

Faculty Office:

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**Education**

Ph. D., Solid State Physics, Purdue University, West Lafayette, IN, May 1984  
Thesis: *Experimental Study of Low-Frequency Excess (1/f) Noise in Metal Films*  
Advisor: Nicholas J. Giordano  
MS, Experimental Physics, Purdue University, West Lafayette, IN, August 1981  
BS with Distinction, Physics (Honors) and Applied Mathematics, Purdue University, West Lafayette, IN  
May 1980

**Employment History**

**Vanderbilt University:**

Professor of Electrical Engineering (1999-present)  
Professor of Physics (2000-present), secondary appointment  
Appointed Landreth Chair of Engineering (2009-present)  
Chair of Electrical Engineering and Computer Science Department (2003-2020)  
~ 35 tenured/tenure-track faculty; ~ 15 administrative staff.  
~ 200 graduate students; ~ 600 undergraduate students; two large research institutes with > 50  
professional research faculty and staff (combined).  
EECS research funding increased from ~ \$ 9M per year in 2002-2003 to ~ \$ 25M per year in  
2020; publications increased from ~ 100 in 2003 to > 300 in 2020.  
Associate Dean for Research (½ time), Vanderbilt University School of Engineering, VUSE (2001-2003)  
~ 85 tenure/tenure-track faculty.  
VUSE research funding increased from ~ \$16.7M in 2001 to ~ \$30 M in 2003; it is now > \$70M.

**Previous Employment:**

Sandia National Laboratories, Albuquerque, NM, Distinguished/Senior Member of Technical Staff,  
Radiation Technology & Assurance Dept. (SMTS 1984 - 1989, DMTS 1990 - July 1999).  
Purdue University, Research Assistant (1981-1984), Tutor (1981-1983), Graduate Teaching Assistant  
(1980-1981), Undergraduate Teaching Assistant (1978-1980), Physics Department

**Research Interests/Years of Experience**

Effects of ionizing radiation on microelectronic devices & materials - 39 yrs.  
Novel microelectronic materials, including silicon-on-insulator materials - 37 yrs.  
Charge trapping in silicon dioxide, and Si/SiO<sub>2</sub> interface-trap generation - 39 yrs.  
Highly reliable electronics for high-radiation and high-temperature environments - 39 yrs.  
Origin(s) of 1/f noise in semiconductors, semiconductor devices, and metals - 44 yrs.  
Standard test methods to assess and assure radiation hardness and reliability of electronic devices - 37 yrs.  
Defects, reliability, radiation response of SiC, GaN, and other compound semiconductor devices – 23 yrs.  
Thermally stimulated current methods to profile defects in insulators - 13 yrs.  
Co-invented and assisted in development of novel protonic nonvolatile memory - 6 yrs.

## **Selected Professional Honors and Awards**

### *Honors, Awards, and Memberships*

#### Professional Society

2009 IEEE NPSS Merit Award –highest individual technical award given by IEEE NPSS, for lifetime achievement

Fellow of the American Association for the Advancement of Science, 2020

Fellow of The American Physical Society, 2001

Fellow, IEEE (M 87, SM 90, Fellow 1997)

#### **IEEE Confs. on Nuclear and Space Radiation Effects Conference Paper Awards (25):**

Outstanding (O)/Meritorious (M) Student (S: as co-author): 2021(S); 2020(M); 2019(S); 2017(O); 2015(S); 2013(O+S); 2012(S); 2002(O+2M); 2001(M); 1998 (O); 1997(O+2M); 1996(O+M); 1995(O+M); 1994(2M); 1993(M); 1988(O); and 1985(O). Out of ~80-110 papers, per year.

#### **Conferences on Hardened Electronics and Radiation Technology Conference Paper Awards (4):**

2004(M), 1995(O), 1990(O), 1988(O). Out of ~80 papers, per year.

#### **RADECS (RADiation and its Effects on Components and Systems) Conference (2): 2021 (O+S)**

Other Paper/Presentation Awards: Outstanding Student Paper (co-author), 2017 International Workshop on Reliability of Micro- and Nano-Electronics in Harsh Environment, Chengdu, China, May 22-24, 2017. 2015 GOMAC Outstanding student poster award; 1997 Outstanding Radiation Effects Data Workshop Presentation; 1995 Outstanding Oral Presentation, IEEE NSREC.

Member, Phi Beta Kappa (National Honorary), Sigma Pi Sigma (National Physics Honorary), Phi Kappa Phi (National Honorary)

Member, American Society for Engineering Education, continuous since 2002

#### Other Professional Awards and Honors

2014-2019: Honorary Professor, Institute of Microelectronics, Chinese Academy of Sciences

2011-2019: Honored Professor of the Shanghai Institute for Microsystem and Information Technology, Chinese Academy of Sciences

2013: Guest Professor, Harbin Institute of Technology, June 2013

2013: Honorary Professor, Xinjiang Institute of Physics & Chemistry, Chinese Academy of Sciences

2009: American University of Cairo, Egypt, Distinguished Visiting Professor, October 2009

2007: Purdue University, College of Science, Distinguished Alumni Award

2002: Chancellor's Research Award, for achievement in research and scholarship (with Ron Schrimpf, and Sokrates Pantelides). This was presented for work on  $1/f$  noise and identification of structures for the O vacancy in SiO<sub>2</sub>.

2000: Named one of Top 250 most highly cited researchers in Engineering (1981-1999) by Inst. for Scientific Information

*Discover Magazine* (1998), *R&D Magazine* "R&D 100" (1997) and *Industry Week* "Technology of Year" (1997) Awards, for co-invention of protonic nonvolatile field effect transistor memory (patent issued 11/3/1998)

1995-1999: Sandia National Labs Awards for Excellence, and Meritorious Achievement Award

1990: Named Distinguished Member of Technical Staff, Sandia National Laboratories

1984: Lark-Horovitz Award, Purdue University, for excellence in graduate research.

1982-1984: David Ross Graduate Fellow, Purdue Univ; 1980-1982: Purdue Univ Graduate Fellow

**PUBLICATIONS (632 total – 559 refereed)**

491 peer-reviewed journal articles  
55 refereed conference proceedings papers and book chapters  
62 other conference proceedings papers  
13 refereed journal articles in restricted access literature; 11 other publications

Citations: ~ **27,148** (Google Scholar, May 3, 2023)  
h factor: **89** (at least 89 papers cited at least 89 times)  
3 > 400; 16 ≥ 200; 76 ≥ 100; 438 ≥ 10

**PRESENTATIONS (> 700 Total; > 110 Invited Talks and Short Courses)**

*Full lists provided below.*

**Summary of Sponsored Research**

*At Vanderbilt University*

Contracts and Grants as PI (total ~\$3 M)

1. “Development and Evaluation of IC Shielding Overlayers,” **\$50k**, Vorago Semiconductor, April 2022 to September 2022. Fleetwood, Schrimpf, Warren, Sierawski, Reed.
2. “Modeling-Enhanced Survivability Testing (MEST) Strategy for Microelectronics,” **\$75k**, Alphacore (Sub to Department of Defense), Dec. 2021 to June 2022. Fleetwood, Reed, Schrimpf, Sierawski, Warren, Alles. (50%)
3. “Radiation Effects in Vertical 2D Heterostructure Tunneling Devices Formed Using Large-Area Synthesized Materials,” Feb. 1, 2016 – Jan. 31, 2019, **\$720k**, DTRA, Fleetwood, Pantelides, Zhang (40%).
4. “Role of Radiation-induced Defects on the Acceleration of Irradiated GaN HEMT Failure Mechanisms,” Sept. 2013 – Oct. 2016, **\$126k**, NRO, Fleetwood, Schrimpf (50%).
5. “R, D, T, & E of Radiation Effects Phenomena on Electronic Devices Subjected to Aging Environments,” July 2006 – May 2008, **\$1.15M**, US Navy, Fleetwood, Schrimpf, Pantelides (50%)
6. “RDT&E (Research, Development, Test, and Evaluation) of Radiation Effects Phenomena of Hydrogen and Electronics Aging Research,” Jun 2005 – Dec 2005, **\$196k**, Navy/MRC: Fleetwood, Schrimpf, Pantelides. (50 %)
7. “RDT&E of Radiation Effects Phenomena of Hydrogen and Electronics Aging Research,” Apr 2005 – Oct 2005, **\$180k**, Navy/MRC: Fleetwood, Schrimpf, Pantelides. (40 %)
8. “RDT&E of Enhanced Low Dose Rate Sensitivity (ELDRS) Research,” Feb 2004 – Jun 2005, **\$156k**, Defense Threat Reduction Agency: Fleetwood, Schrimpf. (50 %)
9. “Neutron Annealing in GaAs,” Apr 2004 – Mar 2005, **\$50k**, Sandia National Laboratories: Fleetwood. (75 %)
10. “Total Ionizing Dose Research,” Apr 2003 – Apr 2004, **\$45k**, Defense Threat Reduction Agency: Fleetwood, Schrimpf. (50 %)
11. “Low Frequency Noise Measurements,” Jun 2002 – Jun 2003, **\$2.5k**, SiCel Corporation: Fleetwood. (75 %)
12. “Radiation Effects Device Physics for RHTCAD Modeling,” Nov. 1999 – Dec. 2002, **\$478k**, US Navy/MRC: Fleetwood. (75 %)

Contracts and Grants as co-PI (total ~\$42 M)

1. “Radiation Effects Center of Excellence,” **\$5M**, Air Force Office of Scientific Research, 2021, Schrimpf, Fleetwood, Ringel, Speck, Pantelides, Zhang. (15%)

2. "Radiation-Hardened Microelectronics Workforce Development Consortium." 2020, **\$2M**, OSD/NSWC, Alles, Schrimpf, Fleetwood, Massengill, Reed ... (15%)
3. "Physics of Failure and Radiation Effects in Emerging Electronic Materials and Devices in Space Applications," 2017, **\$1.5 M**, AFOSR, Schrimpf, Fleetwood, Alles, Reed, Pantelides, Zhang (25%).
4. "Air Force (AF) Ground Based Strategic Deterrent (GBSD) Program Support," 2015, **\$150k**, USAF, Schrimpf, Massengill, Alles, Kauppila (10%).
5. "Phase 2.0: Total Ionizing Dose Test Screen of Candidate Devices." 2015, **\$148k**, Moog, Witulski, Fleetwood, Schrimpf, Reed, Massengill (20%).
6. "Navy SP27 Model Development and Verification Support," 2014-2015, **\$339k**, US Navy, Schrimpf, Alles, Fleetwood, Massengill (20%).
7. "The Impact of Radiation Damage on Mechanical and Electrical Properties of MEM/NEM Structures," 2015-2018, DTRA, **\$1.75M**, Alles, Schrimpf, Fleetwood, Weller (25%).
8. "Radiation Effects in Two Dimensional Material/High-K Gate Oxides," 2014-2017, **\$655k**, DTRA: Schrimpf, Alles, Reed, Zhang (20%).
9. "Radiation Effects in III-V MOSFETs for sub-10 nm CMOS," 2014-2019, **\$744k**, DTRA: Schrimpf, Alles, Fleetwood, Zhang (25%).
10. "Effects of X-ray based PCB Inspection Systems on Transistor Parameters," Aug. 2013 – July 2014, **\$60k**, Silicon Valley Community Foundation, Bhuva, Fleetwood, Zhang (20%)
11. "Graphene Memory Device," **\$30k**, July 2012 – March 2013, AFRL/Anevee, Alles, Fleetwood, Schrimpf (30%).
12. "Rad-Hard Power MOSFET Consulting Activity," Aug. 1, 2012 – Dec. 31, 2012, **\$42k**, Semicor Corp: Massengill, Witulski, Schrimpf, Fleetwood (20%).
13. "Investigations of Physical Mechanisms for Radiation-Induced Effects in Non-Silicon Channel CMOS Devices," Jan. 1, 2012 – Dec. 31, 2014, **\$1.75M**, DTRA: Reed, Mendenhall, Schrimpf, Weller, Alles, Witulski, Fleetwood, Galloway (10%)
14. "Physical-Mechanisms Based Reliability Analysis for Emerging Technologies," Sept. 2011 – Sept. 2016, **\$1.25M**, AFRL: Schrimpf, Fleetwood, Alles (45%)
15. "D5LE Guidance Replacement Support," Jul. 2011 – Dec. 2011, **\$281k**, Aero Thermo/US Navy: Schrimpf, Fleetwood, Holman, Massengill, Alles (15%).
16. "Minuteman Guidance Replacement Program Radiation Test Philosophy," Jul. 2011 – Sept. 2011, **\$282k**, Department of Defense: Schrimpf, Fleetwood, Holman, Massengill, Weller, Witulski (10%).
17. "Total Dose and Single Event Effects Hardening," Aug. 2011 – Oct. 2011, **\$33k**, Semicor Corp: Rowe, Fleetwood, Massengill, Schrimpf, Alles (20%).
18. "Radiation Studies in GaN Materials and Devices," Feb. 2011 – Jun. 2016, **\$625k**, DTRA: Schrimpf, Fleetwood (50%).
19. "Radiation Effects in Carbon Based Electronic Materials," March 2010 – Sept 2014, **\$1.2M**, DTRA: Alles, Davidson, Pantelides, Fleetwood (25%)
20. "Rapid-Response Silicon-based Optical Dosimeters for Acute, High Dose Radiation," April 2010 – April 2013, **\$714k**, DTRA: Weiss, Fleetwood, Reed, Weller. (20%)
21. "DURIP: Purchase of High-Speed Test/Probe Equipment for Reliability Studies," April 2010 – June 2011, AFOSR, **\$366k** (equipment grant): Reed, Schrimpf, Fleetwood (30%)
22. "MURI: Design-for-Reliability Initiative for Future Technologies," May 2008 – Dec 2013, **\$1.2M**, ONR: Schrimpf, Fleetwood, Pantelides, Reed. (30%)
23. "Fundamental Studies of the Impact of Complex Material Systems," May 2008 – May 2013, **\$1.25M**, DTRA: Reed, Weller, Mendenhall, Massengill, Fleetwood. (10%)
24. "MURI: Radiation Effects on Emerging Electronic Materials and Devices," May 2005 – Apr 2010, **\$5.5M**, AFOSR: Schrimpf, Fleetwood, Massengill, Weller, Reed, Mendenhall (and VU Physics, GA Tech, Florida, NC State, Rutgers, Arizona St.). (25 % - VU Engineering, ~ 1.5M over 5 years)
25. "ISDE – Institute for Space and Defense Electronics," Jan 2005 – Dec 2007, **\$8M**, Aero Thermal Technology/Navy: Schrimpf, Massengill, Fleetwood, Holman. (10 %)
26. "R, D, T, & E of Rad Effects in Analog and Mixed Signal Technology (Air Force Minuteman)," Jun 2005 – May 2006, **\$445k**: Schrimpf, Massengill, Fleetwood, Weller. (15%)
27. "TCAD Modeling of Particle Radiation Effects in GaN-Based Devices," (2006) **\$94.5k**: Schrimpf, Fleetwood. (40%)
28. "RDT&E of Radiation Effects Phenomena of Hydrogen and Electronics Aging Research," Jun 2004 – May 2005, **\$175k**, Navy/MRC: Schrimpf, Fleetwood, Pantelides. (40 %)

*Dan Fleetwood, CV: May 3, 2023*

29. "Radiation Effects in Microelectronics," Jun 2000 – Mar 2005, **\$750k**, Defense Threat Reduction Agency: Schrimpf, Fleetwood, Massengill. (33 %)
30. "Radiation Effects Modeling and Simulation," Sep 2003 – May 2005, **\$273k**, BAE Systems: Schrimpf, Massengill, Fleetwood, Holman, Galloway. (10 %)
31. "ISDE – Institute for Space and Defense Electronics," Nov 2004 – Dec 2004, **\$535k**, US Navy/Draper Labs: Schrimpf, Massengill, Fleetwood, Holman. (20 %)
32. "ISDE Radiation Effects Modeling and Simulation of Electronic Parts and Technologies (RHAP)," Jun 2004 – Dec 2004, **\$529k**, CS Draper Labs: Schrimpf, Massengill, Fleetwood, Weller, Robinson, Galloway. (20 %)
33. "ISDE – Institute for Space and Defense Electronics," Oct 2003 – Sep 2004, **\$2.56M**, US Navy/Draper Labs: Schrimpf, Massengill, Fleetwood, Holman, Galloway. (20 %)
34. "A Comprehensive Computational Workbench for Application & Development of Radiation Effects Simulation Codes," Sep 2003 – Sep 2004, **\$50k**, Arnold Engineering Development Center: Weller, Schrimpf, Fleetwood. (25 %)
35. "Transient Radiation Effects Research," Apr 2003 – Apr 2004, **\$91k**, Defense Threat Reduction Agency: Massengill, Schrimpf, Fleetwood, Holman. (5 %)
36. "ISDE – Institute for Space and Defense Electronics," Jan 2003 – Sep 2003, **\$1.2M**, US Navy/Draper Labs: Schrimpf, Massengill, Fleetwood, Holman, Galloway. (25 %)
37. "Enhanced Low Dose Rate Sensitivity in Bipolar Devices," Apr 2002 – Mar 2003, **\$93k**, Defense Threat Reduction Agency: Schrimpf, Fleetwood. (50%)
38. "New Design Technology for Rad-Hard Microelectronics," Jul 2002 – Mar 2004, **\$50k**, Computational Fluid Dynamics Research Corporation: Schrimpf, Fleetwood. (20 %)
39. "Research and Development of Strategic Weapons System Management and Technology Issues in a Declining Industrial Base," Nov 2001 – Oct 2003, **\$199k**, US Navy/MRC: Mahaffey, Schrimpf, Fleetwood. (10 %)
40. "Single Event Transients in an Undervoltage Detector," Sep 2000 – Oct 2001, **\$10k**, Hughes Electronics: Schrimpf, Massengill, Fleetwood. (20 %)
41. "DURIP: Radiation Sources for Total-Dose Testing of Electronics," Apr 2000 – Jul 2001, **\$154k**, AFOSR: Schrimpf, Fleetwood, Massengill. (50%)
42. "DURIP: Precision Semiconductor Parameter Analyzer and Test Fixture," Jan 2000 – Dec 2000, **\$47k**, AFOSR: Schrimpf, Fleetwood, Massengill (25%)

Selected Contracts and Grants as a participant (Total: \$27.5 M)

1. "Innovative Characterization of Thin-Film and 2D Materials Combining Novel Optical and Electrical Techniques," Oct. 2017 – Sep. 2020, **\$3.0M**, DTRA, Alles, Reed, Schrimpf, Massengill, Fleetwood
2. "SSP D5LE Program Support," Jan. 2013 – Dec. 2015, **\$2.2M**, Aero Thermo/US Navy, Schrimpf, Massengill, Fleetwood (10%)
3. "USAF Minuteman AIMU Refresh," Jan. 2013 – Nov. 2014, **\$1.1M**, Aero Thermo/US Air Force, Schrimpf, Massengill, Reed, Weller, Fleetwood (8%)
4. "Design Science For Radiation Effects Rate Prediction and Development," March 2010 – February 2014, **\$450k**, DTRA, Schrimpf, Alles, Reed, Weller, Fleetwood (10%)
5. "ISDE – Institute for Space and Defense Electronics," Jan. 2008 – Dec. 2010, **\$5.0M**, Aero Thermo Technology/Navy: Schrimpf, Massengill. Radiation effects on microelectronics (8 %)
6. "IGERT: The Vanderbilt-Fisk Interdisciplinary Research and Education in the Nanosciences," Oct 2003 – Oct 2008, **\$2.6M**, NSF: Feldman, Cummings, Collins, Rosenthal, Wittig (role: supported writing of proposal draft; faculty participant). (3 %)
7. "Vanderbilt Scientific Computing Center for Multidisciplinary Research," Sep 2003 – Sep 2008, **\$8.3M**, VU Academic Venture Capital Fund (competitively awarded): Moore, Schrimpf, Sheldon (role – faculty participant in center). (2 %)
8. "MURI: Radiation Effects, from Defects to Devices," Jul 1999 – Jun 2004, **\$4.2M**, AFOSR: Schrimpf, Pantelides (VU), Lucovsky (NC State), Brillson (Ohio St.), Weber (UC Berkeley), Neifeld (Arizona). (role – principal collaborator with Schrimpf and Pantelides). (25 %)

Externally Sponsored Research at Sandia National Laboratories (partial list): Total \$5.4 M

<i>Project</i>	<i>Funding Source</i>	<i>Funding Level &amp; Duration</i>	<i>Role</i>	<i>Duration</i>
Advanced Memory Studies	DoD/Intelligence	<b>325k</b> (18 mo)	PI 100%	1998-1999
Protonic Nonvolatile Memory Dvlpmt. (W. Warren, PI)	DARPA/ETO	<b>800k</b> (24 mo)	Co-PI 25%	1997-1999
Enhanced Low-Dose-Rate Bipolar Gain Degradation	Defense Special Weapons Agency (formerly DNA)	<b>900k</b> (60 mo)	PI 60 %	1994-1999
Thermally Stimulated Current in MOS Capacitors	Defense Nuclear Agency (DNA)	<b>500k</b> (36 mo)	PI 75 %	1992-1994
Radiation Effects on Electronics & Sensors (P Winokur, PI)	Ballistic Missile Defense Org.	<b>1.4M</b> (24 mo)	Co-PI 33 %	1991-1993
Improved MOS Radiation Test Methods (P Winokur, PI)	DNA	<b>750k</b> (48 mo)	Co-PI 50 %	1988-1992
Memory Retention Studies	DoD/Intelligence	<b>300k</b> (24 mo)	PI 60 %	1990-1992
Transistor Degradation Modeling	DoD/Intelligence	<b>200k</b> (24 mo)	PI 50 %	1986-1988
Evaluation of 10-keV X-ray Source (P Winokur, PI)	DNA	<b>200k</b> (24 mo)	Co-PI 50 %	1986-1988

**Summary of Courses Taught at Vanderbilt University**

1. EECE 233/3233 – Electromagnetics (3 hrs). 12 times. Core EE junior electricity and magnetism course. Vectors and operators, Electrostatics, Magnetism, Maxwell’s Eqns. & Plane Wave Solutions, Transmission Lines.

Year	Instructor rating (5 max)	Course rating (5 max)
1999	4.26	3.97
2000	3.84	3.52
2001	4.55	4.05
2002	4.09	3.61
2003	4.31	3.77
2004	4.47	4.13
2005	4.43	4.14
2006	4.34	3.91
2007	3.95	3.27
2008	4.25	3.79
2011	4.00	3.66
2016	4.00	3.55

2. ES 101/ES 1115 – Moore’s Law and the Microelectronics Industry (1 h). 23 times. Fall 2000 through present. Freshman seminar on Moore’s Law, the Microelectronics Economy, and the Stock Market. *New course developed at Vanderbilt.*

Year	Instructor rating (5 max)	Course rating (5 max)
2000	4.23	3.92
2001	4.86	4.57
2002	4.52	4.24
2003	4.75	4.50
2004	4.37	4.05
2005	4.56	4.19
2006	4.11	4.00
2007	4.50	4.50
2008	4.53	4.30
2009	4.36	4.18
2010	4.57	4.35
2011	4.37	4.12
2012	4.38	4.20
2013	3.91	3.91
2014	4.07	3.69
2015	4.45	4.15
2016	4.48	4.27
2017	4.65	4.45
2018	4.31	3.82
2019	4.55	4.40
2020 (in person/on line)	4.79	4.54
2021	4.50	4.20
2022	4.43	3.94

3. EECE 304/6304 – Radiation Effects and Reliability (3 hrs). Graduate course, 12 times. Total Ionizing Dose Effects, Single Event Effects, Displacement Damage, Microelectronics Reliability. *New course developed at Vanderbilt.*

Year	Instructor rating (5 max)	Course rating (5 max)
2000	4.69	4.46
2002	4.60	4.50
2004	4.13	4.13
2006	4.25	4.18
2008	4.25	4.06
2009	4.25	4.08
2012	4.55	4.11
2013	4.75	4.25
2015	4.92	4.57
2017	4.80	4.80
2019	4.88	4.88
2021	4.88	4.88

Note: School means are typically ~ 4.1 out of 5.0.

4. EECE 6302/6307 – Electric and Magnetic Properties of Solids/Solid State Effects and Devices II (3 hrs). 2 times. Graduate course. Semiconductor device and material characterization, with a focus on the defects that limit microelectronics performance, reliability and radiation tolerance. *New course developed in place of two legacy classes that are not currently being offered.*

Year	Instructor rating (5 max)	Course rating (5 max)
2021	4.80	4.60
2022	4.60	4.00

5. EECE 3892 – Introduction to Quantum Engineering (3 hrs). An overview of quantum effects in microelectronics and an introduction to quantum computing (QC). Extends current computing paradigms to quantum-enhanced technologies and practical implementations of QC. *New course to Vanderbilt.*

Year	Instructor rating (5 max)	Course rating (5 max)
2022	3.75	4.00



## **Summary of Graduate Students Advised: Dan Fleetwood**

PhD Graduates (14 as primary advisor; 3 as co-advisor)

**Mariia Gorchichko** completed her PhD (Electrical Engineering) in December 2021. Her dissertation title is “Total-Ionizing-Dose Effects, Low-Frequency Noise, and Random Telegraph Noise of MOSFETs with Advanced Architectures.” MS 2019. ~10 Publications. Mariia received the IEEE NSREC Paul Phelps Award and IEEE NPSS Graduate Student Award. She was supported primarily by teaching assistantships. She is now working at Applied Materials in Santa Clara, CA.

**Pengfei Wang** completed his PhD (Electrical Engineering) in May 2021. His dissertation title is “High-Voltage-Stress Induced Degradation and Radiation Response of GaN-Based HEMTs.” ~10 Publications. Pengfei was supported during his PhD study by AFOSR through the Hi-REV program. Pengfei is working at Western Digital Corporation in Milpitas, CA.

**Simeng (Ellen) Zhao** completed her PhD (Electrical Engineering) in December 2020. Her dissertation title is “Radiation Effects and Low-Frequency Noise of III-V/III-N Semiconductor Devices.” ~15 Publications. MS 2017. Ellen was supported during her PhD study by AFOSR through the Hi-REV program and by the Defense Threat Reduction Agency’s basic research program. She is working at Nokia in Sunnyvale, CA.

**Pan Wang** completed her PhD (Electrical Engineering) in January 2019. Her dissertation title is “Radiation Effects and Low-Frequency Noise of Microelectronic Devices Based on Two-Dimensional Materials.” ~15 Publications. MS 2017. Pan received the IEEE NSREC Paul Phelps Award and IEEE NPSS Graduate Student Award. She was supported by the Defense Threat Reduction Agency’s basic research program. She is working at Amazon in Seattle, WA.

**Rong Jiang** completed her PhD (Electrical Engineering) in January 2018. Her dissertation title is “Bias Dependence of Radiation Response and Reliability of AlGaIn/GaN High Electron Mobility Transistors.” ~13 publications. Rong was supported by AFOSR through the Hi-REV program and by the Defense Threat Reduction Agency’s basic research program through her PhD studies. Rong is working at Intel Corporation, Hillsboro, OR, as a reliability engineer.

**Guoxing Duan** completed his PhD (Electrical Engineering) in August 2016. His dissertation title is “Radiation effects, negative bias-temperature instability, and low-frequency  $1/f$  noise in SiGe/SiO<sub>2</sub>/HfO<sub>2</sub> pMOS Devices.” ~8 publications. MS 2014. Guoxing was supported by AFOSR through the Hi-REV program during his PhD studies. Guoxing is now a reliability engineer with Microsoft in Redmond, WA.

**Jin Chen** completed her PhD (Electrical Engineering) in August 2016. Her dissertation title is “Radiation Response and Reliability of High Speed AlGaIn/GaN HEMTs.” ~15 Publications. MS 2013. Jin was supported by the Defense Threat Reduction Agency’s basic research program during her PhD studies. Jin received the 2014 IEEE NSREC Paul Phelps Award (one of three), the 2015 IEEE NPSS Graduate Student Award (one of four), and the 2015 IEEE NSREC Outstanding Student Conference Paper Award. Jin is now a reliability engineer with Micron Technology in Boise, Idaho.

**Cher Xuan Zhang** completed her PhD (Electrical Engineering) in April 2013. Her dissertation title is “Reliability and Irradiation Effects of 4H-SiC MOS Devices.” > 20 publications: MS 2011. Cher’s work was supported by the Air Force Office of Scientific Research and the Defense Threat Reduction Agency. Cher received the 2012 IEEE NSREC Paul Phelps Award (one of three) and the 2012 IEEE NPSS Graduate Student Award (one of four). Cher is now an engineer with Meta Platforms in Redmond, WA.

**Sarah Ashley Francis** completed her PhD (Electrical Engineering) in October 2011. Her dissertation title was “Aging and irradiation response of  $1/f$  noise in metal oxide semiconductor devices.” ~10 publications; MS 2008. Ashley’s work was funded by the US Navy and AFOSR. She is currently an engineering in the Autani wireless controls division of Enterprise Electric, in Nashville, TN.

**Tania Roy** completed her PhD (Electrical Engineering) in October 2011. Her dissertation title was “Reliability limiting defects in GaN/AlGaIn high electron mobility transistors.” ~9 publications. Tania’s work was funded by the Office of Naval Research through the DRIFT MURI program. Tania was a postdoctoral research associate at the Georgia Institute of Technology and UC-Berkeley. She is currently an associate professor in the Electrical and Computer Engineering Department at Duke University.

**Aritra Dasgupta** completed his PhD (Electrical Engineering) in August 2011. His dissertation title was “Radiation response in MOS devices with high-K gate oxides and metal gates.” Aritra’s work was funded by the Defense Threat Reduction Agency’s basic research program. ~8 publications; MS 2009. He is working at Global Foundries (Hopewell Junction, NY) in advanced semiconductor technology development.

**Xing J. Zhou** completed her PhD (Interdisciplinary Graduate Program in Materials Science) in December 2006. Her dissertation title was “Charge trapping properties of alternative high-K dielectrics in MOS devices.” Xing was funded by the US Navy and AFOSR. Xing has authored or co-authored more than 15 journal articles and received the 2006 IEEE NSREC Paul Phelps Award (one of two) and the 2006 IEEE NPSS Graduate Student Award (one of four). Xing is working with Texas Instruments in Richardson, TX.

**Hao Xiong** completed his PhD (EE) in December 2004. His dissertation title was “Charge trapping and low frequency noise in MOSFETs.” Supported by Defense Threat Reduction Agency, AFOSR MURI, and US Navy/Aging program. 10 publications. MS 2003 (spent one year in Materials Science program). Winner of IEEE NPSS Paul Phelps Award and Graduate Student Award, 2004. Hao worked a post-doctoral researcher at the National Institute of Standards and Technology, Bethesda, MD. He completed the MBA program at Yale University, and is now with the Venture Capital Arm of TCL Corporation in Shenzhen, China.

**James A. Felix** completed his PhD (EE) in December 2003. His dissertation title was “The radiation response and long term reliability of high-K gate dielectrics.” Supported by NSF Risk and Reliability IGERT, and the US Navy. 12 publications. MS 2001. Winner of IEEE NPSS Paul Phelps Award, 2001, and Graduate Student Award, 2002. Jim was a Distinguished Member of the Technical Staff at Sandia National Laboratories, Albuquerque, and is now with the Air Force Research Laboratory in Dayton, OH.

**Stefano Bonaldo** (PhD co-advisee; principal advisor Alessandro Paccagnella, University of Padova, Italy): His dissertation was entitled “Total Ionizing Dose Degradation Mechanisms in Nanometer-Scale Microelectronic Technologies.” Stefano’s work was supported primarily by the University of Padova. He was a visiting scholar at Vanderbilt from September 2018 until July 2019. He is now a post-doctoral research assistant working primarily on biosensors at the University of Padova.

**Indranil Chatterjee** (PhD co-advisee; principal advisor Bharat Bhuvra, EE) completed his PhD (EE) in August 2014. His dissertation was entitled “Geometric Dependence of The Total Ionizing Dose Response of FinFETs.” Indranil’s work was supported by TSMC and the Naval Research Laboratory. He was a post-doctoral research associate at University of Bristol, UK, and is now working for Airbus Industries and is designated as: “Expert - discrete and integrated semiconductor devices.”

**Sriram K. Dixit** (PhD co-advisee; principal advisor Len Feldman, Physics) completed his PhD (Interdisciplinary Graduate Program in Materials Science) in May 2008. His dissertation was entitled

“Radiation-Induced charge trapping studies of advanced Si and SiC based MOS devices.” Sriram joined Intel Corporation as a reliability and product engineer in June 2008.

### **Other MS Advisees**

**Jiarui Ding, MSEE, 2021:** Co-advised with Enxia Zhang: “Aging effects and latent interface-trap buildup in MOS transistors.”

**Ioana Danciu, MSEE, December 2011:** “ $1/f$  noise and aging effects on MOS transistors.” Ioana was supported by the previous employer, the VU Medical Center, during her MS studies. She is now employed at Oak Ridge National Laboratory.

**Rajan Arora, MSEE, May 2009:** “Reliability issues in Ge and SiC MOS devices,” co-advised with Ron Schrimpf. Work supported by AFOSR MURI. Rajan completed his PhD at Georgia Tech and is now working with Texas Instruments in Dallas, TX.

**Dakai Chen** (co-advised with Ron Schrimpf) Thesis title: “Total dose irradiation effects on Si and Ge MOS capacitors with alternative gate dielectrics.” Funded by AFOSR MURI. MS in EE in December 2007. Dakai founded Zero-G radiation effects consultants in 2019.

**Martin Rodgers** (co-advised with Ron Schrimpf), MS, May 2006. His thesis was entitled, “The effects of aging on MOS irradiation and annealing response.” Martin was supported by the US Navy DTO/Aging program and the AFOSR MURI; he now works with Albany Nanotech, New York.

**Xinwen Hu**, MS, May 2003: “Mechanisms of proton-induced degradation in AlGaAs/GaAs heterojunction bipolar transistors.” Funded by AFOSR/MURI. Working at Spang Corporation.

**Quping Hu**, MS, Dec. 2000: “ $1/f$  noise measurements for bulk and SOI MOS devices.” Funded by US Navy/MRC. Left to work at Altera Corporation.

### **PhD Committees**

Xiaosi Zhang, EE, 2023; Shintaro Toguchi, EE, 2022; Jingchen Cao, EE, 2022; Kan Li, IMS, 2022; Christian Schleich, EE, 2022 (Vienna University of Technology); Hugo Dewitte, EE, 2022 (ISAE, University of Toulouse); Chun-Min Zhang, EE, 2021 (EPFL - Neuchatel); Mohammed Rony, EE, 2021; Mahmud Reaz, IGPMS 2021; Yuchen Zhang, EE, 2020; Tianjiao Wang, EE, 2020; Peng Wang, EE, 2020; Andrew Tonigan, IGPMS, 2020; Huiqi Gong, EE, 2018; Wenjun Liao, EE, 2018; Charles Arutt, EE, 2018; Hangfang Zhang, EE, 2018; Kevin Miller, IGPMS, 2018; Chundong Liang, EE, 2017; Kai Ni, EE, 2016; Tu Hong, EE, 2016; Shubhajit Mukherjee, IGPMS, 2015; Girija Gaur, EE, 2015; Schweta Bhandaru, IGPMS, 2015; Yunhao Cao, EE, 2013; Judson Ryckman, EE, 2013; Yang Jiao, EE, 2013; Farah El-Mamouni, EE, 2012; David Hughart, EE, 2012; Nadia Rezzak, EE, 2012; Sandeepan DasGupta, EE, 2010; Jon Gosnell, IGPMS, 2010; Aditya Kalavagunta, EE, 2009; Christina Howe, EE, 2008; Jonny Pellish, EE, 2008; Jingbo Qi, Physics, 2008; Jeffrey Black, EE, 2008; Aditya Karmarkar, IGPMS, 2005 (co-advisor); Abdulrahman Al-Badri, EE, 2005; Sarit Dhar, IGPMS, 2005; Chris Nicklaw, EE, 2003; Tamas Bakos, Physics, 2003; Xiaowei (Vivian) Zhu, EE, 2002; Zsuzsanna Marka, Physics, 2002; Hugh Barnaby, EE, 2002.

### **Other MS Committees**

Frank Padgett, Physics (Fisk Univ.), 2021; Pengfei Wang, EE, 2017; Michael McCurdy, EE, 2017; Vishwa Ramachandran (co-advisor, with R. D. Schrimpf), EE, 2006; Ryan Cizmarik, EE, 2004; John Hutson, EE, 2004; John Stacey, EE, 2004; Ajay Raparla, EE, 2001; Yanfeng Li, EE, 2000

**Post-doctoral researchers advised**

Enxia Zhang, 2008-2010 (now research associate professor at Vanderbilt)

Xing Zhou, 2006-2008 (now at Texas Instruments, Richardson, TX)

Antoine Touboul (co-advisor, with R. D. Schrimpf), 2006 (faculty member at Univ. Montpellier, France)

Bongim Jun, 2002-2004 (now with NASA/JPL)

**Summary of Service**

**National Service**

2007: Chair, APS Pake Prize Committee

2004: Served on Navy SSP Blue Ribbon Panel to review design and progress of Trident Missile/D5LE (D5 Life Extension) at the request of US Navy.

2003: Served on Enhanced Ground Testing panel for Trident Missile/D5LE (D5 Life Extension) at the request of US Navy.

**Professional/Society Service**

2022, Member, Education Committee, IEEE Nuclear and Plasma Sciences Society (NPSS) AdCom

2022, Liaison for IEEE NPSS to Educational Activities Committee

2021, Co-chair, 4<sup>th</sup> International Conference on Radiation Effects in Electronic Devices, Xi'an, China, May 27-30 (hybrid: in-person/virtual).

2019, Scientific Committee, 3<sup>rd</sup> International Conference on Radiation Effects in Electronic Devices, Chongqing, China, May 28-31.

2019, Session Chair, RADECS 2019, Gothenburg, Sweden, July 17-21.

2017, Co-Chair, International Workshop on Reliability of Micro- and Nano-Electronic Devices in Harsh Environment, Chengdu, China, May 22-24, 2017.

2016-2017, Ultra-wide band-gap grand challenge external advisory board, Sandia National Laboratories

2015-Present, Vice-Chair, Publications, IEEE Nuclear and Space Radiation Effects Conference, Radiation Effects Steering Group

2013-Present, Senior Editor, Radiation Effects, *IEEE Transactions on Nuclear Science*

2013-Present, Distinguished Lecturers Chair, IEEE NPSS

2013: Conference publication chair: RADECS 2013, Oxford, UK, Sept. 23-27, 2013

2012-2015, Past Chairman, IEEE Nuclear and Space Radiation Effects Conference, Radiation Effects Steering Group (3 year term)

2009-2012: Chairman, IEEE Nuclear and Space Radiation Effects Conference, Radiation Effects Steering Group (3 year term)

2009: Session Chair, RADECS Conference, Bruges, Belgium, and ISDRS, College Park, MD

2007: Chair, Pake Prize Committee, American Physical Society

2006: Executive Vice-Chair, IEEE Nuclear and Space Radiation Effects Conference, Radiation Effects Steering Group (3 year term)

2006: IEEE NPSS AdCom (4 year term)

2006-2018: Member, Board of Directors, Southeastern Center for Electrical Engineering Education

*Dan Fleetwood, CV: May 3, 2023*

2005-2006: Chair (2005), Forum on Industrial and Applied Physics (FIAP), The American Physical Society: Chaired FIAP Nomination committee. Past-chair (2006) – served on APS Pake Prize Committee, and served as acting chair of FIAP Fellowship Committee.

2006-2010: ABET Program Evaluator

Served as computer engineering visitor, Fall 2006, 2009, and 2010

EE visitor, Fall 2007 and Fall 2008

Developed and implemented assessment for ABET and SACS for VU EECS.

2005: Co-chair, SPIE International Symposium on Noise in Devices and Circuits III (FN 104), Fluctuations and Noise 2005, Austin TX, May 23-26.

2004: General Chair, IEEE Nuclear and Space Radiation Effects Conference, Atlanta, GA. 575 Attendees.

2004: Chair-Elect, Forum on Industrial and Applied Physics (FIAP), The American Physical Society: Chaired FIAP Fellows committee.

2003: Vice-Chair, Forum on Industrial and Applied Physics (FIAP), The American Physical Society: Responsible for planning the FIAP portion of the March 2004 American Physical Society Meeting, Montreal, Quebec. This involved 10 invited symposium with 4-5 invited talks each, and 20 focus sessions, with 6-13 talks each.

Co-organizer, SPIE International Symposium 5112 on Noise as a Tool for Studying Materials; Fluctuations and Noise 2003, Santa Fe, NM, June 1-4, 2003.

2001-2003: IEEE National Fellows Committee – evaluates Fellow Nominations and makes recommendations to IEEE Board of Directors for candidates recommendation for Fellow Grade.

Co-organizer of Symposia on Defects in Electronic Materials and Defects for the March 2002 American Physical Society meeting, through the Forum on Industrial and Applied Physics.

Vice-chair, Publications, IEEE Nuclear and Space Radiation Effects Conference (NSREC) Steering Committee (1994-1997); Short Course Chair (1999 - Norfolk) & Instructor (1995 - Madison), Technical Prog. Chair (1994 - Tucson), Poster Chair (1991 – San Diego), Steering Group Nominating Comm. (1991 & 94), Awards Comm. (87,88,99,00); Session Chair (1993 and 2001), IEEE NSREC

Tech. Prog. Committee/Session Chair, 1994-96 IEEE Semiconductor Interface Specialists Conference (SISC); Arrangements Chair (1997 – Charleston, SC), Technical Chair (1998 – San Diego, CA), and General Chair (1999 – Charleston, SC) IEEE SISC

Co-chair, Workshop on The Si-SiO<sub>2</sub> and the SiC-SiO<sub>2</sub> Interfaces - Similarities and Differences , Albuquerque, NM (1999);

Short Course Instructor, 1996 Taiwanese Space Program Office (Hsinchu, Taiwan), and 1991 IEEE Nuclear Science Symposium (Santa Fe, NM)

Guest Editor, April 1996 Special Issue on Single Event Effects and the Space Radiation Environment, and December 1988-90 issues of *IEEE Transactions on Nuclear Science*.

1996-Present, Editorial Advisory Board, *Microelectronics Reliability*

Co-chair, Workshop on Radiation and Process Induced Defects in MIS Systems, Research Triangle Park, NC (1991)

Technical Program Committee and Session Chair, 1988-9 Conferences on Space Nuclear Power Systems, Albuquerque, NM

Service internal to Vanderbilt

2021-Present: Adviser, VU EE Class of 2025

2003-2020: Chairman, EECS Department

2016, Member, SACS Quality Enhancement Plan Committee

2014, Chancellor's strategic planning sub-committee for Educational Technologies

2012-2015: Stevenson Chair search committee, VU Physics.

2008-2012: Faculty Associate, Memorial House, Vanderbilt Commons

2008-2011: Faculty and Staff Benefits Committee

*Dan Fleetwood, CV: May 3, 2023*

2008: Search Committee, College of Arts and Science

2008: Provost Search Advisory Committee

2006-2009: University Promotion and Tenure Committee

2006: Search Committee, Chair of Biomedical Engineering

2003-2005: Chaired University Task Force on Classified Research. Coordinated campus wide town hall meeting, Nov. 30. Proposed revision to University Faculty Manual, III, Ch. 5 – adopted, 2005.

2002-2005: Executive Committee – Vanderbilt Institute for Nanoscale Science and Engineering; Put together Nanotechnology Database for the Vanderbilt University School of Engineering in 2001, which was instrumental in achieving funding for this initiative, awarded through the VU Academic Venture Capital Fund.

2002-2005: University Senate – Business and Nonacademic Affairs Committee – Spring 2003; Academic Policies and Services Committee – Fall 2003-Spring 2005; Nominating Committee, 2004.

1999-2005: Vanderbilt Undergraduate Summer Research Program VUSE representative.

2004: Search Committee – information technology security officer.

2002-2003: University Undergraduate Research Committee

2002-2003: Senior School Leaders Information Technology Committee

2000-2004: VU Community Giving Allocations Committee.

2002-2004: Served on the H. Fort Flowers Chair Search Committee.

2001-2002: Chair, VUSE Consultative Committee on Promotion and Tenure

2001-2002: VU International Affairs Committee

2001-2002: Chair, VUSE Engineering Research Council

2000-2002: EECS ABET Fulfillment Committee

2000-2003: Executive Committee – Interdisciplinary Graduate Program in Materials Science

1999-2002: Academic Advisor to EE undergraduate class of 2002

1999-2001: EECS Representative to Graduate Faculty Delegate Assembly

Selected Service as a student at Purdue

1978-1980: President, Society of Physics Students, Purdue University

1977-1979: Vice-President, Purdue Chess Club

Selected Community and Additional Service

2005-2007: Industrial Advisory Board, ECE Dept., University of Alabama at Huntsville

2003: Lecture on correspondence chess at the Nashville Chess Center, June

2003: Presented keynote speech at the National Honor Society induction ceremony, September, Brentwood, TN.

### **Selected Personal Awards and Honors**

2011: Received a “Yuri Gagarin First Spaceflight 50<sup>th</sup> Anniversary” medal from the Cosmonautics Federation of Russia for contributions to promoting international cooperation related to space electronics.

International Correspondence Chess GrandMaster title (2008). Currently competing in the 33<sup>rd</sup> World Correspondence Chess Championship

2004: 29<sup>th</sup> person added to Seymour High School (IN) Wall of Fame, in recognition for career and personal achievements.

International Correspondence Chess Master (1997)/Senior IM (2000); Finished 8th in 18<sup>th</sup> World Correspondence Chess Championship; best score and grandmaster norm on Board 3 of the 14<sup>th</sup> International Correspondence Chess Olympiad Final; achieved second GM norm and title while playing first board for USA in 15<sup>th</sup> International Correspondence Chess Olympiad Final.

2005: Winner, Limerick contest, IEEE Semiconductor Interface Specialists Conference

1994: Winner, Limerick contest, IEEE Semiconductor Interface Specialists Conference

1993: Winner, United States Chess Federation Absolute Correspondence Chess Championship

1982: Honorable mention, Lyric-9 Songwriters Competition for pop and country music divisions

1981: 1<sup>st</sup> place individual, ACUI Regional Collegiate Chess Championship

1976: National Merit Scholar; Valedictorian – Seymour High School (IN)

1976: National Scholar Athlete Award

1976: All-South Central Conference (SCC) Baseball Team (left-handed pitcher) – pitched perfect no-hitter in SCC tournament, striking out 17 batters of 21 faced (school record performances)

1975: 1<sup>st</sup> trombone, All-State sight-reading band, Indiana; gold medalist, State solo competition

1975: National Council of Teachers of English Composition Award

### PATENTS: Dan Fleetwood

1. W. L. Warren (SNL), K. J. R. Vanheusden (Univ. of New Mexico), J. R. Schwank, **D. M. Fleetwood**, M. R. Shaneyfelt, P. S. Winokur (SNL), and R. A. B. Devine, "Screening Method for Selecting Semiconductor Substrates Having Defects Below a Predetermined Level in an Oxide Layer," US Patent No. 5,786,231, issued July 28, 1998.
2. W. L. Warren (SNL), K. J. R. Vanheusden (UNM), R. A. B. Devine (France Telecom), and **D. M. Fleetwood** (SNL), "Memory Device Using Movement of Protons," US Patent No. 5,830,575, issued Nov. 3, 1998. European Patent No. 97942460.3-2108 filed 9/17/97.
3. W. L. Warren (SNL), K. J. R. Vanheusden (UNM), **D. M. Fleetwood** (SNL), and R. A. B. Devine (France Telecom), "Memory Device Using Movement of Protons," US Patent No. 6,140,157, issued Oct. 31, 2000.
4. W. L. Warren (SNL), K. J. R. Vanheusden (UNM), **D. M. Fleetwood** (SNL), R. A. B. Devine (France Telecom/CNET), L. B. Archer, G. A. Brown, and R. M. Wallace (Texas Instruments), "Memory Device Using Movement of Protons," US Patent No. 6,159,829, issued Dec. 12, 2000.

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### BOOKS AND SPECIAL ISSUES EDITED

1. D. M. Fleetwood, D. B. Brown, S. Girard, P. Gouker, S. Gerardin, H. Quinn, and H. Barnaby, *Modeling and Simulation of Radiation Effects*, Special Issue: *IEEE Trans. Nucl. Sci.*, pp. 1439-1706, Aug. 2015.
2. D. M. Fleetwood, S. T. Pantelides, and R. D. Schrimpf, *Defects in Microelectronic Materials and Devices* (CRC Press, Boca Raton, FL, 2008), 753 pages.
3. A. A. Balandin, F. Danneville, M. J. Deen, and D. M. Fleetwood, *Noise in Devices and Circuits III*, Vol. 5844, SPIE, The Society for Optical Engineering (SPIE, Bellingham, 2005), 312 pp.
4. R. D. Schrimpf and D. M. Fleetwood, *Radiation Effects and Soft Errors in Integrated Circuits and Electronic Devices* (World Scientific, Singapore, 2004), 350 pp.
5. D. M. Fleetwood and R. Gaillard, *Single Event Effects and the Space Radiation Environment*, Special Issue: April 1996, *IEEE Trans. Nucl. Sci.*, pp. 341-704 (1996).

### PUBLICATION LIST: Dan Fleetwood

#### Peer reviewed journal articles

1. S. Bonaldo and D. M. Fleetwood, "Random telegraph noise in nanometer-scale CMOS transistors exposed to ionizing radiation," *Appl. Phys. Lett.*, vol. 122, Art. no. 173508, Apr. 2023. *Editor's Pick*.
2. D. M. Fleetwood, "Interface traps, correlated mobility fluctuations, and low-frequency noise in metal-oxide-semiconductor transistors," *Appl. Phys. Lett.*, vol. 122, Art. no. 173504, Apr. 2023.
3. S. Toguchi, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, S. Moreau, P. Batude, L. Brunet, F. Andrieu, and M. L. Alles, "Total-ionizing-dose effects on 3-D sequentially integrated FDSOI ring oscillators," *IEEE Trans. Nucl. Sci.*, vol. 70, no. 4, pp. 627-633, April 2023.
4. R. M. Cadena, D. R. Ball, E. X. Zhang, S. Islam, A. Senarath, M. W. McCurdy, E. Farzana, J. S. Speck, N. Karom, A. O'Hara, B. R. Tuttle, S. T. Pantelides, A. F. Witulski, K. F. Galloway, M. L. Alles, R. A. Reed, D. M. Fleetwood, and R. D. Schrimpf, "Low-energy ion-induced single-event burnout in gallium oxide Schottky diodes," *IEEE Trans. Nucl. Sci.*, vol. 70, no. 4, pp. 363-369, April 2023.
5. K. Li, X. Luo, M. W. Rony, M. Gorchichko, G. Hiblot, S. Van Huylbroeck, A. Jourdain, M. L. Alles, R. A. Reed, E. X. Zhang, D. M. Fleetwood, and R. D. Schrimpf, "Low-frequency noise and border traps in irradiated nMOS and pMOS bulk Si FinFETs with SiO<sub>2</sub>/HfO<sub>2</sub> gate dielectrics," *IEEE Trans. Nucl. Sci.*, vol. 70, no. 4, pp. 442-448, April 2023.
6. P. K. Darmawi-Iskandar, A. M. Aaron, E. X. Zhang, B. L. Bhuvu, J. S. Kauppila, J. L. Davidson, M. L. Alles, D. M. Fleetwood, L. W. Massengill, "Total-ionizing-dose effects and low-frequency noise in N-type carbon nanotube field-effect transistors with HfO<sub>2</sub> gate dielectrics," *IEEE Trans. Nucl. Sci.*, vol. 70, no. 4, pp. 449-455, April 2023.
7. J. Cao, I. Wynocker, E. X. Zhang, R. A. Reed, M. L. Alles, R. D. Schrimpf, D. M. Fleetwood, A. Arreghini, M. Rosmeulen, J. P. Bastos, G. Van den Bosch, and D. Linten, "Effects of geometry and cycling on the radiation



- response of charge-trapping NAND memory devices with SiON tunneling oxide,” *IEEE Trans. Nucl. Sci.*, vol. 70, no. 4, pp. 634-640, April 2023.
8. X. Luo, E. X. Zhang, P. F. Wang, K. Li, D. Linten, J. Mitard, R. A. Reed, D. M. Fleetwood, and R. D. Schrimpf, “Negative bias-temperature instabilities and low-frequency noise in Ge FinFETs,” *IEEE Trans. Dev. Mater. Reliab.*, vol. 23, no. 1, pp. 153-161, Mar. 2023.
  9. D. M. Fleetwood, “Perspective on radiation effects in nanoscale metal-oxide-semiconductor devices,” *Appl. Phys. Lett.*, vol. 121, Art. No. 070503, Aug. 2022. [**Featured Article.**]
  10. S. Toguchi, E. X. Zhang, M. W. Rony, X. Luo, D. M. Fleetwood, R. D. Schrimpf, S. Moreau, S. Cheramy, P. Batude, L. Brunet, F. Andrieu, and M. L. Alles, “Effects of layer-to-layer coupling on the total-ionizing-dose response of 3D-sequentially integrated FD-SOI MOSFETs,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 7, pp. 1420-1427, Jul. 2022. [**Outstanding Conference Paper, RADECS 2021.**]
  11. S. Bonaldo, M. Gorchichko, E. X. Zhang, T. Ma, S. Mattiazzo, M. Bagatin, A. Paccagnella, S. Gerardin, R. D. Schrimpf, R. A. Reed, D. Linten, J. Mitard, and D. M. Fleetwood, “TID effects in highly scaled gate-all-around Si nanowire CMOS transistors irradiated to ultrahigh doses,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 7, pp. 1437-1443, Jul. 2022.
  12. S. Bonaldo, T. Ma, S. Mattiazzo, A. Baschiroto, C. Enz, D. M. Fleetwood, A. Paccagnella, and S. Gerardin, “DC response, low-frequency noise, and TID-induced mechanisms in 16-nm FinFETs for high-energy physics experiments,” *Nucl. Instrum. Meth. Phys. Res. A*, vol. 1033, Art. No. 166727, Jun. 2022.
  13. D. M. Fleetwood, E. X. Zhang, R. D. Schrimpf, and S. T. Pantelides, “Radiation effects in AlGaIn/GaN HEMTs,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 5, pp. 1105-1119, May 2022. [**Review article.**]
  14. D. Nergui, J. W. Teng, M. Hosseinzadeh, Y. Mensah, K. Li, M. Gorchichko, A. Ildefonso, B. L. Ringel, E. X. Zhang, D. M. Fleetwood, and J. D. Cressler, “Total-ionizing-dose response of SiGe HBTs at elevated temperatures,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 5, pp. 1079-1084, May 2022.
  15. Y. Zhou, D. Lv, D. Bi, L. S. Wu, R. Wang, S. Y. Ma, E. X. Zhang, D. M. Fleetwood, and A. Wu, “Radiation-hardened silicon photonic passive devices on a 3  $\mu\text{m}$  waveguide platform under gamma and proton irradiation,” *Optics Express*, vol. 30, no. 10, pp. 16921-16930, May 2022.
  16. D. M. Fleetwood, “Effects of bias and temperature on interface-trap annealing in MOS and linear bipolar devices,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 3, pp. 587-608, Mar. 2022. [**Review article.**]
  17. J. W. Teng, D. Nergui, H. Parameswaran, N. E. Sepulveda-Ramos, G. N. Tzintzarov, Y. Mensah, C. D. Cheon, S. G. Rao, M. Gorchichko, K. Li, H. Ying, A. Ildefonso, N. A. Dodds, R. N. Nowlin, E. X. Zhang, D. M. Fleetwood, and J. D. Cressler, “Response of integrated silicon microwave *pin* diodes to X-ray and fast-neutron irradiation,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 3, pp. 282-289, Mar. 2022. (**Outstanding Student Paper**)
  18. J. Cao, P. F. Wang, X. Li, Z. Guo, E. X. Zhang, R. A. Reed, M. L. Alles, R. D. Schrimpf, D. M. Fleetwood, A. Arreghini, M. Rosmeulen, J. P. Bastos, G. Van den Bosch, and D. Linten, “Total-ionizing-dose effects on polycrystalline-Si channel vertical-charge-trapping NAND devices,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 3, pp. 314-320, Mar. 2022.
  19. M. W. Rony, E. X. Zhang, S. Toguchi, X. Luo, M. Reaz, K. Li, D. Linten, J. Mitard, R. A. Reed, D. M. Fleetwood, and R. D. Schrimpf, “Negative bias-stress and total-ionizing-dose effects in deeply scaled Ge-GAA nanowire *p*FETs,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 3, pp. 299-306, Mar. 2022.
  20. U. Surendranathan, M. Wasiolek, K. Hattar, D. M. Fleetwood, and B. Ray, “Total-ionizing-dose effects on read noise of MLC 3-D NAND memories,” *IEEE Trans. Nucl. Sci.*, vol. 69, no. 3, pp. 321-326, Mar. 2022.
  21. Y. Zhou, D. Bi, S. Wang, L. S. Wu, Y. Huang, E. X. Zhang, D. M. Fleetwood, and A. Wu, “High energy irradiation effects on silicon photonic passive devices,” *Optics Express*, vol. 30, no. 3, pp. 4017-4027, Jan. 2022.
  22. J. Ding, E. X. Zhang, K. Li, X. Luo, M. Gorchichko and D. M. Fleetwood, “Aging effects and latent interface-trap buildup in MOS transistors,” *IEEE Trans. Nucl. Sci.*, vol. 68, no. 12, pp. 2724-2735, Dec. 2021.
  23. D. M. Fleetwood, A. O’Hara, T. S. Mayer, M. R. Melloch, and S. T. Pantelides, “Defect and impurity-complex passivation during electron-beam irradiation of GaAs,” *IEEE Trans. Nucl. Sci.*, vol. 68, no. 8, pp. 1548-1555, Aug. 2021.
  24. D. M. Fleetwood, “Radiation effects in a post-Moore world,” *IEEE Trans. Nucl. Sci.*, vol. 68, no. 5, pp. 509-545, May 2021. (**Invited Review**)
  25. G. Borghello, F. Faccio, G. Termo, S. Michelis, S. Costanzo, H. D. Koch, and D. M. Fleetwood, “Effects of bias and temperature on the dose-rate sensitivity of 65 nm CMOS transistors,” *IEEE Trans. Nucl. Sci.*, vol. 68, no. 5, pp. 573-580, May 2021. (**Meritorious Conference Paper, 2020 IEEE NSREC**)

26. M. Gorchichko, E. X. Zhang, P. Wang, S. Bonaldo, R. D. Schrimpf, R. A. Reed, D. Linten, J. Mitard, and D. M. Fleetwood, "Total-ionizing dose response of highly-scaled gate-all-around Si nanowire CMOS transistors," *IEEE Trans. Nucl. Sci.*, vol. 68, no. 5, pp. 687-696, May 2021.
27. S. Toguchi, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, R. A. Reed, S. Moreau, S. Cheramy, P. Batude, L. Brunet, F. Andrieu, and M. L. Alles, "Charge trapping and transconductance degradation in irradiated 3D sequentially-integrated FDSOI MOSFETs," *IEEE Trans. Nucl. Sci.*, vol. 68, no. 5, pp. 707-715, May 2021.
28. R. M. Brewer, E. X. Zhang, M. Gorchichko, P. F. Wang, J. Cox, S. L. Moran, D. R. Ball, B. D. Sierawski, D. M. Fleetwood, R. D. Schrimpf, S. S. Iyer, and M. L. Alles, "Total ionizing dose responses of 22 nm FDSOI and 14 nm bulk FinFET charge-trap transistors," *IEEE Trans. Nucl. Sci.*, vol. 68, no. 5, pp. 677-686, May 2021.
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62. D. M. Fleetwood, "Guidelines for using a 10-keV x-ray source for hardness assurance," Proceedings of the 1986 VHSIC/VLSI Qualifications Workshop, Vail, CO, September 9-11, 1986, Palisades Institute for Research Services, Inc., New York, 1986, pp. 395-402.

#### *Other publications*

1. D. M. Fleetwood, "Moore's Law scaling and radiation effects in MOS devices," *IEEE Electron Devices Newsletter*, vol. 29, no. 4, pp. 3-5, Oct. 2022.
2. D. M. Fleetwood, "75<sup>th</sup> anniversary of the transistor – a Boilermaker reflects," *IEEE NPSS News*, Issue 2: June 2022, pp. 7-8.
3. D. M. Fleetwood, "Radiation hardening 101: How to Protect Nuclear Reactor Electronics," *IEEE Spectrum On-Line*, March 22, 2011.
4. D. M. Fleetwood, "Forum: North of the border," *The Industrial Physicist* **9**, No. 6, 26-27 (2003).
5. R. A. Anderson, C. H. Seager, B. L. Draper, M. R. Shaneyfelt, H. D. Stewart, A. G. Sault, G. V. Herrera, and D. M. Fleetwood, "Investigation of protonated-oxide memory structures," SAND2001-0139, available through NTIS (January 2001).

6. H. P. Hjalmarson, S. C. Witzak, P. A. Schultz, D. J. Bowman, and D. M. Fleetwood, "A mechanism for enhanced low-dose-rate sensitivity of bipolar transistors," SAND2000-2376J, available through NTIS, September 2000.
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8. D. M. Fleetwood, "A first principles approach to total dose hardness assurance," in *Advanced Qualification Techniques: A Practical Guide for Radiation Testing of Electronics*, ed. J. R. Schwank, IEEE Nuclear and Space Radiation Effects Conf. Short Course, Madison, WI, pp. III: 1-69 (1995).
9. D. M. Fleetwood, "Border traps in MOS devices," IEEE Trans. Nucl. Sci. 39, No. 2, 269-71 (1992). **[Guest Editorial]**
10. T. J. Garino, C. A. Reber, and D. M. Fleetwood, "Ceramic coatings on package lids for radiation protection," SAND91-0301, UC-704, available through NTIS (August 1991).
11. D. M. Fleetwood, "Experimental study of low-frequency excess (1/f) noise in metal films," Ph. D. Thesis (Purdue University, 1984, Advisor = N. Giordano).

## **PRESENTATIONS: DAN FLEETWOOD**

### *Invited Talks and Short Courses*

1. D. M. Fleetwood, "Radiation effects in a post-Moore world," IEEE Intl. Reliability Physics Symposium, Monterey, CA, March 26-27, 2023. (Tutorial)
2. D. M. Fleetwood, "Radiation effects and low-frequency noise in AlGaIn/GaN HEMTs," Virtual Workshop on Co-Design for Materials Discovery, Reliability, and Extreme Environments, Sandia National Laboratories, Albuquerque, NM, November 15-17, 2022.
3. D. M. Fleetwood, "Radiation effects in a post-Moore world," Space Qualification 2022 Workshop, virtual, Wollongong, Australia, March 22, 2022.
4. D. M. Fleetwood, "Evolution of total ionizing dose effects in MOS devices with Moore's Law scaling," Space Qualification 2022 Workshop, virtual, Wollongong, Australia, March 22, 2022.
5. D. M. Fleetwood, R. D. Schrimpf, E. X. Zhang, and S. T. Pantelides, "Radiation effects and low-frequency noise in AlGaIn/GaN HEMTs," International Meeting for Future of Electron Devices, IMFEDK 2021, Kansai, Japan, Nov. 17-18, 2021. (Keynote, presented virtually).
6. S. Toguchi, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, R. A. Reed, M. L. Alles, S. Moreau, S. Cheramy, P. Batude, L. Brunet, and F. Andrieu, "Total ionizing dose effects on 3D devices," 17th International School on the Effects of Radiation on Embedded Systems for Space Applications (SERESSA), Nov. 16-19, virtual.
7. P. Wang, E. X. Zhang, D. M. Fleetwood, P. F. Wang, M. W. McCurdy, J.-T. Lin, M. L. Alles, J. L. Davidson, B. W. Alphenaar, and R. D. Schrimpf, "Effects of charge generation and trapping on the X-ray response of strained AlGaIn/GaN HEMTs," IEEE 14<sup>th</sup> International Conference on ASIC (ASICON), Kunming, China, Oct. 26-29, 2021, presented virtually.
8. D. M. Fleetwood, "Radiation effects and defects in AlGaIn/GaN HEMTs," 4<sup>th</sup> International Conference on Radiation Effects in Electronic Devices, Xi'an, China, May 27-30 (Keynote, presented virtually).
9. D. M. Fleetwood, "Radiation effects in a post-Moore world," IEEE Nuclear and Space Radiation Effects Conference, virtual, November 29-30, 2020. (short course)
10. D. M. Fleetwood, P. F. Wang, E. X. Zhang, R. D. Schrimpf, A. O'Hara, and S. T. Pantelides, "Defect dehydrogenation in Si-MOS and compound-semiconductor-based devices," IEEE International Conference on Solid-State and Integrated Circuit Technology, virtual, November 3-6, 2020.
11. B. Parvais, U. Peralagu, A. Vais, A. Alian, L. Witters, Y. Mols, A. Walke, M. Ingels, H. Yu, V. Putcha, A. Khaled, R. Rodriguez, A. Sibaja-Hernandez, S. Yadav, R. El Kashlan, M. Baryshnikova, G. Mannaert, R. Alcotte, B. Kunert, E. Simoen, S. E. Zhao, B. De Jaeger, D. M. Fleetwood, R. Langer, M. Zhao, P. Wambacq, N. Waldron, and N. Collaert, "Advanced Transistors for High Frequency Applications," Spring Meeting of The Electrochemical Society, Montreal, Canada, May 10-15, 2020. (meeting cancelled; proceedings published)
12. D. M. Fleetwood, "Total ionizing dose effects, border traps, and  $1/f$  noise in emerging MOS technologies," European Conference on Radiation Effects on Components and Systems (RADECS), Montpellier, France, Sept. 16, 2019. (short course)
13. D. M. Fleetwood, "Interface-trap annealing and its implications for radiation hardness assurance," 10th International Conference on Materials for Advanced Technologies, Singapore, June 23-28, 2019.
14. R. D. Schrimpf, M. L. Alles, D. M. Fleetwood, K. M. Warren, R. A. Reed, R. A. Weller, R. Austin, A. F. Witulski, N. Mahadevan, G. Karsai, and B. D. Sierawski, "Modeling component and system responses to radiation: Opportunities and limits," Workshop on the Future of Space Radiation Assurance, Jet Propulsion Laboratory, Pasadena, CA, June 3, 2019.
15. D. M. Fleetwood, E. X. Zhang, C. D. Liang, P. Wang, C. X. Zhang, R. D. Schrimpf, M. L. Alles, R. A. Reed, A. O'Hara, S. T. Pantelides, Y. Su, R. Ma, and S. Koester, "Radiation effects on MOS devices based on 2D materials," 3rd International Conference on Radiation Effects of Electronic Devices, Chongqing, China, May 29-31, 2019. (keynote)
16. D. M. Fleetwood, "Reliability limiting defects in MOS gate oxides: Mechanisms and modeling implications," IEEE Intl. Reliab. Phys. Sympos., Monterey, CA, March 31 – April 4, 2019.
17. D. M. Fleetwood, "Bias dependence of interface-trap annealing: Implications for RHA testing," Microelectronics Quality and Reliability Workshop, El Segundo, CA, Feb. 5-7, 2019.
18. R. A. Reed, R. D. Schrimpf, E. X. Zhang, D. M. Fleetwood, M. L. Alles, A. L. Sternberg, J. A. Kozub, H. Gong, K. Ni, and I. K. Samsel, "Radiation-induced transients in advanced devices," Microelectronics Quality and Reliability Workshop, El Segundo, CA, Feb. 5-7, 2019.

19. D. M. Fleetwood, E. X. Zhang, R. D. Schrimpf, and S. T. Pantelides, “ $1/f$  noise, border traps, and radiation response,” RADECS Workshop, Beijing, China, May 16-18, 2018.
20. D. M. Fleetwood, “Evolution of total ionizing dose effects in MOS devices with Moore’s Law scaling,” European Conference on Radiation Effects on Components and Systems (RADECS), Geneva, Switzerland, Oct. 2, 2017. (short course)
21. D. M. Fleetwood, J. Chen, R. Jiang, E. X. Zhang, S. Mukherjee, R. D. Schrimpf, Y. S. Puzyrev, and S. T. Pantelides, “Radiation response,  $1/f$  noise, and reliability of GaN/AlGaIn HEMTs,” 2017 International Workshop on Reliability of Micro- and Nano-Electronics in Harsh Environment, Chengdu, China, May 22-24, 2017. (keynote address)
22. R. A. Reed, R. A. Weller, J. M. Trippe, S. L. Weeden-Wright, E. D. Funkhouser, C. N. Arutt, R. D. Schrimpf, B. D. Sierawski, K. M. Warren, L. W. Massengill, D. M. Fleetwood, M. L. Alles, E. X. Zhang, and M. Asai, “Applications of MRED (Monte Carlo Radiative Energy Deposition),” 12<sup>th</sup> GEANT4 Space Users Workshop, Guildford, UK, April 10-12, 2017.
23. D. M. Fleetwood, “Moore’s Law and radiation effects,” Microelectronics Quality and Reliability Workshop, El Segundo, CA, Feb. 7-9, 2017. (keynote address)
24. D. M. Fleetwood, P. Wang, J. Chen, R. Jiang, E. X. Zhang, M. W. McCurdy, and R. D. Schrimpf, “ $1/f$  noise in AlGaIn/GaN HEMTs,” IEEE International Conference on Solid-State and Integrated Circuit Technology, Hangzhou, China, Oct. 25-28, 2016.
25. E. Simoen, G. Eneman, A. Vinicius De Oliveira, K. Ni, J. Mitard, L. Witters, P. Ghedini Der Agopian, J. A. Martino, D. M. Fleetwood, R. D. Schrimpf, R. A. Reed, N. Collaert, A. Thean, and C. Claeys, “On the assessment of electrically active defects in high-mobility materials and devices,” IEEE International Conference on Solid-State and Integrated Circuit Technology, Hangzhou, China, Oct. 25-28, 2016.
26. D. M. Fleetwood, J. Chen, R. Jiang, E. X. Zhang, and R. D. Schrimpf, “Hardness assurance issues for GaN/AlGaIn HEMTs,” Microelectronics Quality and Reliability Workshop, El Segundo, CA, Feb. 9-10, 2016.
27. S. M. Weiss, S. Bhandaru, S. Hu, and D. M. Fleetwood, “Radiation studies on silicon photonic ring resonators,” SPIE Optics & Photonics, San Diego, CA, Aug. 28 – Sept. 1, 2015.
28. S. T. Pantelides, R. D. Schrimpf, and D. M. Fleetwood, “Connecting theory to experiments – Defects in semiconductor electronic devices,” 28th International Conference on Defects in Semiconductors, Espoo, Finland, July 27 – 31, 2015. (plenary)
29. D. M. Fleetwood, “Energies and microstructures of defects contributing to  $1/f$  noise in microelectronic materials and devices,” 23<sup>rd</sup> International Conference on Noise and Fluctuations, Xi’an, China, June 2-6, 2015. (plenary)
30. D. M. Fleetwood and R. A. Reed, “Radiation effects in microelectronics,” imec, Leuven, Belgium, May 12-13, 2015.
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- 120.S. Bonaldo, T. Wallace, H. J. Barnaby, G. Borghello, G. Termo, F. Faccio, D. M. Fleetwood, A. Baschiroto, S. Mattiazzo, M. Bagatin, A. Paccagnella, and S. Gerardin, "Radiation-induced charge trapping in shallow trench isolations of FinFETs."
- 121.Z. Guo, E. X. Zhang, R. A. Reed, R. D. Schrimpf, D. M. Fleetwood, A. Chasin, J. Mitard, D. Linten, A. Belmonte, and G. Kar, "Total-ionizing-dose effects in IGZO thin-film transistors with SiO<sub>2</sub> tunnel layers."
- 122.S. Islam, A. S. Senarath, D. R. Ball, A. Sengupta, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, E. Farzana, N. S. Hendricks, and J. S. Speck, "Single-event burnout in vertical PtOx/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Schottky diodes with Extreme-k TiO<sub>2</sub> field plates."
- 123.D. O. Nielsen, C. G. Van de Walle, S. T. Pantelides, R. D. Schrimpf, D. M. Fleetwood, and M. V. Fischetti, "Closing the '10-100 eV gap' for electron thermalization in GaN devices from first principles."
- 124.C. A. Champagne, B. D. Sierawski, R. L. Ladbury, M. J. Campola, and D. M. Fleetwood, "Confidence-based approach to including survivors in a probabilistic TID failure assessment."

*Provo, Utah, July 19-23, 2022*

- 125.S. Toguchi, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, S. Moreau, P. Batude, L. Brunet, F. Andrieu, and M. L. Alles, "Total-ionizing-dose effects on 3D sequentially-integrated ring oscillators."
- 126.K. Li, X. Luo, M. Rony, M. Gorchichko, G. Hiblot, S. Huylenbroeck, A. Jourdain, M. L. Alles, R. A. Reed, E. X. Zhang, D. M. Fleetwood, and R. D. Schrimpf, "Low-frequency noise and border traps in irradiated  $n$ MOS and  $p$ MOS bulk Si FinFETs with SiO<sub>2</sub>/HfO<sub>2</sub> gate dielectrics."
- 127.J. Cao, E. X. Zhang, R. A. Reed, M. L. Alles, R. D. Schrimpf, D. M. Fleetwood, A. Arreghini, M. Rosmeulen, J. Bastos, G. Van den Bosch, and D. Linten, "Effects of geometry and cycling on the radiation response of charge-trapping NAND memory devices with SiON tunneling oxide."
- 128.P. Darwani-Iskandar, A. Aaron, E. X. Zhang, B. L. Bhuvu, J. S. Kauppila, J. L. Davidson, M. L. Alles, D. M. Fleetwood, and L. W. Massengill, "Total-ionizing-dose effects and low-frequency noise in  $n$ -type carbon nanotube field-effect transistors with HfO<sub>2</sub> gate dielectrics." *Best paper nominee.*
- 129.R. Cadena, D. R. Ball, R. D. Schrimpf, D. M. Fleetwood, R. A. Reed, M. L. Alles, M. W. McCurdy, S. T. Pantelides, K. F. Galloway, A. F. Witulski, E. Farzana, and J. Speck, "Low-energy ion-induced single-event burnout in gallium oxide Schottky diodes."

130. B. Ringel, J. Teng, D. Nergui, M. Hosseinzadeh, K. Li, E. X. Zhang, D. M. Fleetwood, and J. D. Cressler, “RF performance and TID hardness trade-offs in annular 45-nm RF SOI CMOS devices.”

*Virtual, July 16-23, 2021*

131. J. Cao, P. Wang, X. Li, Z. Guo, E. X. Zhang, R. A. Reed, M. L. Alles, R. D. Schrimpf, D. M. Fleetwood, A. Arreghini, M. Rosmeulen, J. Bastos, G. Van den Bosch, and D. Linten, “Total-ionizing-dose effects on polycrystalline-Si channel vertical-charge-trapping NAND devices with SiON tunneling oxide.”
132. M. W. Rony, E. X. Zhang, S. Toguchi, X. Luo, M. Reaz, K. Li, D. Linten, J. Mitard, R. A. Reed, D. M. Fleetwood, and R. D. Schrimpf, “Negative bias-temperature instabilities and total-ionizing-dose effects in deeply scaled Ge-GAA nanowire pFETs.”
133. D. Nergui, J. W. Teng, A. Ildefonso, M. Gorchichko, E. X. Zhang, D. M. Fleetwood, and J. D. Cressler, “Total-ionizing-dose response of SiGe HBTs at elevated temperatures.” *Best paper nominee*.
134. J. W. Teng, D. Nergui, H. Parameswaran, G. N. Tzintzarov, H. Ying, C. D. Cheon, S. G. Rao, A. Ildefonso, N. A. Dodds, R. N. Nowlin, M. Gorchichko, E. X. Zhang, D. M. Fleetwood, and J. D. Cressler, “Response of integrated silicon RF pin diodes to X-ray and fast neutron irradiation. (**Outstanding Student Paper**)”
135. U. Surendranathan, M. Wasiolek, K. Hattar, D. M. Fleetwood, and B. Ray, “Total-ionizing-dose effects on read noise of MLC 3D NAND memories.”

*Virtual, December 2020*

136. S. Toguchi, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, R. A. Reed, S. Moreau, S. Cheramy, P. Batude, L. Brunet, F. Andrieu, and M. L. Alles, “Charge trapping and transconductance degradation in irradiated 3D sequentially-integrated FDSOI MOSFETs.”
137. R. M. Brewer, E. X. Zhang, J. Cox, S. L. Moran, B. D. Sierawski, D. R. Ball, D. M. Fleetwood, P. F. Wang, R. D. Schrimpf, S. S. Iyer, and M. L. Alles, “Total ionizing dose responses of 22 nm FDSOI and 14 nm bulk FinFET charge-trap transistors.”
138. M. Gorchichko, E. X. Zhang, P. Wang, S. Bonaldo, R. D. Schrimpf, R. A. Reed, D. Linten, J. Mitard, and D. M. Fleetwood, “Total-ionizing dose response of highly-scaled gate-all-around Si nanowire CMOS transistors.” *Best Paper Nominee*.
139. P. F. Wang, X. Li, E. X. Zhang, M. W. McCurdy, R. D. Schrimpf, and D. M. Fleetwood, “Donor- and acceptor-like defects in Irradiated AlGaIn/GaN HEMTs.”
140. K. Li, E. X. Zhang, M. Gorchichko, P. F. Wang, M. Reaz, S. E. Zhao, G. Hiblöt, S. van Huylbroeck, A. Jourdain, M. L. Alles, R. A. Reed, D. M. Fleetwood, and R. D. Schrimpf, “Impacts of through-silicon vias on total-ionizing-dose effects and low-frequency noise in FinFETs.”
141. G. Borghello, F. Faccio, G. Termo, S. Costanzo, H. D. Koch, and D. M. Fleetwood, “Effects of bias and temperature on the dose-rate sensitivity of 65 nm CMOS transistors.” *Meritorious Conference Paper Award*.
142. M. Rony, I. K. Samsel, E. X. Zhang, A. Sternberg, K. Li, M. Reaz, S. M. Austin, R. A. Reed, D. M. Fleetwood, M. L. Alles, R. D. Schrimpf, D. Linten, and J. Mitard, “Single-event-induced charge collection in Ge-channel pMOS FinFETs.”
143. J. W. Teng, A. Ildefonso, G. N. Tzintzarov, H. Ying, A. Moradinia, P. F. Wang, X. Li, E. X. Zhang, D. M. Fleetwood, and J. D. Cressler, “Variability in total-ionizing-dose response of 4<sup>th</sup>-generation SiGe HBTs.”

*San Antonio, TX, July 8-12, 2019*

144. S. Bonaldo, S. E. Zhao, A. O’Hara, M. Gorchichko, E. X. Zhang, S. Gerardin, A. Paccagnella, N. Waldron, N. Collaert, V. Putcha, D. Linten, S. T. Pantelides, R. A. Reed, R. D. Schrimpf, and D. M. Fleetwood, “Total-ionizing-dose effects and low-frequency noise in 16-nm InGaAs FinFETs with HfO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> dielectrics.” (**Outstanding Student Paper**)
145. M. Gorchichko, Y. R. Cao, E. X. Zhang, D. Yan, H. Gong, S. E. Zhao, P. Wang, R. Jiang, C. D. Liang, D. M. Fleetwood, R. D. Schrimpf, R. A. Reed, and Dimitri Linten, “Total-ionizing-dose effects and low-frequency noise in 30-nm gate-length bulk and SOI FinFETs with SiO<sub>2</sub>/HfO<sub>2</sub> gate dielectrics.”
146. S. E. Zhao, S. Bonaldo, P. F. Wang, E. X. Zhang, N. Waldron, N. Collaert, V. Putcha, D. Linten, S. Gerardin, A. Paccagnella, R. D. Schrimpf, R. A. Reed, and D. M. Fleetwood, “Total-ionizing-dose effects on InGaAs FinFETs with improved gate stack.”

- 147.P. Wang, A. L. Sternberg, B. D. Sierawski, E. X. Zhang, K. M. Warren, A. M. Tonigan, R. M. Brewer, N. A. Dodds, G. Vizkelethy, S. L. Jordan, D. M. Fleetwood, R. A. Reed, and R. D. Schrimpf, "Single-event-latchup sensitive-volume model for a 180-nm SRAM test structure."

*Waikoloa Beach, HI, July 16-20, 2018*

- 148.P. Wang, C. Perini, A. O'Hara, H. Gong, P. F. Wang, E. X. Zhang, M. W. McCurdy, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, and E. M. Vogel, "Total-ionizing dose effects and proton-induced displacement damage on MoS<sub>2</sub>-interlayer-MoS<sub>2</sub> tunneling junctions."
- 149.X. Li, W. Lu, Q. Guo, D. M. Fleetwood, C. He, X. Wang, X. Yu, J. Sun, M. Liu, and S. Yao, "Temperature-switching during irradiation as a test for ELDRS in linear bipolar devices." *Best paper nominee.*
- 150.R. Jiang, E. X. Zhang, M. W. McCurdy, P. F. Wang, H. Gong, D. Yan, R. D. Schrimpf, and D. M. Fleetwood, "Dose-rate dependence of the total-ionizing-dose response of GaN-based HEMTs."
- 151.T. D. Haeffner, R. F. Keller, B. D. Sierawski, M. L. Alles, M. W. McCurdy, R. Jiang, E. X. Zhang, R. W. Mohammed, D. R. Ball, R. A. Reed, R. D. Schrimpf, and D. M. Fleetwood, "Total-ionizing-dose effects in FinFETs at low temperature."
- 152.H. Gong, K. Ni, E. X. Zhang, A. L. Sternberg, J. A. Kozub, M. L. Alles, R. A. Reed, D. M. Fleetwood, R. D. Schrimpf, N. Waldron, B. Kunert, and D. Linten, "Pulsed-laser induced single-event transients in InGaAs FinFETs on bulk silicon substrates."
- 153.C. Liang, R. Ma, K. Li, Y. Su, H. Gong, K. L. Ryder, P. Wang, A. L. Sternberg, E. X. Zhang, M. L. Alles, R. A. Reed, S. J. Koester, D. M. Fleetwood, and R. D. Schrimpf, "Laser-induced single event transients in black phosphorus MOSFETs."
- 154.C. N. Arutt, P. D. Shurva, J.-T. Lin, M. L. Alles, B. W. Alphenaar, J. L. Davidson, K. M. Walsh, S. McNamara, D. M. Fleetwood, and R. D. Schrimpf, "Dopant-type and -concentration dependence of total-ionizing-dose response in piezoresistive micromachined cantilevers."
- 155.P. S. Goley, G. N. Tzintzarov, S. Zeinolabedinzadeh, A. Ildefonso, K. Motoki, R. Jiang, E. X. Zhang, D. M. Fleetwood, L. Zimmerman, M. Kaynak, and J. D. Cressler, "Total ionizing dose effects in 70 GHz bandwidth photodiodes in a SiGe integrated photonics platform."
- 156.P. Kumari, L. Davies, N. P. Bhat, E. X. Zhang, M. W. McCurdy, D. M. Fleetwood, and B. Ray, "State-of-the-art flash chips for dosimetry applications." (Radiation Effects Data Workshop)

*New Orleans, LA, July 17-21, 2017*

- 157.P. Wang, A. O. Hara, E. X. Zhang, H. Gong, C. Liang, R. Jiang, W. Liao, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, C. Perini, E. M. Vogel, and B. R. Tuttle, "Effects of bias on the total-ionizing dose response of graphene transistors with Al<sub>2</sub>O<sub>3</sub> and H-BN over-layers."
- 158.R. Jiang, E. X. Zhang, S. M. Zhao, D. M. Fleetwood, R. D. Schrimpf, R. A. Reed, M. L. Alles, J. C. Shank, B. Tellekamp, and W. A. Doolittle, "Total-ionizing-dose response of Nb<sub>2</sub>O<sub>5</sub>-based MIM diodes for neuromorphic computing applications."
- 159.C. Liang, P. Wang, S. M. Zhao, E. X. Zhang, M. L. Alles, D. M. Fleetwood, R. D. Schrimpf, R. Ma, Y. Su, and S. Koester, "Radiation-induced charge trapping in black phosphorus MOSFETs with HfO<sub>2</sub> gate dielectrics."
- 160.S. M. Zhao, R. Jiang, E. X. Zhang, W. Liao, C. Liang, D. M. Fleetwood, R. D. Schrimpf, R. A. Reed, D. Linten, N. Collaert, and J. Mitard, "Total-ionizing-dose response of multi-fin Ge MOS capacitors with high-K dielectrics."
- 161.F. Faccio, E. Lerario, S. Michelis, G. Borghello, D. M. Fleetwood, R. D. Schrimpf, H. Gong, E. X. Zhang, P. Wang, S. Gerardin, A. Paccagnella, and S. Bonaldo, "Influence of LDD spacers and H<sup>+</sup> transport on the total-ionizing-dose response of 65 nm MOSFETs irradiated to ultra-high doses." **[Outstanding Conference Paper.]**
- 162.M. A. Bhuiyan, T.-P. Ma, H. Zhou, P. Ye, X. Lou, X. Gong, R. G. Gordon, R. Jiang, H. Gong, E. X. Zhang, R. A. Reed, and D. M. Fleetwood, "Total ionizing dose effects on GaN based HEMTs and MOSHEMTs: Effects of channel thickness and epitaxial MgCaO as gate dielectric."
- 163.P. Wang, A. L. Sternberg, J. A. Kozub, E. X. Zhang, D. M. Fleetwood, R. A. Reed, R. D. Schrimpf, N. A. Dodds, and S. L. Jordan, "Using two-photon absorption to measure the single-event-latchup sensitive-volume."
- 164.H. Gong, K. Ni, E. X. Zhang, A. L. Sternberg, J. A. Kozub, K. L. Ryder, R. F. Keller, M. L. Alles, R. A. Reed, D. M. Fleetwood, R. D. Schrimpf, A. Vardy, X. Cai, and J. A. del Alamo, "Scaling effects on single-event transients in InGaAs FinFETs." *Best paper nominee.*

- 165.N.-Q. Deng, Y. Yang, T.-L. Ren, W.-J. Liao, X. E. Zhang, D. M. Fleetwood, and H. Tian, "Total-ionizing-dose effects on a graphene oxide X-ray detector."
- 166.C. N. Arutt, W. Liao, H. Gong, M. L. Alles, J. L. Davidson, E. X. Zhang, A. L. Sternberg, D. M. Fleetwood, R. A. Reed, R. D. Schrimpf, P. D. Shurva, J.-T. Lin, B. W. Alphenaar, K. M. Walsh, and S. McNamara, "Dose-rate effects on the total ionizing dose response of piezoresistive micromachined cantilevers."
- 167.H. Gong, W. Liao, E. X. Zhang, A. L. Sternberg, M. W. McCurdy, J. L. Davidson, M. L. Alles, R. A. Reed, D. M. Fleetwood, R. D. Schrimpf, P. D. Shurva, J.-T. Lin, S. McNamara, B. W. Alphenaar, and K. M. Walsh, "Proton-induced total-ionizing-dose and displacement-damage effects on silicon based MEMS resonators."
- 168.W. Liao, E. X. Zhang, M. L. Alles, A. L. Sternberg, C. N. Arutt, S. M. Zhao, P. Wang, M. W. McCurdy, D. M. Fleetwood, R. A. Reed, R. D. Schrimpf, D. Wang, and H. Xie, "Total-ionization-dose effects on microscanners with Al/SiO<sub>2</sub> electrothermal bimorph actuators."
- 169.M. W. McCurdy, R. D. Schrimpf, D. M. Fleetwood, K. Bole, and B. S. Poling, "1.8 MeV proton testing of three different thermally stabilized GaN HEMT RF power devices in three operational modes."
- 170.A. M. Tonigan, C. N. Arutt, E. J. Parma, P. J. Griffin, D. M. Fleetwood, and R. D. Schrimpf, "Correlation of a bipolar-transistor-based neutron displacement damage sensor methodology with proton irradiations."

*Portland, OR, July 11-15, 2016*

- 171.E. X. Zhang, D. M. Fleetwood, J. A. Hachtel, C. Liang, R. A. Reed, M. L. Alles, R. D. Schrimpf, D. Linten, J. Mitard, M. F. Chisholm, and S.T. Pantelides, "Total ionizing dose effects on strained Ge pMOS FinFETs on bulk Si."
- 172.P. Wang, R. Jiang, J. Chen, E. X. Zhang, M. W. McCurdy, R. D. Schrimpf, and D. M. Fleetwood, "Effects of proton irradiation on the gate-voltage dependence of the  $1/f$  noise of GaN/AlGaIn HEMTs."
- 173.R. Jiang, E. X. Zhang, M. W. McCurdy, J. Chen, X. Shen, D. M. Fleetwood, R. D. Schrimpf, S. W. Kaun, E. C. H. Kyle, J. S. Speck, and S. T. Pantelides, "Worst-case bias for irradiation of AlGaIn/GaN HEMTs."
- 174.T. D. Loveless, S. Jagannathan, E. X. Zhang, D. M. Fleetwood, J. S. Kauppila, and L. W. Massengill, "Total Ionizing Dose Effects on a K-band Quadrature LC-Tank VCO in a 32 nm CMOS SOI Technology."
- 175.K. Ni, E. X. Zhang, R. D. Schrimpf, D. M. Fleetwood, R. A. Reed, M. L. Alles, J. Lin, and J. A. del Alamo, "Gate Bias and Geometry Dependence of Total-Ionizing-Dose Effects in InGaAs Quantum-Well MOSFETs."
- 176.I. K. Samsel, E. X. Zhang, S. M. Austin, R. A. Reed, D. M. Fleetwood, M. L. Alles, R. D. Schrimpf, D. Linten, and J. Mitard, "Heavy-Ion Induced Charge Collection in Ge-Channel pMOS FinFETs."
- 177.C. Liang, Y. Su, E. X. Zhang, M. L. Alles, R. D. Schrimpf, D. M. Fleetwood, and S. Koester, "Total Ionizing Dose Effects on Passivated Black Phosphorus Transistors."
- 178.A. P. Omprakash, Z. E. Fleetwood, U. S. Raghunathan, A. S. Cardoso, N. E. Lourenco, J. Babcock, R. Mukhopadhyay, E. X. Zhang, D. M. Fleetwood, and J. D. Cressler, "An Investigation of Total Ionizing Dose Effects on a High-Voltage (36 V) Complementary SiGe on SOI Technology."
- 179.X. Wan, O. K. Baker, M. W. McCurdy, E. X. Zhang, M. Zafrani, S. P. Wainwright, J. Xu, H. L. Bo, R. A. Reed, D. M. Fleetwood, and T. P. Ma, "Low Energy Proton Irradiation Effects on Commercial Enhancement Mode GaN HEMTs."
- 180.W. Liao, E. X. Zhang, M. L. Alles, C. X. Zhang, H. Gong, K. Ni, A. L. Sternberg, D. M. Fleetwood, R. A. Reed, and R. D. Schrimpf, "Total Ionizing Dose Effects on Piezoelectric Micromachined Ultrasonic Transducers."
- 181.H. Gong, W. Liao, E. X. Zhang, A. L. Sternberg, M. W. McCurdy, J. L. Davidson, M. L. Alles, R. A. Reed, D. M. Fleetwood, R. D. Schrimpf, P. D. Shurva, J. Lin, S. McNamara, B. W. Alphenaar, and K. M. Walsh, "Total-Ionizing-Dose Effects in Piezoresistive Micromachined Cantilevers."
- 182.B. D. Sierawski, K. M. Warren, A. L. Sternberg, R. A. Austin, J. M. Trippe, R. A. Reed, R. A. Weller, M. L. Alles, R. D. Schrimpf, L. W. Massengill, D. M. Fleetwood, A. Monterio, G. Buxton, J. Brandenburg, B. Fisher, and R. Davis, "Beyond Ground-Based Tests: Using Cubesats for Single Event Effects Hardness Assurance."
- 183.R. M. Chen, Z. J. Diggins, N. N. Mahatme, L. Wang, E. X. Zhang, Y. R. Chen, Y. N. Liu, B. Narasimham, A. F. Witulski, B. L. Bhuvu, L. W. Massengill, and D. M. Fleetwood, "Effects of Total-Ionizing-Dose Irradiation on SEU- and SET-Induced Soft Errors in Bulk 40-nm Sequential Circuits."
- 184.S. Ren, H. Wu, R. Jiang, M. Bhuiyan, K. Ni, J. Chen, E. X. Zhang, R. A. Reed, D. M. Fleetwood, P. Ye, and T.-P. Ma, "Total Ionizing Dose (TID) Effects in Ultra-Thin Body Ge on Insulator (GOI) Junctionless CMOSFETs with Recessed Source/Drain and Channel."

*Dan Fleetwood, CV: May 3, 2023*

- 185.S. Ren, M. Bhuiyan, J. Zhang, M. Si, R. Jiang, K. Ni, X. Wan, S. Chang, E. X. Zhang, R. A. Reed, D. M. Fleetwood, P. Ye, and T.-P. Ma, "Total Ionizing Dose (TID) Effects in GaAs MOSFETs with La Based Epitaxial Gate Dielectrics."

*Boston, MA, July 13-17, 2015*

- 186.N. E. Ives, A. F. Witulski, R. D. Schrimpf, D. M. Fleetwood, R. W. Bruce, M. W. McCurdy, E. X. Zhang, and L. W. Massengill, "Effects of proton-induced displacement damage on gallium nitride power amplifier RF performance."
- 187.I. K. Samsel, E. X. Zhang, A. L. Sternberg, R. A. Reed, D. M. Fleetwood, M. L. Alles, R. D. Schrimpf, D. Linten, J. Mitard, L. Witters, and N. Collaert, "Charge collection mechanisms of Ge-channel bulk pMOSFETs."
- 188.K. Ni, E. X. Zhang, R. D. Schrimpf, R. A. Reed, D. M. Fleetwood, A. L. Sternberg, S. Ren, T.-P. Ma, L. Dong, J. Zhang, and P. D. Ye, "Charge collection mechanisms in GaAs MOSFETs."
- 189.J. Chen, Y. S. Puzyrev, R. Jiang, E. X. Zhang, M. W. McCurdy, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, A. Arehart, S. A. Ringel, P. Saunier, and C. Lee, "Effects of high field stress on the radiation response of GaN/AlGaIn HEMTs." (**Outstanding Student Paper**)
- 190.L. Wang, E. X. Zhang, C. X. Zhang, G. X. Duan, R. D. Schrimpf, D. M. Fleetwood, R. A. Reed, I. K. Samsel, J. Hachtel, M. L. Alles, L. Witters, N. Collaert, D. Linten, J. Mitard, S. T. Pantelides, and K. F. Galloway, "Total ionizing dose effects on Ge channel pFETs with raised Si<sub>0.55</sub>Ge<sub>0.45</sub> source/drain."
- 191.X. Wan, S. Ren, D. Liu, W. Zhou, J. Xu, H. Bo, E. X. Zhang, D. M. Fleetwood, and T. P. Ma, "SEB hardened power MOSFETs with high-K dielectric."
- 192.S. Ren, M. Si, K. Ni, X. Wan, J. Chen, S. Chang, X. Sun, E. X. Zhang, R. A. Reed, D. M. Fleetwood, P. Ye, S. Cui, and T.-P. Ma, "Total ionizing dose effects in extremely scaled ultra-thin channel nanowire gate-all-around InGaAs MOSFETs."
- 193.C. N. Arutt, K. M. Warren, R. D. Schrimpf, R. A. Weller, J. S. Kauppila, J. D. Rowe, A. L. Sternberg, R. A. Reed, D. R. Ball, and D. M. Fleetwood, "Protons as a screen for displacement-damage sensitivity in bipolar junction transistors."

*Paris, France, July 14-18, 2014*

- 194.G. X. Duan, D. M. Fleetwood, C. X. Zhang, E. X. Zhang, R. D. Schrimpf, R. A. Reed, M. L. Alles, G. Bersuker, and C. D. Young, "Bias dependence of total ionizing dose effects in SiGe-SiO<sub>2</sub>/HfO<sub>2</sub> devices."
- 195.C. X. Zhang, E. X. Zhang, B. Wang, D. M. Fleetwood, M. L. Alles, R. D. Schrimpf, S. T. Pantelides, A. Rooney, K. Khestanova, R. Gorbachev, and S. Haigh, "Radiation effects on encapsulated graphene-hBN devices."
- 196.J. Chen, E. X. Zhang, C. X. Zhang, M. W. McCurdy, D. M. Fleetwood, R. D. Schrimpf, S. W. Kaun, E. C.H. Kyle, and J. S. Speck, "RF performance of proton-irradiated AlGaIn/GaN HEMTs."
- 197.C. X. Zhang, Akm Newaz, E. X. Zhang, B. Wang, D. M. Fleetwood, M. L. Alles, R. D. Schrimpf, K. I. Bolotin, and S. T. Pantelides, "Total ionizing dose effects on MoS<sub>2</sub> transistors."
- 198.J. X. Luo, J. Chen, Z. Chai, K. Lu, E. X. Zhang, D. M. Fleetwood, and X. Wang, "Total dose effects in TDBC SOI NMOSFETs."
- 199.E. X. Zhang, I. K. Samsel, N. C. Hooten, W. G. Bennett, E. D. Funkhouser, M. W. McCurdy, D. M. Fleetwood, R. A. Reed, M. L. Alles, R. D. Schrimpf, D. Linten, and J. Mitard, "Heavy ion and laser induced charge collection in SiGe bulk PMOSFETs."
- 200.I. Chatterjee, E. X. Zhang, B. L. Bhuvu, R. A. Reed, M. L. Alles, D. R. Ball, R. D. Schrimpf, D. M. Fleetwood, D. Linten, E. Simoen, C. Claeys, and J. Mitard, "Geometry dependence of total-dose effects in bulk FinFETs."
- 201.K. Ni, E. X. Zhang, M. W. McCurdy, N. C. Hooten, W. G. Bennett, R. A. Reed, R. D. Schrimpf, D. M. Fleetwood, M. L. Alles, T. W. Kim, and J. A. del Alamo, "Single event transient response of InAs quantum-well MOSFETs."
- 202.T. D. Haeffner, T. D. Loveless, E. X. Zhang, A. L. Sternberg, S. Jagannathan, R. D. Schrimpf, J. S. Kauppila, M. L. Alles, D. M. Fleetwood, L. W. Massengill, and N. F. Haddad, "Irradiation and temperature effects for a 32 nm RF silicon-on-insulator CMOS process."
- 203.S. L. Weeden-Wright, W. G. Bennett, N. C. Hooten, E. X. Zhang, M. W. McCurdy, R. D. Schrimpf, R. A. Reed, R. A. Weller, D. M. Fleetwood, M. L. Alles, D. Linten, M. Jurczak, and A. Fantini, "TID and displacement damage resilience of 1T1R HfO<sub>2</sub>/Hf resistive memories."

- 204.S. L. Weeden-Wright, M. P. King, N. C. Hooten, W. G. Bennett, B. D. Sierawski, R. D. Schrimpf, R. A. Weller, R. A. Reed, M. H. Mendenhall, D. M. Fleetwood, and R. C. Baumann, "Effects of stopping ions and LET fluctuations on soft error rate prediction."
- 205.A. S. Cardoso, P. S. Chakraborty, N. E. Lourenco, D. M. Fleischhauer, Z. E. Fleetwood, T. D. England, L. Najafzadeh, N. J. Roche, J. H. Warner, D. McMorrow, S. P. Buchner, E. X. Zhang, C. X. Zhang, R. A. Reed, D. M. Fleetwood, P. Paki-Amouzou, and J. D. Cressler, "Single event transient and total dose response of precision voltage reference circuits designed in 90 nm SiGe BiCMOS technology."

*San Francisco, CA, July 8-12, 2013*

- 206.E. X. Zhang, D. M. Fleetwood, N. D. Pate, R. A. Reed, A. F. Witulski, and R. D. Schrimpf, "Time-domain reflectometry measurements of total-ionizing-dose degradation of nMOSFETs."
- 207.S. Jagannathan, D. T. Loveless, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, T. D. Haeffner, J. S. Kauppila, N. Mahatme, B. L. Bhuvu, M. L. Alles, W. T. Holman, A. F. Witulski, and L. W. Massengill, "Sensitivity of high-frequency RF circuits to TID degradation."
- 208.I. Chatterjee, E. X. Zhang, B. L. Bhuvu, R. D. Schrimpf, D. M. Fleetwood, Y. P. Fang, and T. S. Oates, "Bias dependence of total-dose effects in triple-well FinFETs." *Best Paper Nominee*.
- 209.J. Chen, Y. S. Puzyrev, C. X. Zhang, E. X. Zhang, M. W. McCurdy, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, S. W. Kaun, E. C. Kyle, and J. S. Speck, "Proton-induced dehydrogenation of defects in AlGaIn/GaN HEMTs."
- 210.X. Sun, S. Cui, T. P. Ma, O. I. Sadaat, T. Palacios, E. X. Zhang, and D. M. Fleetwood, "Ionizing radiation induced threshold voltage shifts in GaN MOS HEMTs on Si substrates."
- 211.J. Bi, E. X. Zhang, M. W. McCurdy, R. A. Reed, R. D. Schrimpf, D. M. Fleetwood, M. L. Alles, R. A. Weller, Z. Han, D. Linten, M. Jurczak, and A. Fantini, "Total-dose response of HfO<sub>2</sub>/Hf-based bipolar resistive memories."
- 212.J. D. Greenlee, J. C. Shank, J. L. Compagnoni, M. B. Tellekamp, W. A. Doolittle, E. X. Zhang, J. Bi, D. M. Fleetwood, M. L. Alles, and R. D. Schrimpf, "Radiation effects on lithium niobite memristors for neuromorphic computing applications."
- 213.M. P. King, R. A. Reed, R. D. Schrimpf, R. A. Weller, M. H. Mendenhall, B. D. Sierawski, D. M. Fleetwood, N. J. Gaspard, E. C. Auden, S. L. Weeden-Wright, R. C. Baumann, J. A. Pellish, M. D. Berg, and C. M. Seidleck, "Singly charged particle single-event upsets in 45 nm bulk SRAMs. (**Outstanding Conference Paper and Outstanding Student Paper**)"
- 214.I. K. Samsel, E. X. Zhang, N. C. Hooten, W. B. Bennett, R. A. Reed, R. D. Schrimpf, M. W. McCurdy, D. M. Fleetwood, R. A. Weller, X. Sun, T. P. Ma, O. I. Saadat, and T. Palacios, "Charge collection mechanisms in AlGaIn/GaN MOS high electron mobility transistors."

*Miami, FL, July 16-20, 2012*

- 215.E. X. Zhang, D. M. Fleetwood, G. X. Duan, S. A. Francis, C. X. Zhang, and R. D. Schrimpf, "Charge pumping measurements of radiation-induced interface-trap density in floating-body SOI FinFETs."
- 216.C. X. Zhang, E. X. Zhang, D. M. Fleetwood, Mike L. Alles, R. D. Schrimpf, E. B. Song, S. M. Kim, K. Galatsis, and K. L. Wang, "Total ionizing dose effects on graphene-based non-volatile memory devices."
- 217.D. R. Hughart, R. D. Schrimpf, D. M. Fleetwood, N. L. Rowsey, M. E. Law, B. R. Tuttle, and S. T. Pantelides, "The effects of proton-defect interactions on radiation-induced interface trap formation and annealing."
- 218.N. L. Rowsey, M. E. Law, R. D. Schrimpf, D. M. Fleetwood, B. R. Tuttle, and S. T. Pantelides, "Mechanisms separating time-dependent and true dose-rate effects in irradiated bipolar oxides."
- 219.R. Arora, E. X. Zhang, N. E. Lourenco, J. D. Cressler, D. M. Fleetwood, R. D. Schrimpf, A. K. Sutton, G. Freeman, and B. Greene, "Total-dose tolerance of 32-nm SOI nFETs and the impact of technology scaling on nFET reliability."
- 220.N. N. Mahatme, E. X. Zhang, R. A. Reed, B. L. Bhuvu, R. D. Schrimpf, D. M. Fleetwood, D. Linten, E. Simoen, A. Griffoni, M. Aoulaiche, M. Jurczak, and G. Groeseneken, "Impact of back-gate bias and device geometry on the total ionizing dose response of 1-transistor floating body RAMs." (**Outstanding Student Paper**)
- 221.J. Yao, Z. Ye, M. Li, Y. F. Li, R. D. Schrimpf, D. M. Fleetwood, and Y. Wang, "Including process-related variability in soft error rate analysis of advanced logic design based on a foundry process design kit."

*Dan Fleetwood, CV: May 3, 2023*

- 222.Y. S. Puzyrev, B. Wang, E. X. Zhang, C. X. Zhang, A. K. M. Newaz, K. I. Bolotin, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Surface reactions and defect formation in irradiated graphene devices." *Best Paper Nominee*.
- 223.F. El-Mamouni, E. X. Zhang, D. R. Ball, B. Sierawski, M. P. King, R. D. Schrimpf, R. A. Reed, M. L. Alles, D. M. Fleetwood, D. Linten, E. Simoen, and G. Vizkelethy, "Heavy-ion-induced current transients in bulk and SOI FinFETs."
- 224.E. W. Kenyon, N. E. Lourenco, S. Jain, E. X. Zhang, T. D. England, J. D. Cressler, R. D. Schrimpf, and D. M. Fleetwood, "Capabilites of a 180 nm SiGe BiCMOS technology platform for focal plane array applications in an unshielded Europa environment."

*Las Vegas, NV, July 25-29, 2011*

- 225.A. Dasgupta, D. M. Fleetwood, R. A. Reed, R. A. Weller, M. H. Mendenhall, and B. Sierawski, "Dose enhancement in metal-gate, high-K MOS devices."
- 226.Y. Puzyrev, T. Roy, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Radiation-induced defect evolution and electrical degradation of AlGaIn/GaN high-electron-mobility transistors."
- 227.C. X. Zhang, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, X. Shen, S. T. Pantelides, S. H. Ryu, and S. Dhar, "Effects of bias on the irradiation and annealing responses of SiC MOS devices."
- 228.D. R. Hughart, R. D. Schrimpf, D. M. Fleetwood, B. R. Tuttle, and S. T. Pantelides, "Mechanisms of interface trap buildup and annealing during elevated temperature irradiation."
- 229.N. L. Rowsey, M. E. Law, R. D. Schrimpf, D. M. Fleetwood, B. R. Tuttle, and S. T. Pantelides, "A quantitative model for ELDRS and H<sub>2</sub> degradation effects in irradiated oxides based on first principles calculations."
- 230.N. Rezzak, P. Maillard, R. D. Schrimpf, M. L. Alles, D. M. Fleetwood, and Y. A. Li, "The impact of device width on the variability of leakage currents in 90 and 65 nm CMOS technologies."
- 231.M. Li, Y. A. Li, R. D. Schrimpf, D. M. Fleetwood, N. Rezzak, J. Wang, D. Wang, X. Chen, and Y. Wang, "A new physical model and parameter extraction approach for total-ionizing-dose-aware SPICE models."
- 232.R. Arora, K. A. Moen, J. D. Cressler, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, A. K. Sutton, H. M. Nayfeh, and G. Freeman, "Layout-induced trade-offs between RF performance and total-dose tolerance in 45 nm RF-CMOS."
- 233.E. X. Zhang, A. K. M. Newaz, S. Bhandaru, B. Wang, C. X. Zhang, D. M. Fleetwood, M. L. Alles, R. D. Schrimpf, S. T. Pantelides, S. M. Weiss, R. A. Reed, R. A. Weller, and K. I. Bolotin, "Low-energy x-ray- and ozone-exposure induced defect formation in graphene materials and devices."
- 234.J. J. Song, C. H. Park, Y. H. Jeong, O. Kim, B. K. Choi, E. X. Zhang, R. D. Schrimpf, and D. M. Fleetwood, "Fin width and bias dependence of the response of triple-gate MOSFETs to total-dose irradiation."

*Denver, CO, July 19-23, 2010*

- 235.E. X. Zhang, D. M. Fleetwood, F. El Mamouni, R. D. Schrimpf, M. L. Alles, W. Xiong, K. Akarvardar, and S. Cristoloveanu, "Total ionizing dose effects on FinFET-based capacitor-less 1T-DRAMs."
- 236.A. Dasgupta, D. M. Fleetwood, R. A. Reed, R. A. Weller, M. H. Mendenhall, and B. D. Sierawski, "Dose enhancement and reduction in high-K MOS insulators."
- 237.C. X. Zhang, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, K. F. Galloway, E. Simoen, J. Mitard, and C. Claeys, "Effects of processing and radiation bias on leakage currents in Ge pMOSFETs."
- 238.B. R. Tuttle, D. R. Hughart, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Defect interactions of H<sub>2</sub> in SiO<sub>2</sub>: Implications for ELDRS and latent interface trap buildup."
- 239.T. Roy, E. X. Zhang, Y. S. Puzyrev, D. M. Fleetwood, R. D. Schrimpf, B. K. Choi, A. B. Hmelo, and S. T. Pantelides, "Process dependence of proton-induced degradation in HEMTs."
- 240.N. Rezzak, R. D. Schrimpf, M. L. Alles, E. X. Zhang, D. M. Fleetwood, and Y. F. Li, "Layout-related stress effects on radiation-induced leakage current."
- 241.F. El Mamouni, M. Bawedin, E. X. Zhang, R. D. Schrimpf, D. M. Fleetwood, and S. Cristoloveanu, "Total dose effects on the performance of irradiated capacitor-less MSDRAM cells."
- 242.Y. F. Li, N. Rezzak, E. X. Zhang, R. D. Schrimpf, D. M. Fleetwood, J. Wang, D. Wang, Y. Wu, and S. Cai, "Including the effects of process-related variability on radiation response in advanced foundry process design kits."

*Quebec City, Canada, July 20-24, 2009*

- 243.R. Arora, J. Rozen, D. M. Fleetwood, K. F. Galloway, X. C. Zhang, J. Han, S. Dimitrijevic, F. Kong, L. C. Feldman, S. T. Pantelides, and R. D. Schrimpf, "Charge trapping properties of 3C- and 4H-SiC MOS capacitors with nitrated gate oxides."
- 244.D. R. Hughart, R. D. Schrimpf, D. M. Fleetwood, X. J. Chen, H. J. Barnaby, K. E. Holbert, R. L. Pease, D. G. Platteter, B. R. Tuttle, and S. T. Pantelides, "The effects of aging and hydrogen on the radiation response of gated lateral PNP bipolar transistors."
- 245.F. El Mamouni, E. X. Zhang, R. D. Schrimpf, D. M. Fleetwood, R. A. Reed, S. Cristoloveanu, and W. Xiong, "Fin-width dependence of ionizing radiation-induced degradation in 100-nm gate length finFETs."
- 246.M. J. Beck, Y. S. Puzyrev, N. Sergueev, K. Varga, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "The role of atomic displacements in ion-induced dielectric breakdown." *Best Paper Nominee*.
- 247.M. Silvestri, S. Gerardin, F. Faccio, R. D. Schrimpf, D. M. Fleetwood, and A. Paccagnella, "The role of irradiation bias on the time dependent dielectric breakdown of 130-nm MOSFETs exposed to x-rays." *Best Paper Nominee*.
- 248.A. Kalavagunta, M. Silvestri, M. J. Beck, S. K. Dixit, R. D. Schrimpf, R. A. Reed, D. M. Fleetwood, L. Shen, and U. K. Mishra, "Impact of proton irradiation-induced bulk defects on gate-lag in GaN HEMTs."

*Tucson, AZ, July 14-18, 2008*

- 249.D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, R. L. Pease, and G. W. Dunham, "Electron capture, hydrogen release, and ELDRS in linear bipolar transistors."
- 250.X. J. Zhou, D. M. Fleetwood, R. D. Schrimpf, F. Faccio, and L. Gonella, "Radiation effects on the 1/f noise of field oxide field effect transistors."
- 251.M. J. Beck, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Displacement damage effects in single-event gate rupture." *Best Paper Nominee*.
- 252.H. Park, S. K. Dixit, R. D. Schrimpf, D. M. Fleetwood, and S. E. Thompson, "Total ionizing dose effects on strained HfO<sub>2</sub>-based MOSFETs."
- 253.I. G. Batyrev, R. Durand, D. Hughart, M. Bounasser, D. M. Fleetwood, R. D. Schrimpf, B. Tuttle, G. W. Dunham, and S. T. Pantelides, "Effects of hydrogen soaking on the radiation response of bipolar transistors: experiments and modeling."
- 254.X. J. Chen, H. J. Barnaby, K. Holbert, R. L. Pease, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, and P. C. Adell, "Annealing behavior of oxide trapped charge in bipolar base oxides after radiation exposure in H<sub>2</sub> environments."
- 255.J. D. Black, D. R. Ball, K. M. Warren, R. D. Schrimpf, R. A. Reed, D. M. Fleetwood, W. H. Robinson, A. D. Tipton, D. A. Black, P. E. Dodd, and N. F. Haddad, "Characterizing SRAM single event upset in terms of single and double node charge collection."
- 256.J. R. Schwank, M. R. Shaneyfelt, J. A. Felix, P. E. Dodd, A. Dasgupta, S. A. Francis, X. J. Zhou, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, and G. K. Lum, "Effects of moisture exposure on radiation-induced MOS device degradation and its implications for long-term aging." *Best Paper Nominee*.

*Honolulu, HI, July 23-27, 2007*

- 257.K. Adarvardar, R. D. Schrimpf, D. M. Fleetwood, S. Cristoloveanu, P. Gentil, and B. Blalock, "Evidence of radiation-induced dopant neutralization in partially-depleted SOI MOSFETs."
- 258.D. K. Chen, R. D. Schrimpf, D. M. Fleetwood, K. F. Galloway, S. Lee, H. Seo, G. Lucovsky, B. Jun, and J. D. Cressler, "Total dose response of HfSiON MOS capacitors."
- 259.S. K. Dixit, X. J. Zhou, R. D. Schrimpf, D. M. Fleetwood, S. T. Pantelides, L. C. Feldman, G. Bersuker, and R. Choi, "Radiation induced charge trapping in ultra-thin HfO<sub>2</sub> based MOSFETs."
- 260.M. J. Beck, R. Hatcher, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Quantum mechanical description of displacement damage formation." *Best Paper Nominee*.
- 261.M. Caussanel, A. Canals, S. K. Dixit, M. J. Beck, R. D. Schrimpf, D. M. Fleetwood, S. T. Pantelides, and A. D. Touboul, "Doping-type dependence of damage in Si diodes exposed to x-ray, proton, and He<sup>+</sup> irradiation."
- 262.F. Faccio, L. Gonella, H. J. Barnaby, M. McLain, D. M. Fleetwood, and R. D. Schrimpf, "Total ionizing dose effects in shallow trench isolation oxides."
- 263.A. Madan, B. Jun, R. M. Diestelhorst, A. Appaswamy, J. D. Cressler, R. D. Schrimpf, D. M. Fleetwood, T. Isaacs-Smith, J. R. Williams, and S. J. Koester, "Radiation tolerance of Si/SiGe n-MODFETs."
- 264.P. Cheng, B. Jun, A. Sutton, C. Zhu, A. Appaswamy, J. D. Cressler, R. D. Schrimpf, and D. M. Fleetwood, "Probing radiation and hot-carrier-induced damage processes in SiGe HBTs using mixed-mode electrical stress."



*Dan Fleetwood, CV: May 3, 2023*

- 265.M. Bellini, B. Jun, A. K. Sutton, A. C. Appaswamy, P. Cheng, J. D. Cressler, P. W. Marshall, R. D. Schrimpf, D. M. Fleetwood, B. El-Kareh, S. Balster, P. Steinmann, and H. Yasuda, "The effects of proton and x-ray irradiation on the DC and AC performance of complementary (nnp + pnp) SiGe HBTs on thick-film SOI."
- 266.R. M. Diestelhorst, S. Finn, B. Jun, A. K. Sutton, P. Cheng, J. D. Cressler, P. W. Marshall, R. D. Schrimpf, D. M. Fleetwood, H. Gustat, B. Heinemann, G. G. Fisher, D. Knoll, and B. Tillack, "The effects of x-ray and proton irradiation on a 200 GHz/90 GHz complementary (nnp + pnp) SiGe:C HBT technology."
- 267.B. Jun, A. K. Sutton, R. M. Diestelhorst, G. J. Duperon, J. D. Cressler, J. D. Black, T. Haeffner, R. A. Reed, M. L. Alles, R. D. Schrimpf, D. M. Fleetwood, and P. W. Marshall, "The application of RHBD to n-MOSFETs intended for use in cryogenic-temperature radiation environments."

*Ponte Vedra Beach, FL, July 17-21, 2006*

- 268.X. J. Zhou, D. M. Fleetwood, L. Tsetseris, R. D. Schrimpf, and S. T. Pantelides, "Effects of switched-bias annealing on charge trapping in HfO<sub>2</sub> gate dielectrics."
- 269.I. G. Batyrev, M. P. Rodgers, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Effects of water on the aging and radiation response of MOS devices."
- 270.X. J. Chen, H. J. Barnaby, R. D. Schrimpf, D. M. Fleetwood, R. L. Pease, and D. G. Platteter, "Nature of interface defect buildup in gated bipolar devices under low dose rate irradiation."
- 271.M. J. Beck, L. Tsetseris, M. Caussanel, R. D. Schrimpf, D. M. Fleetwood and S. T. Pantelides, "Atomic-scale mechanism for dopant-type dependent damage in Si at low NIEL." *Best Paper Nominee.*
- 272.V. Ramachandran, B. Narasimham, R. D. Schrimpf, W. T. Holman, D. M. Fleetwood, A. F. Witulski, R. L. Pease, G. Dunham, J. Seiler, and D. G. Platteter, "Modeling total-dose effects of a low-dropout voltage regulator."
- 273.S. K. Dixit, S. Dhar, J. Rozen, S. Wang, R. D. Schrimpf, D. M. Fleetwood, S. T. Pantelides, and L. C. Feldman, "Total dose radiation response of nitrided and non-nitrided SiO<sub>2</sub>/4H-SiC MOS Capacitors."
- 274.G. Lucovsky, S. Lee, H. Seo, L. B. Fleming, M. Ulrich, D. E. Aspnes, R. D. Schrimpf, D. M. Fleetwood, J. A. Felix, and J. Luning, "Differences between charge trapping states in irradiated nano-crystalline HfO<sub>2</sub> and non-crystalline Hf silicates."
- 275.M. Bellini, B. Jun, T. Chen, J. D. Cressler, P. W. Marshall, D. Chen, R. D. Schrimpf, D. M. Fleetwood, and J. Cai, "Radiation and bias effects in fully-depleted and partially-depleted SiGe HBTs fabricated on CMOS-compatible SOI."
- 276.B. Jun, R. M. Diestelhorst, M. Bellini, G. Espinel, A. P. Gnana Prakash, J. D. Cressler, D. Chen, R. D. Schrimpf, and D. M. Fleetwood, "Temperature-dependence of gate-induced drain leakage in X-ray irradiated 130 nm CMOS devices."
- 277.A. K. Sutton, A. P. Gnana Prakash, B. Jun, E. Zao, R. M. Diestelhorst, G. Espinel, J. D. Cressler, M. A. Carts, A. M. Phan, P. W. Marshall, R. L. Ladbury, C. J. Marshall, R. A. Reed, R. D. Schrimpf, and D. M. Fleetwood, "An investigation of dose enhancement and source dependent effects in 200 GHz SiGe HBTs."

*Seattle, WA, July 11-15, 2005*

- 278.X. J. Zhou, D. M. Fleetwood, J. A. Felix, E. P. Gusev, and C. D'Emic, "NBTI and radiation effects in high-K alternative dielectrics." *Best Paper Nominee.*
- 279.A. P. Karmarkar, D. M. Fleetwood, R. D. Schrimpf, R. A. Weller, B. D. White, L. J. Brillson, and U. K. Mishra, "Proton-induced damage in GaN-based Schottky diodes."
- 280.M. P. Rodgers, D. M. Fleetwood, and R. D. Schrimpf, "The effects of aging on MOS irradiation and annealing response."
- 281.L. Tsetseris, R. D. Schrimpf, D. M. Fleetwood, R. L. Pease, and S. T. Pantelides, "Common origin for enhanced low-dose-rate sensitivity and bias temperature instability under negative bias."

*Atlanta, GA, July 19-23, 2004*

- 282.S. N. Rashkeev, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Effects of hydrogen motion on interface trap formation and annealing."
- 283.R. A. Weller, M. H. Mendenhall, and D. M. Fleetwood, "A screened Coulomb scattering module for displacement damage computations in Geant4."
- 284.H. D. Xiong, B. Jun, D. M. Fleetwood, R. D. Schrimpf, and J. R. Schwank, "Charge trapping and low frequency noise in SOI buried oxides."
- 285.J. Stacey, R. D. Schrimpf, D. M. Fleetwood, and K. Holmes, "Surface charge analysis as a total dose radiation measurement tool for Si/SiO<sub>2</sub>."

286. A. P. Karmarkar, B. Jun, D. M. Fleetwood, R. D. Schrimpf, R. A. Weller, B. D. White, L. J. Brillson, and U. K. Mishra, "Proton irradiation effects on GaN-based high electron mobility transistors with Si-doped  $\text{Al}_x\text{Ga}_{1-x}\text{N}$  and thick GaN cap layers."
287. J. A. Felix, M. R. Shaneyfelt, J. R. Schwank, P. E. Dodd, D. M. Fleetwood, E. P. Gusev, "The effects of processing on radiation-induced charge buildup and annealing in devices with high-K gate dielectrics."
288. M. R. Shaneyfelt, J. R. Schwank, J. A. Felix, P. E. Dodd, D. M. Fleetwood, R. L. Pease, and M. C. Maher, "Annealing behavior of linear bipolar devices with enhanced low-dose-rate sensitivity."
289. B. Jun, H. D. Xiong, C. R. Cirba, R. D. Schrimpf, D. M. Fleetwood, and S. Cristoloveanu, "Total dose effects on double gate fully depleted SOI MOSFETs."
290. S. Ducret, F. Saigne, J. Boch, R. D. Schrimpf, D. M. Fleetwood, J. R. Vaille, L. Dusseau, J. P. David, and R. Ecoffet, "Effect of thermal annealing on radiation induced degradation of bipolar technologies when the dose rate is switched from high to low."
291. J. Boch, F. Saigne, S. Ducret, R. D. Schrimpf, D. M. Fleetwood, P. Iaconi, and L. Dusseau, "Total dose effects on bipolar integrated circuits: characterization of the saturation region."
292. B. Jun, Y. V. White, R. Pasternak, S. N. Rashkeev, R. D. Schrimpf, D. M. Fleetwood, N. H. Tolk, F. Brunier, N. Bresson, and S. Cristoloveanu, "Charge trapping in irradiated SOI wafers measured by second harmonic generation."

Monterey, CA, July 21-25, 2003

293. S. N. Rashkeev, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Effects of Electric Field on Radiation-Induced Dopant Deactivation by Hydrogen."
294. J. A. Felix, D. M. Fleetwood, R. D. Schrimpf, M. R. Shaneyfelt, J. R. Schwank, P. E. Dodd, E. P. Gusev, and C. D'Emic, "Radiation-Induced Charge Trapping in Thin  $\text{Al}_2\text{O}_3/\text{SiO}_x\text{N}_y/\text{Si}$  (100) Gate Dielectric Stacks." *Best Paper Nominee*.
295. B. Jun, R. D. Schrimpf, D. M. Fleetwood, and S. Cristoloveanu, "Charge Separation Techniques for Irradiated Pseudo-MOS SOI Transistors."
296. X. Hu, A. P. Karmarkar, D. M. Fleetwood, R. D. Schrimpf, R. D. Geril, R. A. Weller, B. D. White, M. Bataiev, J. L. Brillson, and U. K. Mishra, "Proton-Irradiation Effects on AlGaIn/GaN High Electron Mobility Transistors."
297. J. Boch, R. Cizmarik, R. D. Schrimpf, D. M. Fleetwood, and F. Saigne, "Impact of Mechanical Stress on Total-Dose Effects in Bipolar Transistors."
298. R. A. Weller, A. L. Sternberg, L. W. Massengill, R. D. Schrimpf, and D. M. Fleetwood, "Evaluating Average and Atypical Response in Radiation Effects Simulations."
299. B. D. White, M. Bataiev, S. A. Ringel, L. J. Brillson, X. Hu, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, and W. J. Schaff, "Electrical and Spectral Properties of 1.8 MeV Proton Irradiated AlGaIn/GaN HEMT Structures as a Function of Proton Fluence."
300. R. Pasternak, A. Chatterjee, Y. V. Shirokaya, B. K. Choi, Z. Marka, J. K. Miller, Y. Jiang, R. G. Albridge, S. N. Rashkeev, S. T. Pantelides, R. D. Schrimpf, D. M. Fleetwood, and N. H. Tolk, "Contactless Ultra-Fast Laser Probing of Radiation-Induced Leakage Current in Ultra-Thin Oxides."

Phoenix, AZ, July 15-19, 2002

301. D. M. Fleetwood, H. D. Xiong, Z. Y. Lu, C. J. Nicklaw, J. A. Felix, R. D. Schrimpf, and S. T. Pantelides, "Unified Model of Hole Trapping,  $1/f$  Noise, and Thermally Stimulated Current in MOS Devices." *Meritorious Conference Paper Award*.
302. H. D. Xiong, D. M. Fleetwood, B. K. Choi, and A. L. Sternberg, "Temperature Dependence and Irradiation Response of  $1/f$  Noise in MOSFETs."
303. J. A. Felix, D. M. Fleetwood, R. D. Schrimpf, J. G. Hong, G. Lucovsky, J. R. Schwank, and M. R. Shaneyfelt, "Total Dose Radiation Response of Hafnium Silicate Capacitors."
304. S. N. Rashkeev, C. R. Cirba, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, S. C. Witzak, and A. Michez, "Physical Model for Enhanced Interface-Trap Formation at Low Dose Rates." *Meritorious Conference Paper Award*.
305. B. K. Choi, R. D. Schrimpf, D. M. Fleetwood, L. W. Massengill, K. F. Galloway, M. R. Shaneyfelt, T. L. Meisenheimer, P. E. Dodd, J. R. Schwank, Y. M. Lee, R. S. Johnson, and G. Lucovsky, "Long-Term Reliability Degradation of Ultra-Thin Dielectric Films due to Heavy-Ion Irradiation." *Best Paper Nominee*.
306. C. J. Nicklaw, Z. Y. Lu, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "The Structure, Properties, and Dynamics of Oxygen Vacancies in Amorphous  $\text{SiO}_2$ ."

- 307.H. J. Barnaby, S. K. Smith, R. D. Schrimpf, D. M. Fleetwood, and R. L. Pease, "Analytical Model for Proton Radiation Effects in Bipolar Devices."
- 308.X. Hu, B. K. Choi, H. J. Barnaby, D. M. Fleetwood, R. D. Schrimpf, K. F. Galloway, R. A. Weller, K. McDonald, and R. Dettmer, "Proton-Induced Degradation in AlGaAs/GaAs Heterojunction Bipolar Transistors."
- 309.B. D. White, M. Bataiev, L. J. Brillson, B. K. Choi, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, R. W. Dettmer, W. J. Schaff, and U. K. Mishra, "Characterization of 1.8 MeV Proton Irradiated AlGaN/GaN Field-Effect Transistor Structures by Nanoscale Depth-Resolved Luminescence Spectroscopy."
- 310.M. R. Shaneyfelt, R. L. Pease, J. R. Schwank, M. C. Maher, G. L. Hash, D. M. Fleetwood, P. E. Dodd, C. A. Reber, S. C. Witzak, L. C. Riewe, H. P. Hjalmarsen, J. C. Banks, B. L. Doyle, and J. A. Knapp, "Impact of Passivation Layers on Enhanced Low-Dose-Rate Sensitivity and Thermal-Stress Effects in Linear Bipolar ICs." **Outstanding Conference Paper Award.**

*Vancouver, BC, July 16-20, 2001*

- 311.S. N. Rashkeev, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Proton-Induced Defect Generation at the Si/SiO<sub>2</sub> Interface."
- 312.J. A. Felix, D. M. Fleetwood, L. C. Riewe, M. R. Shaneyfelt, and P. S. Winokur, "Bias and Frequency Dependence of Radiation-Induced Charge Trapping in MOS Devices." *Best paper nominee.*
- 313.L. W. Massengill, B. K. Choi, D. M. Fleetwood, R. D. Schrimpf, M. R. Shaneyfelt, T. L. Meisenheimer, P. E. Dodd, J. R. Schwank, Y. M. Lee, R. S. Johnson, and G. Lucovsky, "Heavy-Ion-Induced Breakdown in Ultrathin Gate Oxides." **Meritorious Conference Paper Award.**
- 314.B. D. White, L. J. Brillson, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Detection of Trap Activation by Ionizing Radiation in SiO<sub>2</sub> by Spatially Localized Cathodoluminescence Spectroscopy."
- 315.A. Karmarkar, B. K. Choi, R. D. Schrimpf, and D. M. Fleetwood, "Aging and Baking Effects on the Radiation Hardness of MOS Capacitors."

*Reno, NV, July 24-28, 2000*

- 316.D. M. Fleetwood, L. C. Riewe, P. S. Winokur, and F. W. Sexton, "Electrical Breakdown of Irradiated Oxides During Current-Temperature Stress."
- 317.H. J. Barnaby, R. D. Schrimpf, D. M. Fleetwood, R. L. Pease, T. Turflinger, P. Cole, J. Krieg, and M. C. Maher, "Origins of Total-Dose Response Variability in LM111 Comparators."
- 318.S. T. Pantelides, S. N. Rashkeev, R. Buczko, D. M. Fleetwood, and R. D. Schrimpf, "Reactions of Mobile Hydrogen with the Si-SiO<sub>2</sub> Interface." *Best paper nominee.*
- 319.B. D. White, L. J. Brillson, S. C. Lee, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, Y. M. Lee, and G. Lucovsky, "Low Energy Electron-Excited Nanoscale Luminescence: A Tool to Detect Trap Activation by Ionizing Radiation."
- 320.P. E. Bunson, M. Di Ventura, S. T. Pantelides, D. M. Fleetwood, and R. D. Schrimpf, "Hydrogen Related Defects in Irradiated SiO<sub>2</sub>."
- 321.C. J. Nicklaw, M. P. Pagey, S. T. Pantelides, D. M. Fleetwood, R. D. Schrimpf, K. F. Galloway, J. E. Wittig, B. M. Howard, E. Taw, W. H. McNeil, and J. F. Conley, Jr., "Defects and Nanocrystals Generated by Si Implantation into a-SiO<sub>2</sub>."
- 322.C. R. Cirba, Y. Li, H. J. Barnaby, R. D. Schrimpf, D. M. Fleetwood, and S. Kosier, "Determining Energy Distributions of Interface Traps in Gate-Controlled Semiconductor Devices."
- 323.H. P. Hjalmarsen, S. C. Witzak, P. A. Schultz, D. J. Bowman, and D. M. Fleetwood, "A Mechanism for Enhanced Low-Dose-Rate Degradation in Bipolar Transistors."
- 324.S. C. Lee, A. Rappala, Y. F. Li, G. Gasiot, R. D. Schrimpf, D. M. Fleetwood, K. F. Galloway, M. Featherby, and D. Johnson, "Total Dose Effects in Composite Nitride-Oxide (NO) Films and Optimizing Composite Layer Thickness for Minimizing Threshold Voltage Shift."
- 325.M. R. Shaneyfelt, J. R. Schwank, S. C. Witzak, L. C. Riewe, P. S. Winokur, G. L. Hash, R. L. Pease, and D. M. Fleetwood, "Thermal-Stress Effects on Enhanced Low-Dose-Rate Sensitivity of Linear Bipolar Circuits." *Best paper nominee.*
- 326.N. H. Tolck, S. K. Singh, Z. Marka, W. Wang, S. N. Rashkeev, S. T. Pantelides, S. C. Lee, R. D. Schrimpf, and D. M. Fleetwood, "Characterization of X-ray Radiation Damage in Gate and Isolation Oxides Using Second Harmonic Generation."

*Dan Fleetwood, CV: May 3, 2023*

327. J. R. Schwank, M. R. Shaneyfelt, R. A. Loemker, B. L. Draper, P. E. Dodd, S. C. Witzcak, L. C. Riewe, V. Ferlet-Cavrois, P. Paillet, J. L. Leray, and D. M. Fleetwood, "Correlation Between Co-60 and X-ray Exposures on Radiation-Induced Charge Buildup in Silicon-on-Insulator Buried Oxides."

*Norfolk, VA, July 12-16, 1999*

328. D. M. Fleetwood, P. S. Winokur, L. C. Riewe, O. Flament, P. Paillet, and J. L. Leray, "The Role of Electron Transport and Trapping in MOS Total-Dose Modeling."  
329. O. Flament, P. Paillet, J. L. Leray, and D. M. Fleetwood, "Consideration on Isochronal Anneal Technique: From Measurement to Physics."  
330. K. Vanheusden, P. P. Korambath, H. A. Kurtz, S. P. Karna, D. M. Fleetwood, W. M. Shedd, and R. D. Pugh, "The Effect of Near-Interface Network Strain on Proton Trapping in SiO<sub>2</sub>."

*Newport Beach, CA, July 20-24, 1998*

331. D. M. Fleetwood, P. S. Winokur, M. R. Shaneyfelt, L. C. Riewe, O. Flament, P. Paillet, and J. L. Leray, "Effects of Isochronal Annealing and Irradiation Temperature on Radiation-Induced Trapped Charge."  
332. F. W. Sexton, D. M. Fleetwood, M. R. Shaneyfelt, P. E. Dodd, G. L. Hash, L. P. Schanwald, R. A. Loemker, and K. S. Krisch, "Precursor Ion Damage and Angular Dependence of Single Event Gate Rupture in Thin Oxides." *Best Paper Nominee*.  
333. K. Vanheusden, D. M. Fleetwood, J. R. Schwank, M. R. Shaneyfelt, T. L. Meisenheimer, and B. L. Draper, "The Effects of Irradiation and Proton Implantation on the Density of Mobile Protons in SiO<sub>2</sub> Films."  
334. S. C. Witzcak, R. C. Laco, D. C. Mayer, D. M. Fleetwood, R. D. Schrimpf, and K. F. Galloway, "Space Charge Limited Degradation of Bipolar Oxides at Low Electric Fields." *Outstanding Conference Paper Award*.  
335. R. J. Graves, C. R. Cirba, R. D. Schrimpf, R. J. Milanowski, F. Saigne, A. Michez, D. M. Fleetwood, and S. C. Witzcak, "Modeling Low-Dose-Rate Effects in Irradiated Bipolar-Base Oxides."  
336. S. C. Witzcak, R. C. Laco, D. C. Mayer, R. D. Schrimpf, H. J. Barnaby, K. F. Galloway, R. L. Pease, and D. M. Fleetwood, "Measurement Bias Dependence of Enhanced Bipolar Gain Degradation at Low Dose Rate." *Best Paper Nominee*.

*Snowmass, CO, July 21-25, 1997*

337. D. M. Fleetwood, M. J. Johnson, T. L. Meisenheimer, and P. S. Winokur, "Latent Interface Traps and 1/f Noise in Irradiated MOS Devices," *Meritorious Conference Paper Award*.  
338. D. M. Fleetwood, "Revised Model of Thermally Stimulated Current in MOS Capacitors."  
339. F. W. Sexton, D. M. Fleetwood, M. R. Shaneyfelt, P. E. Dodd, and G. L. Hash, "Single Event Gate Rupture in Thin Gate Oxides," *Outstanding Conference Paper Award*.  
340. W. L. Warren, K. Vanheusden, D. M. Fleetwood, J. R. Schwank, P. S. Winokur, and M. J. Knoll "Nonvolatile Field Effect Transistors Based on Protons and Si/SiO<sub>2</sub>/Si Structures."  
341. S. C. Witzcak, R. D. Schrimpf, D. M. Fleetwood, R. C. Laco, D. C. Mayer, K. F. Galloway, J. M. Puhl, R. L. Pease, and J. S. Suehle, "Evaluation of Temperature-Enhanced Gain Degradation of Vertical NPN and Lateral PNP Bipolar Transistors," *Meritorious Conference Paper Award*.  
342. M. Simons, R. L. Pease, D. M. Fleetwood, J. R. Schwank, and M. Krzesniak, "Dose Enhancement in a Room Co-60 Source."  
343. M. R. Shaneyfelt, P. S. Winokur, D. M. Fleetwood, G. L. Hash, J. R. Schwank, F. W. Sexton, and R. L. Pease, "Impact of Aging on Radiation Hardness," *Best Paper Nominee*.  
344. A. Wu, R. D. Schrimpf, R. L. Pease, D. M. Fleetwood, and S. L. Kosier, "Radiation-Induced Gain Degradation in Lateral PNP PJT's with Lightly and Heavily Doped Emitters."  
345. R. L. Pease, D. B. Brown, L. Cohn, D. M. Fleetwood, and A. H. Johnston, "A Proposed Hardness Assurance Test Methodology for Bipolar Linear Circuits and Devices in a Space Ionizing Radiation Environment."  
346. K. Vanheusden, S. P. Karna, R. D. Pugh, J. R. Schwank, W. L. Warren, D. M. Fleetwood, and R. A. B. Devine, "Irradiation Response of Mobile Protons in Buried SiO<sub>2</sub>."  
347. M. Simons, R. L. Pease, D. M. Fleetwood, J. R. Schwank, M. Krzesniak, T. Turflinger, J. Buaron, L. C. Riewe, W. T. Kemp, P. W. C. Duggan, J. M. Puhl, A. H. Johnston, M. Wiedeman, R. E. Mills, A. G. Holmes-Seidle, L. M. Cohn, H. Doane, and W. Lohmeier, "Common-Source TLD and RADFET Characterization of Co-60, Cs-137, and X-ray Irradiation Sources," *Outstanding Presentation, 1997 IEEE Radiation Effects Data Workshop*.

*Indian Wells, CA, July 15-19, 1996*

348. D. M. Fleetwood, L. C. Riewe, J. R. Schwank, S. C. Witzak, and R. D. Schrimpf, "Radiation Effects at Low Electric Fields in Thermal, SIMOX, and Bipolar-Base Oxides," **Outstanding Conference Paper Award**.
349. W. L. Warren, K. Vanheusden, D. M. Fleetwood, J. R. Schwank, M. R. Shaneyfelt, P. S. Winokur, and R. A. B. Devine, "Over-Coordinated O Centers in SIMOX and Thermal Oxides," *Best Paper Nominee*.
350. D. M. Schmidt, A. Wu, R. D. Schrimpf, D. M. Fleetwood, R. L. Pease, and W. E. Combs, "Modeling Ionizing Radiation Induced Gain Degradation of the Lateral PNP BJT," *Best Paper Nominee*.
351. S. C. Witzak, R. D. Schrimpf, K. F. Galloway, D. M. Fleetwood, R. L. Pease, J. M. Puhl, D. M. Schmidt, W. E. Combs, and J. S. Suehle, "Accelerated Tests for Simulating Low Dose Rate Gain Degradation of Lateral and Substrate PNP Bipolar Junction Transistors," **Meritorious Conference Paper Award**.

*Madison, WI, July 17-21, 1995*

352. D. M. Fleetwood, W. L. Warren, J. R. Schwank, P. S. Winokur, M. R. Shaneyfelt, and L. C. Riewe. "Effects of Interface Traps and Border Traps on MOS Postirradiation Annealing Response," **Outstanding Conference Paper Award**.
353. D. M. Schmidt, D. M. Fleetwood, R. D. Schrimpf, R. L. Pease, R. J. Graves, G. H. Johnson, K. F. Galloway, and W. E. Combs, "Comparison of Ionizing Radiation-Induced Gain Degradation in Lateral, Substrate, and Vertical PNP BJT's."
354. R. D. Schrimpf, R. J. Graves, D. M. Schmidt, D. M. Fleetwood, R. L. Pease, W. E. Combs, and M. DeLaus, "Hardness Assurance Issues for Lateral PNP Bipolar Junction Transistors." **Voted Outstanding Oral Presentation of Conference; Meritorious Conference Paper Award**.
355. W. L. Warren, M. R. Shaneyfelt, D. M. Fleetwood, and P. S. Winokur, "Microscopic Nature of Defect Centers in Doped Oxides," *Best Paper Nominee*.

*Tucson, AZ, July 18-22, 1994*

356. D. M. Fleetwood, R. A. Reber, Jr., P. S. Winokur, S. L. Kosier, R. D. Schrimpf, A. Wei, R. N. Nowlin, M. DeLaus, R. L. Pease, and W. E. Combs, "Physical Mechanisms Contributing to Enhanced Bipolar Gain Degradation at Low Dose Rates." **Meritorious Conference Paper Award**.
357. M. R. Shaneyfelt, D. M. Fleetwood, J. R. Schwank, T. L. Meisenheimer, and P. S. Winokur, "Role of Burn-in During Qualification Testing." **Meritorious Conference Paper Award**.
358. R. N. Nowlin, D. M. Fleetwood, and R. D. Schrimpf, "Saturation of the Dose-Rate Response of Single-Poly BJT's Below 10 rad(SiO<sub>2</sub>)/s: Implications for Hardness Assurance."
359. P. Khosropour, D. M. Fleetwood, K. F. Galloway, R. D. Schrimpf, and P. Calvel, "Estimating Low-Dose-Rate Irradiation Response of MOSFETs."
360. W. L. Warren, M. R. Shaneyfelt, D. M. Fleetwood, J. R. Schwank, P. S. Winokur, R. A. B. Devine, and D. Mathiot, "Microscopic Nature of Border Traps in MOS Devices," *Best Paper Nominee*.
361. N. S. Saks, M. Simons, D. M. Fleetwood, J. T. Yount, and P. M. Lenahan, "Radiation Effects in Oxynitrides Grown in N<sub>2</sub>O," *Best Paper Nominee*.
362. S. L. Kosier, A. Wei, R. D. Schrimpf, W. E. Combs, D. M. Fleetwood, M. DeLaus, and R. L. Pease, "Bounding the Total-Dose Response of Modern Bipolar Transistors."
363. R. L. Pease, S. L. Kosier, R. D. Schrimpf, W. E. Combs, M. DeLaus, and D. M. Fleetwood, "Correlation of Hot-Carrier Stress and Ionization Induced Degradation in Bipolar Transistors."

*Snowbird, UT, July 19-23, 1993*

364. D. M. Fleetwood, M. R. Shaneyfelt, L. C. Riewe, P. S. Winokur, and R. A. Reber, Jr., "Surprising Effects of High-Temperature Biased Annealing on the Postirradiation Electrical Response of MOS Devices." **Meritorious Conference Paper Award**.
365. R. N. Nowlin, D. M. Fleetwood, R. D. Schrimpf, R. L. Pease, and W. E. Combs, "Hardness Assurance and Testing Issues for Bipolar/BiCMOS Devices," *Best Paper Nominee*.
366. T. S. Mayer, D. M. Fleetwood, D. E. Beutler, J. A. Cooper, and M. R. Melloch, "Unexpected Increase in the Thermal Generation Rate of Bulk GaAs Due to Electron-Beam Metallization."
367. J. R. Schwank, D. M. Fleetwood, M. R. Shaneyfelt, and P. S. Winokur, "A Critical Comparison of Charge-Pumping, Dual Transistor, and Midgap Measurement Techniques."
368. M. R. Shaneyfelt, D. M. Fleetwood, P. S. Winokur, J. R. Schwank, and T. L. Meisenheimer, "Effects of Device Scaling and Geometry on MOS Radiation Hardness Assurance."

*Dan Fleetwood, CV: May 3, 2023*

- 369.S. L. Kosier, R. D. Schrimpf, R. N. Nowlin, D. M. Fleetwood, M. DeLaus, R. L. Pease, W. E. Combs, A. Wei, and F. Chai, "Charge Separation for Bipolar Transistors."  
370.W. L. Warren, M. R. Shaneyfelt, J. R. Schwank, D. M. Fleetwood, P. S. Winokur, R. A. B. Devine, W. P. Maszara, and J. B. McKitterick, "Paramagnetic Defect Centers in Irradiated BESOI and SIMOX Buried Oxides."

*New Orleans, LA, July 13-17, 1992*

- 371.D. M. Fleetwood, S. L. Miller, R. A. Reber, Jr., P. J. McWhorter, and P. S. Winokur, "New Insights into Radiation-Induced Oxide-Trap Charge Through Thermally-Stimulated-Current Measurement and Analysis," *Best Paper Nominee*.  
372.F. W. Sexton, D. M. Fleetwood, C. C. Aldridge, G. Garrett, J. C. Pelletier, and J. I. Gaona, "Qualifying Commercial ICs for Total-Dose Space Environments."  
373.J. R. Schwank, D. M. Fleetwood, M. R. Shaneyfelt, P. S. Winokur, C. L. Axness, and L. C. Riewe, "Latent Interface-Trap Buildup: Issues for Long-Term Device Response," *Best Paper Nominee*.  
374.M. R. Shaneyfelt, J. R. Schwank, D. M. Fleetwood, P. S. Winokur, K. L. Hughes, G. L. Hash, and M. P. Connors, "Interface-Trap Buildup Rates in Wet and Dry Oxides."

*San Diego, CA, July 15-19, 1991*

- 375.D. M. Fleetwood, R. A. Reber, Jr., and P. S. Winokur, "Effect of Bias on Thermally Stimulated Current (TSC) in Irradiated MOS Devices," *Best Paper Nominee*.  
376.T. L. Meisenheimer, D. M. Fleetwood, M. R. Shaneyfelt, and L. C. Riewe, " $1/f$  Noise in N- and P-Channel MOS Devices Through Irradiation and Annealing."  
377.M. R. Shaneyfelt, K. L. Hughes, J. R. Schwank, F. W. Sexton, D. M. Fleetwood, P. S. Winokur, and E. W. Enlow, "Wafer-Level Testing for Hardness Assurance."  
378.M. R. Shaneyfelt, D. M. Fleetwood, J. R. Schwank, and K. L. Hughes, "Comparison of Low-Energy X-ray and Cobalt-60 Irradiations of MOS Devices as a Function of Gate Bias."  
379.J. H. Scofield and D. M. Fleetwood, "Physical Basis for Nondestructive Tests of MOS Radiation Hardness."  
380.D. M. Fleetwood, P. S. Winokur, and T. L. Meisenheimer, "Hardness Assurance for Low-Dose Space Applications," *Best Paper Nominee*.

*Reno, Nevada, July 16-20, 1990*

- 381.D. M. Fleetwood, P. S. Winokur, and L. C. Riewe, "Predicting Switched-Bias Response from Steady State Irradiations."  
382.P. S. Winokur, F. W. Sexton, D. M. Fleetwood, M. D. Terry, P. V. Dressendorfer, M. R. Shaneyfelt, and J. R. Schwank, "Implementing QML for Radiation Hardness Assurance."  
383.T. L. Meisenheimer and D. M. Fleetwood, "Effect of Radiation-Induced Charge on  $1/f$  Noise in MOS Devices."  
384.M. R. Shaneyfelt, J. R. Schwank, D. M. Fleetwood, P. S. Winokur, and F. W. Sexton, "Field Dependence of Interface-Trap Buildup in Polysilicon and Metal Gate MOS Devices."

*Marco Island, Florida, July 24-28, 1989*

- 385.D. M. Fleetwood, J. R. Schwank, P. S. Winokur, F. W. Sexton, and M. R. Shaneyfelt, "Dual Transistor Method to Determine Threshold Voltage Shifts due to Oxide-Trapped and Interface-Trapped Charge in MOS Transistors," *Best Paper Nominee*.  
386.D. M. Fleetwood, P. S. Winokur, L. C. Riewe, and R. L. Pease, "An Improved Standard Total-Dose Test for CMOS Space Electronics."  
387.P. J. McWhorter, D. M. Fleetwood, R. A. Pastorek, and G. T. Zimmerman, "Comparison of MOS Capacitor and Transistor Postirradiation Response."  
388.J. H. Scofield, T. P. Doerr, N. A. Schwadron, and D. M. Fleetwood, " $1/f$  Noise: A Nondestructive Technique to Predict MOS Radiation Hardness?"  
389.J. R. Schwank, F. W. Sexton, D. M. Fleetwood, M. R. Shaneyfelt, K. L. Hughes, and M. S. Rodgers, "Evaluation of Lot Acceptance Tests Using CMOS ICs."

*Portland, Oregon, July 12-15, 1988*

- 390.D. M. Fleetwood, P. S. Winokur, and J. R. Schwank, "Using Laboratory X-ray and Cobalt-60 Irradiations to Predict CMOS Device Response in Strategic and Space Environments," *Outstanding Conference Paper Award*.

- 391.D. M. Fleetwood, S. S. Tsao, and P. S. Winokur, "Total Dose Hardness Assurance Issues for SOI MOSFETs."  
392.D. M. Fleetwood, D. E. Beutler, L. J. Lorence, Jr., D. B. Brown, B. L. Draper, L. C. Riewe, H. B. Rosenstock, and D. P. Knott, "How Much Do We Know About X-ray Dose Enhancement Effects on MOS Oxides?"  
393.J. R. Schwank, F. W. Sexton, D. M. Fleetwood, R. V. Jones, R. S. Flores, M. S. Rodgers, and D. T. Sanders, "Temperature Effects on the Radiation Response of MOS Devices," *Best Paper Nominee*.  
394.W. Beezhold, D. E. Beutler, D. M. Fleetwood, R. L. Hospelhorn, and D. P. Knott, "Resolution of Computer Predictions and Measured Dose Enhancement Effects in CMOS Diodes in a Medium-Energy X-ray Environment."  
395.D. E. Beutler, W. Beezhold, J. S. Browning, D. M. Fleetwood, M. Connors, C. L. Freshman, D. P. Knott, and N. E. Counts, "Comparison of Photocurrent Enhancement and Upset Enhancement in CMOS Devices in a Medium-Energy X-Ray Environment."  
396.C. L. Axness, J. R. Schwank, P. S. Winokur, J. S. Browning, R. Koga, and D. M. Fleetwood, "Single-Event Upset in 16k CMOS SRAMs in Space Satellite Environments."

*Snowmass, Colorado, July 28-31, 1987*

- 397.D. M. Fleetwood, P. V. Dressendorfer, and D. C. Turpin, "A Reevaluation of Worst-Case Postirradiation Response for Hardened MOS Transistors."  
398.D. M. Fleetwood and P. V. Dressendorfer, "A Simple Method to Predict Radiation and Annealing Biases that Lead to Worst-Case CMOS Static RAM Postirradiation Response," *Best Paper Nominee*.  
399.J. R. Schwank, D. M. Fleetwood, P. S. Winokur, P. V. Dressendorfer, D. C. Turpin, and D. T. Sanders, "The Role of Hydrogen in Radiation-Induced Defect Formation in Polysilicon-Gate CMOS Devices."  
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401.S. S. Tsao, D. M. Fleetwood, H. T. Weaver, L. Pfeiffer, and G. K. Celler, "Radiation-Tolerant, Sidewall-Hardened SOI/MOS Transistors."  
402.C. M. Dozier, D. M. Fleetwood, D. B. Brown, and P. S. Winokur, "Sandia/NRL Interlaboratory Comparison of Low-Energy X-ray and Cobalt-Irradiations of MOS Transistors."

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- 407.D. M. Fleetwood, P. S. Winokur, R. W. Beegle, P. V. Dressendorfer, and B. L. Draper, "Accounting for Dose-Enhancement Effects with CMOS Transistors."  
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409.P. S. Winokur, E. B. Errett, D. M. Fleetwood, P. V. Dressendorfer, and D. C. Turpin, "Optimizing and Controlling the Radiation Hardness of a Si-Gate CMOS Process." *Outstanding Conference Paper Award*.

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- 410.S. Bonaldo, E. X. Zhang, S. Mattiazzo, A. Paccagnella, S. Gerardin, R. D. Schrimpf, and D. M. Fleetwood, "Total-ionizing-dose effects at ultra-high doses in AlGaIn/GaN HEMTs," RADECS 2022, Venice, Italy, Oct. 3-7, 2022.  
411.X. Li, P. F. Wang, H. Qiu, E. X. Zhang, M. W. McCurdy, R. D. Schrimpf, and D. M. Fleetwood, "Gate leakage in AlGaIn/GaN HEMTs subjected to irradiation and bias stress," RADECS 2022, Venice, Italy, Oct. 3-7, 2022.

- 412.Z. Guo, K. Li, X. Li, X. Luo, E. X. Zhang, R. A. Reed, D. M. Fleetwood, R. D. Schrimpf, A. Chasin, J. Mitard, and D. Linten, "Total-ionizing-dose effects in IGZO thin-film transistors," RADECS 2022, Venice, Italy, Oct. 3-7, 2022.
- 413.S. C. Witczak, R. D. Schrimpf, D. M. Fleetwood, S. R. Messenger, M. Langlois, M. W. McCurdy, and J. Rodriguez, "Energy dependence of proton-induced degradation in a bipolar junction transistor," RADECS 2022, Venice, Italy, Oct. 3-7, 2022.
- 414.S. Toguchi, E. X. Zhang, M. W. Rony, X. Luo, D. M. Fleetwood, R. D. Schrimpf, S. Moreau, S. Cheramy, P. Batude, L. Brunet, F. Andrieu, and M. L. Alles, "Effects of layer-to-layer coupling on the total-ionizing-dose response of 3D-sequentially integrated FDSOI MOSFETs," RADECS 2021, Vienna, Austria (Hybrid), Sept. 13-17, 2021. **(Outstanding Conference Paper)**
- 415.S. Bonaldo, M. Gorchichko, E. X. Zhang, T. Ma, S. Mattiazzo, M. Bagatin, A. Paccagnella, S. Gerardin, R. D. Schrimpf, R. A. Reed, D. Linten, J. Mitard, and D. M. Fleetwood, "TID effects in highly scaled gate-all-around Si nanowire CMOS transistors irradiated to ultra-high doses," RADECS 2021, Vienna, Austria (Hybrid), Sept. 13-17, 2021.
- 416.S. Bonaldo, T. Ma, S. Mattiazzo, A. Baschiroto, C. Enz, D. M. Fleetwood, A. Paccagnella, and S. Gerardin, "TID degradation and low frequency noise in 16 nm bulk FinFETs irradiated to ultra-high doses," RADECS 2021, Vienna, Austria (Hybrid), Sept. 13-17, 2021.
- 417.D. M. Fleetwood, T. S. Mayer, M. R. Melloch, A. O'Hara, and S. T. Pantelides, "Defect and impurity-complex depassivation during electron-beam irradiation of GaAs," RADECS 2020, virtual, October 2020.
- 418.S. Bonaldo, S. Mattiazzo, C. Enz, A. Baschilotto, D. M. Fleetwood, A. Paccagnella, and S. Gerardin, "TID mechanisms and low-frequency noise in 28 nm MOSFETs irradiated to ultra-high doses," RADECS 2019, Montpellier, France, Sept. 16-20, 2019.
- 419.S. Bonaldo, E. X. Zhang, S. E. Zhao, V. Putcha, B. Parvais, D. Linten, S. Gerardin, A. Paccagnella, R. A. Reed, R. D. Schrimpf, and D. M. Fleetwood, "Total-ionizing-dose effects in InGaAs MOSFETs with high-k gate dielectrics and InP substrates," RADECS 2019, Montpellier, France, Sept. 16-20, 2019.
- 420.W. Liao, M. L. Alles, E. X. Zhang, D. M. Fleetwood, R. A. Reed, R. A. Weller, and R. D. Schrimpf, "Monte Carlo simulation of displacement damage in graphene," RADECS 2019, Montpellier, France, Sept. 16-20, 2019.
- 421.K. Li, E. X. Zhang, S. Bonaldo, A. L. Sternberg, J. A. Kozub, M. Reaz, L. D. Ryder, K. L. Ryder, H. Gong, S. M. Weiss, R. A. Weller, A. Vardi, J. A. del Alamo, R. A. Reed, D. M. Fleetwood, and R. D. Schrimpf, "Pulsed laser-induced single-event transients in InGaAs FinFETs with sub-10-nm fin widths," RADECS 2019, Montpellier, France, Sept. 16-20, 2019.
- 422.P. Wang, K. Hirokijyoti, A. Krishnaprasad, D. Dev, A. O'Hara, R. Jiang, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, and T. Roy, "Total-ionizing-dose response of MoS<sub>2</sub> transistors with ZrO<sub>2</sub> and h-BN gate dielectrics," RADECS 2018, Gothenburg, Sweden, Sept. 17-21, 2018.
- 423.S. E. Zhao, R. Jiang, H. Gong, P. Wang, E. X. Zhang, N. Waldron, B. Kunert, J. Mitard, N. Collaert, S. Sioncke, D. Linten, R. D. Schrimpf, R. A. Reed, and D. M. Fleetwood, "Gate bias and length dependences of total-ionizing-dose effects in InGaAs FinFETs on bulk Si," RADECS 2018, Gothenburg, Sweden, Sept. 17-21, 2018.
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- 425.S. Bonaldo, S. Gerardin, X. Jin, A. Paccagnella, F. Faccio, G. Borghello, and D. M. Fleetwood, "Spatial distribution of interface traps in 65 nm pMOSFETs irradiated to ultra-high doses," RADECS 2018, Gothenburg, Sweden, Sept. 17-21, 2018.
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- 427.P. F. Wang, E. X. Zhang, K. H. Chuang, W. Liao, H. Gong, P. Wang, C. N. Arutt, K. Ni, M. W. McCurdy, I. Verbauwhede, E. Bury, D. Linten, D. M. Fleetwood, R. D. Schrimpf, and R. A. Reed, "X-ray and proton radiation effects on 40 nm CMOS physically unclonable function devices," RADECS 2017, Geneva, Switzerland, Oct. 2-6, 2017.
- 428.G. Borghello, F. Faccio, E. Lerario, S. Michelis, S. Kulis, D. M. Fleetwood, R. D. Schrimpf, S. Gerardin, A. Paccagnella, and S. Bonaldo, "Dose rate sensitivity of 65 nm MOSFETs exposed to ultra-high doses," RADECS 2017, Geneva, Switzerland, Oct. 2-6, 2017.



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433. K. Ni, E. X. Zhang, J. A. Kozub, R. Jiang, R. D. Schrimpf, R. A. Reed, D. M. Fleetwood, M. L. Alles, J. Lin, A. Vardi, and J. A. del Alamo, "Understanding charge collection mechanisms in InGaAs FinFETs using high-speed pulsed-laser transient testing with tunable wavelength," RADECS 2016, Bremen, Germany, Sept. 19-23, 2016.
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- 447.D. K. Chen, R. D. Schrimpf, D. M. Fleetwood, K. F. Galloway, A. Dimoulas, A. Sotiropoulos, and Y. Panayiotatos, "Total dose response of Ge MOS capacitors with HfO<sub>2</sub>/Dy<sub>2</sub>O<sub>3</sub> gate stacks," RADECS 2006, Athens, Greece, Sept. 27-29, 2006.
- 448.J. R. Schwank, F. W. Sexton, M. R. Shaneyfelt, and D. M. Fleetwood, "Hardness assurance test issues for high dose rate environments," RADECS 2006, Athens, Greece, Sept. 27-29, 2006.
- 449.R. R. Cizmarik, R. D. Schrimpf, D. M. Fleetwood, K. F. Galloway, D. G. Platteter, M. R. Shaneyfelt, R. L. Pease, J. Boch, D. R. Ball, J. D. Rowe, and M. C. Maher, "The impact of mechanical stress on the total-dose response of linear bipolar transistors with various passivation layers," RADECS2004 Workshop, Madrid, Spain, Sept. 22-24, 2004.
- 450.J. Boch, F. Saigne, R. D. Schrimpf, D. M. Fleetwood, and R. Cizmarik, "Elevated Temperature Irradiation at High Dose Rate of Commercial Linear Bipolar IC's," RADECS '03, Noordwijk, The Netherlands, Sept. 15-19, 2003.
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- 453.P. Paillet, V. Ferlet-Cavrois, J. R. Schwank, and D. M. Fleetwood, "Response of SIMOX and UNIBOND buried oxides: Trapping and detrapping properties," RADECS '99, Fontevraud, France, Sept. 13-17, 1999.
- 454.R. L. Pease, M. R. Shaneyfelt, P. S. Winokur, D. M. Fleetwood, J. Gorelick, S. McClure, S. Clark, D. Alexander, and L. Cohn, "Mechanisms for Enhanced Packaging and/or Burn-In Total Dose Sensitivity in Microelectronics," RADECS '97, Cannes, France, Sept. 15-19, 1997.
- 455.M. R. Shaneyfelt, J. R. Schwank, D. M. Fleetwood, and P. S. Winokur, "Effects of Temperature on MOS Radiation Response," RADECS '97, Cannes, France, Sept. 15-19, 1997.
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- 458.R. A. Reed, M. P. King, B. Sierawski, A. Dasgupta, R. A. Weller, D. M. Fleetwood, M. H. Mendenhall, K. M. Warren, and R. D. Schrimpf, "Radiation response of advanced semiconductors," Orlando, FL, March 28 – April 1, 2011.
- 459.R. A. Weller, A. L. Sternberg, A. Kobayashi, L. W. Massengill, R. D. Schrimpf, and D. M. Fleetwood, "Modeling Semiconductor Device Response Using Detailed Radiation Event Simulations," Monterey, California, March 1-5, 2004. **Meritorious Conference Paper Award.**
- 460.C. R. Cirba, H. J. Barnaby, J. M. Hutson, J. A. Felix, R. D. Schrimpf, and D. M. Fleetwood, "Modeling Oxide Trapped Charge Annealing Processes in Irradiated SOI MOSFETs," Albuquerque, New Mexico, March 13-16, 1995.
- 461.D. M. Fleetwood, M. R. Shaneyfelt, W. L. Warren, J. R. Schwank, and P. S. Winokur, "Charge Trapping in Field Oxides," Albuquerque, New Mexico, March 13-16, 1995. **Outstanding Conference Paper Award.**
- Monterey, California, February 14-17, 1994*
- 462.M. R. Shaneyfelt, D. M. Fleetwood, T. L. Meisenheimer, J. R. Schwank, and P. S. Winokur, "Radiation Response of Hardened Field Oxides Before and After Elevated Temperature Anneals."
- 463.T. L. Meisenheimer, D. M. Fleetwood, M. R. Shaneyfelt, and P. S. Winokur, "Temperature Dependence of Static RAM Volatility."
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- 464.M. R. Shaneyfelt, J. R. Schwank, D. M. Fleetwood, and F. W. Sexton, "MOS Process Development for Ultrahardened Applications."

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*Melbourne, Florida, February 7-10, 1989*

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#### **Presentations at IEEE Semiconductor Interface Specialists Conferences**

474. P. Wang, R. Jiang, E. X. Zhang, H. Gong, S. Zhao, R. D. Schrimpf, and D. M. Fleetwood, "Gate voltage dependence of  $1/f$  noise of GaN/AlGaIn HEMTs," San Diego, CA, Dec. 8-10, 2016.  
475. M. Bhuiyan, X. Lou, X. Gong, H. Zhou, K. Ni, R. Jiang, H. Gong, E. X. Zhang, R. G. Gordon, R. A. Reed, D. M. Fleetwood, P. D. Ye, and T. P. Ma, "Radiation induced charge trapping in epitaxial  $\text{La}_2\text{O}_3$  gate dielectric grown on GaAs," San Diego, CA, Dec. 8-10, 2016.  
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483. X. J. Zhou, D. M. Fleetwood, I. Danciu, A. Dasgupta, S. A. Francis, and A. D. Touboul, "Effects of strained Si-Si bonds and O vacancies near the  $\text{SiO}_2/\text{Si}$  interface," Washington, DC, Dec. 6-8, 2007.

484. X. J. Zhou, D. M. Fleetwood, L. Tsetseris, R. D. Schrimpf, S. T. Pantelides, J. A. Felix, E. P. Gusev, and C. D'Emic, "Effects of irradiation and bias-temperature stress on charge trapping in HfO<sub>2</sub> Gate Dielectrics," Washington, DC, Dec. 1-3, 2005.
485. J. A. Felix, M. R. Shaneyfelt, D. M. Fleetwood, E. P. Gusev, R. D. Schrimpf, and C. D'Emic, "The Effects of Interfacial Layer Thickness and Processing on the Radiation Response of High-K/SiO<sub>x</sub>N<sub>y</sub>/Si (100) Gate Dielectric Stacks," Washington, DC, Dec. 4-6, 2003.
486. J. A. Felix, D. M. Fleetwood, R. D. Schrimpf, J. G. Hong, G. Lucovsky, J. R. Schwank, and M. R. Shaneyfelt, "Radiation Response and Reliability of Hafnium Silicate Capacitors," San Diego, CA, Dec. 5-7, 2002.
487. S. N. Rashkeev, C. R. Cirba, D. M. Fleetwood, R. D. Schrimpf, S. C. Witzak, A. Michez, and S. T. Pantelides, "Physical Model for Enhanced Interface-Trap Formation at Low Dose Rates," San Diego, CA, Dec. 5-7, 2002.
488. S. N. Rashkeev, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Proton-Induced Defect Generation at the Si/SiO<sub>2</sub> Interface," Washington, DC, Nov. 29 to Dec. 1, 2001.
489. D. M. Fleetwood, J. A. Felix, L. C. Riewe, and P. S. Winokur, "Effects of Alternating Bias Irradiation on Defects in MOS Devices," San Diego, CA, Dec. 7-9, 2000.
490. S. N. Rashkeev, R. Buczko, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Reactions of Hydrogen with Si-SiO<sub>2</sub> Interfaces," San Diego, CA, Dec. 7-9, 2000.
491. D. M. Fleetwood, L. C. Riewe, and F. W. Sexton, "Breakdown During High-Field Bias-Temperature Stress," Charleston, SC, Dec. 2-4, 1999.
492. D. M. Fleetwood, P. S. Winokur, O. Flament, and P. S. Winokur, "Stability of Trapped Electrons in SiO<sub>2</sub>," San Diego, CA, Dec. 3-5, 1998.
493. F. W. Sexton, D. M. Fleetwood, and K. S. Krisch, "Mechanisms of Heavy-Ion Induced Gate Rupture in Thin Oxides," San Diego, CA, Dec. 3-5, 1998.
494. K. Vanheusden, R. A. B. Devine, D. M. Fleetwood, and W. L. Warren, "Hydrogen Diffusion and Chemistry During the Annealing-Induced Generation of Mobile Protons in the Oxide Layer of Si/SiO<sub>2</sub>/Si Capacitors," San Diego, CA, Dec. 3-5, 1998.
495. K. Vanheusden, W. L. Warren, L. B. Archer, D. M. Fleetwood, R. A. B. Devine, B. L. Draper, J. R. Schwank, M. R. Shaneyfelt, P. S. Winokur, and R. M. Wallace, "Generation Kinetics and Thermal Stability of Mobile Protons in SiO<sub>2</sub> Thin Films," Charleston, SC, Dec. 4-6, 1997.
- San Diego, CA, Dec. 5-7, 1996*
496. D. M. Fleetwood and R. D. Schrimpf, "Enhanced Low-Rate Radiation-Induced Charge Trapping at the Emitter-Base/Oxide Interface of Bipolar Devices."
497. K. Vanheusden, W. L. Warren, D. M. Fleetwood, and R. A. B. Devine, "Temperature Dependence of Electron Capture by Protons (H<sup>+</sup>) in SiO<sub>2</sub> Thin Films."
- Charleston, SC, Dec. 7-9, 1995*
498. D. M. Fleetwood, W. L. Warren, J. R. Schwank, P. S. Winokur, M. R. Shaneyfelt, and L. C. Riewe, "Fast and Slow Border Traps in MOS Devices."
499. K. Vanheusden, W. L. Warren, J. R. Schwank, D. M. Fleetwood, M. R. Shaneyfelt, P. S. Winokur, and R. A. B. Devine, "Paramagnetic Interface Traps in High-Temperature Annealed Si/SiO<sub>2</sub>/Si Structures."
- San Diego, CA, Dec. 7-10, 1994*
500. D. M. Fleetwood and N. S. Saks, "Density and Energy of Oxide-Trap Charge due to High-Field Stress."
501. W. L. Warren, D. M. Fleetwood, M. R. Shaneyfelt, J. R. Schwank, P. S. Winokur, and R. A. B. Devine, "Identity of Border Traps in SiO<sub>2</sub> Films."
502. M. R. Shaneyfelt, D. M. Fleetwood, J. R. Schwank, T. L. Meisenheimer, and P. S. Winokur, "Effects of Reliability Screens on MOS Charge Trapping."
503. R. A. B. Devine, W. L. Warren, and D. M. Fleetwood, "On the Nature of Annealing Induced Interfacial and Bulk Oxide Degradation in Si/SiO<sub>2</sub>/Si Structures."
- Ft. Lauderdale, FL, Dec. 8-11, 1993*
504. D. M. Fleetwood, M. R. Shaneyfelt, and J. R. Schwank, "Simple Method to Estimate MOS Oxide-Trap, Interface-Trap, and Border-Trap Densities."
505. W. L. Warren, D. M. Fleetwood, M. R. Shaneyfelt, J. R. Schwank, P. S. Winokur, and R. A. B. Devine, "Delocalized Spin Centers in SiO<sub>2</sub> Thin Films."

506.R. A. B. Devine, W. L. Warren, and D. M. Fleetwood, "Point Defect Generation and Oxide Degradation During Annealing of the Si/SiO<sub>2</sub> Interface."

*San Diego, CA, Dec. 9-12, 1992*

507.D. M. Fleetwood, S. L. Miller, and R. A. Reber, Jr, "Energy Distribution of Trapped Holes in Irradiated SiO<sub>2</sub>."

508.M. R. Shaneyfelt, J. R. Schwank, D. M. Fleetwood, and P. S. Winokur, "Effect of Oxide Thickness on Interface-Trap Buildup Rates."

*Orlando, FL, Dec. 11-14, 1991*

509.D. M. Fleetwood, R. A. Reber, Jr., and P. S. Winokur, "Hole and Electron Trapping in Irradiated MOS Devices."

510.J. R. Schwank, D. M. Fleetwood, M. R. Shaneyfelt, and P. S. Winokur, "Latent, Thermally-Activated Interface-Trap Generation in MOS Devices."

*San Diego, CA, Dec. 5-8, 1990*

511.D. M. Fleetwood and J. H. Scofield, "Correlation Between Preirradiation Channel Resistance and Postirradiation Interface-Trap Charge in MOS Transistors."

512.T. L. Meisenheimer and D. M. Fleetwood, "Effect of Oxide and Interface-Trap Charge on 1/f Noise in MOS Devices."

513.M. R. Shaneyfelt, J. R. Schwank, D. M. Fleetwood, and P. S. Winokur, "Hole-Trapping/Hydrogen Transport (HT<sup>2</sup>) Model for Interface-Trap Buildup in MOS Devices."

*Ft. Lauderdale, FL, Dec. 6-9, 1989*

514.D. M. Fleetwood, "Radiation Induced Charge Neutralization and Interface-Trap Buildup in MOS Devices."

515.J. H. Scofield, N. Schwadron, and D. M. Fleetwood, "Correlation Between 1/f Noise of MOSFETs and Oxide Trapped Charge Following Co-60 Irradiation."

*San Diego, CA, Dec. 14-16, 1986*

516.J. R. Schwank, P. S. Winokur, P. V. Dressendorfer, and D. M. Fleetwood, "Radiation-Induced Interface-Traps in Polysilicon Gate MOS Devices."

*Ft. Lauderdale, FL, Dec. 5-7, 1985*

517.J. D. McBrayer, D. M. Fleetwood, R. A. Pastorek, and R. V. Jones, "Damage Due to Hot-Carrier and Radiation Effects in MOS Transistors."

#### **Contributed Talks at Electrochemical (ECS) or Materials Research Society (MRS) Meetings**

518.S. H. Lee, R. D. Schrimpf, D. M. Fleetwood, and D. Linten, "Retention instability of low-resistance state in metal-oxide RRAM," Fall Materials Research Meeting, Boston, MA, Nov. 29 – Dec. 4, 2015.

519.Y. Puzyrev, X. Shen, K. Ni, C. X. Zhang, J. Hachtel, B. Choi, M. Chisholm, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Memristive switching of self-assembled ZnO nanorods," Fall Materials Research Meeting, Boston, MA, Nov. 29 – Dec. 4, 2015.

520.Z. Zhang, A. R. Arehart, E. C. H. Kyle, J. Chen, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, J. S. Speck, and S. A. Ringel, "Proton irradiation effects on deep level states in *p*-type GaN," Reliability and Materials Issues of Semiconductors-Optical and Electron Devices and Materials III, Spring Materials Research Society Meeting, San Francisco, CA, April 6-10, 2015.

521.E. X. Zhang, D. M. Fleetwood, G. X. Duan, C. X. Zhang, R. D. Schrimpf, E. Simoen, and D. Linten, "Fin width and gate length dependences of charge pumping and DCIV currents in floating-body SOI MOSFETs," Fall Electrochemical Society Meeting, Oct. 7-12, 2012.

522.E. X. Zhang, C. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, S. Dhar, S.-H. Ryu, X. Shen, and S. T. Pantelides, "Bias-temperature instabilities and radiation effects on SiC MOSFETs," in *Silicon Nitride, Silicon Dioxide, and Emerging Dielectrics 11*, Spring Meeting of the Electrochemical Society, Montreal, QC, May 2-6, 2011.

523.R. Arora, D. M. Fleetwood, R. D. Schrimpf, K. F. Galloway, B. G. Schmidt, B. R. Rogers, K. B. Chung, and G. Lucovsky, "Temperature stress response of germanium MOS with HfSiON dielectric," in *Silicon Nitride, Silicon Dioxide, and Emerging Dielectrics 10*, Spring Meeting of the Electrochemical Society, San Francisco, CA, May 25-29, 2009.

- 524.R. Pasternak, B. Jun, R. D. Schrimpf, D. M. Fleetwood, M. Alles, R. Dolan, R. Standley, and N. Tolk, "Investigation of second-harmonic generation for SOI wafer metrology," 12<sup>th</sup> International Symposium on SOI Technology and Devices, 207<sup>th</sup> Meeting of The Electrochemical Society, Quebec City, QC, May 15-20, 2005.
- 525.L. Tsetseris, X. J. Zhou, D. M. Fleetwood, R. D. Schrimpf and S. T. Pantelides, "Physical mechanisms of negative-bias temperature instability, MRS Spring Meeting, San Francisco, CA, March 28 – April 1, 2005.
- 526.L. Tsetseris, X. Zhou, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Field-Induced Reactions of Water Molecules at Si-Dielectric Interfaces," MRS Fall Meeting, Boston, MA, Dec. 1-5, 2003.
- 527.C. R. Cirba, S. Cristoloveanu, R. D. Schrimpf, L. C. Feldman, D. M. Fleetwood, and K. F. Galloway, "Total-Dose Radiation Hardness of Double-Gate Ultra-Thin SOI MOSFETs," 203<sup>rd</sup> Meeting of The Electrochemical Society, Paris, France, April 27 – May 2, 2003.
- 528.H. P. Hjalmarson, P. A. Schultz, D. J. Bowman, and D. M. Fleetwood, "A Unified Computational Approach to Oxide Aging," Fall Meeting, Boston, MA, Nov. 30 – Dec. 4, 1998.
- 529.K. Vanheusden, W. L. Warren, R. A. B. Devine, D. M. Fleetwood, J. R. Schwank, P. S. Winokur, and Z. J. Lemnios, "Direct Observation of Mobile Protons in SiO<sub>2</sub> Thin Films: Potential Application in a Novel Memory Device," Fall Meeting, Boston, MA, Dec. 2-6, 1996.
- 530.W. L. Warren, K. Vanheusden, J. R. Schwank, D. M. Fleetwood, M. R. Shaneyfelt, P. S. Winokur, and R. A. B. Devine, "Positively Charged Over-Coordinated Oxygen Centers in SiO<sub>2</sub> Thin Films," Fall Meeting, Boston, MA, Dec. 2-6, 1996.
- 531.K. Vanheusden, W. L. Warren, J. R. Schwank, D. M. Fleetwood, M. R. Shaneyfelt, P. S. Winokur, and R. A. B. Devine, "Paramagnetic Interface Traps in High-Temperature Annealed Si/SiO<sub>2</sub>/Si Structures," Spring Meeting, San Francisco, CA, April 8-12, 1996.
- 532.R. A. B. Devine, D. Mathiot, W. L. Warren, and D. M. Fleetwood, "Near-Interface Oxide Degradation in High-Temperature Annealed Si/SiO<sub>2</sub>/Si Structures," Materials Research Society Meeting, Boston, MA, Nov. 29-Dec. 3, 1993.
- 533.R. A. B. Devine, W. L. Warren, M. R. Shaneyfelt, D. M. Fleetwood, and B. Aspar, "Oxide Modification Due to High-Temperature Processing of Si/SiO<sub>2</sub>/Si Structures," European Materials Research Society Meeting, Strasbourg, France, May 4-7, 1993.

#### **Contributed Talks at March American Physical Society Meetings**

- 534.A. O'Hara, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Effects of excess electron-hole pairs on defect migration in semiconductors," March Meeting of the American Physical Society, Las Vegas, NV, March 5-10, 2023.
- 535.A. O'Hara, P. Wang, C. Perini, E. X. Zhang, D. M. Fleetwood, E. Vogel, and S. T. Pantelides, "Passivation and depassivation of defects in graphene-based FETs," March American Physical Society Meeting, New Orleans, LA, March 13-17, 2017.
- 536.Y. S. Puzyrev, X. Shen, K. Ni, C. X. Zhang, J. Hachtel, B. Choi, M. Chisholm, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Memristive switching of ZnO nanorod mesh," March Meeting of The American Physical Society, March 14-18, 2016, Baltimore, MD.
- 537.K. H. Warnick, Y. Puzyrev, T. Roy, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Field-enhanced vacancy diffusion in AlGa<sub>N</sub>," March Meeting of The American Physical Society, Feb. 27 – Mar. 2, 2012, Boston, MA.
- 538.T. Roy, Y. S. Puzyrev, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, "Defect energy distribution in GaN/AlGa<sub>N</sub> heterostructures grown in Ga-rich and ammonia-rich conditions," March American Physical Society Meeting, Dallas, TX, March 21-25, 2011.
- 539.Y. S. Puzyrev, T. Roy, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Atomic displacements in proton-irradiated AlGa<sub>N</sub>/GaN heterostructures," March American Physical Society Meeting, Dallas, TX, March 21-25, 2011.
- 540.Y. S. Puzyrev, B. R. Tuttle, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Theory of hot-carrier-induced phenomena in GaN HEMTs," Portland, OR, March 15-19, 2010.
- 541.N. Sergueev, Y. S. Puzyrev, M. Beck, K. Varga, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Ion-induced quantum transport in ultrathin a-SiO<sub>2</sub> films," Portland, OR, March 15-19, 2010.
- 542.Y. S. Puzyrev, M. Beck, B. Tuttle, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Interaction of hydrogen with defects in GaN," Pittsburgh, PA, March 16-20, 2009.
- 543.X. J. Zhou, D. M. Fleetwood, R. D. Schrimpf, L. Gonella, and F. Faccio, "Transition from high to low 1/f noise regimes in field oxide field effect transistors," New Orleans, LA, March 10-14, 2008.

- 544.M. J. Beck, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Disorder-recrystallization effects following low-energy beam-solid interactions," New Orleans, LA, March 10-14, 2008.
- 545.A. Dasgupta, S. A. Francis, and D. M. Fleetwood, "Effects of aging and humidity on low-frequency noise of MOS transistors," New Orleans, LA, March 10-14, 2008.
- 546.A. G. Marinopoulos, I. Batyrev, X. J. Zhou, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "H-shuttling within a Hf-defect complex in Si/SiO<sub>2</sub>/HfO<sub>2</sub> structures," New Orleans, LA, March 10-14, 2008.
- 547.I. G. Batyrev, L. Tsetseris, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Reactions of water molecules at the Si/SiO<sub>2</sub> interface," Denver, CO, March 5-9, 2007.
- 548.I. G. Batyrev, S. T. Pantelides, M. P. Rodgers, D. M. Fleetwood, and R. D. Schrimpf, "New SiOH complexes and proton release mechanism in silica as a source of SiO<sub>2</sub> interface trap buildup," Baltimore, MD, March 13-17, 2006.
- 549.L. Tsetseris, X. J. Zhou, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Hole-controlled defect formation at Si-SiO<sub>2</sub> interfaces in the presence of water and fluorine-related species," Montreal, Quebec, March 22-26, 2004.
- 550.R. Pasternak, Y. V. Shirokaya, Z. Marka, J. K. Miller, S. N. Rashkeev, S. T. Pantelides, N. H. Tolk, B. K. Choi, D. M. Fleetwood, and R. D. Schrimpf, "Contactless Characterization of Carrier Injection and Recombination Processes at Semiconductor Interfaces Using Second-Harmonic Generation," Austin, TX, March 3-7, 2003.
- 551.H. D. Xiong and D. M. Fleetwood, "Temperature Dependence of 1/f Noise in MOSFETs," Indianapolis, IN, March 18-22, 2002.
- 552.Z. Y. Lu, C. J. Nicklaw, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "The Structure, Properties, and Dynamics of Oxygen Vacancies in Amorphous SiO<sub>2</sub>," Indianapolis, IN, March 18-22, 2002.
- 553.R. Pasternak, Z. Marka, Y. V. Shirokaya, S. N. Rashkeev, S. T. Pantelides, B. K. Choi, D. M. Fleetwood, R. D. Schrimpf, and N. H. Tolk, "Changes in Carrier Dynamics at Si/SiO<sub>2</sub> Interfaces After X-ray Irradiation Detected by Electric Field Induced Second-Harmonic Generation," Indianapolis, IN, March 18-22, 2002.
- 554.J. H. Scofield, N. P. Borland, and D. M. Fleetwood, "Temperature and Gate-Voltage Dependencies of Random Telegraph Noise Due to Oxide Traps in Small Gate-Area MOSFETs," Bull. Am. Phys. Soc. **38**, 633 (1993), Seattle, WA, March 22-26, 1993.
- 555.D. M. Fleetwood, R. A. Reber, Jr., and P. S. Winokur, "Temperature and Radiation-Induced Trapped-Positive-Charge Neutralization in MOS Devices," Bull. Amer. Phys. Soc. **37**, 773 (1992), Indianapolis, IN, March 16-20, 1992.
- 556.J. H. Scofield, N. P. Borland, and D. M. Fleetwood, "Temperature- and Gate-Voltage Dependencies of the Low-Frequency Noise of Small Gate Area MOSFETs," Bull. Amer. Phys. Soc. **37**, 267 (1992), Indianapolis, IN, March 16-20, 1992.
- 557.D. M. Fleetwood and J. H. Scofield, "Correlation Between 1/f Noise and Radiation-Induced-Hole Trapping in MOSFETs," Bull. Amer. Phys. Soc. **35**, 445, Anaheim, CA, March 12-16, 1990.
- 558.D. M. Fleetwood, J. T. Masden, and N. Giordano, "1/f Noise in Thin Platinum Wires and Films," Bull. Amer. Phys. Soc. **28**, 460 (1983), Los Angeles, CA, March 21-25, 1983.
- 559.D. M. Fleetwood and N. Giordano, "Experimental Study of 1/f Noise in Tin," Bull. Amer. Phys. Soc. **27**, 217 (1982), Dallas, TX, March 8-12, 1982.

#### **Other Contributed Talks**

- 560.D. O. Nielsen, C. G. Van de Walle, S. T. Pantelides, R. D. Schrimpf, D. M. Fleetwood, and M. V. Fischetti, "Closing the '10-100 eV gap' for electron thermalization in GaN devices from first principles," Intl. Workshop Computational Nanotechnology, Barcelona, Spain, June 12-16, 2023.
- 561.E. Farzana, N. S. Hendricks, A. Bhattacharyya, S. Krishnamoorthy, J. S. Speck, R. M. Cadena, D. R. Ball, S. Islam, A. Senarath, E. X. Zhang, D. M. Fleetwood, and R. D. Schrimpf, "Radiation effects on vertical  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> power diodes," GOMACTech 2023, March 20-23, San Diego, CA.
- 562.N. Deng, P. Wang, E. X. Zhang, B. Guo, D. Li, B. Ma, D. M. Fleetwood, H. Tian, and J. Zhang, "Low-frequency 1/f noise in a graphene/silicon X-ray detector," *2021 IEEE International Conference on Manipulation, Manufacturing and Measurement on the Nanoscale (3M-NANO)*, Xi'an, China, Aug. 2-6, 2021.
- 563.P. Wang, M. W. McCurdy, J. Lin, E. X. Zhang, M. L. Alles, J. L. Davidson, B. W. Alphenaar, D. M. Fleetwood, and R. D. Schrimpf, "Effects of external strain on GaN-based HEMTs under X-ray irradiation," Reliability of Compound Semiconductors Workshop, May 24, 2021, presented virtually by D. M. Fleetwood.
- 564.D. M. Fleetwood, A. O'Hara, S. T. Pantelides, T. S. Mayer, and M. R. Melloch, "Defect dehydrogenation in GaN and GaAs," Microelectronics Reliability and Qualification Workshop, virtual, Feb. 9-11, 2021.

565. D. M. Fleetwood, P. F. Wang, E. X. Zhang, M. W. McCurdy, R. D. Schrimpf, R. Jiang, B. S. Poling, and E. R. Heller, "High field stress-induced degradation and low-frequency noise of AlGaIn/GaN HEMTs," Microelectronics Reliability and Qualification Workshop, El Segundo, CA, Feb. 4-6, 2020.
566. U. Peralagu, A. Alian, V. Putcha, A. Khaled, R. Rodriguez, A. Sibaja-Hernandez, S. Chang, E. Simoen, S. E. Zhao, B. De Jaeger, D. M. Fleetwood, P. Wambacq, M. Zhao, B. Parvais, N. Waldron, and N. Collaert, "CMOS-compatible GaN-based devices on 200 mm-Si for RF applications: Integration and performance," IEEE Intl. Electron Devices Meeting, San Francisco, CA, Dec. 8-11, 2019.
567. P. F. Wang, E. X. Zhang, R. Jiang, M. W. McCurdy, B. S. Poling, E. R. Heller, R. D. Schrimpf, and D. M. Fleetwood, "High field stress-induced degradation and low-frequency noise of AlGaIn/GaN HEMTs," Reliability of Compound Semiconductors Workshop, Minneapolis, MN, April 29, 2019.
568. Y. Yuan, S. Chen, H. Zhao, W. Wu, D. M. Fleetwood, and E. X. Zhang, "A new imaging method for forward-looking linear-array SAR based on fractional Fourier transform," IEEE RADAR Conference, Boston, MA, Apr. 22-26, 2019.
569. D. M. Fleetwood, R. Jiang, E. X. Zhang, and R. D. Schrimpf, "Voltage-stress induced defects in AlGaIn/GaN HEMTs," Microelectronics Reliability and Qualification Workshop, El Segundo, CA, Feb. 6-8, 2018.
570. D. M. Fleetwood, "IEEE Nuclear and Plasma Sciences Society's Distinguished Lecture Program," IEEE Sections Congress, Sydney, Australia, Aug. 11-13, 2017.
571. R. Jiang, X. Shen, E. X. Zhang, J. Chen, D. M. Fleetwood, R. D. Schrimpf, S. W. Kaun, E. C. H. Kyle, J. S. Speck, and S. T. Pantelides, "Oxygen-impurity-induced hot-carrier degradation and total-ionizing-dose effects in unpassivated AlGaIn/GaN HEMTs," 2017 International Workshop on Reliability of Micro- and Nano-Electronics in Harsh Environment, Chengdu, China, May 22-24, 2017. (Outstanding Student Paper)
572. S. E. Zhao, R. Jiang, E. X. Zhang, and D. M. Fleetwood, "Using Capacitance-Frequency Measurements to Estimate Interface and Border Trap Charge Densities in MOS Devices," 2017 International Workshop on Reliability of Micro- and Nano-Electronics in Harsh Environment, Chengdu, China, May 22-24, 2017.
573. B. D. Sierawski, R. A. Reed, K. M. Warren, A. L. Sternberg, R. A. Austin, J. M. Trippe, R. A. Weller, M. L. Alles, R. D. Schrimpf, L. W. Massengill, D. M. Fleetwood, G. W. Buxton, III, J. C. Brandenburg, W. B. Fisher, and R. Davis, "CubeSat: Real-time soft error measurements at low earth orbits," IEEE Intl. Reliability Physics Sympos., Monterey, CA, April 2-6, 2017.
574. M. L. Alles, K. Bolotin, A. Zettl, B. Homeijer, J. L. Davidson, R. D. Schrimpf, R. A. Reed, and D. M. Fleetwood, "Radiation effects in M&NEMs," Gomactech 2016, Orlando, FL, March 14-17.
575. B. Mallick, A. Chatterjee, G. Setlur, V. Koldyaev, D. M. Fleetwood, N. Tolk, and R. D. Schrimpf, "Modeling saturation of second harmonic generation in Si/dielectric system: An ultra-sensitive non-invasive metrological tool," 24<sup>th</sup> DAE-BRNS National Laser Symposium, RRCAT, Indore, India, Dec. 2-5, 2015.
576. E. Farzana, Z. Zhang, E. C. H. Kyle, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, J. S. Speck, A. R. Arehart, and S. A. Ringel, "Comparison of electron and proton irradiation-induced traps in n-type GaN," 57<sup>th</sup> Electronic Materials Conference, Columbus, OH, Jun. 24-26, 2015. **(Best student paper.)**
577. M. L. Alles, R. D. Schrimpf, D. M. Fleetwood, R. A. Reed, K. Ni, I. Samsel, and E. X. Zhang, "What vs. why: Characterization for insight," NASA Electronic Parts and Packaging Program Electronics Technology Workshop, Greenbelt, MD, Jun. 23-26, 2015.
578. V. Koldyaev, M. C. Kryger, J. P. Changala, M. L. Alles, D. M. Fleetwood, R. D. Schrimpf, and N. H. Tolk, "Rapid non-destructive detection of sub-surface Cu in SOI wafers by optical second harmonic generation," SEMI Advanced Semiconductor Manufacturing Conference, Saratoga Springs, NY, May 3-6, 2015.
579. S. Ren, M. Si, K. Ni, S. Chang, X. Sun, E. X. Zhang, D. M. Fleetwood, P. D. Ye, S. Cui, T. P. Ma, "A study of radiation hardness of InGaAs nanowire gate-all-around MOSFETs," Gomactech 2015, St. Louis, MO, March 23-26, 2015.
580. S. J. Koester, C. Kim, Y. Su, R. D. Schrimpf, D. M. Fleetwood, M. L. Alles, R. A. Reed, C. X. Zhang, and E. X. Zhang, "Radiation effects in field-effect transistors based upon 2D materials," Gomactech 2015, St. Louis, MO, March 23-26, 2015.
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582. I. K. Samsel, E. X. Zhang, K. Ni, R. A. Reed, R. D. Schrimpf, D. M. Fleetwood, R. A. Weller, M. W. McCurdy, and M. L. Alles, "Physical mechanisms for radiation-induced effects in non-Si channel CMOS devices," Gomactech 2015, St. Louis, MO, March 23-26, 2015. **(Best student poster.)**



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584. W. T. Holman, B. D. Sierawski, R. A. Reed, R. A. Weller, A. L. Sternberg, R. Austin, and D. M. Fleetwood, “The small satellite (CubeSat) Program as a pedagogical framework for the undergraduate EE curriculum,” 121 ASEE Conference, Indianapolis, IN, June 15-18, 2014.
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587. A. Arehart, A. Sasikumar, Z. Zhang, P. Kumar, S. Ringel, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, B. Poling, G. Via, E. Heller, P. Saunier, and C. Lee, “Comparison of irradiation and electrical stressors on AlGaIn/GaN HEMT reliability,” GOMACTech 2014, Charleston, SC, March 31 – April 3, 2014.
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591. G. Gaur, D. S. Koktysh, D. M. Fleetwood, R. A. Reed, R. A. Weller and S. M. Weiss, “Effects of x-ray and gamma-ray irradiation on the optical properties of quantum dots immobilized in porous silicon,” SPIE Defense, Security, and Sensing, Baltimore, MD, April 29 – May 3, 2013.
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- 601.E. X. Zhang, D. M. Fleetwood, S. A. Francis, C. X. Zhang, F. El-Mamouni, and R. D. Schrimpf, "Charge pumping and DCIV currents in SOI FinFETs," International Semiconductor Device Research Symposium, College Park, MD, Dec. 7-9, 2011.
- 602.R. A. Reed, R. A. Weller, M. H. Mendenhall, K. M. Warren, R. D. Schrimpf, D. M. Fleetwood, B. Sierawski, N. Dodds M. King, A. DasGupta, F. El-Mamouni, D. Black, "Applications of MRED," 8th Geant4 Space Users Workshop, Tsukuba, Japan, December 7-9, 2011.
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- 604.K. H. Warnick, Y. S. Puzyrev, T. Roy, D. M. Fleetwood, R. D. Schrimpf, and S. T. Pantelides, "Room-temperature native defect diffusion in semiconductors," American Vacuum Society Symposium 58, Nashville, TN, Oct. 31-Nov. 4, 2011.
- 605.S. Bhandaru, S. M. Weiss, E. X. Zhang, D. M. Fleetwood, R. A. Reed, R. A. Weller, B. R. Rogers, and R. R. Harl, "Effect of 10-keV x-rays on silicon oxidation," American Vacuum Society Symposium 58, Nashville, TN, Oct. 31-Nov. 4, 2011.
- 606.X. Shen, S. Dasgupta, R. A. Reed, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Metastable defects and recoverable degradation in InAs/AlSb HEMTs," American Vacuum Society Symposium 58, Nashville, TN, Oct. 31-Nov. 4, 2011.
- 607.B. R. Tuttle, R. D. Schrimpf, D. M. Fleetwood, and S. T. Pantelides, "Atomic-scale physical mechanisms for reliability modeling of microelectronics," DOD High Performance Users Group Conference, Portland, OR, June 21-23.
- 608.T. Roy, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, Y. S. Puzyrev, and S. T. Pantelides, "Reliability limiting defects in AlGaIn/GaN HEMTs," 2011 IEEE Intl. Reliability Physics Symposium, Monterey, CA, April 10-14, 2011.
- 609.M. L. Alles, J. L. Davidson, S. T. Pantelides, R. D. Schrimpf, D. M. Fleetwood, K. I. Bolotin, J. U. Lee, and C. D. Cress, "Radiation effects in carbon devices – It's all about the substrate," Government Microcircuit Applications and Critical Technologies Conference, Orlando, FL, March 21-24, 2011.
- 610.R. Arora, K. A. Moen, A. Madan, J. D. Cressler, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, A. K. Sutton, and H. M. Nayfeh, "Impact of body tie and source/drain contact spacing on the hot carrier reliability of 45-nm RF-CMOS," IEEE International Integrated Reliability Workshop, pp. 56-60, 2010.
- 611.Y. Li, N. Rezzak, R. D. Schrimpf, D. M. Fleetwood, E. Zhang, Y. Wu, S. Cai, J. Wang, and D. Wang, "Including the effects of process-related variability on radiation response using a new test chip," in *10th IEEE International Conference on Solid-State and Integrated Circuit Technology (ICSICT)*, 2010, pp. 1636-1638.
- 612.M. P. King, D. Gong, C. Liu, T. Liu, A. C. Xiang, J. Ye, R. D. Schrimpf, R. A. Reed, M. L. Alles, and D. M. Fleetwood, "Response of a 0.25  $\mu\text{m}$  thin-film Si-on-sapphire CMOS technology to total ionizing dose," Topical Workshop on Electronics for Particle Physics, Aachen, Germany, September 20-24, 2010.
- 613.T. Roy, E. X. Zhang, S. Dasgupta, S. A. Francis, D. M. Fleetwood, and R. D. Schrimpf, "1/f noise in GaN/AlGaIn HEMTs grown under Ga-rich, N-rich, and NH<sub>3</sub>-rich conditions," Reliability of Compound Semiconductors Workshop, Portland, OR, May 17, 2010.
- 614.S. DasGupta, R. A. Reed, R. D. Schrimpf, D. M. Fleetwood, X. Shen, S. T. Pantelides, J. Bergman, and B. Brar, "Electrical stress induced degradation in InAs – AlSb HEMTs," Proc. Intl. Reliab. Phys. Sympos., Anaheim, CA, May 2-6, pp. 813-817 (2010).
- 615.R. A. Reed, R. A. Weller, D. M. Fleetwood, N. Dodds, M. Clemens, B. Sierawski, and A. Dasgupta, "Impact of complex material systems on the radiation response of advanced semiconductors," Government Microcircuit Applications and Critical Technologies Conference, Reno, NV, March 22-25, 2010.
- 616.E. X. Zhang, D. M. Fleetwood, M. L. Alles, R. D. Schrimpf, F. El Mamouni, W. Xiong, and S. Cristoloveanu, "Effects of fin width on memory windows in finFET ZRAMs," International Semiconductor Device Research Symposium, College Park, MD, Dec. 9-11, 2009.
- 617.H. D. Xiong, W. Wang, Q. Li, C. Richter, J. Suehle, W-K. Hong, T. Lee, and D. M. Fleetwood, "Random telegraph signals and 1/f noise in ZnO nanowire field effect transistors," IEEE Nano 2007, Hong Kong, August 2-5, 2007.

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619. B. Jun, M. Fouillat, R. D. Schrimpf, D. M. Fleetwood, and S. Cristoloveanu, "Total dose radiation effects in partially-depleted SOI transistors with ultrathin gate oxide," *Proceedings IEEE SOI Conference*, Charleston SC, October 4-7, 2004, pp. 30-31.
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621. R. A. Weller, A. L. Sternberg, A. Kobayashi, M. H. Mendenhall, L. W. Massengill, R. D. Schrimpf, and D. M. Fleetwood, "Adaptation of GEANT4 for Single Event Simulations," presented at the Fourteenth Biennial Single Event Effects Symposium, Manhattan Beach, CA, April 2004.
622. B.K. Choi, W.P. Kang, J.L. Davidson, M. Howell, R.D. Schrimpf, and D.M. Fleetwood, "CVD Diamond Photoconductive Devices", *DIAMOND 2003*, 14th European Conference on Diamond, Diamond-like Materials, Carbon Nanotubes, Nitrides and Silicon Carbide, Salzburg Convention Centre, Salzburg, Austria, September 7-12, 2003.
623. J. A. Felix, H. D. Xiong, D. M. Fleetwood, E. P. Gusev, R. D. Schrimpf, A. L. Sternberg, and C. D'Emic, "Interface Trapping Properties of nMOSFETs with Al<sub>2</sub>O<sub>3</sub>/SiO<sub>x</sub>N<sub>y</sub>/Si(100) Gate Dielectric Stacks After Exposure to Ionizing Radiation," *Insulating Films on Silicon Conference*, Barcelona, Spain, June 18-20, 2003.
624. J. R. Schwank, D. M. Fleetwood, H. D. Xiong, M. R. Shaneyfelt, and B. L. Draper, "Generation of Metastable Electron Traps in the Near Interfacial Region of SOI Buried Oxides by Ion Implantation and Their Effect on Device Properties," *Insulating Films on Silicon Conference*, Barcelona, Spain, June 18-20, 2003.
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629. K. Vanheusden, W. L. Warren, W. M. Shedd, R. D. Pugh, D. M. Fleetwood, J. R. Schwank, and R. A. B. Devine, "Characterization of Interface Traps in SOI Material," *IEEE International SOI Conference*, Yosemite NP, CA, Oct. 6-9 (1997).
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631. A. N. Campbell, K. A. Peterson, D. M. Fleetwood, and J. M. Soden, "Effects of Focused Ion Beam Irradiation on MOS Transistors," *International Reliability Physics Symposium*, Denver, CO, April 7-10, 1997.
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633. W. L. Warren, D. M. Fleetwood, J. R. Schwank, M. R. Shaneyfelt, P. S. Winokur, R. A. B. Devine, W. P. Maszara, and J. B. McKitterick, "Shallow Oxygen-Related Donors in Bonded and Etchback SOI Substrates," *IEEE International SOI Conference*, Palm Springs, CA, Oct. 5-7, 1993.
634. J. H. Scofield, N. Borland, and D. M. Fleetwood, "Random Telegraph Signals in Small Gate-Area p-MOS Transistors," *Noise in Physical Systems*, St. Louis, MO, August 15-20, 1993.
635. W. L. Warren, J. R. Schwank, M. R. Shaneyfelt, D. M. Fleetwood, and P. S. Winokur, "Radiation Induced Defect Centers in Bonded and Etchback SOI Materials," *Insulating Films on Semiconductors (INFOS) Conference*, Delft, The Netherlands, June 2-5 (1993).
636. P. S. Winokur and D. M. Fleetwood, "Total Dose Radiation Hardness Assurance for Space Electronics," *8th Symposium on Space Nuclear Power Systems*, Albuquerque, NM, Jan. 7-10, 1991.

- 637.F. W. Sexton, P. S. Winokur, D. M. Fleetwood, M. R. Shaneyfelt, M. D. Terry, and R. V. Jones, "Test Structures for a QML Approach to Radiation Hardness Assurance," Workshop on Test Structures for Semiconductor Device Radiation Hardening and Hardness Assurance, Los Angeles, CA, April 26, 1990, pp. 261-84.
- 638.J. R. Schwank, F. W. Sexton, D. M. Fleetwood, M. S. Rodgers, and K. L. Hughes, "The Response of Metal-Oxide-Semiconductor Devices Irradiated at High Temperatures," 6th Symposium on Space Nuclear Power Systems, Albuquerque, New Mexico, Jan. 9-12, 1989.
- 639.D. M. Fleetwood and S. S. Tsao, "Silicon-on-Insulator Electronics for a Space Nuclear Power System," 5th Symposium on Space Nuclear Power Systems, Albuquerque, NM, Jan. 11-14, 1988.
- 640.S. S. Tsao, D. M. Fleetwood, L. Pfeiffer, G. K. Celler, V. Kaushik, B. Cowden, and A. K. Datye, "Island-Edge Effects in MOS/SOI Transistors," SOS/SOI Workshop, Durango, CO, Oct. 6-8, 1987, pp. 33-34.
- 641.D. M. Fleetwood, "Reevaluating the Worst-Case Post-Irradiation Response of MOS Transistors," in Proceedings of the 1987 VHSIC/VLSI Qualifications, Reliability, and Logistics Workshop, Colorado Springs, Aug. 1987, prepared by Palisades Institute for Research Services, Inc., New York, 1987, pp. 293-302.
- 642.D. M. Fleetwood and P. V. Dressendorfer, "The Effect of Elevated Temperature on Irradiated Metal-Oxide-Semiconductor (MOS) Devices," 4th Symposium on Space Nuclear Power Systems, Albuquerque, NM, Jan. 12-15, 1987.
- 643.J. R. Schwank, P. S. Winokur, P. V. Dressendorfer, and D. M. Fleetwood, "Performance of Polysilicon Gate CMOS Devices in Space and SDI Environments," Space Electronics Conference, Albuquerque, NM, Sept. 9-11, 1986.
- 644.D. M. Fleetwood and N. Giordano, " $1/f$  Noise in Metal Films: Resistivity Dependence and Sample-to-Sample Variations," Noise in Physical Systems, Montpellier, France, May 1983.

#### **External Seminars**

- 645.D. M. Fleetwood, "Moore's law and radiation effects," Michigan State University, April 21, 2023.
- 646.D. M. Fleetwood, "Moore's law and radiation effects," Raj and Jeannette Mittra Distinguished Lecture, Pennsylvania State University, April 7, 2023.
- 647.D. M. Fleetwood, "Use and misuse of statistics," L3Harris Webinar (via Zoom), June 16, 2022.
- 648.D. M. Fleetwood, "75<sup>th</sup> anniversary of the transistor, Moore's Law, and radiation effects on microelectronics," EPFL/IEEE Swiss Section, Neuchatel, Switzerland, IEEE NPSS Distinguished Lecture, June 8, 2022.
- 649.D. M. Fleetwood, "Moore's law and radiation effects," NPSS INSAT (National Institute of Applied Science and Technology) Student Branch Chapter, Tunisia, IEEE NPSS Distinguished Lecture, via Google Meet, Nov. 22, 2021.
- 650.D. M. Fleetwood, " $1/f$  noise, radiation effects, and defects in microelectronic devices," IEEE NPSS Distinguished Lecture, ISAE SUPAERO, Toulouse, France, June 17, 2021 (via Zoom).
- 651.D. M. Fleetwood, "Moore's law and radiation effects," Yale University, Special ECE Department Seminar, Nov. 4, 2020 (via Zoom).
- 652.D. M. Fleetwood, "Are there still roles for elevated-temperature, post-irradiation annealing in radiation-hardness-assurance testing?" JEDEC JC13.4 Working Group Meeting, New Orleans, LA, Jan. 7, 2020.
- 653.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, Los Alamos/Santa Fe IEEE NPSS Chapter, Los Alamos, NM, November 12, 2019.
- 654.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, Northern Virginia IEEE NPSS Chapter, Arlington, VA, September 9, 2019.
- 655.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, Singapore IEEE NPSS Chapter, Singapore University of Technology and Design, July 2, 2019.
- 656.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, ISAE SUPAERO, Toulouse, France, June 7, 2019.
- 657.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, Universite de Montpellier II, France, June 6, 2019.
- 658.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, Dallas IEEE Section, November 29, 2018.
- 659.D. M. Fleetwood, "Moore's law and radiation effects," seminar at Texas Instruments, Dallas, TX, November 29, 2018.
- 660.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, Oakland/East Bay Chapter of the IEEE NPSS, November 16, 2017.

- 661.D. M. Fleetwood, "Basic mechanisms of radiation effects," National University of Defense Technology, Changsha, China, Sept. 4, 2017.
- 662.D. M. Fleetwood, "Evolution of total ionizing dose effects in MOS devices with Moore's Law scaling," IEEE NPSS Distinguished Lecture, National University of Defense Technology, Changsha, China, Sept. 4, 2017.
- 663.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, University of Wollongong, Center for Medical Radiation Physics, August 14, 2017.
- 664.D. M. Fleetwood, "Moore's law and radiation effects," University of Electronic Science and Technology of China, Chengdu, China, May 22, 2017.
- 665.D. M. Fleetwood, "Moore's law and radiation effects," Micron Technology: Friday Forum, Boise, ID, May 5, 2017.
- 666.D. M. Fleetwood, "Moore's law and radiation effects," Iowa State University, Distinguished Lecture, ECE Department, Ames, IA, Oct. 7, 2016.
- 667.E. X. Zhang, C. Liang, C. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, M. L. Alles, R. A. Reed, K. Bolotin, and S. T. Pantelides, "Radiation effects in 2D materials and devices," University of Memphis, Physics Dept. Colloquium, Oct. 7, 2016.
- 668.D. M. Fleetwood, "Moore's law and radiation effects," IEEE NPSS Distinguished Lecture, TRIUMF, Vancouver, BC, University of British Columbia, August 9, 2016.
- 669.D. M. Fleetwood, J. Chen, R. Jiang, E. X. Zhang, S. Mukherjee, R. D. Schrimpf, Y. S. Puzyrev, and S. T. Pantelides, "Radiation response,  $1/f$  noise, and reliability of GaN/AlGaIn HEMTs," Tsinghua University, Beijing, China, June 17, 2016.
- 670.D. M. Fleetwood, E. X. Zhang, C. X. Zhang, G. X. Duan, and R. D. Schrimpf, "Radiation effects and reliability of advanced CMOS devices," Beijing Microelectronics Technology Institute, Beijing, China, June 16, 2016.
- 671.D. M. Fleetwood, "Moore's law and radiation effects," Tsinghua University, IEEE NPSS Distinguished Lecture, Beijing, China, June 15, 2016.
- 672.D. M. Fleetwood, "Moore's law and radiation effects," Univ. Jean Monnet St. Etienne, IEEE NPSS Distinguished Lecture, ECE Department, St. Etienne, France, April 28, 2016.
- 673.D. M. Fleetwood, "Moore's law and radiation effects," Boston University, Distinguished Lecture, ECE Department, Boston, MA, Sept. 30, 2015.
- 674.R. D. Schrimpf, W. G. Bennett, S. L. Weeden-Wright, M. L. Alles, R. A. Reed, D. M. Fleetwood, E. X. Zhang, D. Linten, M. Jurzak, R. DeGraeve, and A. Fantini, "Reliability issues for RRAM in radiation environments," presented at 5th International Stanford/imec RRAM Workshop, Leuven, Belgium, September 24, 2015.
- 675.D. M. Fleetwood, "Energies and microstructures of defects contributing to  $1/f$  noise in microelectronic materials and devices," Harbin Institute of Technology, Harbin, China, June 5, 2015.
- 676.D. M. Fleetwood, E. X. Zhang, K. Ni, G. X. Duan, R. D. Schrimpf, and R. A. Reed, "Radiation effects in SiGe and III-V channel MOSFETs," imec, Leuven, Belgium, May 11, 2015.
- 677.D. M. Fleetwood, E. X. Zhang, K. Ni, R. D. Schrimpf, and R. A. Reed, "Single event transient responses of SiGe and InGaAs MOSFETs," Shanghai Institute for Microsystem and Information Technology, Shanghai, China, Oct. 31, 2014.
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- 679.R. D. Schrimpf and D. M. Fleetwood, "Radiation effects in devices and ICs: BJT gain degradation and single-event effects," Harbin Institute of Technology, Harbin, China, May 7, 2014.
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