

Curriculum Vitae

Hugh J. Barnaby

IceMOS Professor in Electrical, Computer and Energy Engineering

Affiliate Faculty School of Earth and Space Exploration & Global Security Initiative

Arizona State University

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Education

Ph.D., Electrical Engineering **May 2002**

Vanderbilt University - Nashville, TN

Doctoral Dissertation: "Characterization and Modeling of Proton Radiation Effects in Linear Bipolar Devices and Circuits"

Advisor: Ronald D. Schrimpf

MSEE, Electrical Engineering **December 1999**

Vanderbilt University - Nashville, TN

MS Thesis: "Characterization of Ionizing Radiation Effects in Lateral PNP Bipolar Junction Transistors and Identification of Gate Control as a Hardening Approach"

Advisor: Ronald D. Schrimpf

B.A., Mathematics and Philosophy **May 1992**

University of California -Berkeley California

Additional Universities Attended

Georgetown University, Washington D.C. 1986-1987

University of New Mexico 1988, 1993-1996

Academic Experience

IceMOS Professor **March 2021 – present**

Electrical Engineering, Arizona State University, Tempe, Az

School of Earth and Space Exploration (Affiliate Faculty), Arizona State University, Tempe, Az

Global Security Initiative (Affiliate Faculty), Arizona State University, Tempe, Az

Professor **August 2017 – March 2021**

Electrical Engineering, Arizona State University, Tempe, Az

School of Earth and Space Exploration (Affiliate Faculty), Arizona State University, Tempe, Az

Global Security Initiative (Affiliate Faculty), Arizona State University, Tempe, Az

Associate Professor **August 2009 – August 2017**

Electrical Engineering, Arizona State University, Tempe, Az

Assistant Professor **August 2004 – August 2009**

Electrical Engineering, Arizona State University, Tempe, Az

Faculty Fellow, Office of Naval Research **May 2008 – August 2008**

Naval Research Laboratory, Washington, D.C.

Invited Professor **June 2012 – July 2012,**

University of Bordeaux I, Bordeaux, France **May 2005 – July 2005**

Assistant Professor **January 2002 - August 2004**

Electrical and Computer Engineering, University of Arizona, Tucson, Az

Visiting Researcher**September 2000 - December 2000**

University of Bordeaux I, France

Research Assistant**August 1996 - December 2001**

Electrical Engineering and Computer Science, Vanderbilt University, Nashville, TN

Industrial Experience**Consultant****2003 – present**

Sandia National Laboratories, Albuquerque, NM

Alphacore Inc., Tempe, AZ

Jet Propulsion Laboratory, Pasadena, CA

NuFlare Technologies, Sunnyvale, CA,

Air Force Research Laboratory, Albuquerque, NM

Maxim Integrated, Dallas, TX

Medtronic Inc., Tempe, AZ

Landauer Inc., Glenwood IL

Ridgetop Group, Tucson, AZ

National Semiconductor Corporation, Tucson, AZ

Intern**Summer 1997**

NEC Corporation, Tsukuba, Japan

Staff Scientist**June 1993 - August 1996**

Mission Research Corporation, Albuquerque, NM

Recent Academic and Professional Service**University Senate****Spring 2014 - present****University Committee on Research and Creative Activities****Spring 2019****University Governance Grievance Committee****Fall 2023 - present****School of ECEE Personnel Committee****Spring 2018 – Spring 2024****University Radiation Safety Committee****Fall 2022 – present****IEEE Fellow Evaluation Committee Member****2021 - 2023****Recent Administrative Leadership****School of ECEE Circuits Group Chair****Fall 2008 – Spring 2011; Fall 2014 – Spring 2017****IEEE Conference Technical Chair****2016 - 2018****IEEE Conference General Chair****2016 - 2020****IEEE Fellow Evaluation Committee Chair****2024 - present****Microelectronics Common SWAP Hub Technical Lead****2023 - present****School of ECEE Circuits Group Chair****Fall 2008 – Spring 2011; Fall 2014 – Spring 2017****Research Summary****Awards:** Total \$79.4M, individual recognition \$15.9M**Expenditures:** \$10.6M**Publications:** Refereed Archival Journal Papers (164) and Conference Proceedings (71), Conference Presentation (129), Patents (4). Citations (6648), H-index - 43

Principle Areas of Teaching and Research

Research Awards

- Hostile Environment Electronics – radiation damage in semiconductor materials, radiation and extreme temperature effects in semiconductor devices and integrated circuits, circuit and system hardening-by-design, compact modeling for extreme environments, space instrumentation
- Integrated Devices, Circuits and Sensors – advanced CMOS, heterogeneous integration, wireless transceivers, hardened power electronics, radiation dosimeters and detectors, non-volatile memory, neuromorphic circuits

Teaching

- Solid State Materials and Devices
- Electronic Circuits
- Extreme Environment Electronics
- Computer Modeling

Selected Honors and Professional Activities

- IEEE Fellow (2017)
- Teaching Excellence Award (2018)
- Visiting Professor, University of Bordeaux II (2004, 2011)
- Conference Committee, general chairperson, technical program chairman, local arrangements chairperson, short course chairperson, short course instructor, session chairperson, poster chairperson, awards committee member, presenter, and reviewer for the IEEE Nuclear and Space Radiation Effects Conference
- Session chairperson and reviewer for the International Radiation Effects and its Effects on Components and Systems Conference
- Published multiple papers on semiconductor device modeling and power MOSFET design
- Principle Investigator for multiple large scale research programs

Publications

Refereed Archival Journal Papers

1. J. M. Young, S. Banerjee, X. Gao, H. Barnaby, L. Musson, and T. Buchheit, "Neutron Displacement Damage in Bipolar Junction Transistors Isolated from an Integrated Circuit," IEEE Transactions on Nuclear Science, 2024.
2. A. I. Vidana, N. A. Dodds, R. N. Nowlin, T. M. Wallace, P. J. Oldiges, B. M. Dodd, J. Xiong, R. M. Cadena, J. Trippe, and J. S. Kauppila, "The Effects of Threshold Voltage and Number of Fins per Transistor on the TID Response of GF 12LP Technology," IEEE Transactions on Nuclear Science, 2024.
3. C. T. Chang, P. Apsangi, K. Muthuseenu, A. Privat, B. Kennedy, M. R. McCartney, D. J. Smith, K. E. Holbert, and H. J. Barnaby, "Analysis of Total Ionizing Dose Effects Using Electron Holography," IEEE Transactions on Nuclear Science, 2024.
4. M. Spear, H. J. Barnaby, T. Wallace, J. Solano, O. Forman, D. Wilson, I. S. Esqueda, A. Privat, M. Turowski, and R. VonNiederhausern, "Non-linear coupling effects in fully depleted SOI transistors," IEEE Transactions on Nuclear Science, vol. 70, no. 4, pp. 434-441, 2023.
5. C. S. Dyer, K. A. Ryden, P. A. Morris, A. D. P. Hands, P. J. McNulty, J. R. Vaille, L. Dusseau, G. Cellere, A. Paccagnella, and H. J. Barnaby, "The Living With a Star Space Environment Testbed Payload," IEEE Transactions on Nuclear Science, vol. 70, no. 3, pp. 200-215, 2023.

6. S. Bonaldo, T. Wallance, H. Barnaby, G. Borghello, G. Termo, F. Faccio, D. M. Fleetwood, S. Mattiazzo, M. Bagatin, and A. Paccagnella, "Radiation-Induced Charge Trapping in Shallow Trench Isolations of FinFETs," *IEEE Transactions on Nuclear Science*, vol. 71, no. 4, pp. 427-236, 2023.
7. P. Apsangi, N. Chamele, H. J. Barnaby, Y. Gonzalez-Velo, K. E. Holbert, and M. N. Kozicki, "Impact of TID on the Analog Conductance and Training Accuracy of CBRAM-Based Neural Accelerator," *IEEE Transactions on Nuclear Science*, vol. 70, no. 12, pp. 2572-2577, 2023.
8. F. Al Mamun, S. Vrudhula, D. Vasileska, H. Barnaby, and I. S. Esqueda, "Evidence of transport degradation in 22 nm FD-SOI charge trapping transistors for neural network applications," *Solid-State Electronics*, vol. 209, p. 108783, 2023.
9. T. Wallace, M. Spear, A. Privat, J. Neuendank, G. Irumva, D. Wilson, I. S. Esqueda, H. J. Barnaby, M. Turowski, and E. Mikkola, "Layout dependence of total ionizing dose effects on 12-nm bulk FinFET core digital structures," *IEEE Transactions on Nuclear Science*, vol. 70, no. 4, pp. 620-626, 2022.
10. I. P. Livingston, I. S. Esqueda, and H. J. Barnaby, "An implicit analytical surface potential based model for long channel symmetric double-gate MOSFETs accounting for oxide and interface trapped charges," *Solid-State Electronics*, vol. 187, p. 108193, 2022.
11. P. Apsangi, H. Barnaby, M. Kozicki, Y. Gonzalez-Velo, and J. Taggart, "Effect of conductance linearity of Ag-chalcogenide CBRAM synaptic devices on the pattern recognition accuracy of an analog neural training accelerator," *Neuromorphic Computing and Engineering*, vol. 2, no. 2, p. 021002, 2022.
12. T. P. Xiao, C. H. Bennett, S. Agarwal, D. R. Hughart, H. J. Barnaby, H. Puchner, A. A. Talin, and M. J. Marinella, "Single-Event Effects Induced by Heavy Ions in SONOS Charge Trapping Memory Arrays," *IEEE Transactions on Nuclear Science*, vol. 69, no. 3, pp. 406-413, 2021.
13. L. E. Heffern, C. J. Hardgrove, A. Parsons, E. Johnson, R. Starr, G. Stoddard, R. Blakeley, T. Prettyman, T. S. J. Gabriel, and H. Barnaby, "Active neutron interrogation experiments and simulation verification using the Single-scintillator Neutron and Gamma-Ray spectrometer (SINGR) for geosciences," *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, vol. 1020, p. 165883, 2021.
14. W. Chen, S. Tappertzhofen, H. J. Barnaby, and M. N. Kozicki, "Conductive-Bridging Access Memory," *Resistive Switching: Oxide Materials, Mechanisms, Devices and Operations*, p. 147, 2021.
15. E. M. Al Seragi, S. Dash, K. Muthuseenu, J. D. Cressler, H. J. Barnaby, A. Khachatrian, S. P. Buchner, D. McMorro, and S. Zeinolabedinzadeh, "Radiation Hardened Millimeter-Wave Receiver Implemented in 90nm, SiGe HBT Technology," *IEEE Transactions on Nuclear Science*, 2021.
16. M. Cannon, A. Rodrigues, D. Black, J. Black, L. Bustamante, M. Breeding, B. Feinberg, M. Skoufis, H. Quinn, and L. T. Clark, "Multiscale System Modeling of Single-Event-Induced Faults in Advanced Node Processors," *IEEE Transactions on Nuclear Science*, vol. 68, no. 5, pp. 980-990, 2021.
17. M. G. Esposito, J. E. Manuel, A. Privat, T. P. Xiao, D. Garland, E. Bielejec, G. Vizkelethy, J. Dickerson, J. Brunhaver, and A. A. Talin, "Investigating Heavy-Ion Effects on 14-nm Process FinFETs: Displacement Damage Versus Total Ionizing Dose," *IEEE Transactions on Nuclear Science*, vol. 68, no. 5, pp. 724-732, 2021.
18. X. Han, A. Privat, K. Holbert, J.-s. Seo, S. Yu, and H. Barnaby, "Total Ionizing Dose Effects on Multistate HfO_x-Based RRAM Synaptic Array," *IEEE Transactions on Nuclear Science*, vol. 68, no. 5, pp. 756-761, 2021.
19. M. Musisi-Nkambwe, S. Afshari, H. Barnaby, M. N. Kozicki, and I. S. Esqueda, "The Viability of Analog-based Accelerators for Neuromorphic Computing: a Survey," *Neuromorphic Computing and Engineering*, 2021.

20. K. Muthuseenu, H. Barnaby, K. Galloway, A. Koziukov, T. Maksimenko, M. Vyrostkoy, K. Bu-Khasan, A. Kalashnikova, and A. Privat, "Analysis of SEGR in Silicon Planar Gate Super-Junction Power MOSFETs," *IEEE Transactions on Nuclear Science*, vol. 68, no. 5, pp. 611-616, 2021.
21. K. Muthuseenu, H. Barnaby, K. Galloway, A. Koziukov, T. Maksimenko, M. Vyrostkoy, K. Bu-Khasan, A. Kalashnikova, and A. Privat, "Single-Event Gate Rupture Hardened Structure for High-Voltage Super-Junction Power MOSFETs," *IEEE Transactions on Electron Devices*, vol. 68, no. 8, pp. 4004-4009, 2021.
22. A. Privat, H. Barnaby, M. Spear, M. Esposito, J. Manuel, L. Clark, J. Brunhaver, A. Duvnjak, R. Jokai, and K. Holbert, "Evidence of Interface Trap Build-Up in Irradiated 14-nm Bulk FinFET Technologies," *IEEE Transactions on Nuclear Science*, vol. 68, no. 5, pp. 671-676, 2021.
23. T. P. Xiao, C. H. Bennett, S. Agarwal, D. R. Hughart, H. J. Barnaby, H. Puchner, V. Prabhakar, A. A. Talin, and M. J. Marinella, "Ionizing Radiation Effects in SONOS-Based Neuromorphic Inference Accelerators," *IEEE Transactions on Nuclear Science*, vol. 68, no. 5, pp. 762-769, 2021.
24. K. Muthuseenu, H. Barnaby, A. Patadia, K. Holbert, and A. Privat, "Ionizing radiation tolerance of stacked Si₃N₄-SiO₂ gate insulators for power MOSFETs," *Microelectronics Reliability*, vol. 104, p. 113554, 2020.
25. Y. Luo, X. Han, Z. Ye, H. Barnaby, J.-S. Seo, and S. Yu, "Array-level programming of 3-bit per cell resistive memory and its application for deep neural network inference," *IEEE Transactions on Electron Devices*, vol. 67, no. 11, pp. 4621-4625, 2020.
26. A. Privat, H. Barnaby, B. Tolleson, K. Muthuseenu, and P. Adell, "Temperature dependence of bipolar junction transistor current-voltage characteristics after low dose rate irradiation," *Microelectronics Reliability*, vol. 113, p. 113947, 2020.
27. A. Privat, P. Davis, H. Barnaby, and P. Adell, "Total Dose Effects on Negative and Positive Low-Dropout Linear Regulators," *IEEE Transactions on Nuclear Science*, vol. 67, no. 7, pp. 1332-1338, 2020.
28. S. Yin, Y. Kim, X. Han, H. Barnaby, S. Yu, Y. Luo, W. He, X. Sun, J.-J. Kim, and J.-s. Seo, "Monolithically Integrated RRAM-and CMOS-Based In-Memory Computing Optimizations for Efficient Deep Learning," *IEEE Micro*, vol. 39, no. 6, pp. 54-63, November, 2019.
29. Z. L. Ye, R. Liu, J. L. Taggart, H. J. Barnaby, and S. M. Yu, "Evaluation of Radiation Effects in RRAM-Based Neuromorphic Computing System for Inference," *IEEE Transactions on Nuclear Science*, vol. 66, no. 1, pp. 97-103, Jan 2019.
30. A. Witulski, N. Mahadevan, J. Kauppila, G. Karsai, A. Sternberg, R. Schrimpf, R. Reed, P. Adell, H. Schone, and A. Daniel, "Simulation of Transistor-Level Radiation Effects on System-Level Performance Parameters," *IEEE Transactions on Nuclear Science*, vol. 66, no. 7, pp. 1634-1641, 2019.
31. J. L. Taggart, R. B. Jacobs-Gedrim, M. L. McLain, H. J. Barnaby, E. S. Bielejec, W. Hardy, M. J. Marinella, M. N. Kozicki, and K. Holbert, "Failure Thresholds in CBRAM Due to Total Ionizing Dose and Displacement Damage Effects," *IEEE Transactions on Nuclear Science*, vol. 66, no. 1, pp. 69-76, Jan 2019.
32. I. P. Livingston, I. S. Esqueda, and H. J. Barnaby, "Explicit approximation of the surface potential equation of a dynamically depleted silicon-on-insulator MOSFET for performance and reliability simulations," *Solid-State Electronics*, vol. 160, p. 107609, 2019.
33. R. B. Jacobs-Gedrim, D. R. Hughart, S. Agarwal, G. Vizkelethy, E. S. Bielejec, B. L. Vaandrager, S. E. Swanson, K. E. Knisely, J. L. Taggart, H. J. Barnaby, and M. J. Marinella, "Training a Neural Network on Analog TaOx ReRAM Devices Irradiated With Heavy Ions: Effects on Classification Accuracy Demonstrated With CrossSim," *IEEE Transactions on Nuclear Science*, vol. 66, no. 1, pp. 54-60, Jan 2019.

34. X. Huang, R. Fang, C. Yang, K. Fu, H. Fu, H. Chen, T.-H. Yang, J. Zhou, J. Montes, and M. Kozicki, "Steep-slope field-effect transistors with AlGaIn/GaN HEMT and oxide-based threshold switching device," *Nanotechnology*, vol. 30, no. 21, p. 215201, 2019.
35. A. Privat, H. J. Barnaby, P. C. Adell, B. Tolleson, Y. Wang, X. Han, P. Davis, B. Rax, and T. E. Buchheit, "Multiscale modeling of total ionizing dose effects in commercial-off-the-shelf parts in bipolar technologies," *IEEE Transactions on Nuclear Science*, vol. 66, no. 1, pp. 190-198, 2019.
36. J. L. Taggart, W. Chen, Y. Gonzalez-Velo, H. J. Barnaby, K. Holbert, and M. N. Kozicki, "In Situ Synaptic Programming of CBRAM in an Ionizing Radiation Environment," *IEEE Transactions on Nuclear Science*, vol. 65, pp. 192-199, Jan 2018.
37. X. Yan, H. Wang, H. Barnaby, and I. S. Esqueda, "Impact Ionization and Interface Trap Generation in 28-nm MOSFETs at Cryogenic Temperatures," *IEEE Transactions on Device Materials Reliability*, vol. 18, no. 3, pp. 456-462, 2018.
38. Tolleson, BS, Adell, PC, Rax, B, Barnaby, HJ, Privat, A, Han, X, Mahmud, A, Livingston, I, "Improved Model for Excess Base Current in Irradiated Lateral PNP Bipolar Junction Transistors," *IEEE Transactions on Nuclear Science*, vol. 65, no. 8, pp. 1488 - 1495, 2018.
39. Nichol, Tyler, Nagy, Gyula, Huszank, Robert, Tenne, Dmitri, Kozicki, Michael N, Barnaby, Hugh J, Rajta, Istvan and Mitkova, Maria "Proton Beam Effects on Ge-Se/Ag Thin Films," *J physica status solidi*, vol. 255, no. 6, p. 1700453, 2018.
40. Li, Xingji, Yang, Jianqun, Fleetwood, Daniel M, Liu, Chaoming, Wei, Yi Dan, Barnaby, HJ and Galloway, KF, "Hydrogen Soaking, Displacement-Damage Effects, and Charge Yield in Gated Lateral Bipolar Junction Transistors," *IEEE Transactions on Nuclear Science*, vol. 65, no. 6, pp. 1271 - 1276, 2018.
41. R. Fang, I. Livingston, I. S. Esqueda, M. Kozicki, and H. Barnaby, "Bias temperature instability model using dynamic defect potential for predicting CMOS aging," *Journal of Applied Physics*, vol. 123, no. 22, p. 225701, 2018.
42. J. L. Taggart, R. Fang, Y. Gonzalez-Velo, H. J. Barnaby, M. N. Kozicki, J. L. Pacheco, et al., "Resistance State Locking in CBRAM Cells Due to Displacement Damage Effects," *IEEE Transactions on Nuclear Science*, vol. 64, pp. 2300-2306, Aug 2017.
43. H. J. Barnaby, R. D. Schrimpf, K. F. Galloway, X. Li, J. Yang, and C. Liu, "Displacement Damage in Bipolar Junction Transistors: Beyond Messenger-Spratt," *IEEE Transactions on Nuclear Science*, vol. 64, pp. 149-155, Jan 2017.
44. W. Chen, N. Chamele, Y. Gonzalez-Velo, H. Barnaby, and M. Kozicki, "Low Temperature Characterization of Cu-Cu: silica Based Programmable Metallization Cell," *IEEE Electron Device Letters*, vol. 38, pp. 1244-1247, Sep 2017.
45. W. Chen, R. Fang, H. Barnaby, M. Balaban, Y. Gonzalez-Velo, J. Taggart, A. Mahmud, K. Holbert, A. H. Edwards, M. N. Kozicki, "Total-Ionizing-Dose Effects on Resistance Stability of Programmable Metallization Cell Based Memory and Selectors," *IEEE Transactions on Nuclear Science*, vol. 64, no. 1 pp. 269-276, Jan. 2017.
46. W. Chen, S. Tappertzhofen, H. J. Barnaby, and M. N. Kozicki, "SiO₂ based conductive bridging random access memory," *Journal of Electroceramics*, vol. 39, pp. 109-131, Dec 2017.
47. Y. Gonzalez-Velo, H. J. Barnaby, and M. N. Kozicki, "Review of radiation effects on ReRAM devices and technology," *Semiconductor Science and Technology*, vol. 32, Aug 2017.
48. X. Li, J. Yang, H. J. Barnaby, K. F. Galloway, R. D. Schrimpf, D. M. Fleetwood, C. Liu., "Dependence of Ideality Factor in Lateral PNP Transistors on Surface Carrier Concentration," *IEEE Transactions on Nuclear Science*, vol. 64, no. 6, pp. 1549 – 1553, Jun 2017.

49. A. Mahmud, Y. Gonzalez-Velo, H. J. Barnaby, M. N. Kozicki, M. Mitkova, K. E. Holbert, M. Goryll, T. L. Alford, J. L. Taggart, W. Chen, "A Comparative Study on TID Influenced Lateral Diffusion of Group 11 Metals into GeS_{1-x} and Ge_xSe_{1-x} Systems: A Flexible Radiation Sensor Development Perspective," *IEEE Transactions on Nuclear Science*, vol. 64, no. 8, pp. 2292 – 2299, Aug. 2017.
50. M. L. McInain, H. Barnaby, and G. Schlenvogt, "Effects of Channel Implant Variation on Radiation-Induced Edge Leakage Currents in n-Channel MOSFETs," *IEEE Transactions on Nuclear Science*, vol. 64, no. 8, pp. 2235 – 2241, 2017.
51. A. Nazari, E. Mikkola, B. Jalali-Farahani, and H. Barnaby, "A 12-b, 650-MSps time-interleaved pipeline analog to digital converter with 1.5 GHz analog bandwidth for digital beam-forming systems," *Analog Integrated Circuits and Signal Processing*, vol. 89, pp. 213-222, Oct 2016.
52. M. Mitkova, K. Wolf, G. Belev, M. Ailavajhala, D. A. Tenne, H. Barnaby, et al., "X-ray radiation induced effects in selected chalcogenide glasses and CBRAM devices based on them," *Physica Status Solidi B-Basic Solid State Physics*, vol. 253, pp. 1060-1068, Jun 2016.
53. W. Chen, R. Fang, M. B. Balaban, W. Yu, Y. Gonzalez-Velo*, H. J. Barnaby, M. N Kozicki, "A CMOS-compatible electronic synapse device based on Cu-SiO₂-W programmable metallization cells," *Nanotechnology*, vol. 27, p. 255202 (1-9), 2016.
54. M. Saremi, A. Privat, H. J. Barnaby, L. T. Clark, "Physically Based Predictive Model for Single Event Transients in CMOS Gates," *IEEE Transactions on Electron Devices*, vol. 63, pp. 2248-2254, Jun 2016.
55. K. Wolf, M. S. Ailavajhala, D. A. Tenne, H. Barnaby, M. N. Kozicki, and M. Mitkova, "Electron beam effects in Ge-Se thin films and resistance change memory devices," *Emerging Materials Research*, vol. 5, pp. 126-134, Jun 2016.
56. W. Chen, H. J. Barnaby, and M. N. Kozicki, "Volatile and Non-Volatile Switching in Cu-SiO₂ Programmable Metallization Cells," *IEEE Electron Device Letters*, vol. 37, pp. 580-583, 2016.
57. W. Chen, H. J. Barnaby, and M. N. Kozicki, "Impedance Spectroscopy of Programmable Metallization Cells With a Thin SiO₂ Switching Layer," *IEEE Electron Device Letters*, vol. 37, pp. 576-579, 2016.
58. M. N. Kozicki and H. J. Barnaby, "Conductive Bridging Random Access Memory – Materials, Devices and Applications," *Semiconductor Science and Technology*, vol. 31, no. 11, pp. 113001, 2016.
59. Y. Gonzalez-Velo, A. Mahmud, W. H. Chen, J. L. Taggart, H. J. Barnaby, M. N. Kozicki, et al., "Radiation Hardening by Process of CBRAM Resistance Switching Cells," *IEEE Transactions on Nuclear Science*, vol. 63, pp. 2145-2151, Aug 2016.
60. R. Liu, H. J. Barnaby, and S. M. Yu, "System-level analysis of single event upset susceptibility in RRAM architectures," *Semiconductor Science and Technology*, vol. 31, Dec 2016.
61. A. Mahmud, Y. Gonzalez-Velo, M. Saremi, H. J. Barnaby, M. N. Kozicki, K. E. Holbert, et al., "Flexible Ag-ChG Radiation Sensors: Limit of Detection and Dynamic Range Optimization Through Physical Design Tuning," *IEEE Transactions on Nuclear Science*, vol. 63, pp. 2137-2144, Aug 2016.
62. D. Mahalanabis, R. Liu, H. J. Barnaby, S. Yu, M. N. Kozicki, A. Mahmud, E. Deionno, "Single Event Susceptibility Analysis in CBRAM Resistive Memory Arrays," *IEEE Transactions on Nuclear Science*, vol. 62, pp. 2606-2612, 2015.
63. D. Mahalanabis, V. Bharadwaj, H. J. Barnaby, S. Vrudhula, and M. N. Kozicki, "A Nonvolatile Sense Amplifier Flip-Flop Using Programmable Metallization Cells," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 5, pp. 205-213, 2015.
64. R. Liu, D. Mahalanabis, H. J. Barnaby, and S. Yu, "Investigation of Single-Bit and Multiple-Bit Upsets in Oxide RRAM-Based 1T1R and Crossbar Memory Arrays," *IEEE Transactions on Nuclear Science*, vol. 62, pp. 2294-2301, 2015.

65. I. S. Esqueda, H. J. Barnaby, and M. P. King, "Compact Modeling of Total Ionizing Dose and Aging Effects in MOS Technologies," *IEEE Transactions on Nuclear Science*, vol. 62, pp. 1501-1515, 2015.
66. A. H. Edwards, H. J. Barnaby, K. A. Campbell, M. N. Kozicki, W. Liu, and M. J. Marinella, "Reconfigurable Memristive Device Technologies," *Proceedings of the IEEE*, vol. 103, pp. 1004-1033, 2015.
67. W. Chen, H. J. Barnaby, M. N. Kozicki, A. H. Edwards, Y. Gonzalez-Velo*, R. Fang, K. E. Holbert, S. Yu, W. Yu, "A Study of Gamma-Ray Exposure of Cu-SiO₂ Programmable Metallization Cells," *IEEE Transactions on Nuclear Science*, vol. 62, pp. 2404-2411, 2015.
68. H. J. Barnaby, B. Vermeire, and M. J. Campola, "Improved Model for Increased Surface Recombination Current in Irradiated Bipolar Junction Transistors," *IEEE Transactions on Nuclear Science*, vol. 62, pp. 1658-1664, 2015.
69. P. C. Adell, B. Rax, I. S. Esqueda, and H. J. Barnaby, "Hydrogen Limits for Total Dose and Dose Rate Response in Linear Bipolar Circuits," *IEEE Transactions on Nuclear Science*, vol. 62, pp. 2476-2481, 2015.
70. S. Rajabi, M. Saremi, H. J. Barnaby, A. Edwards, M. N. Kozicki, M. Mitkova, D. Mahalanabis, Y. Gonzalez-Velo*, A. Mahmud, "Static impedance behavior of programmable metallization cells," *Solid-State Electronics*, vol. 106, pp. 27-33, 2015.
71. M. Saremi, H. J. Barnaby, A. Edwards, and M. N. Kozicki, "Analytical Relationship between Anion Formation and Carrier-Trap Statistics in Chalcogenide Glass Films," *ECS Electrochemistry Letters*, vol. 4, pp. H29-H31, 2015.
72. M. Mitkova, K. Wolf, G. Belev, M. Ailavajhala, D. A. Tenne, H. Barnaby, M. N. Kozicki, "X-ray radiation induced effects in selected chalcogenide glasses and CBRAM devices based on them," *Physica Status Solidi (b)*, 2015.
73. D. Mahalanabis, Y. Gonzalez-Velo*, H. J. Barnaby, M. N. Kozicki, P. Dandamudi, S. Vrudhula, "Impedance Measurement and Characterization of Ag-Ge₃₀Se₇₀-Based Programmable Metallization Cells," *IEEE Transactions on Electron Devices*, vol. 61, pp. 3723-3730, 2014.
74. J. L. Taggart, Y. Gonzalez-Velo*, D. Mahalanabis, A. Mahmud, H. J. Barnaby, M. N. Kozicki, K. E. Holbert, M. Mitkova, K. Wolf, E. Deionno, A. L. White, "Ionizing Radiation Effects on Nonvolatile Memory Properties of Programmable Metallization Cells," *IEEE Transactions on Nuclear Science*, vol. 61, no. 6, pp. 2985-2990, 2014.
75. D. Mahalanabis, H. J. Barnaby, M. N. Kozicki, V. Bharadwaj, S. Rajabi, "Investigation of Single Event Induced Soft Errors in Programmable Metallization Cell Memory," *IEEE Transactions on Nuclear Science*, vol. 61, pp. 3557-3563, 2014.
76. T. Nichol, M. R. Latif, M. S. Ailavajhala, D. A. Tenne, Y. Gonzalez-Velo*, H. J. Barnaby, M. N. Kozicki, M. Mitkova, "Structural and Material Changes in Thin Film Chalcogenide Glasses Under Ar-Ion Irradiation," *IEEE Transactions on Nuclear Science*, vol. 61, pp. 2855-2861, Dec 2014.
77. P. Dandamudi, A. Mahmud, Y. Gonzalez-Velo*, M. N. Kozicki, H. J. Barnaby, B. Roos, T. L. Alford, M. Ailavajhala, M. Mitkova, K. E. Holbert, "Flexible Sensors Based on Radiation-Induced Diffusion of Ag in Chalcogenide Glass," *IEEE Transactions on Nuclear Science*, vol. 61, no. 6, pp. 3432-3437, 2014.
78. D. Mahalanabis, H. J. Barnaby, Y. Gonzalez-Velo*, M. N. Kozicki, S. Vrudhula, P. Dandamudi, "Incremental resistance programming of programmable metallization cells for use as electronic synapses," *Solid-State Electronics*, vol. 100, pp. 39-44, 2014.
79. M. S. Ailavajhala, T. Nichol, Y. Gonzalez-Velo*, C. D. Poweleit, H. J. Barnaby, M. N. Kozicki, D. P. Butt, M. Mitkova, "Thin Ge-Se films as a sensing material for radiation doses," *Physica Status Solidi (b)*, vol. 251, pp. 1347-1353, 2014.

80. R. C. Fang, Y. Gonzalez-Velo*, W. Chen, K. E. Holbert, M. N. Kozicki, H. Barnaby, S. Yu, "Total ionizing dose effect of gamma-ray radiation on the switching characteristics and filament stability of HfOx resistive random access memory," *Applied Physics Letters*, vol. 104, 2014.
81. P. Dandamudi, H. J. Barnaby, M. N. Kozicki, Y. Gonzalez-Velo*, and K. E. Holbert, "Total Ionizing Dose Tolerance of Ag-Ge40S60 based Programmable Metallization Cells," *IEEE Transactions on Nuclear Science*, vol. 61, pp. 1726-1731, 2014.
82. M. S. Ailavajhala, Y. Gonzalez-Velo*, C. D. Poweleit, H. J. Barnaby, M. N. Kozicki, D. P. Butt, et al., "New functionality of chalcogenide glasses for radiation sensing of nuclear wastes," *Journal of Hazardous Materials*, vol. 269, pp. 68-73, 2014.
83. I. S. Esqueda and H. J. Barnaby, "A defect-based compact modeling approach for the reliability of CMOS devices and integrated circuits," *Solid-State Electronics*, vol. 91, pp. 81-86, 2014.
84. Y. Gonzalez-Velo*, H. J. Barnaby, M. N. Kozicki, C. Gopalan, and K. Holbert, "Total Ionizing Dose Retention Capability of Conductive Bridging Random Access Memory," *IEEE Electron Device Letters*, vol. 35, pp. 205-207, 2014.
85. M. S. Ailavajhala, Y. Gonzalez-Velo*, C. Poweleit, H. Barnaby, M. N. Kozicki, K. Holbert, D. P. Butt, and M. Mitkova, "Gamma radiation induced effects in floppy and rigid Ge-containing chalcogenide thin films," *Journal of Applied Physics*, vol. 115, pp. 043502-043502-9, 2014.
86. P. Dandamudi, M. N. Kozicki, H. J. Barnaby, Y. Gonzalez-Velo*, M. Mitkova, K. E. Holbert, M. Ailavajhala, and W. Yu, "Sensors Based on Radiation-Induced Diffusion of Silver in Germanium Selenide Glasses," *IEEE Transactions on Nuclear Science*, vol. 60, pp. 4257-4264, 2013.
87. A. H. Edwards, H. Barnaby, A. C. Pineda, and P. A. Schultz, "Interface Effects on Total Energy Calculations for Radiation-Induced Defects," *IEEE Transactions on Nuclear Science*, vol. 60, pp. 4109-4115, 2013.
88. J. D. Gleason, H. J. Barnaby, M. L. Alles, G. J. Schlenvogt, "An Examination of High-Injection Physics of Silicon P-N Junctions With Applications in Photocurrent Modeling," *IEEE Transactions on Nuclear Science*, vol. 60, pp. 4570-4575, 2013.
89. Y. Gonzalez-Velo*, H. J. Barnaby, M. N. Kozicki, P. Dandamudi, A. Chandran, K. E. Holbert, M. Mitkova, M. Ailavajhala, "Total-Ionizing-Dose Effects on the Resistance Switching Characteristics of Chalcogenide Programmable Metallization Cells," *IEEE Transactions on Nuclear Science*, vol. 60, pp. 4563-4569, 2013.
90. G. J. Schlenvogt, H. J. Barnaby, J. Wilkinson, S. Morrison, and L. Tyler, "Simulation of TID Effects in a High Voltage Ring Oscillator," *IEEE Transactions on Nuclear Science*, vol. 60, pp. 4547-4554, 2013.
91. E. O. Mikkola, V. Swaminathan, B. Sivakumar, and H. J. Barnaby, "Ultra-low-power radiation hard ADC for particle detector readout applications," *Journal of Instrumentation*, vol. 8, 2013.
92. M. Mitkova, P. Chen, M. Ailavajhala, D. P. Butt, D. A. Tenne, H. Barnaby, I. S. Esqueda, "Gamma ray induced structural effects in bare and Ag doped Ge-S thin films for sensor application," *Journal of Non-Crystalline Solids*, vol. 377, pp. 195-199, 2013.
93. M. N. Kozicki, P. Dandamudi, H. J. Barnaby, Y. Gonzalez-Velo*, "(Invited) Programmable Metallization Cells in Memory and Switching Applications," *ECS Transactions*, vol. 58(5), 47-52, 2013.
94. Y. Gonzalez-Velo*, H. J. Barnaby, A. Chandran, D. R. Oleksy, P. Dandamudi, M. N. Kozicki, K. E. Holbert, M. Mitkova, M. Ailavajhala, P. Chen, "Effects of Cobalt-60 Gamma-Rays on Ge-Se Chalcogenide Glasses and Ag/Ge-Se Test Structure," *IEEE Transactions on Nuclear Science*, vol. 59, no. 6, pp. 3093-3100, 2012.
95. P. C. Adell, I. S. Esqueda, H. J. Barnaby, B. Rax, A. H. Johnston, "Impact of Low Temperatures (< 125 K) on the Total Ionizing Dose Response and ELDRS in Gated Lateral PNP BJTs," *IEEE Transactions on Nuclear Science*, vol. 59, no. 6, pp. 3081-3086, 2012.

96. I. S. Esqueda, H. J. Barnaby, "Modeling the Non-Uniform Distribution of Radiation-Induced Interface Traps," *IEEE Transactions on Nuclear Science*, vol. 59, no. 4, pp. 723-727, 2012.
97. I. S. Esqueda, H. J. Barnaby, P.C. Adell, "Modeling the Effects of Hydrogen on the Mechanisms of Dose Rate Sensitivity," *IEEE Transactions on Nuclear Science*, vol. 59, no. 4, pp. 701-706, 2012.
98. Z. Zhu, A. Kathuria, S. G. Krishna, M. Mojarradi, B. Jalali-Farahani, H. Barnaby, W. Wu, G. Gildenblat, "Design applications of compact MOSFET model for extended temperature range (60 to 400k)," *Electronics Letters*, vol. 47, no. 2, pp. 141-142, 2011.
99. I. S. Esqueda, H. J. Barnaby, K. E. Holbert, Y. Boulghassoul, "Modeling Inter-device Leakage in 90 nm Bulk CMOS Devices," *IEEE Transactions on Nuclear Science*, vol. 58, no. 2, pp. 793 - 799, 2011.
100. N. Rezzak, M. L. Alles, R. D. Schrimpf, S. Kalemeris, L. W. Massengill, J. Sochacki, H. J. Barnaby, "The sensitivity of radiation-induced leakage to STI topology and sidewall doping," *Microelectronics Reliability*, vol. 51, pp. 889-894, 2011.
101. G. J. Schlenvogt, H. J. Barnaby, J. D. Rollins, J. Wilkinson, S. Morrison, L. Tyler, "Characterization and Modeling of Parasitic Field-Oxide Transistors for Use in Radiation Hardening by Design," *IEEE Transactions on Nuclear Science*, vol. 58, no. 6, pp. 2863-2870, 2011.
102. I.S. Esqueda, H.J. Barnaby, P.C. Adell, B.G. Rax, H. P. Hjalmarson, M. L. McLain, R.L. Pease, "Modeling Low Dose Rate Effects in Shallow Trench Isolation Oxides," *IEEE Transactions on Nuclear Science*, vol. 58, no. 6, pp. 2945-2952, 2011.
103. H.J. Barnaby, S. Malley, M. Land, S. Charnicki, A. Kathuria, B. Wilkens, E. DeIonno, W. Tong, "Impact of Alpha Particles on the Electrical Characteristics of TiO₂ Memristors," *IEEE Transactions on Nuclear Science*, vol. 58, no. 6, pp. 2838-2844, 2011.
104. I.S. Esqueda, H. J. Barnaby, K. E. Holbert, F. El-Mamouni, R. D. Schrimpf, "Modeling of Ionizing Radiation-Induced Degradation in Multiple Gate Field Effect Transistors," *IEEE Transactions on Nuclear Science*, vol. 58, no. 2, pp. 499 - 505, 2011.
105. R. L. Pease, P. C. Adell, B. Rax, S. McClure, H. J. Barnaby, K. Kruckmeyer, B. Triggs, "Evaluation of an Accelerated ELDRS Test Using Molecular Hydrogen," *IEEE Transactions on Nuclear Science*, vol. 57, no. 6, pp. 3419 - 3425, 2010.
106. G. J. Schlenvogt, H. J. Barnaby, I. S. Esqueda, K. E. Holbert, J. Wilkinson, S. Morrison, L. Tyler, "Failure Analysis and Radiation-Enabled Circuit Simulation of a Dual Charge Pump Circuit," *IEEE Transactions on Nuclear Science*, vol. 57, no. 6, pp. 3609 - 3614, 2010.
107. I. S. Esqueda, H. J. Barnaby, M. L. McLain, P. C. Adell, F. E. Mamouni, S. K. Dixit, R. D. Schrimpf, W. Xiong, "Modeling the Radiation Response of Fully-Depleted SOI n-Channel MOSFETs," *IEEE Transactions on Nuclear Science*, vol. 56, no. 4, pp. 2247 - 2250, 2009.
108. 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, S. T. Pantelides, "The Effects of Aging and Hydrogen on the Radiation Response of Gated Lateral PNP Transistors," *IEEE Transactions on Nuclear Science*, vol. 56, no. 6, pp. 3361 - 3366, 2009.
109. P. C. Adell, R. L. Pease, H. J. Barnaby, B. Rax, X. J. Chen, S. S. McClure, "Irradiation with Molecular Hydrogen as an Accelerated Total Dose Hardness Assurance Test Method for Bipolar Linear Circuits," *IEEE Transactions on Nuclear Science*, vol. 56, no. 6, pp. 3326 - 3333, 2009.
110. X. J. Chen, H. J. Barnaby, P. Adell, R. L. Pease, B. Vermeire, K. E. Holbert, "Modeling the Dose Rate Response and the Effects of Hydrogen in Bipolar Technologies," *IEEE Transactions on Nuclear Science*, vol. 56, no. 6, pp. 3196 - 3202, 2009.
111. H. J. Barnaby, M. L. McLain, I. S. Esqueda, X. J. Chen, "Modeling Ionizing Radiation Effects in Solid State Materials and CMOS Devices," *IEEE Transactions on Circuits and Systems – I: Regular Papers*, vol. 56, no. 8, pp. 1870 – 1883, 2009.

112. F. E. Mamouni, S. K. Dixit, R. D. Schrimpf, P. C. Adell, I. S. Esqueda, M. L. McLain, H. J. Barnaby, S. Cristoloveanu, W. Xiong, "Gate-length and drain-bias dependence of band-to-band tunneling-induced drain leakage in irradiated fully depleted SOI devices," *IEEE Transactions on Nuclear Science*, vol. 55, pp. 3259 - 3264, 2008.
113. X. J. Chen, H. J. Barnaby, B. Vermeire, K. E. Holbert, D. Wright, R. L. Pease, R. D. Schrimpf, D. M. Fleetwood, S. T. Pantelides, M. R. Shaneyfelt, P. Adell, "Post-irradiation Annealing Mechanisms of Defects Generated in Hydrogenated Bipolar Oxides," *IEEE Transactions on Nuclear Science*, vol. 55, pp. 3032 - 3038, 2008.
114. R. L. Pease, P. C. Adell, B. Rax, X. J. Chen, H. J. Barnaby, K. Holbert, H. P. Hjalmarson, "The Effects of Hydrogen on the Enhanced Low Dose Rate Sensitivity (ELDRS) of Bipolar Linear Circuits," *IEEE Transactions on Nuclear Science*, vol. 55, pp. 3169 - 3173, 2008.
115. F. Faccio, H. J. Barnaby, X. J. Chen, D. M. Fleetwood, L. Gonella, M. L. McLain, R. D. Schrimpf, "Total ionizing dose effects in shallow trench isolation oxides," *Microelectronics Reliability*, vol. 48, pp. 1000 - 1007, 2008.
116. X. J. Chen and H. J. Barnaby, "The effects of radiation induced interface traps on base current in gated bipolar test structures," *Solid State Electronics*, vol. 52, issue 5, pp. 683-687, May 2008.
117. Sunil Lekhwani, H. Barnaby, N Porobic, K Chandrashekar, B. Vermeire, "LWS/SET board for ELDRS/proton effects in bipolar devices," *Journal of Radiation Effects Res. Engr.*, 24, pp. 125-132, 2008.
118. M. McLain, H. J. Barnaby, K. E. Holbert, R. D. Schrimpf, H. Shah, A. Amort, M. Baze, J. Wert, "Enhanced TID susceptibility in sub-100 nm Bulk CMOS I/O transistors and circuits," *IEEE Transactions on Nuclear Science*, vol. 54, pp. 2210 - 2217, 2007.
119. M. Umnov, O. Palusinski, P. Deymier, R. Guzman, J. Hoying, H. Barnaby, Y. Yang, S. Raghavan, "Experimental evaluation of electrical conductivity of microtubules," *Journal of Materials Science*, vol. 42, pp. 373-378, 2007
120. R. L. Pease, D. G. Platteter, G. Dunham, J. E. Seiler, P. C. Adell, H. J. Barnaby, X. J. Chen, "The effects of hydrogen in hermetically sealed packages on the total dose and dose rate response of bipolar linear circuits," *IEEE Transactions on Nuclear Science*, vol. 54, pp. 2168 - 2173, 2007.
121. W Chen, N. Varanasi, V. Pouget, H. J. Barnaby, B. Vermeire, P. C. Adell, T. Copani, P. Fouillat, "Impact of VCO topology on SET induced frequency response," *IEEE Transactions on Nuclear Science*, vol. 54, pp. 2500 - 2505, 2007.
122. X. J. Chen, H. J. Barnaby, B. Vermeire, K. Holbert, D. Wright, R. L. Pease, R. D. Platteter, G. Dunham, J. Seiler, Steve McClure, P. Adell, "Mechanisms of enhanced radiation-induced degradation due to excess molecular hydrogen in bipolar oxides," *IEEE Transactions on Nuclear Science*, vol. 54, pp. 1913-1919, 2007.
123. P. C. Adell, H. J. Barnaby, R.D. Schrimpf, B. Vermeire, "Band-to-band tunneling (BBT) induced leakage current enhancement in irradiated fully depleted SOI devices," *IEEE Transactions on Nuclear Science*, vol. 54, pp. 2174 - 2180, 2007.
124. H. J. Barnaby, M. McLain, I. S. Esqueda, "Total-ionizing-dose effects on isolation oxides in modern CMOS technologies," *Nuclear Instruments and Methods in Physics Research B* 261 (2007) 1142-1145.
125. H. Barnaby, "Total-ionizing-dose effects in modern CMOS technologies," *IEEE Transactions on Nuclear Science*, vol. 53, pp. 3103-3121, 2006 (review article).
126. H. H. Chung, W. Chen, B. Bakaloglu, H. J. Barnaby, B. Vermeire, S. Kiaei, "Analysis of single events effects on monolithic PLL frequency synthesizers," *IEEE Transactions on Nuclear Science*, vol. 53, pp. 3539-3543, 2006.

127. W. Chen, V. Pouget, G.K. Gentry, H. J. Barnaby, B. Vermeire, B. Bakkaloglu, S. Kiaei, K. E. Holbert, P. Fouillat, "Radiation hardened by design RF circuits implemented in 0.13 μm CMOS technology," IEEE Transactions on Nuclear Science, vol. 53, pp. 3449-3454, 2006.
128. X. J. Chen, H. J. Barnaby, R. D. Schrimpf, D. M. Fleetwood, R. L. Pease, R. D. Platteter, "Nature of interface defect buildup in gated bipolar devices under low dose rate irradiation," IEEE Transactions on Nuclear Science, vol. 53, pp. 3649-3654, 2006.
129. X. J. Chen, H. J. Barnaby, R. L. Pease, R. D. Schrimpf, D. Platteter, M. Shaneyfelt, B. Vermeire "Estimation and verification of radiation induced Not and Nit energy distribution using combined bipolar and MOS characterization methods in gated bipolar devices," IEEE Transactions on Nuclear Science, vol. 52, pp. 2245-2251, 2005.
130. I. S. Esqueda, H.J. Barnaby, M. L. Alles, "Two-dimensional methodology for modeling radiation-induced off-state leakage in CMOS technologies," IEEE Transactions on Nuclear Science, vol. 52, pp. 2259-2264, 2005.
131. J. Spann, T. J. Thornton, J. Yang, A. Balijepallai, H. J. Barnaby, X. J. Chen, D. Alexander, W. T. Kemp, S. J. Sampson, M. E. Wood "Total dose radiation response of CMOS compatible SOI MESFETs" IEEE Transactions on Nuclear Science, vol. 52, pp. 2398-2402, 2005.
132. P. C. Adell, R. D. Schrimpf, C. R. Cirba, W. T. Holman, X. Zhu, H. J. Barnaby, O. Mion, "Single event transient effects in a voltage reference," Microelectronics Reliability, vol. 45, pp. 355-359, 2005.
133. J. Yan, D. Seif, S. Raghavan, B. Vermeire, H. J. Barnaby, T. Peterson, F. Shadman, "Sensor for monitoring the rinsing of patterned wafers," IEEE Transactions on Semiconductor Manufacturing, vol. 17, pp. 531-537, Nov. 2004.
134. E.H. Minson, I. S. Esqueda, H.J. Barnaby, R. L. Pease, D.G. Platter, Gary Dunham, "Assessment of gated sweep technique for total dose and dose rate analysis in bipolar oxides," IEEE Transactions on Nuclear Science, vol. 51, pp. 3723-3729, 2004.
135. E. Mikkola, B. Vermeire, H. J. Barnaby, H.G. Parks, K. Borhani, "SET tolerant CMOS comparator," IEEE Transactions on Nuclear Science, vol. 51, pp. 3609-3614, 2004.
136. X. J. Chen, H. J. Barnaby, R. L. Pease, R. D. Schrimpf, D. G. Platteter, G. Dunham, "Radiation-Induced base current broadening mechanisms in gated bipolar devices," IEEE Transactions on Nuclear Science, vol. 51, pp. 3178-3185, 2004.
137. R. L. Pease, D. G. Platteter, G. W. Dunham, J. E. Seiler, H. J. Barnaby, R. D. Schrimpf, M. R. Shaneyfelt, M. C. Maher, R. N. Nowlin, "Characterization of enhanced low dose rate sensitivity (ELDRS) effects using gated lateral PNP transistor structures," IEEE Transactions on Nuclear Science, vol. 51, pp. 3773-3780, 2004.
138. X. Hu, B. K. Choi, H. J. Barnaby, D. M. Fleetwood, R. D. Schrimpf, S. C. Lee, S. Shojah-Ardalan, R. Wilkins, U. K. Mishra, R. Dettmer, "The energy dependence of proton-induced degradation in AlGaIn/GaN high electron mobility transistors," IEEE Transactions on Nuclear Science, vol. 51, pp. 293-297, 2004.
139. H. J. Barnaby, R. D. Schrimpf, K.F. Galloway, D.R. Ball, R.L. Pease, P. Fouillat, "Test structures for analyzing radiation effects in bipolar technologies," IEEE Transactions on Semiconductor Manufacturing, vol 16, pp 253 –258, 2003.
140. W. Chen, V. Pouget, H. J. Barnaby, J. D. Cressler, P. Fouillat, Y. Devel, and D. Lewis, "Investigation of single-event transients in voltage-controlled oscillators," IEEE Transactions on Nuclear Science, vol. 50, pp. 2081- 2087, 2003.
141. H.J. Barnaby, C. Cirba, R.D. Schrimpf, K.F. Galloway, M. Pagey, R. Milanowski, "A two dimensional engineering model for radiation-induced interface trap formation," Journal of Radiation Effects Res. Engr., 19, pp. 127-133, 2002.

142. 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," *IEEE Transactions on Nuclear Science*, vol. 49, pp. 2643-2649, 2002.
143. X. Hu, B. K. Choi, H. J. Barnaby, D. M. Fleetwood, R. D. Schrimpf, R. A. Weller, K. McDonald, and R. Detmer, "Proton-induced degradation in AlGaAs/GaAs heterojunction bipolar transistors," *IEEE Transactions on Nuclear Science*, vol. 49, pp. 3213-3216, 2002.
144. D. R. Ball, R. D. Schrimpf, and H. J. Barnaby, "Separation of ionization and displacement damage using a gate-controlled lateral PNP bipolar transistors," *IEEE Transactions on Nuclear Science*, vol. 49, pp. 3185-3190, 2002.
145. A.L. Sternberg, L.W. Massengill, R.D. Schrimpf, Y. Boulghassoul, H. J. Barnaby, S. Buchner, R.L. Pease, J.W. Howard, "Effect of amplifier parameters on single-event transients in an inverting operational amplifier," *IEEE Transactions on Nuclear Science*, vol. 49, pp. 1496-1501, 2002.
146. Y. Deval; H. Lapuyade; P. Fouillat; H. Barnaby; F. Darracq; R. Briand; D. Lewis; R. D. Schrimpf; "Evaluation of a design methodology dedicated to dose-rate-hardened linear integrated circuits," *IEEE Transactions on Nuclear Science*, vol. 49, pp. 1468- 1473, 2002.
147. H. J. Barnaby, R. D. Schrimpf, A. L. Sternberg, V. Berthe, C. R. Cirba, and R. L. Pease, "Proton radiation response mechanisms in bipolar analog circuits," *IEEE Transactions on Nuclear Science*, vol. 48, pp. 2074-2080, 2001.
148. P. Adell, R. D. Schrimpf, H. J. Barnaby, C. Chatry, R. Marec, P. Calvel, C. Barillot, O. Mion, "Analysis of single event transients in analog circuits," *IEEE Transactions on Nuclear Science*, vol. 47, pp. 2616-2623, 2000.
149. J. K. Shreedhara, H. J. Barnaby, B. Bhuvu, A. Raparla, D. V. Kerns, S. E. Kerns, "Circuit technique for threshold voltage stabilization using substrate bias in total dose environments," *IEEE Transactions on Nuclear Science*, 47, pp. 2557-2560, 2000.
150. H. J. Barnaby, C. R. Cirba, R. D. Schrimpf, D. M. Fleetwood, R. L. Pease, M. R. Shaneyfelt, T. Turflinger, J. F. Krieg, M. C. Maher, "Origins of total-dose response variability in linear bipolar microcircuits," *IEEE Transactions on Nuclear Science*, 47, pp. 2342-2349, 2000.
151. H. J. Barnaby, C. R. Cirba, R. D. Schrimpf, S. Kosier, P. Fouillat, X. Montagner, "Modeling BJT radiation response with non-uniform distributions of interface traps," *IEEE Transactions on Nuclear Science*, 47, pp. 514-518, 2000.
152. H.J. Barnaby, R.J. Milanowski, R.D. Schrimpf, L.W. Massengill, M. Pagey, "Modeling ionizing radiation effects in lateral PNP BJT's with non-uniform trapped charge distributions," *Journal of Radiation Effects Res. Engr.*, 17, pp. 75-84, 1999.
153. R.J. Milanowski, L.W. Massengill, R.D. Schrimpf, R. Graves, H.J. Barnaby, K.F. Galloway, M. Pagey, C. Nicklaw, J. Johann, "Radiation hardened technology computer aided design," *Journal of Radiation Effects Res. Engr.*, vol. 17, no. 1, pp. 50-57, 1999.
154. X.W. Zhu, L.W. Massengill, C.R. Cirba, H.J. Barnaby, "Charge deposition modeling of terrestrial ions in scaled MOS devices," *IEEE Transactions Nuclear Science*, vol. 46, pp. 1378-1385, 1999.
155. J. Krieg, J. Titus, M. Gehlhausen, D. Emily, T. Turflinger, R. L. Pease, H.J. Barnaby, R.D. Schrimpf, M. C. Maher, "Hardness assurance implications of bimodal irradiation response in a bipolar linear voltage comparator," *IEEE Transactions Nuclear Science*, 46, pp. 1627-1632, 1999.
156. K. Warren, L.W. Massengill, R.D. Schrimpf, H.J. Barnaby, "Analysis of the influence of MOS device geometry on predicted SEU cross sections," *IEEE Transactions Nuclear Science*, 46, pp. 1363-1369, 1999.

157. S. Kerns, D. Jiang, M. de la Bardonnie, F. Pelanchon, H.J. Barnaby, D. V. Kerns, R. D. Schrimpf, B. L. Bhuvu, P. Mialhe, A. Hoffmann, J.-P. Charles "Light emission studies of total dose and hot carrier effects on silicon junctions," IEEE Transactions Nuclear Science, 46, pp. 1804-1808, 1999.
158. H.J. Barnaby, R.D. Schrimpf, J. Krieg, J. Titus, M. Gehlhausen, P. Cole, D. Emily, T. Turflinger, R. L. Pease, S.C. Witzak, M. C. Maher, "Identification of degradation mechanisms in a bipolar linear voltage comparator through correlation of transistor and circuit response," IEEE Transactions Nuclear Science, 46, pp. 1666-1673, 1999.
159. H.J. Barnaby, C.R. Cirba, S.L. Kosier, P. Fouillat, X. Montagner, R.D Schrimpf, "Minimizing gain degradation in lateral PNP BJTs using gate control" IEEE Transactions Nuclear Science, 46, pp. 1652-1659, 1999.
160. D. V. Kerns, Jr., H. J. Barnaby, S. E. Kerns "Threshold voltage stabilization in radiation environments," IEEE Transactions Nuclear Science, 45, pp. 3175-3178, 1998.
161. S.C. Witzak, R.D. Schrimpf, H.J. Barnaby, R.C. Laco, D.C. Mayer, K.F. Galloway, R. L. Pease "Moderated degradation enhancement of lateral PNP transistors due to measurement bias," IEEE Transactions Nuclear Science, 45, pp. 2644-2648, 1998.
162. P. Cazenave, P. Fouillat, X. Montagner, H. Barnaby, R.D. Schrimpf, L. Bonora, J.P. David, M.C. Calvet, and P. Calvel, "Total dose effects on gate controlled lateral PNP bipolar junction transistors," IEEE Transactions Nuclear Science, 45, pp. 2577-2583, 1998.
163. A. Wu, R. D. Schrimpf, H. J. Barnaby, D. M Fleetwood, R. L. Pease, S. L. Kosier, "Radiation induced gain degradation in lateral PNP BJT's with lightly and heavily doped emitters," IEEE Transactions Nuclear Science, 44, pp. 1914-1921, 1997.
164. H.J. Barnaby, H.J. Tausch, R. Turfler, P. Cole, P. Baker, R.L. Pease, "Analysis of bipolar circuit response mechanisms for high and low dose rate total dose irradiations," IEEE Transactions Nuclear Science, 43, pp. 3040-3048, 1996.

National Conference Proceedings Refereed Papers

1. J. Kim, T. D. Loveless, J. Pew, R. Young, D. Rcising, M. Nour, P. Manos, M. Chambers, H. J. Barnaby, and J. Neuendank, "On-Chip Characterization of Random Telegraph Signal Noise in Bulk 90 nm CMOS," in 2024 IEEE International Reliability Physics Symposium (IRPS), 2024: IEEE, pp. 1-6.
2. B. Tolleson, C. Bennett, T. P. Xiao, D. Wilson, J. Short, J. Kim, D. R. Hughart, N. Gilbert, S. Agarwal, and H. J. Barnaby, "TID Response of an Analog In-Memory Neural Network Accelerator," in 2023 IEEE International Reliability Physics Symposium (IRPS), 2023: IEEE, pp. 1-6.
3. J. Neuendank, F. Al Mamun, H. Barnaby, S. Bonaldo, M. Spear, T. Wallace, D. Loveless, J. Pew, M. Nour, and P. Manos, "TID Effects on Random Telegraph Signals in Bulk 90 nm MOSFET Devices," in 2023 IEEE International Integrated Reliability Workshop (IIRW), 2023: IEEE, pp. 1-5.
4. S. Banerjee, L. T. T. Ho, X. Gao, J. Young, L. C. Musson, H. Barnaby, and T. Buchheit, "Modeling Neutron Radiation Damage in Bipolar Junction Transistors Isolated from an Integrated Circuit," in 2023 IEEE International Conference on Plasma Science (ICOPS), 2023: IEEE, pp. 1-1.
5. C. YoungSciortino, J. Neuendank, L. T. Clark, H. Barnaby, D. Wilson, M. Spear, A. Privat, and M. J. Marinella, "TCAD Calibrated SEE Fault Model Validated with Beam Results for a 12nm D Flip-Flop," in 2022 22nd European Conference on Radiation and Its Effects on Components and Systems (RADECS), 2022: IEEE, pp. 1-6.
6. M. Spear, F. Al Mamun, J. Solano, H. J. Barnaby, and I. S. Esqueda, "Radiation-induced Enhancement of Scattering Effects in FD-SOI MOSFETs," in 2022 22nd European Conference on Radiation and Its Effects on Components and Systems (RADECS), 2022: IEEE, pp. 1-5.

7. J. Solano, M. Spear, T. Wallace, D. Wilson, O. Forman, I. S. Esqueda, H. Barnaby, A. Privat, M. Turowski, and R. Vonniederhauser, "Total Ionizing Dose Response of Commercial 22nm FD-SOI CMOS Technology," in 2022 IEEE Radiation Effects Data Workshop (REDW)(in conjunction with 2022 NSREC), 2022: IEEE, pp. 1-5.
8. J. Neuendank, M. Spear, T. Wallace, D. Wilson, J. Solano, G. Irumva, I. S. Esqueda, H. J. Barnaby, L. T. Clark, and J. Brunhaver, "Single event upset and total ionizing dose response of 12LP FinFET digital circuits," in 2022 IEEE Radiation Effects Data Workshop (REDW)(in conjunction with 2022 NSREC), 2022: IEEE, pp. 1-9.
9. A. R. Benedetto, C. Cook, M. J. Campola, S. Roark, A. Tender, and H. J. Barnaby, "Radiation-Induced Defects in BJTs on NASA ELDRS Space Experiment," in 38th Hardened Electronics and Radiation Technology (HEART) Conference, 2022.
10. A. Benedetto, H. Barnaby, C. Cook, M. J. Campola, and A. Tender, "In-Flight Demonstration of Enhanced-Low-Dose-Rate-Sensitivity (ELDRS) in Bipolar Junction Transistors," in 2022 IEEE Aerospace Conference (AERO), 2022: IEEE, pp. 1-6.
11. A. R. Benedetto, H. J. Barnaby, C. Cook, M. J. Campola, A. Tender, "Results from Enhanced Low Dose Rate Sensitivity (ELDRS) Experiment on the NASA Space Electronic Testbed Mission," 35th Annual Small Satellite Conference, Utah State University, Logan, UT, Aug. 7-12, 2021.
12. A. Benedetto, H. Barnaby, C. Cook, M. Campola, and A. Tender, "Results from Enhanced Low Dose Rate Sensitivity Experiment on the NASA Space Environment Testbed," in 2021 IEEE Radiation Effects Data Workshop (REDW)(in conjunction with 2020 NSREC), IEEE, pp. 1-5.
13. L. Heffern, A. Parsons, R. D. Starr, C. Hardgrove, E. Johnson, G. J. Stoddard, R. Blakeley, H. Barnaby, and T. H. Prettyman, "Active Interrogation of Analog Planetary Surfaces using Neutron and Gamma-Ray Instruments," AGU Fall Meeting Abstracts 2019, EP53F-2244
14. K. Muthuseenu, E. C. Hylin, H. J. Barnaby, P. Apsangi, M. N. Kozicki, G. Schlenvogt, and M. Townsend, "TCAD Model for Ag-GeSe 3-Ni CBRAM Devices," in 2019 International Conference on Simulation of Semiconductor Processes and Devices (SISPAD), September, 2019: IEEE, pp. 1-4.
15. L. Heffern, A. Parsons, R. D. Starr, C. Hardgrove, E. Johnson, G. J. Stoddard, R. Blakeley, H. Barnaby, and T. H. Prettyman, "Active Interrogation of Analog Planetary Surfaces using Neutron and Gamma-Ray Instruments," in AGU Fall Meeting 2019, 2019: AGU.
16. Z. Ye, R. Liu, H. J. Barnaby, and S. Yu, "Evaluation of Single Event Effects in SRAM and RRAM Based Neuromorphic Computing System for Inference," 2019 IEEE International Reliability Physics Symposium (IRPS), pp. 1-4, Mar. 2019.
17. Y. Gonzalez-Velo, A. Patadia, H. J. Barnaby, and M. N. Kozicki, "Impact of radiation induced crystallization on programmable metallization cell electrical characteristics and reliability," Faraday discussions, vol. 213, pp. 53-66, Feb. 2019.
18. B. Cambou, F. Afghah, D. Sonderegger, J. Taggart, H. Barnaby, and M. Kozicki, "Ag conductive bridge RAMs for physical unclonable functions," 2017 IEEE International Symposium on Hardware Oriented Security and Trust (HOST), 2017, pp. 151-151.
19. D. Mahalanabis, M. Sivaraj, W. Chen, S. Shah, H.J. Barnaby, M.N. Kozicki, J. Blain Christen, S. Vrudhula, "Demonstration of Spike Timing Dependent Plasticity in CBRAM Devices with Silicon Neurons," IEEE International Symposium on Circuits and Systems, Montreal, CA, May 23-25, 2016.
20. I. S. Esqueda, H. J. Barnaby, "Surface-Potential-Based Compact Modeling of BTI," IEEE International Reliability Physics Symposium, Pasadena, CA USA April 17-21, 2016.
21. K. Wolf, M. Ailavajhala, D. Tenne, H. Barnaby, M. Koziki, and M. Mitkova, "E-Beam Induced Effects in Ge-Se Based Redox Conductive Bridge Memory Devices and Thin Films," TMS2015 Supplemental Proceedings, pp. 567-574.

22. A. Mahmud, Y. Gonzalez-Velo*, M. Saremi, H. J. Barnaby, M. N. Kozicki, K. E. Holbert, M. Mitkova, T. L. Alford, M. Goryll, D. Mahalanabis, W. Yu, W. Chen, J. Taggart, "Optimization of Flexible Ag-Chalcogenide Glass Sensors for Radiation Detection," 15th European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 1-4, 2015
23. Y. Gonzalez-Velo, A. Mahmud, W. Chen, J. Taggart, H. J. Barnaby, M. N. Kozicki, M. Ailavajhala, K. E. Holbert, M. Mitkova, "TID Impact on Process Modified CBRAM Cells," 15th European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 1-4, 2015
24. A. Privat, L. Clark, H. J. Barnaby, "Transient Response Exploration of SRAM Cell Metastable States Caused by Ionizing Radiation with 3D Mixed Mode Simulation" 21st IEEE International Conference on Electronics Circuits and Systems, December 7-10, 2014 Marseille, France
25. M. N. Kozicki, H. Barnaby, M. Mitkova, Y. Gonzalez-Velo*, P. Dandamudi, M. Ailavajhala, K. E. Holbert, "Radiation tolerance of programmable metallization cell memory devices," Abstracts of Papers of the American Chemical Society, 2014.
26. M. Saremi, S. Rajabi, H. J. Barnaby, M. N. Kozicki, "The Effects of Process Variation on the Parametric Model of the Static Impedance Behavior of Programmable Metallization Cell (PMC)," MRS Proceedings, vol. 1692, pp. mrss14-1692-cc09-39, 2014.
27. M. Mitkova, M. Ailavajhala, Y. Gonzalez-Velo*, C. Poweleit, H. Barnaby, M. Kozicki, D. P. Butt, "New Functionality of Chalcogenide Glasses for Radiation Sensing of Nuclear Wastes," G16 CONFERENCE, p. 75, 2014.
28. Y. Gonzalez-Velo*, H. J. Barnaby, M. N. Kozicki, and K. Holbert, "Total-ionizing-dose effects on the impedance of silverdoped chalcogenide programmable metallization cells," IEEE Aerospace Conference, pp. 1-7, 2014
29. A. Edwards, H. Barnaby, P. Schultz, and A. Pineda, "Interface effects on calculated defect levels for oxide defects," APS Meeting Abstracts, p. 44010, 2014
30. I. S. Esqueda, H. J. Barnaby, "Defect-based compact model for circuit reliability simulation in advanced CMOS technologies," IEEE International Integrated Reliability Workshop Final Report, pp. 45-49, 2013
31. E. DeIonno, M. D. Looper, J. V. Osborn, H. J. Barnaby, W. M. Tong, "Radiation effects studies on thin film TiO₂ memristor devices," IEEE Aerospace Conference, pp. 1-8, 2013.
32. H. Barnaby, A. Edwards, D. Oleksy, M. Kozicki, "Finite element modeling of Ag transport and reactions in chalcogenide glass resistive memory," IEEE Aerospace Conference, pp. 1-10, 2013.
33. P. Dandamudi, H. J. Barnaby, M. N. Kozicki, Y. Gonzalez-Velo*, K. E. Holbert, "Total ionizing dose tolerance of the resistance switching of Ag-Ge₄₀SeO based Programmable Metallization Cells," 14th European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 1-4, 2013
34. M. Mitkova, M.S. Ailavajhala, D. P. Butt, Hugh Barnaby, Y. Gonzalez Velo*, C.D. Poweleit, M.N. Kozicki "New Functionality of Chalcogenide Glasses for Radiation Sensing of Nuclear Wastes" Proceedings of 3rd International Conference on Research Frontiers in Chalcogen Cycle Science & Technology, pp. 75-82, 2013
35. D. R. Oleksy, H. J. Barnaby, M. N. Kozicki, M. Mitkova, M. Ailavajhala, P. Chen, "Basic radiation effects mechanisms in chalcogenide-based nanoionic structures," GOMAC Proceedings, Orlando, FL, March 21-24, 2012.
36. B.J. Farahani, S. G. Krishna, S. Venkatesan, Z. Zhu, A. Kathuria, G. Gildenblat, H. J. Barnaby, "Wide-temperature high-resolution integrated data acquisition for spectroscopy in space," IEEE Aerospace Conference, pp. 1-11, 2011
37. J. Oiler, X. Qiu, J. Zhu, R. Tang, S. J. Chen, H. Huang, K. Holbert, H. Barnaby, H. Yu, "The sensitivity enhancement for the radiation sensor based on Film Bulk Acoustic-Wave Resonator," 16th International Solid-State Sensors, Actuators and Microsystems Conference (TRANSDUCERS), pp. 2058-2061, 2011

38. P. Chen, M. Ailavajhala, M. Mitkova, D. Tenne, I. S. Esqueda, H. Barnaby, "Structural study of Ag-Ge-S solid electrolyte glass system for resistive radiation sensing," IEEE Workshop on Microelectronics and Electron Devices (WMED), pp. 1-4, 2011.
39. I. S. Esqueda, H. J. Barnaby, P. C. Adell, "Modeling the effects of hydrogen on the mechanisms of dose rate sensitivity," 12th European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 1-6, 2011
40. I. S. Esqueda, H. J. Barnaby, "Modeling the non-uniform distribution of interface traps," 12th European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 15-19, 2011.
41. J. Oiler, X. Qiu, J. Zhu, Z. Wang, C. Yu, H. J. Barnaby, K. Holbert, H. Yu, "Film Bulk Acoustic-Wave Resonator Based Radiation Sensor," Proceedings of the 5th IEEE International Conference on Nano/Micro Engineered and Molecular Systems, January 20-23, Xiamen, China, pp. 967 – 970, 2010.
42. J. Tomas, S. Saighi, S. Renaud, J. Silver, H. J. Barnaby, "A conductance-based silicon neuron with membrane voltage dependent temporal dynamics," 8th IEEE International NEWCAS Conference, pp. 377 – 380. 2010.
43. X. J. Chen, H. J. Barnaby, J. H. Warner, S. R. Messenger, R. J. Walters, S. A. Ringel, J. Park, "Non-linear behaviors of dark current slope in P+N GaAs solar cells following proton irradiations," 2009 34th IEEE Photovoltaic Specialists Conference (PVSC), June 7-12 2009, pp 1565 – 1570.
44. W. Chen, T. Copani, H. J. Barnaby, S. Kiaei, "A 14-GHz CMOS receiver with local oscillator and IF bandpass filter for satellite applications," 2009 IEEE Radio Frequency Integrated Circuits Symposium, June 7-9 2009 pp. 123 – 126.
45. M. L. McLain, H. J. Barnaby, I.S. Esqueda, J. Oder, B. Vermeire, "Reliability of high performance standard two-edge and radiation hardened by design enclosed geometry transistors," IEEE International Reliability Physics Symposium Proceedings, April 26-30 2009, pp. 174 – 179.
46. S. Goswami, J. Silver, T. Copani, W. Chen, H. J. Barnaby, B. Vermeire, S. Kiaei, "A 14mW 5Gbps CMOS Trans-impedance Amplifier with Gain-Reuse Regulated Cascode Compensation for Parallel Optical Interconnects," IEEE International Solid-State Circuits Conference, Digest of Technical Papers, February 8-12 2009, pp 100 – 101.
47. I. S. Esqueda, H. J. Barnaby, K. E. Holbert, F. E. Mamouni, R. D. Schrimpf, "Modeling of ionizing radiation-induced degradation in multiple gate field effect transistors," 2009 European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 2-6, 2009.
48. H. J. Barnaby, M. L. McLain, I. S. Esqueda, and X. J. Chen, "Modeling Ionizing Radiation Effects in Solid State Materials and CMOS Devices," IEEE Custom Integrated Circuits Conference (CICC), September 2008, pp. 273 – 280.
49. T. Copani, B. Vermeire, A. Jain, H. Karaki, K. Chandrashekar, S. Goswami, H. H. Chung, I. Deligoz, B. Bakkaloglu, H. Barnaby, and S. Kiaei, "A fully integrated pulsed-LASER time-of-flight measurement system with 12ps single-shot precision", IEEE Custom Integrated Circuits Conference (CICC), September 2008, pp. 359 – 362.
50. S. Goswami, T Copani, B. Vermeire, H. J. Barnaby, "BW extension in shunt feedback transimpedance amplifiers using negative miller capacitance," IEEE International Symposium on Circuits and Systems, May 2008, pp 61 – 64.
51. X. J. Chen, H. J. Barnaby, R. L. Pease, P. C. Adell, "Behavior of radiation-induced defects in bipolar oxides during irradiation and annealing in hydrogen-rich and –depleted ambients," 2008 IEEE International Reliability Physics Symposium Proceedings, April 2008, pp. 115 - 120.
52. M. L. McLain, H. J. Barnaby, P. C. Adell, "Analytical model of the radiation response in FDSOI MOSFETs," 2008 IEEE International Reliability Physics Symposium Proceedings, April 2008, pp. 643 - 644.

53. S. Goswami, T Copani, A Jain, H Karaki, B. Vermeire, H. J. Barnaby, G. Fetzner, R. Vercillo, S. Kiaei, "A 96Gb/s throughput transceiver for short distance parallel optical links," 2008 IEEE International Solid-State Circuits Conference, Digest of Technical Papers, February 2008, pp 230 – 231.
54. N. Gupta, B. Vermeire, H. Barnaby, M. Goksel, E. Li, D. Czajkowski, "Design of a 1 Gb Radiation Hardened NAND flash memory," Non-Volatile Memory Technology Symposium, November 2007, pp.10 – 14.
55. E. Mikkola, B. Vermeire, T. Chiu, H. Barnaby, H. G. Parks, "Total dose radiation effect simulations on a high-precision data acquisition system," 2007 European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 1-6, 2007.
56. P. C. Adell, S. McClure, R. L. Pease, B. G. Rax, G. W. Dunham, H. J. Barnaby, X. J. Chen, "Impact of hydrogen contamination on the total dose response of linear bipolar microcircuits," 2007 European Conference on Radiation and Its Effects on Components and Systems (RADECS), pp. 1-8, 2007.
57. W. Chen, T Copani, H. J Barnaby, S. Kiaei, "A 0.13- μm CMOS Ultra-Low Power Front-End Receiver for Wireless Sensor Networks," 2007 IEEE Radio Frequency Integrated Circuits (RFIC) Symposium, June 2007 Page(s):105 – 108.
58. M. McLain, M. Campola, I. S. Esqueda, H. J. Barnaby, "Modeling "dog bone" gate geometry in n-channel MOSFETs," 8th European Conference on Radiation and Its Effects on Components and Systems, 2005 RADECS, September 2005, PJ201 – PJ2-6.
59. J. Yan, H.J. Barnaby, B. Vermeire, T. Peterson, F. Shadman; "Test structures for analyzing mechanisms of wafer chemical contaminant removal", Proc. IEEE 2002 Int. Conference on Microelectronic Test Structures, March 2003, pp. 209-213,
60. D. R. Ball, H. J. Barnaby, and R. D. Schrimpf, "Analysis of proton radiation damage in bipolar transistors using gate control," GOMAC 2002 Digest of Papers, 2002.
61. 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," GOMAC 2002 Digest of Papers, 2002.
62. H.J. Barnaby, R. D. Schrimpf, K. F. Galloway, D. R. Ball, R. L. Pease, and P. Fouillat, "Test structures for analyzing radiation effects in bipolar technologies," Proc. IEEE 2002 Int. Conference on Microelectronic Test Structures, vol. 15, pp. 197-200, 2002.
63. X. Hu, B. K. Choi, H. J. Barnaby, D. M. Fleetwood, R. D. Schrimpf, S. C. Lee, S. Shojah-Ardalan, R. Wilkins, U. K. Mishra, and R. Dettmer, "The energy dependence of proton-induced degradation in AlGaIn/GaN high electron mobility transistors," RADECS2002 Workshop Proc., pp. 17-20, 2002.
64. E. Mikkola, B. Vermeire, H.G. Parks, H. J. Barnaby, and D. Goodman, "Prognostic cells for total dose ionizing radiation," RADECS2002 Workshop Proc., pp. 235-238, 2002.
65. Y. Deval; H. Lapuyade; P. Fouillat; H. Barnaby; F. Darracq; R. Briand; D. Lewis; R. D. Schrimpf; "Evaluation of a design methodology dedicated to dose-rate-hardened linear integrated circuits," 6th European Conference on Radiation and Its Effects on Components and Systems, September 2001, pp. 237 - 242.
66. A.L. Sternberg, L.W. Massengill, R.D. Schrimpf, Y. Boulghassoul, H. J. Barnaby, S. Buchner, R.L. Pease, J.W. Howard, "Effect of amplifier parameters on single-event transients in an inverting operational amplifier," 6th European Conference on Radiation and Its Effects on Components and Systems, September 2001, pp. 398 - 404.
67. H.J. Barnaby, C.R. Cirba, R.D. Schrimpf, K.F. Galloway, M. Pagey, R. Milanowski, "A two dimensional engineering model for radiation-induced interface trap formation," GOMAC 2000 Digest of Papers, pp. 613 - 616.

68. H.J. Barnaby, C.R. Cirba, Steve Kosier, P. Fouillat, X. Montagner, R.D Schrimpf, "Modeling BJT radiation response with non-uniform energy distributions of interface traps," Proc. Radiation and Its Effects on Components and Systems, 1999, pp. 75 – 79.
69. H.J. Barnaby, C.R. Cirba, R.D. Schrimpf, K.F. Galloway, M. Pagey, R. Milanowski, "A two dimensional engineering model for radiation-induced interface trap formation," GOMAC 1998 Digest of Papers, pp. 585 - 588.
70. R.J. Milanowski, L.W. Massengill, R.D. Schrimpf, R. Graves, H.J. Barnaby, K.F. Galloway, M. Pagey, C. Nicklaw, J. Johann, "Radiation hardened technology computer aided design," GOMAC 1998 Digest of Papers, pp. 573 - 577.
71. H.J. Barnaby, R.D. Schrimpf, D.M. Fleetwood, S. L. Kosier, "The effects of emitter-tied field plates on lateral PNP ionizing radiation response," Proceedings of the 1998 Bipolar/BiCMOS Circuits Technology Meeting, pp. 35-38.

National Conference Presentations

1. Z. Giorno, J. Neuendank, F. Al Mamun¹, C. Acosta¹, P. Muscat, J. Chen, N. Bonfiglio, H. J. Barnaby, D. Loveless, M. Turowski, E. Mikkola, Mohamed Nour, Usman Suriono, M. Chambers, S. Kosier, "Investigating Cryogenic and Radiation-Induced Performance Variations in 90 nm NMOS Devices, 2024 HEART Conference, Huntsville, AL, April 2024.
2. T. Wallace, M. Spear, A. Privat, J. Neuendank, G. Irumva, D. Wilson, I. Sanchez Esqueda, H. J. Barnaby, M. Turowski, E. Mikkola, D. Hughart, M. J. Marinella, A. Gutierrez, R. Von Niederhausern, S. Holloway, D. Beltran, J. L. Taggart, "Layout Dependence of Total Ionizing Dose Effects on 12-nm Bulk FinFET Digital Structures," IEEE Nuclear and Space Radiation Effects Conference, Provo, UT, Jul. 18-22, 2022.
3. M. Spear, H. J. Barnaby, T. Wallace, J. Solano, O. Forman, D. Wilson, I. Sanchez Esqueda, A. Privat, M. Turowski, R. Von Niederhausern, "Non-linear Coupling Effects in Fully Depleted SOI Transistors," IEEE Nuclear and Space Radiation Effects Conference, Provo, UT, Jul. 18-22, 2022.
4. P. Apsangi, S. Roark, A. Privat, , H. J. Barnaby, H.P. Hjalmarson, K. Muthuseenu, K. E. Holbert, "Correlating percent in-package hydrogen to hydrogen concentration in oxide after ionizing radiation exposure," IEEE Nuclear and Space Radiation Effects Conference, Provo, UT, Jul. 18-22, 2022.
5. X. Han, M. Spear, J. Seo, D. Wilson, T. Wallace, O. Forman, J. Solano, M. Turowski, M. Marinella, H. J. Barnaby, "Total Ionizing Dose Effects in FDSOI SRAM-Based XNOR IMC Synaptic Array," IEEE Nuclear and Space Radiation Effects Conference, Provo, UT, Jul. 18-22, 2022.
6. C. YoungSciortino, J. Neuendank, L. T. Clark, H. Barnaby, D. Wilson, M. Spear, A. Privat M. J. Marinella, "TCAD Calibrated SEE Fault Model Validated with Beam Results for a 12nm D Flip-Flop," European Conference on Radiation and Its Effects on Components and Systems (RADECS), Venice, IT, Oct 3-7, 2022.
7. M. Spear, H. J. Barnaby, F. Mamun, J. Solano, I. Sanchez Esqueda, "Radiation-induced Enhancement of Scattering Effects in FD-SOI MOSFETs," European Conference on Radiation and Its Effects on Components and Systems (RADECS), Venice, IT, Oct 3-7, 2022.
8. J. Neuendank, M. Spear, T. Wallace, D. Wilson, J. Solano, G. Irumva, I. S. Esqueda, H. J. Barnaby, L. T. Clark, and J. Brunhaver, "Single Event Upset Response of 12LP FinFET Digital Circuit," Single Event Effects Symposium, La Jolla, CA, 2022.
9. A. R. Benedetto, C. Cook, M. J. Campola, S. Roark, A. Tender, H. J. Barnaby, "Radiation-Induced Defects in BJTs on NASA ELDRS Space Experiment," 38th Hardened Electronics and Radiation Technology (HEART) Conference, Tarrytown, NY, March 7-11, 2022.

10. D. Wilson, M. Spear, T. Wallace, G. Irumva, J. Neuendank, I. Sanchez Esqueda, H. J. Barnaby, A. Privat, M. Turowski, E. Mikkola, D. Hughart, Manuel, G. Vizkelethy, M. King, M. J. Marinella, "Total Ionizing Dose and Single Event Effects on 12-nm bulk FinFETs," 38th Hardened Electronics and Radiation Technology (HEART) Conference, Tarrytown, NY, March 7-11, 2022.
11. A. Benedetto, H. Barnaby, C. Cook, M. Campola, and A. Tender, "BJTs in Space: ELDRS Experiment on NASA Space Environment Testbed," IEEE Nuclear and Space Radiation Effects Conference Data Workshop, online event, July. 17-23, 2021.
12. H. Barnaby, "First Results from BJT Enhanced Low Dose Rate Sensitivity (ELDRS) Experiment on NASA Space Electronic Testbed," Microelectronics Reliability & Qualification Workshop (MRQW), Virtual Event, Feb. 9-11, 2021
13. H. J. Barnaby, A. Benedetto, C. Cook, M. Campola, "Latest Results from BJT Enhanced Low Dose Rate Sensitivity (ELDRS) Experiment on NASA Space Electronic Testbed," 2nd International Electronic Conference - Radiation Effects in Electronics, online, Oct. 22, 2021.
14. A. Privat, H. Barnaby, L. Clark, J. Brunhaver, D. Alen, K. Holbert, M. McLain, M. Marinella, and M. King, "Evidence of Interface trap build-up irradiated 14nm Bulk FinFET Technologies," IEEE Nuclear and Space Radiation Effects Conference, Santa Fe, NM, Dec. 1-4 (virtual), 2020.
15. P. Apsangi, H. J. Barnaby, N. Chamele, Y. Gonzalez-Velo, K. Holbert, M. N. Kozicki, "Impact of Total Ionizing Dose on Analog Synaptic Characteristics of CBRAM," IEEE Nuclear and Space Radiation Effects Conference, Santa Fe, NM, Dec. 1-4 (virtual), 2020.
16. X. Han, A. Privat, K. Holbert, J. Seo, H. J. Barnaby, S. Yu, Total Ionizing Dose Effects on Multi-state HfOx-based RRAM Synaptic Arrays," IEEE Nuclear and Space Radiation Effects Conference, Santa Fe, NM, Dec. 1-4 (virtual), 2020.
17. M. Cannon, A. Rodrigues, D. Black, J. Black, L. Bustamante, B. Feinberg, M. McLain, S. Aggarwal, M. Marinella, L. Clark, J. Brunhaver, H. Barnaby, "Multiscale System Modeling of Single Event Induced Faults in Advanced Node Processors," IEEE Nuclear and Space Radiation Effects Conference, Santa Fe, NM, Dec. 1-4 (virtual), 2020.
18. M. G. Esposito, J. E. Manuel, T. Xiao, A. Privat, D. Garland, E. Bielejec, G. Vizkelethy, J. Dickerson, J. Brunhaver, A. A. Talin, M. P. K. S. Member, H. Barnaby, M. McLain, and M. J. Marinella, "Investigating Heavy Ion Effects on 14nm-Process FinFETs: Displacement Damage Versus Total Ionizing Dose," IEEE Nuclear and Space Radiation Effects Conference, Santa Fe, NM, Dec. 1-4 (virtual), 2020.
19. K. Muthuseenu, H. J. Barnaby, A. Patadia, K. Holbert, and A. Privat, "Ionizing Radiation Tolerance of Stacked Si₃N₄-SiO₂ Gate Insulators for Power MOSFETs," IEEE Nuclear and Space Radiation Effects Conference, San Antonio, TX, July 8-12, 2019.
20. A. Privat, H. Barnaby, B. Tolleson, M. Kiraneswar, P. Adell, "Temperature Response on NPN and PNP Bipolar Junction Transistors after Total Ionizing Dose Irradiation Exposure," European Conference on Radiation and Its Effects on Components and Systems (RADECS), Montpellier, FR, September 16-20, 2019.
21. A. Privat, P. Davis, H. Barnaby, P. Adell, "Total Dose Effects on Negative and Positive Low-Dropout Linear Regulators," European Conference on Radiation and Its Effects on Components and Systems (RADECS), Montpellier, FR, September 16-20, 2019.
22. Z. Ye, R. Liu, J. Taggart, H. Barnaby, and S. Yu, "Evaluation of Radiation Effects in RRAM based Neuromorphic Computing System for Inference," IEEE Nuclear and Space Radiation Effects Conf., Kona, HI., July 2018.
23. Taggart, J, Jacobs-Gedrim, RB, McLain, ML, Barnaby, HJ, Bielejec, ES, Hardy, W, Marinella, MJ, Kozicki, MN and Holbert, K., "Failure Thresholds in CBRAM Due to Total Ionizing Dose and Displacement Damage Effects," IEEE Nuclear and Space Radiation Effects Conf., Kona, HI., July 2018.

24. Privat, A, Barnaby, HJ, Adell, PC, Tolleson, BS, Wang, Y, Han, X, Davis, P, Rax, BR and Buchheit, TE "Multi-scale Modeling of Total Ionizing Dose Effects in Commercial-off-the shelf Parts in Bipolar Technologies," IEEE Nuclear and Space Radiation Effects Conf., Kona, HI., July 2018.
25. Jacobs-Gedrim, RB, Hughart, DR, Agarwal, S, Vizkelethy, G, Bielejec, ES, Vaandrager, BL, Swanson, SE, Knisely, KE, Taggart, JL and Barnaby, HJ, "Training a Neural Network on Analog TaOx RRAM Devices Irradiated with Heavy Ions: Effects on Classification Accuracy Demonstrated with CrossSim," IEEE Nuclear and Space Radiation Effects Conf., Kona, HI., July 2018.
26. J. L. Taggart, W. Chen, Y. Gonzalez-Velo, H. J. Barnaby, K. Holbert, M. N. Kozicki, "In Situ Synaptic Programming of Cu-SiO₂ CBRAM in a TID Environment," IEEE Nuclear and Space Radiation Effects Conference, New Orleans, LA, July 17-21, 2017.
27. A. Mahmud, Y. Gonzalez-Velo, H. J. Barnaby, J. Aberle, S. Moallemi, J. Kitchen, C. Birtcher, K. Hilgers, T. Eller, K. Holbert, A. Raman, D. E. Thomas, R. Arslanbekov, K. Bhatt, "A Novel Passive Wireless Total Dose Dosimeter," IEEE Nuclear and Space Radiation Effects Conference, New Orleans, LA, July 17-21, 2017.
28. B. S. Tolleson, P. C. Adell, H. J. Barnaby, A. Privat, X. Han, A. Mahmud, "Improved Model for Excess Base Current in Irradiated Bipolar Junction Transistors," European Conference on Radiation and Its Effects on Components and Systems (RADECS), Venice, IT, Oct 3-7, 2022. Geneva, SWITZ October 2-6, 2017.
29. X. Li, J. Yang, C. Liu, D. M. Fleetwood, H. J. Barnaby, K. F. Galloway, "Hydrogen Soaking and Displacement Damage Effects in Gated Lateral Bipolar Junction Transistors," European Conference on Radiation and Its Effects on Components and Systems (RADECS), Venice, IT, Oct 3-7, 2022. Geneva, SWITZ October 2-6, 2017.
30. A. Mahmud, Y. Gonzalez-Velo, H. J. Barnaby, J. Aberle, S. Moallemi, J. Kitchen, C. Birtcher, K. Hilgers, T. Eller, K. Holbert, A. Raman, D. E. Thomas, R. Arslanbekov, K. Bhatt, "A Novel Passive Wireless Total Dose Dosimeter," IEEE Nuclear and Space Radiation Effects Conference, New Orleans, LA, July 17-21, 2017.
31. J. L. Taggart, G. J. Schlenvogt, H. J. Barnaby, M. N. Kozicki, "Evolution of the Intrinsic Electric Field in Programmable Metallization Cell with Increasing Generation Rate," HEART Conference, Chantilly, VA, April 2016.
32. M. Balaban, W. Chen, H. Barnaby, M. N. Kozicki, "Effects of Annealing Temperature on the Performance of W-SiO₂-Cu PMC Devices," MRS Spring Meeting, Phoenix, AZ, 2016.
33. W. Yu, R. Fang, H. Barnaby, M. Kozicki, "A Novel Low-Voltage Variable Capacitor Based on Dendritic Filaments," MRS Spring Meeting, Phoenix, AZ, 2016.
34. K. Wolf, G. Belev, M. Ailavajhala, D. Tenne, H. Barnaby, M. N. Kozicki, M. Mitkova, "Low and High Intensity X-rays Induced Effects in Ge-Se Glasses and Programmable Metallization Cell (PMC) Devices Based on Them," Third International Conference on Radiation and Applications in Various Fields of Research, Budva, Montenegro, June 8-12, 2015.
35. K. Wolf, M. Ailavajhala, D. Tenne, H. Barnaby, M. N. Kozicki, M. Mitkova, "Radiation Effects in Chalcogenide Glass – Silver Systems and Nanoionic Devices Based on Such Systems," Amorphous and Nanocrystalline Chalcogenides 7, Cluj, Romania, June 5-10, 2015.
36. W. Chen, R. Fang, Y. Gonzalez Velo*, A. Belmonte, H. Barnaby, M. Kozicki, "Impedance Spectroscopy of Cu-SiO₂ Based Programmable Metallization Cells," 57th Electronic Materials Conference, Columbus, OH, June 24-26, 2015.
37. D. Mahalanabis, H. J. Barnaby, M. N. Kozicki, E. Deionno, A. Mahmud, M. Kay, "Analysis of Single Event Upset Susceptibility in CBRAM 1T-1R Memory," IEEE Nuclear and Space Radiation Effects Conf., Boston, MA., July 2015.

38. W. Chen, H. J. Barnaby, M. N. Kozicki, Y. Gonzalez-Velo*, R. Fang, W. Yu, S. Yu, K. Holbert, "A Study of Gamma-ray Exposure of Cu-SiO₂ Programmable Metallization Cells," IEEE Nuclear and Space Radiation Effects Conf., Boston, MA., July 2015.
39. P. C. Adell, I. S. Esqueda, H. J. Barnaby, B. G. Rax, "Hydrogen Limits for Total Dose and Dose Rate Response," IEEE Nuclear and Space Radiation Effects Conf., Boston, MA., July 2015.
40. J. L. Taggart, M. L. McLain, H. J. Barnaby, M. N. Kozicki, "Combined Neutron/Gamma-Ray Effects in Ag-Ge₃₀Se₇₀ Based Programmable Metallization Cells," HEART Conference, Chantilly, VA, April 2015.
41. H. J. Barnaby, C. Nicklaw, "New Model for Simulating Impact of NBTI on Single Event Transient Propagation," Single Event Effects Symposium, San Diego, CA, 2014.
42. M. Saremi, S. Rajabi, H. J. Barnaby, "Comparison of Single Event Transients in Ground-Plane (GP)-FinFETs vs. SOI-FinFETs," Single Event Effects Symposium, San Diego, CA, 2014.
43. P. Dandamudi, A. Mahmud, M. N. Kozicki, Y. Gonzalez-Velo*, H. J. Barnaby, B. Roos, T. L. Alford, M. Ailavajhala, M. Mitkova, and K. E. Holbert, "Flexible Sensors based on Radiation-Induced Diffusion of Silver in Ge₂₀Se₈₀ Chalcogenide Glass," IEEE Nuclear and Space Radiation Effects Conf., Paris, FR., July 2014.
44. J. L. Taggart, Y. Gonzalez-Velo*, D. Mahalanabis, A. Mahmud, H. J. Barnaby, M. N. Kozicki, K. Holbert, M. Mitkova, K. Wolf, E. DeIonno, I. A. L. White, "Ionizing radiation effects on non-volatile memory properties of programmable metallization cells," IEEE Nuclear and Space Radiation Effects Conf., Paris, FR., July 2014.
45. D. Mahalanabis, H. J. Barnaby, M. N. Kozicki, S. Rajabi, "Investigation of Single Event Induced Soft Errors in 1T1R PMC Memory," IEEE Nuclear and Space Radiation Effects Conf., Paris, FR., July 2014.
46. T. Nichol, D. Tenne, P. Miranda, H. J. Barnaby, M. N. Kozicki, D. Butt, and M. Mitkova, "Structural and material changes in chalcogenide glasses under Ion irradiation " IEEE Nuclear and Space Radiation Effects Conf., Paris, FR., July 2014.
47. M. S. Ailavajhala, Y. Gonzalez-Velo*, C. Poweleit, H. Barnaby, M. N. Kozicki, K. Holbert, D. P. Butt, and M. Mitkova, "Gamma radiation induced effects in floppy and rigid Ge-containing chalcogenide thin films," International Conference on Amorphous and Nanocrystalline Semoconductors (ICANS 25), Toronto, CA, 2013.
48. M. S. Ailavajhala, Y. G. Velo, K. Holbert, H. Barnaby, M. Kozicki, D. P. Butt, M. Mitkova, "Experimental and modeling approach to studying silver diffusion under gamma radiation" MRS Spring Meeting San Francisco, CA, 2014.
49. M. N. Kozicki, H. J. Barnaby, M. Mitkova, Y. Gonzalez-Velo*, P. Dandamudi, M. Ailavajhala, and K. Holbert, "Radiation tolerance of Programmable Metallization Cell memory devices," American Chemical Society Spring Meeting, Dallas, TX, 2014.
50. M. Saremi, S. Rajabi, H. J. Barnaby, M. N. Kozicki, "The effects of process variation on the parametric model of the static impedance behavior of programmable metallization cell (PMC)," MRS Spring Meeting, San Francisco, CA, 2014.
51. K. Wolf, D. Tenne, H. J. Barnaby, M. N. Kozicki, and M. Mitkova, "Influence of electron-beam on performance of chalcogenide based memristors," MRS Spring Meeting, San Francisco CA, 2014.
52. M. Mitkova, P. Chen, M. Ailavajhala, D. P. Butt, D. A. Tenne, H. Barnaby, I.S. Esqueda, "Gamma Ray Induced Structural Effects in Bare and Ag Doped Ge-S Thin Films for Possible Sensor Applications," 18th International Symposium on Non-Oxide and New Optical Glasses ISNOG, Saint Malo, France, July 1-5, 2013.

53. Mahesh Ailavajhala, Hugh Barnaby, Y. Gonzalez-Velo*, Maria Mitkova, Darryl Butt. "Application of Ion Transport in Chalcogenide Glasses for Radiation Sensing," International Material Institute- New Functionality of Glasses (IMI-NFG), Siracusa, Italy (January 12, 2013) (Best Poster Award).
54. M. Mitkova, M. Ailavajhala, Y. Gonzales-Velo*, C.D. Powelait, H. J. Barnaby, M. N. Kozicki, D.P. Butt, "New Functionality of Chalcogenide Glasses for Radiation Sensing of Nuclear Wastes" 3rd International Conference on Research Frontiers in Chalcogenide Cycle Science and Technology, Delft, The Netherlands, 27-28 May 2013.
55. M. S. Ailavajhala, P. Chen, M. Mitkova, D. P. Butt, D. Olesky, Y. Gonzalez-Velo*, H. Barnaby, "Dependence of the Structure on Performance of Chalcogenide Glass Based Radiation Sensors," IEEE Workshop on Microelectronics and Electron Devices (WMED), pp. 1-2. 2012
56. Mahesh Ailavajhala, Ping Chen, Dmitri Tenne, Hugh Barnaby, Yago G. Velo*, Maria Mitkova, Darryl Butt. "Simulation and Structural Analysis of Gamma Radiation Induced Ag Diffusion in Ge-Se Thin Films and Devices." MRS Spring Meeting, San Francisco, CA, 2013.
57. G. J. Schlenvogt, H. J. Barnaby, J. Wilkinson, S. Morrison, L. Tyler, "Simulation of TID Effects in a High Voltage Ring Oscillator," IEEE Nuclear and Space Radiation Effects Conf., San Francisco, CA., July 2013.
58. J. D. Gleason, H. J. Barnaby, M. L. Alles, G. J. Schlenvogt, "Expanded Transient Junction Photocurrent Modeling with a Variable Impedance Equivalent Circuit," IEEE Nuclear and Space Radiation Effects Conf., San Francisco, CA., July 2013.
59. P. Dandamudi, M. N. Kozicki, H. J. Barnaby, Y. Gonzalez-Velo*, M. Mitkova, K. E. Holbert, M. Ailavajhala, W. Yu, "Sensors Based on Radiation-Induced Diffusion of Silver in Germanium Selenide Glasses," IEEE Nuclear and Space Radiation Effects Conf., San Francisco, CA., July 2013.
60. A. H. Edwards, H. Barnaby, A. C. Pineda, P. A. Schultz, "Interface Effects on Total Energy Calculations for Radiation-Induced Defects," IEEE Nuclear and Space Radiation Effects Conf., San Francisco, CA., July 2013.
61. Y. Gonzalez-Velo*, H. J. Barnaby, M. N. Kozicki, P. Dandamudi, A. Chandran, K. E. Holbert, M. Mitkova, M. Ailavajhala, "Total-Ionizing-Dose Effects on the Resistance Switching Characteristics of Chalcogenide Programmable Metallization Cells," IEEE Nuclear and Space Radiation Effects Conf., San Francisco, CA., July 2013.
62. H. Barnaby, M. Kozicki, D. Oleksy, Arthur Edwards, "Finite Element Modeling of Ag Transport and Reactions in Chalcogenide Glass Resistive Memory." APS March Meeting, Baltimore MD (2013).
63. M. N. Kozicki, H. J. Barnaby, "Electrochemical Resistive Memory: Basic Mechanisms and Modeling," Microelectronics Reliability and Qualification Workshop, Los Angeles, CA, December 2012.
64. Y. Gonzalez-Velo*, H. J. Barnaby, A. Chandran, D. R. Oleksy, P. Dandamud, M. N. Kozicki, K. E. Holbert, M. Mitkova, M. Ailavajhala, P. Chen, "Effects of Cobalt-60 Gamma-Rays on Ge-Se Chalcogenide Glasses and Ag/Ge-Se Test Structure ," IEEE Nuclear and Space Radiation Effects Conf., Miami, FL, July 2012.
65. P. C. Adell, I. S. Esqueda, H. J. Barnaby, B. Rax, A. H. Johnston, "Impact of Low Temperatures (< 125 K) on the Total Ionizing Dose Response and ELDRS in Gated Lateral PNP BJTs," IEEE Nuclear and Space Radiation Effects Conf., Miami, FL, July 2012.
66. J. D. Gleason, H. J. Barnaby, "Transient Radiation-Induced Capacitance Variation in Silicon PN Junctions, 2012 Single Event Effects Symposium, San Diego, CA, 2012.
67. G. J. Schlenvogt, H. J. Barnaby, J. D. Rollins, J. Wilkinson, S. Morrison, L. Tyler, "Characterization and Modeling of Parasitic Field-Oxide Transistors for Use in Radiation Hardening by Design," IEEE Nuclear and Space Radiation Effects Conf., Las Vegas, NV, July 2011.

68. I.S. Esqueda, H.J. Barnaby, P.C. Adell, B.G. Rax, H. P. Hjalmarson, M.L. McLain, R.L. Pease, "Modeling Low Dose Rate Effects in Shallow Trench Isolation Oxides," IEEE Nuclear and Space Radiation Effects Conf., Las Vegas, NV, July 2011.
69. H.J. Barnaby, S. Malley, M. Land, S. Charnicki, A. Kathuria, B. Wilkens, E. DeIonno, W. Tong, "Impact of Alpha Particles on the Electrical Characteristics of TiO₂ Memristors," IEEE Nuclear and Space Radiation Effects Conf., Las Vegas, NV, July 2011.
70. I. S. Esqueda, H. J. Barnaby, K. E. Holbert, Y. Boulghassoul, "Modeling Inter-device Leakage in 90 nm Bulk CMOS Devices," 2011 RADECS, Sevilla, Spain, September 2011.
71. H. J. Barnaby, J. Sochacki, "Total Ionizing Dose Radiation Effects in a Commercial 45 nm Partially Depleted Silicon-On-Insulator Technology," 2011 HEART Conference, Orlando, FL, March 28 – April 1, 2011.
72. H. J. Barnaby, M. Alles, "Analytical Model for Transient Radiation Effects in Floating Body SOI Transistors. 2011 Single Event Effects Symposium, San Diego, Ca, 2011.
73. I. S. Esqueda, W. Wu, H. J. Barnaby, G. Gildenblat, "Modeling of Ionizing Radiation Effects in CMOS Devices Using PSP Surface-Potential-Based Compact Model," IEEE Nuclear and Space Radiation Effects Conf., Denver, Co., July 2010.
74. G. J. Schlenvogt, H. J. Barnaby, I. S. Esqueda, K. E. Holbert, J. Wilkinson, S. Morrison, L. Tyler, "Failure Analysis and Radiation-Enabled Circuit Simulation of a Dual Charge Pump Circuit," IEEE Nuclear and Space Radiation Effects Conf., Denver, Co., July 2010.
75. I. S. Esqueda, H. J. Barnaby, M. L. McLain, P. C. Adell, F. E. Mamouni, S. K. Dixit, R. D. Schrimpf, W. Xiong, "Modeling the Radiation Response of Fully-Depleted SOI n-Channel MOSFETs," IEEE Nuclear and Space Radiation Effects Conf., Quebec City, CA., July 2009.
76. 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, S. T. Pantelides, "The Effects of Aging and Hydrogen on the Radiation Response of Gated Lateral PNP Transistors," IEEE Nuclear and Space Radiation Effects Conf., Quebec City, CA., July 2009.
77. P. C. Adell, R. L. Pease, H. J. Barnaby, B. Rax, X. J. Chen, S. S. Mclure, "Irradiation with Molecular Hydrogen as an Accelerated Total Dose Hardness Assurance Test Method for Bipolar Linear Circuits," IEEE Nuclear and Space Radiation Effects Conf., Quebec City, CA., July 2009.
78. X. J. Chen, H. J. Barnaby, P. Adell, R. L. Pease, B. Vermeire, K. E. Holbert, "Modeling the Dose Rate Response and the Effects of Hydrogen in Bipolar Technologies," IEEE Nuclear and Space Radiation Effects Conf., Quebec City, CA., July 2009.
79. N. Rezzak, M. L. Alles, R. D. Schrimpf, S. Kalemeris, L. W. Massengill, J. Sochacki, H. J. Barnaby, "The sensitivity of radiation-induced leakage to STI topology and sidewall doping," IEEE Nuclear and Space Radiation Effects Conf., Quebec City, CA., July 2009.
80. M. L. McLain, H. J. Barnaby, K. E. Holbert, "Modeling Ionizing Radiation Effects in Shallow Trench Isolation Field Oxide FETs," IEEE Nuclear and Space Radiation Effects Conf., Quebec City, CA., July 2009.
81. G.K. Siddhartha, H. J. Barnaby, B. Vermeire, "Single Event Transients in Switched Capacitor Circuits," Single Event Effects Symposium, Long Beach, CA, April, 2009.
82. M. L. McLain, H. J. Barnaby, H. L. Hughes, P. J. McMarr, "Effects of Channel Implant Variation on Radiation-Induced Edge Leakage Currents in n-Channel MOSFETs," 2008 HEART Conference, Albuquerque, March 2009.
83. X. J. Chen, H. J. Barnaby, B. Vermeire, K. E. Holbert, D. Wright, R. L. Pease, R. D. Schrimpf, D. M. Fleetwood, S. T. Pantelides, M. R. Shaneyfelt, P. Adell, "Post-irradiation Annealing Mechanisms of

- Defects Generated in Hydrogenated Bipolar Oxides,” IEEE Nuclear and Space Radiation Effects Conf., Tucson, Az., July 2008.
84. R. L. Pease, P. C. Adell, B. Rax, X. J. Chen, H. J. Barnaby, K. Holbert, H. P. Hjalmarson, “The Effects of Hydrogen on the Enhanced Low Dose Rate Sensitivity (ELDRS) of Bipolar Linear Circuits,” IEEE Nuclear and Space Radiation Effects Conf., Tucson, Az., July 2008.
 85. M. L. McLain, H. J. Barnaby, K. E. Holbert, L. T. Clark, Radiation Induced Inter-Device Leakage Current in 90 nm Bulk CMOS Devices and Circuits,” IEEE Nuclear and Space Radiation Effects Conf., Tucson, Az., July 2008.
 86. F. E. Mamouni, S. K. Dixit, R. D. Schrimpf, P. C. Adell, I. S. Esqueda, M. L. McLain, H. J. Barnaby, S. Cristoloveanu, W. Xiong, “Gate-Length and Drain-Bias Dependence of Band-To-Band Tunneling-Induced Drain Leakage in Irradiated Fully Depleted SOI Devices,” IEEE Nuclear and Space Radiation Effects Conf., Tucson, Az., July 2008.
 87. N. Gupta, B. Vermeire, H. J. Barnaby, M. Goksel, E. Li, D. Czajkowski, “Design of a 4 Gb Radiation Hardened NAND Flash Memory,” Single Event Effects Symposium, Long Beach, CA, April, 2008.
 88. M. McLain, H. J. Barnaby, K. Holbert, M. Baze, A. Amort, J. Wert, “Gate width effects on the radiation response of sub-100 nm bulk CMOS two-edge transistors,” Hardened Electronics and Radiation Technology Conference (HEART), Colorado Springs, March 2008.
 89. J. A. Nelson, M. Campola, H. J. Barnaby, E. R. Long, “Space Instrument for High-Accuracy Total-Ionizing-Dose Measurements,” Government Microcircuit Applications and Critical Technology Conference, Las Vegas, NV, March 2008.
 90. H. J. Barnaby, B. Vermeire, P. Adell, “Radiation Effects Issues for SOI in Next Generation SRAM-based FPGAs,” Military and Aerospace FPGA and Applications (MAFA) Meeting, Palm Beach, FL, November 2007.
 91. M. McLain, H. J. Barnaby, K. E. Holbert, R. D. Schrimpf, H. Shah, A. Amort, M. Baze, J. Wert, “Enhanced TID Susceptibility in Sub-100 nm Bulk CMOS I/O Transistors and Circuits,” IEEE Nuclear and Space Radiation Effects Conf., Honolulu, Hawaii, July 2007.
 92. R. L. Pease, D. G. Platteter, G. Dunham, J. E. Seiler, P. C. Adell, H. J. Barnaby, X. J. Chen, “The Effects of Hydrogen in Hermetically Sealed Packages on the Total Dose and Dose Rate Response of Bipolar Linear Circuits,” IEEE Nuclear and Space Radiation Effects Conf., Honolulu, Hawaii, July 2007.
 93. W. Chen, N. Varanasi, V. Pouget, H. J. Barnaby, B. Vermeire, P. C. Adell, T. Copani, P. Fouillat, “Impact of VCO Topology on SET Induced Frequency Response,” IEEE Nuclear and Space Radiation Effects Conf., Honolulu, Hawaii, July 2007.
 94. X. J. Chen, H. J. Barnaby, B. Vermeire, K. Holbert, D. Wright, R. L. Pease, R. D. Platteter, G. Dunham, J. Seiler, Steve McClure, P. Adell, “Mechanisms of enhanced radiation-induced degradation due to excess molecular hydrogen in bipolar oxides,” IEEE Nuclear and Space Radiation Effects Conf., Honolulu, Hawaii, July 2007.
 95. P. C. Adell, H. J. Barnaby, R. D. Schrimpf, B. Vermeire, “Band-to-Band Tunneling (BBT) Induced Leakage Current Enhancement in Irradiated Fully Depleted SOI Devices,” IEEE Nuclear and Space Radiation Effects Conf., Honolulu, Hawaii, July 2007.
 96. F. Faccio, H. J. Barnaby, X. J. Chen, D. M. Fleetwood, L. Gonella, M. McLain, R. D. Schrimpf, “Total Ionizing Dose Effects in Shallow Trench Isolation Oxides,” IEEE Nuclear and Space Radiation Effects Conf., Honolulu, Hawaii, July 2007.
 97. N. Varanasi, W. Chen, B. Vermeire, P. C. Adell, V. Pouget, P. Fouillat, J. Cressler, H. J. Barnaby, “Linear Systems Analysis of Single Event Transients in Voltage Controlled Oscillators,” Single Event Effects Symposium, Long Beach, CA, April, 2007.

98. V. Pouget, W. Chen, D. Lewis, H. Barnaby, P. Fouillat, "Single Event Transient Mapping of a Voltage-Controlled Oscillator," Single Event Effects Symposium, Long Beach, CA, April, 2007.
99. H. J. Barnaby, M. McLain, H. Shah, B. Vermeire, E. Mikkola, "Radiation-enabled predictive technology modeling approaches for deep-submicron CMOS integrated circuit design," Microelectronics Reliability and Qualification Workshop, Los Angeles, CA, December 2006.
100. H. Barnaby, M. McLain, I. Esqueda, "Total-Ionizing-Dose Effects in Modern CMOS Technologies," CAARI 2006: 19th International Conference on the Application of Accelerators in Research and Industry, Fort Worth, TX, August, 2006.
101. H. H. Chung, W. Chen, B. Bakkaloglu, H. J. Barnaby, B. Vermeire, S. Kiaei, "Analysis of single events effects on monolithic PLL frequency synthesizers," IEEE Nuclear and Space Radiation Effects Conf., Ponte Vedra Beach, FL, July, 2006.
102. W. Chen, V. Pouget, G.K. Gentry, H. J. Barnaby, B. Vermeire, B. Bakkaloglu, S. Kiaei, K. E. Holbert, P. Fouillat, "Radiation hardened by design RF circuits implemented in 0.13 μm CMOS technology," IEEE Nuclear and Space Radiation Effects Conf., Ponte Vedra Beach, FL, July, 2006.
103. X. J. Chen, H. J. Barnaby, R. D. Schrimpf, D. M. Fleetwood, R. L. Pease, R. D. Platteter, "Nature of interface defect buildup in gated bipolar devices under low dose rate irradiation," IEEE Nuclear and Space Radiation Effects Conf., Ponte Vedra Beach, FL, July, 2006.
104. I. S. Esqueda, H. J. Barnaby, M. McLain, K. E. Holbert, M. Baze, J. D. Black, L. W. Massengill, B. Bhuvu, R. D. Schrimpf, F. Faccio, "Characterization of the Radiation Response of 0.13 μm n-Channel MOSFETs," IEEE Nuclear and Space Radiation Effects Conf., Ponte Vedra Beach, FL, July, 2006.
105. W. Chen, J. Oder, B. Vermeire, and H. J. Barnaby, "Modeling Single Event Transients (SETs) with Linear Macro-models," Single Event Effects Symposium, Long Beach, CA, April, 2006.
106. N. Varanasi, W. Chen, and H. J. Barnaby, "Single Event Transients (SETs) in RF Circuits," Single Event Effects Symposium, Long Beach, CA, April, 2006.
107. I. S. Esqueda, H. J. Barnaby, M. L. Alles, "Two-dimensional methodology for modeling radiation-induced off-state leakage in CMOS technologies," 2005 Nuclear and Space Radiation Effects Conf., Seattle, WA, July 2005.
108. J. Spann, T. J. Thornton, J. Yang, A. Balijepallai, H. J. Barnaby, X. J. Chen, D. Alexander, W. T. Kemp, S. J. Sampson, and M. E. Wood "Total dose radiation response of CMOS compatible SOI MESFETs," 2005 Nuclear and Space Radiation Effects Conf., Seattle, WA, July 2005.
109. X. J. Chen, H. J. Barnaby, R. L. Pease, R. D. Schrimpf, D. G. Platteter, M. R. Shaneyfelt, "Verification of Radiation Induced Oxide and Interface Trap Buildup Using Combined Bipolar and MOS Characterization Methods in Gated Bipolar Devices," 2005 Nuclear and Space Radiation Effects Conf., Seattle, WA, July 2005.
110. T. J. Thornton, H. Barnaby, B. J. Blalock, S. C. Terry, and M. M. Mojarradi, "Extreme Environment Electronics by Design," 2005 GOMACTech Conf., Las Vegas, NV.
111. H. J. Barnaby, N. Porobic, S. Lekhwani, K. Chandrashekar, B. Vermeire, "LWS/SET Board for ELDRS/Proton Effects in Bipolar Devices," 2005 HEART Conf.
112. H. J. Barnaby, I. S. Esqueda, "Modeling and Analysis of Radiation-Induced Off-State Leakage in Deep Submicron CMOS Technologies," 2004 Microelectronics Reliability and Qualification Workshop.
113. E. Mikkola, B. Vermeire, H. J. Barnaby, H. G. Parks, K. Borhani, "SEU tolerant CMOS comparator," 2004 Nuclear and Space Radiation Effects Conf., Atlanta, GA, July 2004.
114. X. J. Chen, H. J. Barnaby, R. L. Pease, R. D. Schrimpf, D. G. Platteter, and G. Dunham, "Radiation-Induced Base Current Broadening Mechanisms in Gated Bipolar Devices," 2004 Nuclear and Space Radiation Effects Conf., Atlanta, GA, July 2004.

115. E.H. Minson, I. S. Esqueda, H.J. Barnaby, R. L. Pease, D.G. Platter, Gary Dunham, "Assessment of gated sweep technique for total dose and dose rate analysis in bipolar oxides," 2004 Nuclear and Space Radiation Effects Conf., Atlanta, GA, July 2004.
116. R. L. Pease, D. G. Platteter, G. W. Dunham, J. E. Seiler, H. J. Barnaby, R. D. Schrimpf, M. R. Shaneyfelt, M. C. Maher, and R. N. Nowlin, "Characterization of Enhanced Low Dose Rate Sensitivity (ELDRS) Effects Using Gated Lateral PNP Transistor Structures," 2004 Nuclear and Space Radiation Effects Conf., Atlanta, GA, July 2004.
117. H.J. Barnaby, W. Chen, "Optimization of SiGe HBT Designs for High-Speed RF Applications," 2004 IEEE Wireless and Microwave Technology (WAMI) Conf., Tampa, FL
118. H.J. Barnaby, P. UnniKrishnan, B. Vermeire, "New Methodology for Modeling Dose Rate Effects in Analog/Mixed Signal Circuits," 2004 HEART Conf.
119. P. UnniKrishnan, B. Vermiere, W. Chen, H. J. Barnaby, "SEE Modeling in the Frequency Domain," 2004 SEE Symposium.
120. W. Chen, V. Pouget, H. J. Barnaby, J. D. Cressler, P. Fouillat, Y. Devel, and D. Lewis, "Investigation of single-event transients in voltage-controlled oscillators," 2003 Nuclear and Space Radiation Effects Conf., Monterey, CA, July 2003.
121. D. R. Ball, H. J. Barnaby, and R. D. Schrimpf, "Analysis of proton radiation damage in bipolar transistors using gate control," 2002 HEART Conf.
122. 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," 2002 HEART Conf.
123. 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," 2002 Nuclear and Space Radiation Effects Conf., Phoenix, AZ, July 2002.
124. D. R. Ball, R. D. Schrimpf, and H. J. Barnaby, "Separation of ionization and displacement damage using a gate-controlled lateral PNP bipolar transistors," 2002 Nuclear and Space Radiation Effects Conf., Phoenix, AZ, July 2002.
125. P. C. Adell, C. R. Cirba, H. J. Barnaby, R. D. Schrimpf, X. Zhu, T. Holman, and O. Mion, "Comparing Circuit-level to Mixed-mode Simulations of SET in Integrated Circuits," 2002 SEE Symposium.
126. H.J. Barnaby, R. Briand, P. Fouillat, V. Pouget, H. Lapuyade, D. Lewis, P. Adell, X.W. Zhu, L.W. Massengill, R.D. Schrimpf, "Laser testing for Single-Event Transient Characterization in Analog Microcircuits," Nanospace 2001.
127. H.J. Barnaby, C.R. Cirba, R.D. Schrimpf, K.F. Galloway, M. Pagey, R. Milanowski, "A two dimensional engineering model for radiation-induced interface trap formation," 2000 Heart Conf.
128. H.J. Barnaby, C.R. Cirba, R.D. Schrimpf, K.F. Galloway, M. Pagey, R. Milanowski, "A two dimensional engineering model for radiation-induced interface trap formation," 1998 Heart Conf.
129. R.J. Milanowski, L.W. Massengill, R.D. Schrimpf, R. Graves, H.J. Barnaby, K.F. Galloway, M. Pagey, C. Nicklaw, J. Johann, "1998 Heart Conf.

Other Publications

Book Chapters

1. H.J. Barnaby, "Total Dose Effects in Linear Bipolar Integrated Circuits," Radiation Effects and Soft Errors in Integrated Circuits and Electronics Devices, D. M. Fleetwood, R. D. Schrimpf (Editor), World Scientific Publishing Co: Singapore. 2004.

Articles

1. K. Muthuseenu, P. Biswas, and H. J. Barnaby, "TCAD Simulation of CBRAM Devices," Silvaco Simulation Standard, 2020. [Online]. Available: <https://silvaco.com/simulation-standard/tcad-simulation-of-cbram-devices/>.
2. H.J. Barnaby, "Will Radiation-Hardening-by-Design (RHBD) Work?" Nuclear & Plasma Sciences Society Newsletter, March 2005.

Reports

1. P. Apsangi, S. Roark, H. Hjalmarsen, H. J. Barnaby, K. Muthuseenu, and K. Holbert, "Correlating percent in-package hydrogen to hydrogen concentration in oxide after ionizing radiation exposure," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-1661C.
2. H. Barnaby, T. Wallace, M. J. Marinella, J. Neuendank, D. Wilson, L. Massengill, J. Kauppila, and G. Poe, "Summary of Recent Total Ionizing Dose Testing on GF 12LP CMOS Technology," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-15352C.
3. H. J. Barnaby, J. Manuel, J. Young, G. Vizkelethy, and E. Bielejec, "Single Event Upset Response of 12L FinFET Digital Circuits," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-5862C.
4. M. Marinella, T. Xiao, C. Bennett, B. Feinberg, W. Wahby, R. Jacobs-Gedrim, V. Agrawal, H. Puchner, H. Barnaby, and S. Agarwal, "Energy Efficient Deep Neural Network Processing: Digital CMOS Limits and Prospects for Analog In-Memory Computing," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-1803C.
5. M. Spear, H. Barnaby, J. Neuendank, and T. Wallace, "Characterization of Total Ionizing Dose Effects in 12nm FinFET Technology with 60keV X-Rays," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-1333C.
6. M. Spear, T. Wallace, D. Wilson, J. Solano, G. Irumva, I. S. Esqueda, H. J. Barnaby, L. Clark, J. Brunhaver, and M. Turowski, "Single Event Upset and Total Ionizing Dose Response of 12LP FinFET Digital Circuits," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-9556C.
7. B. Tolleson, M. Marinella, C. Bennett, H. Barnaby, D. Wilson, and J. Short, "Vector-Matrix Multiplication Engine for Neuromorphic Computation with a CBRAM Crossbar Array [Slides]," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-2012R.
8. D. Wilson, M. Spear, T. Wallace, G. Irumva, J. Neuendank, I. Sanchez, H. Barnaby, A. Privat, M. Turowski, and E. Mikkola, "Total ionizing dose and single event effects on 12-nm bulk FinFETs," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2022, issue SAND2022-2273C.
9. T. Patrick Xiao, C. H. Bennett, S. Agarwal, D. R. Hughart, H. J. Barnaby, H. Puchner, V. Prabhakar, A. Alec Talin, and M. J. Marinella, "Ionizing radiation effects in SONOS-based neuromorphic inference accelerators," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 0018-9499, 2021.
10. S. Agarwal, L. T. Clark, C. YoungSciortino, G. Ng, D. A. Black, M. J. Cannon, J. Black, H. M. Quinn, H. Barnaby, and J. S. Brunhaver, "Measurement and Modeling of Single Event Transients in 12nm Inverters," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2021.
11. M. Marinella, S. Agarwal, C. Bennett, T. Xiao, R. B. Jacobs-Gedrim, D. R. Hughart, E. J. Fuller, A. A. Talin, H. Barnaby, and J. A. Incorvia, "Efficient Neural Network Processing with Analog In-Memory Computing," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2020.
12. M. Cannon, A. F. Rodrigues, D. A. Black, J. Black, L. G. Bustamante, B. Feinberg, H. Quinn, L. T. Clark, J. S. Brunhaver, and H. Barnaby, "Fault Tracking and Modeling in Advanced Node Processors of Single Event Effects," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2020.

13. M. Cannon, A. F. Rodrigues, D. A. Black, J. Black, L. G. Bustamante, B. Feinberg, L. Clark, J. Brunhaver, H. Barnaby, and S. Agarwal, "Multiscale Modeling of Single Event-Induced Faults in FinFET-based Processors," Sandia National Lab.(SNL-NM), Albuquerque, NM (United States). 2020.
14. M. J. Marinella, R. B. Jacobs-Gedrim, C. Bennett, A. H. Hsia, D. R. Haghart, C. D. James, G. Vizkelethy, E. Bielejec, S. Agarwal, and E. J. Fuller, "Energy efficient neuromorphic algorithm training with analog memory arrays," Sandia National Laboratories Albuquerque United States, pp. 335-339, Mar. 2019.

Invited Presentations

Invited Refereed Conference Presentations

1. H. J. Barnaby, "Combined Effects of Total Ionizing Dose and Displacement Damage in Linear Bipolar Devices and Circuits," International Conference on Radiation Effects on Electronic Devices (ICREED), Chongqing, China, May 29-31, 2019.
2. H. J. Barnaby, "Modeling Ionizing Radiation Effects in Solid State Materials and CMOS Devices," International Conference on Radiation Effects on Electronic Devices (ICREED), Beijing, China, May 16-18, 2018.
3. H. J. Barnaby, "Programmable Metallization Cells: Technology and Applications," 14th International Conference on Modern Materials and Technologies CIMTEC 2018, Perugia, Italy, June 4 - 14, 2018.
4. Y. Gonzalez-Velo, A. Patadia, H.J. Barnaby, and M.N. Kozicki, "Impact of radiation induced crystallization on programmable metallization cell electrical characteristics and reliability," New memory paradigms: memristive phenomena and neuromorphic applications, Faraday Discussion Meeting, Aachen, Germany, October 15 - 17, 2018.
5. H. J. Barnaby, R. D. Schrimpf, "Total Dose and Displacement Damage in Bipolar Junction Transistors," International Conference on Radiation Effects on Electronic Devices (ICREED), Harbin CN, Oct.12-21, 2015. Presenter: H. J. Barnaby
6. M. N Kozicki, P. Dandamudi, H. J Barnaby, Y. Gonzalez-Velo*, "Programmable Metallization Cells in Memory and Switching Applications," 224th ECS Meeting, San Francisco, CA, Oct. 27-Nov. 1, 2013. Presenter: M. N Kozicki
7. H. J. Barnaby, "Total Ionizing Dose and Displacement Damage Effects in Embedded Memory Technologies," 2013 Radiation Effects on Components and Systems Conference (RADECS) Short Course, Oxford, UK, Sept. 23, 2013. Instructor: H. J. Barnaby.
8. H. J Barnaby, M. L. Mclain, I. S. Esqueda, X. J. Chen, "Modeling ionizing radiation effects in solid state materials and CMOS devices", IEEE Custom Integrated Circuits Conference, San Jose, CA, Sept., 2008. Presenter: H. J. Barnaby
9. H.J. Barnaby, "Total-Dose Effects in Modern Integrated Circuit Technologies," 2005 Nuclear and Space Radiation Effects Conference (NSREC) Short Course, Seattle, WA, July, 11, 2005 Instructor: H. Barnaby.

Invited Conference Presentations (non-refereed)

1. H. J. Barnaby, T. Wallace, "Total Ionizing Dose Response Mechanisms in a 12-nm FinFET Technology," Microelectronics Reliability Qualification Workshop, Los Angeles, CA, January 2024. Presenter: H. J. Barnaby
2. H. J. Barnaby, T. Wallace, "Total Ionizing Dose Response Mechanisms in a 12-nm FinFET Technology," Microelectronics Reliability Qualification Workshop, Los Angeles, CA, January 2024. Presenter: H. J. Barnaby
3. H. J. Barnaby, "Modeling Cumulative Radiation Effects in Semiconductor Devices and Integrated Circuits," 2022 SERESSA, Geneva Switzerland, December 2022. Presenter: H. J. Barnaby

4. M. Spear, H. J. Barnaby, J. Neuendank, T. Wallace, "Characterization of Total Ionizing Dose Effects in 12nm FinFET Technology with 60keV X-Rays," Microelectronics Reliability Qualification Workshop Los Angeles, CA, January 2022. Presenter: H. J. Barnaby
5. H. Barnaby, T. Wallace, M. Marinella, J. Neuendank, D. Wilson, G. Poe, C. Moyers, J. Kauppila, L. Massengill, "Summary of Recent Total Ionizing Dose Testing on GF 12LP CMOS Technology," Radiation Hardened Electronics Technology (RHET) 2022, Kissimmee, FL, November 8-10, 2022. Presenter: H. J. Barnaby
6. H. J. Barnaby, I. Livingston, I. S. Esqueda, "Compact Modeling of Total Ionizing Dose and Aging Effects in MOS (Planar SOI) Technologies," 2019 Microelectronics Reliability and Qualification Workshop, Los Angeles, CA, February 4-6, 2019. Presenter: H. J. Barnaby
7. H. Barnaby, A. Privat, B. Tolleson, X. Han, P. Adell, H. Schone, W. Parker, "Macromodel-based Radiation Effects Characterization and Qualification Technique for Commercial-off-the-shelf (COTS) Parts," Radiation Hardened Electronics Technology (RHET) 2019, Melbourne, FL, November 4-6, 2019. Presenter: H. J. Barnaby
8. H. J. Barnaby, S. Yu, M. N. Kozicki, M. Marinella, "Radiation Effects in RRAM-based Neuromorphic Computing Systems," Radiation Hardened Electronics Technology (RHET) 2018, Phoenix, AZ, November 5 - 7, 2018. Presenter: H. J. Barnaby
9. H. J. Barnaby, M. N. Kozicki, S. Yu, D. Mahalanbis, "Memristor Applications Beyond Non-volatile Memory" Radiation Hardened Electronics Technology (RHET) 2015 Meeting, Albuquerque NM, Oct. 2015. Presenter: H. J. Barnaby
10. M.N. Kozicki, H. Barnaby, and J. Chae, "The Programmable Metallization Cell Technology Platform" Northrop-Grumman Nanotechnology Workshop, Redondo Beach, CA, July 6-7, 2015. Presenter: M.N. Kozicki
11. M. N. Kozicki, S. Yu, H. J. Barnaby, "Radiation Tolerant Nonvolatile Memory Beyond Flash: Ionic Resistive RAM" Radiation Hardened Electronics Technology (RHET) 2014 Meeting, Albuquerque NM, Oct. 2014. Presenter: H. J. Barnaby
12. H. J. Barnaby, Y. Gonzalez Velo*, P. Dandamudi, M. N. Kozicki, Maria Mitkova, M. Ailavajhala, K. Wolf, "Radiation Effects in Redox/Resistive RAMs (ReRAM)," Workshop on Fault-Tolerant Spaceborne Computing Employing New Technologies, Albuquerque, NM, May, 2013.
13. H. J. Barnaby, Y. Gonzalez Velo, P. Dandamudi, M. N. Kozicki, Maria Mitkova, M. Ailavajhala, "Basic Mechanisms, Modeling Approaches, and Circuit Applications for Chalcogenide Glass Resistive Memory," CyberSci Summit 2013, Arlington, VA, June, 2013.
14. M. Kozicki, H. J. Barnaby, "Electrochemical Resistive Memory: Basic Mechanisms and Modeling," 2012 Microelectronics Reliability and Qualification Workshop, Presenter: H. J. Barnaby
15. H. J. Barnaby, M. Gopalan, Achal Kathuria, X. J. Chen, P. C. Adell, R. L. Pease, I. S. Esqueda, "Effects of Molecular Hydrogen on Total Dose Response in Semiconductor Oxides," 2009 Microelectronics Reliability and Qualification Workshop. Presenter: H. J. Barnaby
16. H. J. Barnaby, Total Dose Effects in Solid State Materials and Devices, School on Effects of Radiation on Embedded Systems for Space Applications (SERESSA), Takasaki, Japan, December, 2009. Instructor: H. Barnaby.
17. H. J. Barnaby, "Radiation Effects in Advanced Microelectronic Materials and Devices," School on Effects of Radiation on Embedded Systems for Space Applications (SERESSA), West Palm Beach, FL, 2008. Instructor: H. Barnaby.
18. H. J. Barnaby, "Radiation Effects in Advanced Microelectronic Materials and Devices," School on Effects of Radiation on Embedded Systems for Space Applications (SERESSA), Buenos Aires, Argentina, December, 2007. Instructor: H. Barnaby.

19. H. J. Barnaby, Y. Cao, G. Gildenblat, "Radiation-enabled compact modeling and circuit analysis with PTM and the new, industry standard, PSP model" Radiation Hardened Electronics Technology (RHET) 2006 Meeting, Denver Co, Oct. 2006. Presenter: H. J. Barnaby
20. H. J. Barnaby, "Radiation Effects in Advanced Microelectronic Materials and Devices," First School on Effects of Radiation on Embedded Systems for Space Applications (SERESSA), Manaus Brazil, Nov. 20-25, 2005. Instructor: H. Barnaby.
21. H. Barnaby, M. McLain, I. Sanchez, "Total-Dose Effects and hardening-by-design in deep sub-micron CMOS," 5th Radiation Hardening-by-Design Workshop, September 13-14, 2005, Kirtland Air Force Base, NM. Presenter: H. J. Barnaby

Invited University Presentations (non-refereed)

1. H. J. Barnaby, "Programmable Metallization Cells: Technology and Applications," MIT Special Materials Science Seminar, Massachusetts Institute of Technology, Cambridge, MA, Dec. 2015.
2. H. J. Barnaby, "The Physics of High Speed in Heterojunction Bipolar Transistors," ASU CSSER seminar, Sept, 2003.

Invited Industry Presentations (non-refereed)

1. H. J. Barnaby (chair), "Strategies for Assuring COTS Devices," Emerging Space Radiation Assurance Challenges for the 2020s, Pasadena, CA, June 2-4.
2. H. J. Barnaby, "Programmable Metallization Cells: Technology and Applications," JPL Division Seminar, Pasadena, CA, Dec. 2015.
3. H. J. Barnaby, Y. Gonzalez Velo*, P. Dandamudi, M. N. Kozicki, Maria Mitkova, M. Ailavajhala, "Basic Mechanisms, Modeling Approaches, and Circuit Applications for Chalcogenide Glass Resistive Memory," Sandia National Laboratory Seminar, Albuquerque, NM, Nov., 2014.
4. H. J. Barnaby, S. Vrudhula, D. Mahalanabis, J. Yang, "ChG Memristor-based Threshold Logic," Qualcomm Seminar, San Diego, CA, May, 2012.
5. H. J. Barnaby, "Total-Dose Effects in Modern Integrated Circuit Technologies," ISR Seminar, Los Alamos National Laboratory, Los Alamos, NM, Nov. 2006.
6. H.J. Barnaby, "Single Event Effects in Next Generation Technologies," 2003 Pacific Northwest National Laboratory, Invited Speaker Series.

Patents and Disclosures

Patents Awarded

1. H. J. Barnaby, P. C. Adell, B. S. Tolleson, "Method for modeling excess current in irradiated bipolar junction transistors," ed: US Patent 11,0017,143, 2021.
2. X. Huang, Y. Zhao, R. Fang, and H. Barnaby, "Steep slope transistors with threshold switching devices," ed: US Patent 11,189,717, 2021.
3. H. J. Barnaby and I. S. Esqueda, "Physics-based reliability model for large-scale CMOS circuit design," ed: US Patent 9,032,348, 2015.
4. H. Yu, J. K. Oiler, H. J. Barnaby, "Film bulk acoustic wave resonator-based high energy radiation detectors and methods using the same", ed: US Patent, 8,704,191. 2014.

Patent Applications

1. X. Huang, Y. Zhao, R. Fang, and H. Barnaby, "Steep slope transistors with threshold switching devices," ed: US Patent App. 16/739,333, 2020.
2. H. J. Barnaby, "Sub-mm Wireless Ionizing Radiation Detector," ed: US Patent App. 12/716,163, 2010.
3. J. B. Hoying, P. Deymier, and H. Barnaby, "Immunoassay-based microsensing using optical sensors," ed: US Patent App. 11/808,656, 2007.

Patent Disclosures:

1. A. Nazari, B. Jalali-Farahani, H. J. Barnaby, "Sample Time Calibration of Interleaved Analog-to-digital Data Converters, US patent application number 62/280,144 on Jan. 19, 2016.
2. Y Gonzalez Velo*, A. Mahmud, P. Dandamudi, H. J. Barnaby, M. N. Kozicki, "Flexible Ag-Chalcogenide Sensors for Radiation Detection," US patent application number 62/258,737 on Nov. 23, 2015.