, L. W. Massengill, D. V. Kerns, Jr. and M. L. Alles, "SEU Models for CMOS/SOI," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1989, Marco Island, FL.
- M. L. Alles, S. E. Kerns, L. W. Massengill, D. V. Kerns, Jr., T. W. Houston, H. Lu and L. R. Hite, "Characterization of Single-Event Vulnerability of CMOS-SOI Transistors," Government Microcircuits Applications Conference, November 1989, Kissimmee, FL.
- N. Kaul, B. L. Bhuvu, V. Rangavajhala, H. van der Molen and S. E. Kerns, "Topology Dependent Failure Exposure Levels for CMOS ICs," IEEE Conference on Nuclear and Space Radiation Effects, July 1990, Reno, NV.
- B. L. Bhuvu, S. Mehrotra, L. W. Massengill and S. E. Kerns, "Dose-Rate Current Partitioning and Simulation for CMOS ICs," IEEE Nuclear and Space Radiation Effects Conference, July 1990, Reno, NV.
- M. L. Alles, J. C. Lee, L. W. Massengill and S. E. Kerns, "High Frequency Diffusion Capacitance in SOI/SEU Modeling," 1990 SOI/SOS Technology Workshop, September 1990, Key West, FL.
- M. L. Alles, S. E. Kerns, L. Massengill, J. E. Clark and K. L. Jones, "Body Tie Placement in CMOS/SOI Digital Circuits for Transient Radiation Environments," IEEE Nuclear and Space Radiation Effects Conference, July 1991, San Diego, CA.
- N. Kaul, B. L. Bhuvu and S. E. Kerns, "Circuit Simulation Techniques for Single Event Transients in Combinational Circuits," IEEE Annual Conference on Nuclear and Space Radiation Effects, July 1991, San Diego, CA.
- L. W. Massengill, M. L. Alles, S. E. Kerns, N. Kaul and B. L. Bhuvu, "SEU Characterization of Modern, Hardened Technologies," 1992 SEU Symposium, April 1992, Los Angeles, CA.
- M. L. Alles, L. W. Massengill, S. E. Kerns, J. L. Jones, J. E. Clark and W. F. Kraus, "Effect of Temperature-Dependent Bipolar Gain Distribution on SEU Vulnerability of SOI CMOS SRAMs," The 1992 SOI/SOS Conference, November 1992.
- S. E. Kerns and M. H. Yaktien, "Effects of X-Ray Exposure on CMOS Device Performance," DARPA XRL Workshop, January 1993, New Orleans, LA.
- L. W. Massengill, M. L. Alles, S. E. Kerns and K. L. Jones, "Analytical Correlation Between Observed Non-Ideal SEU Cross-Section Data and Process Parameter Distributions," 1993 IEEE Nuclear and Space Radiation Effects Conference, July 1993, Snowbird, UT.
- M. P. Pagey, M. H. Yaktien, A. I. Matta, R. J. Milanowski, B. L. Bhuvu and S. E. Kerns, "Characterization of Gate-Oxide Defects in X-Irradiated MOS Devices," IEEE Nuclear Science and Radiation Effects Conference, July 1993, Snowbird, UT.
- S. E. Kerns and L. W. Massengill, "SEU Rates in Advanced Digital CMOS," European Conference on Radiations and Their Effects on Components and Systems, September 1993, Saint-Malo, France.
- S. Velacheri, L. Massengill and S. Kerns, "Single Event Charge Collection and Enhancement in Submicron MOSFETs," IEEE Nuclear and Space Radiation Effects Conference, July 1994, Tucson, AZ.
- M. P. Pagey, R. J. Milanowski, K. T. Henegar, B. L. Bhuvu and S. E. Kerns, "Comparison of Forming Gas, Nitrogen, and Vacuum Anneal Effects on X-Ray Irradiated MOSFETs," IEEE Nuclear and Space Radiation Effects Conference, July 1995, Madison, WI.
- M. P. Pagey, R. J. Milanowski, E. S. Snyder, N. Bui, B. L. Deem, B. L. Bhuvu and S. E. Kerns, "Unified Model for n-Channel Hot-Carrier Degradation Under Different Degradation Mechanisms," International Reliability Physics Symposium, April 1996, Dallas, TX.

- M. Satagopan, M. Pagey, B. L. Bhuva and S. E. Kerns, "Effects of Process Variations on Device Performance and Degradation," IEEE Nuclear and Space Radiation Effects Conference, July 1996, Palm Springs, CA.
- B. Bhuva, V. Janapaty, N. Bui and S. Kerns, "A Study of Plasma-Induced Charging Damage Using Various Carrier-Injection Conditions and Time-Expanded Waveform Approach," IEEE International Conference on Plasma Process Induced Damage, May 1997, Monterey, CA.
- S. E. Kerns, P. P. Karhade, B. L. Bhuva and D. V. Kerns, "Method for Evaluating Suitability of COTS Devices for Use in Radiation Environments," European Conference on Radiations and Their Effects on Components and Systems, September 1997, Canes, France.
- V. Janapaty, B. Bhuva, N. Bui and S. Kerns, "Coupling Between Hot-Carrier Degradations Modes of pMOSFETs," SPIE Conference on Microelectronic Manufacturing Yield, Reliability, and Failure Analysis, October 1997, Austin, TX.
- B. Bhuva, V. Janapaty, N. Bui and S. Kerns, "Statistical Effects of Plasma-Etch Damage on Hot-Carrier Degradation," SPIE Conference on Microelectronic Manufacturing Yield, Reliability, and Failure Analysis, October 1997, Austin, TX.
- B. Bhuva, V. Janapaty, N. Bui and S. Kerns, "Plasma-Induced Polarity Dependent Hot-Carrier Response of CMOS Devices Across a Wafer," International Reliability Workshop, November 1997, Lake Tahoe, NV.
- N. Akil, A. Hoffmann, J.-P. Charles, S. Kerns and D. V. Kerns, Jr., "Effects of Fast Neutrons on Electrical Parameters and Light Emission from N-Channel Silicon JFETs," 2<sup>nd</sup> French-Italian Symposium on SiO<sub>2</sub> and Advanced Dielectrics, June 1998, L'Aquila, Italy.
- N. Akil, A. Hoffmann, J.-P. Charles, S. Kerns and D. V. Kerns, Jr., "Electroluminescence under Avalanche in Silicon Junctions of Micro-Electronic Structure," 3<sup>rd</sup> International Conference on Electric Charge in Solid Insulators, July 1998, Tours, France.
- D. V. Kerns, Jr., S. E. Kerns and R. T. Nash, "Developing Engineering Leadership Through an Undergraduate Minor in Management of Technology," American Society for Engineering Education, July 1998, Seattle, WA.
- D. V. Kerns, Jr., W. P. Kang, J. L. Davidson, Q. Zhou, Y. Gurbuz and S. E. Kerns, "A Total-Dose Radiation Hard Diamond MIS Gas Sensor," IEEE Nuclear Science and Radiation Effects Conference, July 1998, Newport Beach, CA.
- P. Daniels, S. Kerns and K. Watson, "Evaluating Engineering Programs Under ABET EC2000 Criteria: A Perspective from ABET Program Visitors," Frontiers in Education Conference, November 1998, Tempe, AZ.
- K. Watson, P. Daniels and S. Kerns, "Preparing Engineering Programs Under ABET EC2000 Criteria: Recommendations for Institutions," Frontiers in Education Conference, November 1998, Tempe, AZ.
- D. V. Kerns, Jr. and S. E. Kerns, "Challenges in the Migration of Commercial MEMS Accelerometers to Military Applications," Sensors Expo, May 1999, Baltimore, MD.
- D. Jiang, M. de la Bardonnie, H. Barnaby, S. Kerns, D. V. Kerns, R. D. Schrimpf, B. L. Bhuva, P. Mialhe, A. Hoffmann and J.-P. Charles, "Total Dose and Hot Carrier Effects on Silicon Light Emitting Devices," IEEE Nuclear and Space Radiation Effects Conference, July 1999, Norfolk VA.
- S. Kerns, D. V. Kerns, D. Jiang, R. D. Schrimpf, H. Barnaby, M. de la Bardonnie, P. Mialhe, A. Hoffmann and J.-P. Charles, "Optical Evidence of Damage Localization in Irradiated and Hot-Carrier-Stressed BJTs," European Conference on Radiations and Their Effects on Components and Systems, September 1999, Chinon France.
- W. P. Kang, J. L. Davidson, A. Wisitsora-at and D. V. Kerns, "Development of Diamond Microtip Field Emitter Devices," 1999 Joint International ECS Meeting, 6<sup>th</sup> International Symposium on Diamond Materials, October 17-22, 1999, Honolulu, HI.
- D. V. Kerns, Jr., J. D. Irwin and S. E. Kerns, "EE for Non-Majors: A New Initiative for the Next Millennium," Frontiers in Education Conference, November 1999, San Juan, PR.
- K. Watson and S. Kerns, "Transforming Practice: A Faculty Workshop on Criteria 2000," Frontiers in Education Conference, November 1999, San Juan, PR.

- S. E. Kerns and J. A. Orr, "Engineering Criteria 2000 -- the Evaluator's Perspective," Frontiers in Education Conference, November 1999, San Juan, PR.
- F. Driscoll and S. E. Kerns, "A Return to Collegiality in Criteria 2000 Visits," Frontiers in Education Conference, November 1999, San Juan, PR.
- C. Salame, S. Kerns, D. V. Kerns, F. Pelanchon, P. Mialhe, A. Hoffmann and J.-P. Charles "Effect of Charge Distribution on Burnout Threshold of Hardened Power MOSFET," European Space Components Conference-ESCCON 2000, Theme: Component Engineering and Technology, ESTEC, March 20-24, 2000, Noordwijk, The Netherlands.
- D. Jiang, B. L. Bhuvu, D. V. Kerns, Jr. and S. E. Kerns, "Comparative Analysis of Metal and Optical Interconnect Technology," Proceedings of IEEE International Interconnect Technology Conference, June 2000, Burlingame, CA.
- J. K. Shreedhara, H. J. Barnaby, B. L. Bhuvu, A. Raparla, D. V. Kerns, Jr. and S. E. Kerns, "Circuit Technique for Threshold Voltage Stabilization Using Substrate Bias in Total Dose Environments," IEEE Nuclear and Space Radiation Effects Conference, July 2000, Reno, NC.
- J. L. Davidson, W. P. Kang, D. V. Kerns and S. E. Kerns, "Field Emission Vacuum Integrated Circuits (FEVICS) for Ultra-High Speed, Radiation-Immune Electronic Systems," National Reconnaissance Office, November 3, 2000, McLean, VA.

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#### **SELECTED INVITED PRESENTATIONS**

- DNA/VHSIC Single Event Workshop, December 1-2, 1982, Naval Research Laboratory, Washington, DC; "CMOS Circuit Hardening Techniques."
- University of Illinois Coordinated Science Laboratory Seminar Series, January 26, 1983, Urbana, IL; "Ion-Immune CMOS Logic."
- University of North Carolina, February 15, 1983, Chapel Hill, NC; "Integrated Circuits for Cosmic Ion Environments."
- DNA/DARPA Single Event Program in Circuit Hardening, April 18, 1983, Hermosa Beach, CA; "Circuit Parameters as Susceptibility Controls."
- DNA/VHSIC Symposium on Single Event Effects, April 20, 1983, Los Angeles, CA; "CMOS Logic Stability Criteria."
- DNA/DARPA Workshop on Single Event Radiation Effects, April 21-22, 1983, Aerospace Corporation, Los Angeles, CA; "Circuit Hardening Concepts;" and "Charge Collection Modeling."
- Radiation Hardened Electronics Technology Meeting, October 18-20, 1983, Anaheim, CA; "Logic Integrity Optimization in Single Event Environments."
- NASA Potential Radiation Effects on the Space Station Workshop, January 26, 1984, Houston, TX; "Predictive Modeling of Single Event Errors in Spaceborne Integrated Circuits."
- Second Annual Symposium on Single Event Effects, April 5-6, 1984, Los Angeles, CA; "Single Event Errors in Combinational Logic and Systems."
- National Bureau of Standards, April 30, 1984, Gaithersburg, MD; "Single Event Errors in Digital VLSI Circuits."
- Radiation Hardened Electronics Technology Meeting, October 16-18, 1984, Dallas, TX; "The RAD Effects Program at North Carolina State University."
- Third Annual Symposium on Single Event Effects, March 5-6, 1985, Los Angeles, CA; "CMOS Upset Mechanisms."
- Microelectronics Center of North Carolina National Conference, March 25-26, 1985, Research Triangle Park, NC; "Transient Radiation Upset Simulations in CMOS Digital IC's," (delivered by L. W. Massengill).
- Rensselaer Polytechnic Institute, April 15, 1985, Troy, NY; "Transient Radiation Effects in CMOS Microelectronics."
- Radiation Hardened Electronics Technology Meeting, October 15-17, 1985, St. Louis, MO; "Single Event Hardening: Techniques and Tradeoffs."

Bell Laboratories, March 12, 1986, Reading, PA; "Device Design for Radiation-Hardened Integrated Circuits."

Fourth Annual Symposium on Single Event Effects, April 8-9, 1986, Los Angeles, CA; "Single Event Hardening Approaches."

1986 Government Microcircuit Applications Conference, November 11-13, 1986, San Diego, CA; "Digital Electronics for Military Systems -- Where do we go from here?" Panel Discussion, Robert M. Braun, Moderator.

University of North Carolina, November 18, 1986, Chapel Hill, NC; "Hardening Electronics for Space Applications."

National Space Radiation and VLSI Technology Conference, Johnson Space Center, January 20-21, 1987, Houston, TX; "Advanced Integrated Circuits for Space Applications."

Fifth Annual Single Event Effects Symposium, April 7-8, 1987, Los Angeles, CA; "SEU Hardening Comparisons."

Task Force on Radiation Hardened Electronics at the SSC, June 27-29, 1988, Lawrence Berkeley Laboratory, CA; "Circuit Design Techniques for Radiation Hardness."

Inter-University Centre of Postgraduate Studies, July 6-10, 1987, Dubrovnik, Yugoslavia, "Cooperative Research Consortia."

25<sup>th</sup> Annual Conference on Nuclear and Space Radiation Effects, July 11-15, 1988, Portland, OR; "What Do We Know About Single Events?"

Nashville Chapter IEEE, September 15, 1988, Nashville, TN; "Space Microelectronics: Solving Tomorrow's Problems Today."

Oak Ridge National Laboratory, November 30, 1988, Oak Ridge, TN; "Radiation Effects on Microelectronics."

Rotary Club of Dickson, August 28, 1989, Dickson, TN; "Educating Future Space Scientists and Engineers; or: Is America Lost in Space?"

Radiation Hardening Electronics Technology, October 17, 1989, Albuquerque, NM; "The University Consortium for Research on Electronics in Space: Its Status, Its Accomplishments, Its Promise."

Radiation Hardening Electronics Technology, October 17, 1989, Albuquerque, NM; "Vanderbilt Analysis Codes: Applications to CMOS/SOI."

Rensselaer Polytechnic Institute, February 6, 1990, Troy, NY; "Single-Event Upset Modeling for CMOS/SOI Digital ICs."

The Charles Stark Draper Laboratory, April 17, 1990, Cambridge, MA; "X-Ray Process-Induced Defects and Source Modeling."

Single-Event Effects Symposium, April 24, 1990, Los Angeles, CA; "SEU Outlook."

DNA/HDL Workshop on Test Structures for Semiconductor Device Radiation Hardening and Hardening Assurance, April 25, 1990, Los Angeles, CA; "PARA."

Center for Comparative Policy Studies in Science, Engineering and Technology, Dubrovnik, Yugoslavia; June 18, 1990, "UCRES-A Multi University Consortium Model for Engineering Education and Research."

Royal Air Force Royal Signals and Radar Establishment, Farnborough, England; September 17-21, 1990, "An Overview of Current U.S. Silicon-On-Insulator Technology."

University of Wisconsin, October 2-4, 1990, Madison, WI; "Process Radiation Interactions with MOS Device Structures."

Vanderbilt Owen Graduate School of Management, October 23, 1990, Nashville, TN; "Technical Writing: A Workshop for Graduate Students in Engineering and the Sciences."

The Charles Stark Draper Laboratory, Cambridge, MA; January 28-29, 1991, "Single-Event Upset Natural Environments."

Second Defense Advanced Research Projects Agency X-Ray Lithography (XRL) Program Workshop, January 30-31, 1991, St. Augustine, FL; "Effects of Process-Radiation-Induced Defects on CMOS Devices."

The Charles Stark Draper Laboratory, January 31, 1991, Cambridge, MA; "UCRES: The University Consortium for Research on Electronics in Space."

Vanderbilt University Meeting on U.S. - U.S.S.R. Academic Collaboration, April 18, 1991, Nashville, TN; "Space Electronics Research at Vanderbilt University."

Louisiana State University, July 25-26, 1991, Baton Rouge, LA; "X-Ray Process-Induced Defects."

Semiconductor Research Corporation, July 16-20, 1991, Dallas - Fort Worth, TX; "Reliability and Performance Degradation of Advanced Commercial CMOS Technologies Using X-Ray Lithography."

C. S. Draper Laboratory, July 23, 1991, Washington, DC; "SEU Modeling and Simulation."

SEMATECH Workshop on X-Ray Lithography and Radiation Effects, November 19, 1991, Austin, TX; "Analytical Characterization of Process-Radiation-Induced Defects in CMOS Devices."

AT & T Bell Labs Workshop on X-Ray Lithography and Radiation Effects, December 16, 1991, Murray Hill, NJ; "Analytical Characterization of Process-Radiation-Induced Defects in CMOS Devices."

1992 SEU Symposium, April 1992, Los Angeles, CA; "SEU Characterization of Modern, Hardened Technologies."

Arnold Air Force Base, March 1993, Tullahoma, TN; "Radiation Effects Specializations at Vanderbilt University."

Second European Conference on Radiations and Their Effects on Components and Systems, September 1993, Saint-Malo, France; "Hardening at the Design Level."

Université Metz / Supélec, May, 1997, Metz, France; "An All Silicon Based Optical Interconnect Technology."

Texas Instruments Central Research Labs, October 1997, Dallas, TX; "Silicon-Based Optical Interconnect."

Motorola, October, 1997, Austin, TX; "An Optical Interconnect System for Silicon Integrated Circuits."

SEMATECH, October, 1998, Austin, TX, "Silicon-Based Optical Interconnect," coauthored with D. V. Kerns.

SRC Annual Program Review – Rensselaer Polytechnic Institute (RPI), November 17-21, 1997, Troy, NY, "An All Silicon Based Optical Interconnect Technology," coauthored with D. V. Kerns.

SRC Annual Program Review – RPI, November 1998, Troy, NY, "An All Silicon Based Optical Interconnect Technology," coauthored with D. V. Kerns.

Vanderbilt University Faculty Forum, December 6, 1999, Nashville, TN; "Olin College: Creating an Educational Institution from First Principles."

Society of Women Engineers, February 17, 2000, Mansfield, MA; "Perspectives of High Ranking Women Engineers."

National Reconnaissance Office, October 2, 2000, "Field Emission Vacuum Integrated Circuits (FEVICS) for Ultra-High Speed, Radiation-Immune Electronic System," coauthored with J. L. Davidson, W. P. Kang, and D. V. Kerns.

National Science Foundation, Women in Engineering Leadership Conference, October 12-14, 2000, Winterpark, CO; "The Creation of Olin College."

FIRST – Women in Science and Technology Forum, November 3, 2000, Manchester, NH; "Where Do You Want to Work?"

FIRST – Women in Science and Technology Forum, November 3, 2000, Manchester, NH; "Widening Your Imagination."

NAE Action Forum on Diversity, March 29-30, 2001, Smith College, Northampton, MA; "Olin College: Engineering for the Future" (supporting R. K. Miller).

Worcester Polytechnic Institute, May 3, 2001, Worcester, MA; "Olin College: Engineering for the Future."

FIRST – Women in Science and Technology Forum, November 9, 2001; Manchester, NH.

American Association for Higher Education, AAHE's 2002 Assessment Conference, June 20-23, 2002, Boston, MA; "Student Partners in Assessment at Olin College."

ASEE/SEFI/TUB International Colloquium, October 1-4, 2002, Berlin, Germany; "The Olin College - Georgia Tech Lorraine Undergraduate Engineering Education Partnership."

International Conference on Engineering and Computer Education, March 16-19, 2003, Sao Paulo, Brazil; "The Engineering Education Societies of the World."

Engineering Societies Diversity Summit, September 16-17, 2003, Washington, DC; "American Society for Engineering Education – Diversity Initiatives."

IEEE Nordic Education Society Chapter Workshop, September 2003, Copenhagen, Denmark; “American Society for Engineering Education – Promoting Excellence in Engineering Education.”

NAE Professional Engineering Societies Convocation, May 3, 2004, Washington, DC; “ASCE Body of Knowledge: Education of the Future Engineer, ‘Comments from the Perspective of Engineering Education.’”

Fifth International Conference on Information Technology Based Higher Education and Training (ITHET) 2004, May 31-June 2, 2004, Istanbul, Turkey; “Information Technology Based Higher Education and Training,” (delivered by Marion Hagler).

ASEE Annual Conference, June 2004, Salt Lake City, UT; “The Role of Engineer.”

NAE 2020 Summit, July 2004, Washington, DC; “Designing from a Blank Slate – The Development of the Initial Olin College Curriculum,” coauthored with Richard K. Miller and David V. Kerns, Jr.

3<sup>rd</sup> ASEE International Colloquium of Engineering Education (ICEE 2004), September 7-10, 2004, Beijing, People’s Republic of China; “A Design-Focused Engineering and Technology Curriculum,” coauthored with David V. Kerns, Jr.

33<sup>rd</sup> International Symposium IGIP/IEEE/ASEE, Engineering Education Today: Local Identity – Global Awareness, September 2 –October 1, 2004, Fribourg, Switzerland; “Olin College – Developing New Engineering Curricula from Basic Principles,” coauthored with David V. Kerns, Jr.

Pennsylvania State University 2004-2005 Air Products Distinguished Lecturer, November 4, 2004; University Park, PA; “Themes for Curricular Innovations.”

University of Vermont College of Engineering and Mathematics Retreat Keynote, December 12-13, 2004, Burlington, VT.

Arizona State University East Commencement Address, December 16, 2004, Mesa, AZ.

Ohio Northern University Spotts Engineering Lecturer, March 21, 2005, Ada, OH; “Predicting Your Future.”

ASEE New England Section Conference, The School of Engineering, Fairfield University, April 8, 2005, Fairfield, CT; “The Value of Engineering Education and Practice in the 21<sup>st</sup> Century.”

National Science Foundation (NSF) Workshop, April 18-19, 2005, National Academy of Engineering, Washington, DC, *Improving the Technological Literacy of Undergraduates Identifying the Research Issues*.

Women in Engineering and Science Program (WESP) Distinguished Lecturer Kansas State University, April 14-15, 2005, Manhattan, KS; “Engineering Life at Olin College.”

ASEE Annual Conference and Exposition President’s Main Plenary Address, June 13, 2005, Portland, OR.

ASEE Annual Conference and Exposition Multidisciplinary Engineering Constituent Committee, June 13, 2005, Portland, OR; “ASEE & ABET Interactions & Collaboration,” co-authored with J. A. Weese and E. C. Jones.

ASEE Annual Conference and Exposition, June 13, 2005, Portland, OR; Panel on “Issues of Diversity in Engineering Education and a Path Forward for Action.”

ASEE Annual Conference and Exposition Distinguished Lecturer, June 15, 2005, Portland, OR; “Highlighting the Engineer of 2020.”

20<sup>th</sup> Anniversary of The Gordon Institute of Tufts University, Invited Speaker, June 21, 2005, Medford, MA; “Educating Engineers in 2020.”

Babson-Olin/SyE<sup>3</sup>, Symposium for Engineering Entrepreneurship Educators, June 22, 2005, Babson Park, MA; “Mapping the Territory: The Engineering Interface.”

Colorado School of Mines Faculty Conference Invited Keynote Speaker, August 22, 2005, Golden, CO, “Engineering Life.”

NAE/ECEDHA Globalization Effects on ECE Education for the Engineering Profession Workshop, November 14, 2005, Washington, DC, Panel on “The Impact of Globalization on ECE Curriculum.”

ICECE ’05, Keynote via video, November 15, 2005, Madrid, Spain, 2<sup>nd</sup> International Conference on Electrical and Computer Engineering 2005, (ICECE ’05), “Building a Common Space for the Education of Engineers.”

SUNY-Oswego, January 10, 2006, Oswego, NY, “Issues in Undergraduate Engineering Education.”

National Consortium for Continuous Improvement in Higher Education (NCCI) Conference, March 27, 2006, MIT, Cambridge, MA, “Creating a Culture of Continuous Improvement – With Students as Partners,”. co-authored with A. C. Schaffner.

NAE Engineering Service Learning Conference on Institutionalizing Service Learning, May 24, 2006, Washington, DC, Panel on “How to Institutionalize Service Learning.”

NAE Engineering Service Learning Conference on Institutionalizing Service Learning, May 24, 2006, Washington, DC, Poster session on “Service to the College: An Opportunity for an Innovative Approach to Service Learning at the Franklin W. Olin College of Engineering,” co-authored with A. C. Schaffner.

Babson-Olin/SyE<sup>3</sup>, Symposium for Engineering Entrepreneurship Educators, June 13, 2006, Babson Park, MA; “Mapping the Territory Part II: The Engineering Interface.”

ASEE Annual Conference and Exposition, June 19, 2006, Chicago, IL, ABET Accreditation of Multidisciplinary Programs, “Progress of the ASEE Accreditation Activities Committee (ASEE/AAC),” co-authored with J. Gosink, J. A. Weese and E. C. Jones.

ASEE Annual Conference and Exposition, June 21, 2006, Chicago, IL, Panel on Issues of Diversity: Path Forward for Action, “Best Practices for Promoting Diversity in Graduate Engineering Education.”

National Society of Professional Engineers 2006 Annual Convention, July 6, 2006, Boston, MA, Led Panel on “Conspiracy to Succeed: Attracting the Right Kids to Engineering.”

A Dialogue on Engineering Education: the Role of the First Year Conference Invited Keynote Speaker, July 31, 2006, Notre Dame, IN, “Alliteration 101: Engaging Entering Engineers – Connecting to Contexts; Reveling in Relevance.”

35<sup>th</sup> International IGIP Symposium on Engineering Education – The Priority for Global Development, Welcome statement delivered via video, September 18, 2006, Tallinn University of Technology, Tallinn, Estonia.

Danish Pedagogical Network for Engineering Education (IPN) 10<sup>th</sup> Anniversary Conference on Globalization and Future Engineering Skills 2020, Invited Keynote Speaker, October 6, 2006, Aalborg University, Denmark, “Globalization and future Engineering Skills – American Perspective.”

University of Texas at Austin, Invited Keynote Speaker, College of Engineering Workshop on Educating the Engineer of 2020: Adapting Engineering Education to the New Century, March 6, 2007, Austin, TX, “Innovating Improvements in Engineering Education.”

Invited Speaker, GaTech ECE Advisory Board, April 16, 2007, Atlanta, GA, “Olin College ... from Scratch to Present.”

Babson-Olin/SyE<sup>3</sup>, Symposium for Engineering Entrepreneurship Educators, June 12, 2007, Babson Park, MA; “Mapping the Territory Part II: The Engineering Interface.”

ASEE Annual Conference and Exposition, June 26, 2007, Honolulu, HI, Panel on “Advice from the Experts for NEEs (New Engineering Educators) at Small Universities.”

ASEE Annual Conference and Exposition, June 27, 2007, Honolulu, HI, “Articulating a Multifaceted Approach for Promoting Diversity in Graduate Engineering Education,” co-authored with E. Deloach, L. Morell, C. C. Purdy, P. Smith, S. L. Truesdale and B. Waugh.

Workshop on the Engineer of the Future, Invited Keynote Speaker, University of Illinois at Urbana-Champaign, Urbana, IL, September 5, 2007, “Olin College – From Scratch to Present.”

Society of Women Engineers National Conference, October 27, 2007, Nashville, TN, Invited Presentation and Panel, “Reforming Engineering Undergraduate Education – Better for Women is Better for Everyone.”

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## RECENT EDITORIALS, ARTICLES AND INTERVIEWS

“The Thing You Think You Cannot Do,” quotation in ExxonMobil editorial on the Federal page of *Washington Post*, February 2004.

“ASEE, For the Time Being,” ASEE President’s Welcome, [www.asee.org](http://www.asee.org), June 2004-June 2005.

“If I’m Happy, Can This Be EE School?,” quotation in article by Charles J. Murray in *EE Times*, August 2004.

“Shifting Gears in Engineering Education,” quotation in article by Dee Anne Finken in *SWE* (Magazine of the Society of Women Engineers), pp. 18-26, fall issue 2004.



“A Perfect Partnership,” President’s letter in *ASEE Prism*, vol. 14, no.1, pp. 50-51, September 2004.  
 “Interview with Dr. Sherra Kerns” in Tsinghua Weekly student newspaper, Tsinghua University, Beijing, China, p. 4, September 17, 2004.  
 “Directions for Engineering Education,” interview/meeting with Vice Premier of Education, Zhili Chen, Beijing, China, September 2004.  
 “Able Scholars,” article by Michelle Lang in *Design News*, November 2004.  
 “The Making of a President,” article by Bethany Halford in *ASEE Prism*, pp. 49-51, November 2004.  
 “The Global Brain,” President’s Letter in *ASEE Prism*, Vol. 14, No. 6, pp. 42-43, February 2005.  
 “ASEE – A Lead Society,” President’s Letter in *ASEE Prism*, Vol. 14, No. 9, p. 53, June 2005.  
 “Competing Forces,” quotation in *ASEE Prism*, p. 28, October 2005.  
 “The Passion and Pain of Engineering Education,” article by Charles J. Murray in *Design News*, October 10, 2005.  
*Chronicle*, ABC Channel 5, WCVB-TV, Boston, MA, on-camera interview featuring Olin College’s “do-it-yourself” culture with co-anchor Mary Richardson, aired March 23, 2006.  
 “Female Engineers Find a Home at Olin College,” article by Catherine Williams in [www.masshightech.com](http://www.masshightech.com), May 2006.  
 “The Olin Experiment,” article by Erico Guizzo in *IEEE Spectrum*, pp. 30-36, May 2006.  
*21 Things Every Future Engineer Should Know: A Practical Guide for Students and Parents*, quotations in book by Pat Remick and Frank Cook, Dearborn Financial Publishing, Inc., Nov. 2006.  
 “Re-engineering the engineer: How tiny Olin College set out to pump new life – and fun – into a musty curriculum,” article by Michael Myser in *Business 2.0 Magazine*, June 2007.

#### **CONSULTING OR PROPRIETARY EXCHANGE AGREEMENTS (PAST AND PRESENT)**

Analog Devices  
 Aptek  
 ARACOR  
 Argonne National Laboratory  
 AT&T  
 BDM  
 Boeing Aerospace  
 C. S. Draper Laboratory  
 General Electric  
 Harris Semiconductor  
 Honeywell  
 Hyundai  
 Jazz Semiconductor  
 Jet Propulsion Laboratories  
 L-3 Communications  
 Martin Marietta  
 Mission Research Corporation  
 Motorola Semiconductor  
 National Semiconductor  
 PeakVision  
 Radiation Microsciences  
 RCA  
 Research Triangle Institute  
 Sandia National Laboratory  
 Scientific Applications International Corporation  
 Silicon Compiler Systems  
 Texas Instruments

TRW  
Trojan Defense  
VHSIC Technologies  
Vitesse  
Westinghouse

## **PATENTS**

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Name of Patent: High Impedance-coupled CMOS SRAM for Improved Single Event Immunity  
Inventors: S.E. Diehl and J.R. Hauser  
Patent number : 4,805,148  
Granted: 1985

Name of Patent: Transmission Cathode for X-ray Production  
Inventors: R. Whitlock, S.E. Kerns, D.V. Kerns Jr., W.P. Kang, and J.L. Davidson.  
Navy Case number 79,348  
Granted: 2001

## **SECURITY CLEARANCES (DATES GRANTED)**

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1/06/83 - 8/20/86	Sandia National Laboratories	(DoE) -- Q
4/13/84 - 1/20/90	Research Triangle Institute	(DoD) -- S
5/16/85		CNWDI
8/23/85 - 9/15/92	N. C. State University	(DoD) -- S; CNWDI
4/03/90 - 1996	National Academy of Sciences	(DoD) -- TS