

David R. Allee

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David R. Allee (BS in Electrical Engineering, University of Cincinnati, 1984; MS and PhD in Electrical Engineering, Stanford University, 1986 and 1990 respectively) is a full Professor of Electrical Engineering at Arizona State University. He has fabricated nanometer scale devices and invented several ultra-high resolution lithography techniques. David is currently Director of Research for Backplane Electronics for the Flexible Display Center (flexdisplay.asu.edu) funded by the Army, and he is investigating a variety of flexible electronics applications with a focus on large area sensing arrays for radiation detection and electric and magnetic field imaging. He has been a regular consultant with several semiconductor industries. He has co-authored over 125 archival scientific publications and U.S. patents.

EDUCATION/TRAINING

Cambridge University	Post-Doc	1990-1991	Electrical Engineering
Stanford University	Ph.D.	1990	Electrical Engineering
Stanford University	M.S.	1986	Electrical Engineering
University of Cincinnati	B.S.	1984	Electrical Engineering

EMPLOYMENT HISTORY

Aug. 2009 – Present	Full Professor, Dept. of Electrical Engineering, Arizona State University
Jan. 2004 – Present	Director of R&D of Backplane Electronics, Flexible Display Center
May 2011 – Present	Consultant with KnowledgeBridge Intl. (holds clearance)
Aug 2013. – Dec. 2013	Sabbatical at the Army Research Laboratory
Aug. 1997 – Aug. 2009	Associate Professor, Dept. of Electrical Engineering, Arizona State University
June 2003 – Aug. 2003	Design Consultant, Motorola, Tempe, AZ
Jan. 2001 - Dec. 2002	Design Consultant, Philips Semiconductors, Tempe, AZ
Aug. 2000 - Dec. 2000	Sabbatical at Intel, Chandler, AZ
May 1999 - Oct. 1999	Design Consultant, Scientific Monitoring, Tempe, AZ
Jan. 1996 - Dec. 1997	Design Consultant, Intel, Chandler, AZ
Aug. 1991 - Aug. 1997	Assistant Professor, Dept. of Electrical Engineering, Arizona State University

HONORS AND DISTINCTIONS:

Consistently Top 5% of Teachers Award 2012, Best Teacher Award, College of Engineering, 2008, Young Faculty

Teaching Excellence Award, College of Engineering, 1994/1995

Chair of Flexible Electronics Conference at SPIE Defense, Security and Sensing 2013

Guest Editor for special issues of Journal of Display Technology and Sensors (online)

Custom Integrated Circuits Conference, Technical Program Committee, 2001-2005, Educational Session Chair 2005 and Analog Sub-committee Chair 2005

Publications:

Archival Refereed Journal Papers:

1. J. Smith, A. Couture, J. Stowell, and D. Allee, "Self-aligning overlapping and optically seamless flexible electronic tiles for ultra-large-area digital x-ray imaging," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, 2014;4(6):1109-1115

2. G.R. Kunnen, J. Smith, H. Chung, D.R. Allee, "A TFT-based, Multi-Stage, Active Pixel Sensor for Alpha Particle Detection," *Electronics Letters*, vol. 50, no. 9, Apr 2014, 2 pages (Featured Article)
3. J. Smith, S. Shah, M. Goryll, J. Stowell, and D. Allee, "Flexible ISFET biosensor using IGZO metal oxide TFTs and ITO sensing layer," *IEEE Sensors Journal*, Vol. 14, No. 4, April 2014, pp. 937-938
4. J. Smith, A. Couture, and D. Allee, "Charge emission induced transient leakage currents of a-Si:H and IGZO TFTs on flexible plastic substrates," *Electronics Letters*, Vol. 50, No. 2, January 16, 2014, pp. 105-106
5. R. Wahl, F. Wang, H. Chung, G. Kunnen, S. Yip, E. Lee, E. Pun, G. Raupp, D. Allee, J. Ho, "Stability and low-frequency noise in InAs NW parallel array thin film transistors," *IEEE Electron Device Letters*, Vol. 34, No. 6, 2013, pp. 765-767
6. S. Kim, X. Zhang, R. Daugherty, E. Lee, G. Kunnen, D.R. Allee, E. Forsythe, and J. Chae, "Design and implementation of electrostatic micro-actuators in ultrasonic frequency on a flexible substrate, PEN (polyethylene naphthalate)," *Sensors and Actuators, A: Physical*, 2012, 8 pages
7. Sangpyeong Kim, Xu Zhang, Robin Daugherty, Ed Lee, George Kunnen, David R. Allee, Eric W. Forsythe, and Junseok Chae, "MEMs based ultrasonic electrostatic actuators on a flexible substrate," *IEEE Electron Device Letters*, vol. 33, no. 7, 2012, pp. 1072-1074
8. David R. Allee, Guest Editorial, *IEEE/OSA Journal of Display Technology*, vol. 8, no. 7, 2012, p. 372
9. John W. Murphy, George R. Kunnen, Israel Mejia, Manuel A. Quevedo-Lopez, David Allee, Bruce Gnade, "Optimizing diode thickness for thin-film solid state thermal neutron detectors," *Applied Physics Letters*, vol. 101, no. 14, 2012, 5 pages
10. Ed Lee, George Kunnen, Alfonso Dominguez, David R. Allee, "A low noise dual stage a-Si:H active pixel sensor," *IEEE Transactions on Electron Devices*, vol. 59, no. 6, pp. 1679-1685, June 2012
11. Ahmet Durgan, Constantine A. Balanis, Craig R. Birtcher, David R. Allee, "Design, Fabrication, Simulation, and Testing of Flexible Bow-Tie Antennas," *IEEE Transactions on Antennas and Propagation*, vol. 59, no. 12, pp. 4425-4435, 2011
12. Aritra Dey, Sameer Venugopal, David R. Allee and Lawrence T. Clark, "Impact of Drain Bias Stress on Forward/Reverse Mode Operation of a-ZIO TFTs," *Solid State Electronics*, vol. 62, pp. 19-24, 2011
13. Edward H. Lee, Anil Indluru, David R. Allee, Lawrence T. Clark, Keith E. Holbert, and Terry L. Alford, "Effects of Gamma Irradiation and Electrical Stress on a-Si:H Thin-Film Transistors for Flexible Electronics and Displays," *IEEE Journal of Display Technology*, vol. 7, no. 6, pp. 325 - 329, 2011
14. Indluru, A.; Venugopal, S. M.; Allee, D. R.; Alford, T. L., "Effect of the Anneal Time on the Enhanced Performance of a-Si:H TFTs for Future Display Technology," *IEEE Journal of Display Technology*, vol. 7, no. 6, pp. 306 - 310, 2011
15. Aritra Dey, Adrian Avendanno, Sameer Venugopal, David R. Allee, Manuel Quevedo, and Bruce Gnade, "CMOS TFT Op-Amps: Performance and Limitations," *IEEE Electron Device Letters*, vol. 32, no. 5, pp. 650-652, 2011
16. Bryan D. Vogt, Barry O'Brien, David R. Allee, Doug Loy, Bulent Akgun and Sushil K. Satija, "Distribution of hydrogen in low temperature passivated amorphous silicon (a-Si:H) films from neutron reflectivity," *Journal of Non-Crystalline Solids*, vol. 357, no. 3, pp. 1114-1117, 2011
17. Korhan Kaftanoglu, Sameer M. Venugopal, Michael Marrs, Aritra Dey, James R. Wilson, Edward Bawolek, David R. Allee, and Doug Loy, "Stability of IZO and a-Si:H TFTs Processed at Low Temperature (200C)" *IEEE Journal of Display Technology*, vol. 7, no. 6, pp. 339-343, 2011
18. Aritra Dey, Anil Indluru, Sameer M. Venugopal, David R. Allee and Terry L. Alford, 'Effect of Electro-Mechanical Stress on a-ZIO TFTs,' *IEEE Electron Device Letters*, vol. 31, no. 12, pp. 1416-1418, December 2010.
19. Nazanin Darbanian, Sameer Venugopal, Shrinivas Gopalan Uppili, David R. Allee, and Lawrence T. Clark, "Flexible Amorphous Silicon Non-Volatile Memory," *Journal of the Society of Information Displays*, Vol. 18, No. 5, pp. 346-350, 2010
20. Manuel Quevedo, S. Gowrisanker, D Allee, S Venugopal, R Krishna, K Kaftanoglu, H.N. Alshareef, and B. E. Gnade, "Novel Materials and Integration Schemes for CMOS-Based Circuits for Flexible Electronics," *Electrochemical Society Transactions*, Vol. 25, No. 7, Issue Title: ULSI Process Integration 6, pp. 503-511, 2009
21. S. Gowrisanker, M.A. Quevedo-Lopez, H. N. Alshareef, B.E. Gnade, S. Venugopal, R. Krishna, K. Kaftanoglu, D.R. Allee, "A Novel Low Temperature Integration of Hybrid CMOS Devices on Flexible Substrates," *Organic Electronics*, vol. 10, no. 7, pp. 1217-1222, Nov. 2009
22. David R. Allee, Lawrence T. Clark, Bryan D. Vogt, Rahul Shringarpure, Sameer M. Venugopal, Shrinivas Gopalan Uppili, Korhan Kaftanoglu, Hemanth Shivalingaiyah, Zi P. Li, J.J. Ravindra Fernando, Edward J. Bawolek, and Shawn O'Rourke, "Degradation Effects in a-Si:H Thin Film Transistors and Their Impact on Circuit Performance," *IEEE Transactions on Electron Devices*, vol. 56, no. 6, pp. 1166-1176, June 2009

23. Jiaying Cai, Karel Cizek, Brent Long, Kenyon McAferty, Casey G. Campbell, David R. Allee, Bryan D. Vogt, Jeff La Belle and Joseph Wang, "Flexible Thick-Film Electrochemical Sensors: Impact of Mechanical Bending and Stress on the Electrochemical Behavior," *Sensors and Actuators B: Chemical*, vol. 137, pp. 379-385, 2009.
24. Rahul Shringarpure, Sameer Venugopal, Korhan Kaftanoglu, Lawrence T. Clark, David R. Allee, and Edward Bawolek, "Compact modeling of amorphous silicon thin film transistors with BSIM3," *Journal of Society of Information Displays*, vol. 16, p. 1147-1155, 2008.
25. Rahul Shringarpure, Sameer Venugopal, Lawrence T. Clark, David R. Allee, Edward Bawolek, "Localization of gate biased induced threshold voltage degradation in a-Si:H TFTs," *IEEE Electron Device Letters*, Vol. 29, No. 1, 2008, pp. 93-95.
26. Nathan D. Hindman, Ziyang Wang, Lawrence T. Clark, and David R. Allee, "Experimentally Measured Input Referred Voltage Offsets and Kickback Noise in RHBD Analog Comparator Arrays," *IEEE Transactions on Nuclear Science*, Vol. 54, No. 6, Part 1, 2007, pp. 2073-2079.
27. G.B. Raupp, S.M. O'Rourke, C. Moyer, B.P. O'Brien, S.K. Ageno, D.E. Loy, E.J. Bawolek, D.R. Allee, S.M. Venugopal, J. Kaminski, D. Bottesch, J. Dailey, K. Long, M. Marrs, N.R. Munizza, H. Haverinen, N. Colaneri, "Low-temperature amorphous-silicon backplane technology development for flexible displays in a manufacturing pilot-line environment," *Journal for the Society of Information Displays*, Vol. 15, No. 7, 2007, pp. 445-454
28. Zi Li, Sameer Venugopal, Rahul Shringarpure, David R. Allee and Lawrence T. Clark, "Noise Margin Analysis of a-Si:H Digital Circuits," *Journal for the Society of Information Displays*, Vol. 15, No. 4, 2007, pp. 251-259
29. Rahul Shringarpure, Sameer Venugopal, Zi Li, Lawrence T. Clark, David R. Allee, Edward Bawolek, and Daniel Toy, "Circuit Simulation of Threshold Voltage Degradation in a-Si:H TFT's Fabricated at 175°C," *IEEE Transactions on Electron Devices*, Vol. 54, No. 7, July 2007, pp. 1781-1783
30. Alex Z. Kattamis, I-Chun Cheng, Ke Long, Bahman Hekmatshoar, Kunigunde Cherenack, Sigurd Wagner, James C. Sturm, Sameer Venugopal, Douglas E. Loy, Shawn M. O'Rourke and David R. Allee, "Amorphous silicon thin-film transistor backplanes deposited at 200C on clear plastic for lamination to electrophoretic displays," *IEEE Journal of Display Technology*, Vol. 3, No. 3, 2007, pp. 304-308.
31. Sameer M. Venugopal, and David R. Allee, "Integrated a-Si:H source drivers for 4" QVGA electrophoretic display on flexible stainless steel substrate," *IEEE Journal of Display Technology*, Vol. 3, No. 1, March 2007, pp. 57-63.
32. Sameer M. Venugopal, David R. Allee, Zi Li, and Lawrence T. Clark, "Threshold-voltage recovery of a-Si:H digital circuits," *Journal of the Society for Information Displays*, Vol. 14, No. 11, November 2006, pp. 1053-1057.
33. Peter Smith, David Allee, Curt Moyer, and Douglas Loy, "Flexible Transistor Arrays," *Information Display*, Vol. 21, No. 6, June 2005, pp. 18-22
34. Islam, M.M.; Allee, D.R.; Konasani, S.; Rodriguez, A.A., "A low-cost digital controller for a switching DC converter with improved voltage regulation," *Power Electronics Letters, IEEE*, Volume 2, Issue 4, Dec. 2004 Page(s):121 – 124
35. H.C. Kim, D.R. Allee, and T.L. Alford, "Thickness Dependence on the Thermal Stability of Silver Thin Films," *Applied Physics Letters*, Vol. 81, p. 4287, 2002
36. M. Hasan, H.H. Shen, D.R. Allee, M. Pennell, "A Behavioral Model of a 1.8V, Flash A/D Converter Based on Device Parameters," *IEEE Transactions on Computer-Aided Design*, vol. 19, no. 1, Jan. 2000, pp. 69-82
37. W. Xie, X. Dai, L.S. Xu, D.R. Allee, and J. Spector, "Fabrication of Cr Nanostructures with the Scanning Tunneling Microscope," *Nanotechnology*, vol. 8, no. 2, June 1997, p.88-93
38. C.B. Wheeler, D.L. Mathine, S.R. Johnson, G.N. Maracas, and D.R. Allee, "Selectively Oxidized GaAs MESFET's Transferred to a Si Substrate," *IEEE Electron Device Letters*, vol. 18, no. 4, p138, April 1997
39. C. Wheeler, S. Daryanani, D.L. Mathine, G.N. Maracas, and D.R. Allee, "Monolithic Integration of a GaAs MESFET with a Resonant Cavity LED using a Buried Oxide Layer," *Photonics Technology Letters* 9(2), p194, 1997
40. D.K. Ferry, M. Khoury, D.P. Pivin Jr., K.M. Connolly, T.K. Whidden, M.N. Kozicki, and D.R. Allee, "Nanolithography," *Semicond. Sci. Technol.* 11, p.1552, 1996.
41. D.L. Mathine, H. Nejad, D.R. Allee, R. Droopad, and G.N. Maracas, "Reduction of the Thermal Impedance of VCSELs after Integration with Copper Substrates," *Appl. Phys. Lett.*, 69(4), p. 463, July 1996.
42. H.C. Day, D.R. Allee, "Selective area oxidation of Si₃N₄ with an ambient scanning tunneling microscope," *Nanotechnology* 6, p1, 1995.
43. L.S. Xu, and D.R. Allee, "Ambient Scanning Tunneling Lithography of Langmuir Blodgett and Self-Assembled Monolayers," *J. Vac. Sci. Technol. B*, 13(6), p2837, Nov. 1995.
44. H.J. Song, M.J. Rack, K. Abugharbieh, S.Y. Lee, V. Khan, D.K. Ferry, and D.R. Allee, "25nm Chromium oxide lines by scanning tunneling lithography in air," *J. Vac. Sci. Technol. B*, 12(6), pp. 3720-3724, Nov./Dec. 1994.
45. H.C. Day, D.R. Allee, "Selective area oxidation of silicon with a scanning force microscope," *Appl. Phys. Lett.*, 62 (21), pp. 2691-2693, 24 May 1993.

46. H.C. Day, D.R. Allee, R. George and V.A. Burrows, "Nanometer scale patterning of a monolayer Langmuir-Blodgett film with a scanning tunneling microscope in air," *Appl. Phys. Lett.*, , 62 (14), pp. 1629-1631, 5 April 1993.
47. M. Van Hove, G. Zou, W. De Raedt, Ph. Jansen, R. Jonckheere, M. Van Rossum, A. Hoole, D.R. Allee, A.N. Broers, P. Crozat, Y. Jin, F. Aniel, and R. Adde," Scaling behavior of delta-doped AlGaAs/InGaAs HEMT's with gatelengths down to 60nm and source-drain gaps down to 230nm," *J. Vac. Sci. Technol. B*, 11(4), pp. 1203-1208, Jul. / Aug. 1993.
48. D.R. Allee, X.D. Pan, A.N. Broers, and C.P. Umbach, "Ultra-high resolution electron beam patterning of SiO₂: a review," presented at the *IIAS Symposium on Science and Technology of Mesoscopic Structures*, New Public Hall, Nara, Japan, November 6-8, 1991, Invited Talk, in *Science and Technology of Mesoscopic Structures*, Eds. S. Namba, C. Hamaguchi, and T. Ando, Springer Verlag, Tokyo, p362 (1992)
49. D.R. Allee, C.P. Umbach, and A.N. Broers, "Direct Nanometer Scale Patterning of SiO₂ with Electron Beam Irradiation," *J. Vac. Sci. Technol. B*, 9(6), pp. 2839-2843, Nov. / Dec. 1991.
50. X. Pan, D.R. Allee, and A.N. Broers, "Nanometer Scale Pattern Replication Using E-Beam Direct Patterned SiO₂ as the Etching Mask," *Appl. Phys. Lett.*, 59 (24), pp.3157-3158, 9 December 1991.
51. D.R. Allee, and A.N. Broers, "Limits of Nano-Gate Fabrication," *IEEE Proceedings*, vol. 79, no. 8, pp. 1093-1105, Aug. 1991.
52. S.Y. Chou, D.R. Allee, R.F.W. Pease, and J.S. Harris Jr., "Lateral Resonant Tunneling Transistors Employing Field Induced Quantum Wells and Barriers," *IEEE Proceedings*, vol. 79, no. 8, pp. 1131-1139, Aug. 1991.
53. D.R. Allee, and A.N. Broers, "Direct Nanometer Scale Patterning of SiO₂ with Electron Beam Irradiation through a Sacrificial Layer," *Appl. Phys. Lett.*, 57(21), pp. 2271-2273, Nov. 19, 1990.
54. D.R. Allee, S.Y. Chou, J.S. Harris Jr., and R.F.W. Pease, "Resonant Tunneling of 1-Dimensional Electrons Across an Array of 3-Dimensionally Confined Potential Wells," *Superlattices and Microstructures*, Vol. 7, No. 2, pp. 131-134, 1990.
55. D.R. Allee, S.Y. Chou, J.S. Harris Jr., and R.F.W. Pease, "Engineering Lateral Quantum Interference Devices Using Electron Beam Lithography and Molecular Beam Epitaxy," *J. Vac. Sci. Technol. B*, 7(6), pp. 2015-2019, Nov./Dec. 1989.
56. N.I. Maluf, S.Y. Chou, J.P. McVittie, S.W.J. Kuan, D.R. Allee, and R.F.W. Pease, "Effects of Chromium on the Reactive Ion Etching of Steep-Walled Trenches in Silicon," *J. Vac. Sci. Technol. B* 7(6), pp. 1497-1501, Nov./Dec. 1989.
57. S.Y. Chou, D.R. Allee, R.F.W. Pease, and J.S. Harris Jr., "Observation of Electron Resonant Tunneling in a Lateral Dual Gate Resonant Tunneling Field Effect Transistor," *Appl. Phys. Lett.* 55(2), pp. 176-178, 10 July 1989.
58. D.R. Allee, J.D. Pehoushek, and R.F.W. Pease, "Novel Monte Carlo Simulation of Space-Charge-Induced Energy Broadening in Laser Irradiated Cathodes," *J. Vac. Sci. Technol. B*, 6(6), pp. 1989-1994, Nov./Dec. 1988 .
59. S.W.J. Kuan, C.W. Frank, C.C. Fu, D.R. Allee, P. Maccagno, and R.F.W. Pease, "Ultrathin Polymer Films for Microlithography," *J. Vac. Sci. Technol. B*, 6(6), pp. 2274-2279, Nov./Dec. 1988.
60. P.R. de la Houssaye, D.R. Allee, Y. Pao, D.G. Schlom, J.S. Harris, and R.F.W. Pease, "Electron saturation velocity variation in InGaAs and GaAs channel MODFETs for gate length to 550A," *IEEE Electron Device Letters*, Vol. 9, No. 3, March 1988, pp. 148-150.
61. D.R. Allee, P.R. de la Houssaye, D.G. Schlom, J.S. Harris, and R.F.W. Pease, "Sub-100nm Gate Length GaAs MESFETs and MODFETs Fabricated by a Combination of Molecular Beam Epitaxy and Electron Beam Lithography," *J. Vac. Sci. Technol. B*, 6(1), pp. 328-332, Jan./Feb. 1988.

Awarded US Patents

1. *US patent 8,860,197*, awarded 2014
Integrated circuits secure from invasion and methods of manufacturing the same
Lawrence T. Clark, and David R. Allee
2. *US patent 8,860,575*, awarded 2014
Flexible identification systems and related methods
David R. Allee, Lawrence T. Clark, Terry L. Alford, Constantine A. Balanis, James T. Aberle, and Kevin Baugh
3. *US patent 8,796,608*, awarded 2014
Dual stage active pixel devices and related methods
Edward H. Lee, David R. Allee, and George R. Kunnen
4. *US patent 8,610,223*, awarded 2013
Embedded microelectromechanical systems sensor and related devices and methods
Narendra V. Lakamraju, Sameer M. Venugopal, Stephen M. Phillips, David R. Allee

5. *US patent 8,488,370*, awarded 2013
Differential threshold voltage non-volatile memory and related methods
Sameer M. Venugopal, David R. Allee, Lawrence T. Clark, Nazanin Darbianian
6. *US patent 8,462,565*, awarded 2013
Differential threshold voltage non-volatile memory and related methods
Sameer M. Venugopal, David R. Allee, Lawrence T. Clark
7. *US patent 8,319,191*, awarded 2012
Sensor devices and related methods
David R. Allee
8. *US patent 8,319,561*, awarded 2012
Amplifiers with depletion and enhancement mode thin film transistors and related methods
Sameer M. Venugopal, Aritra Dey, David R. Allee
9. *US Patent No. 6,819,124*,
Detection of electromigration in integrated circuits
D.R. Allee, and T.L. Alford
10. *US Patent No. 6,304,784*
Flexible Probing Device and Methods for Manufacturing the Same
D.R. Allee, and L.C. Jaw
11. *US Patent No. 6,255,979*
CMOS Flash Analog to Digital Converter Compensation
D.R. Allee, and B.R. McDaniel

Refereed International Conference Proceedings Publications:

1. D. Allee, E. Forsythe, D. Morton, and D. Hull, "Flexible hybrid electronics for large area sensing arrays: x-rays, neutrons, and low frequency electric fields," Military Sensing Symposium, Battlespace, Acoustic, Seismic, Magnetic and Electric-field Sensing and Signatures, 28-31 October 2014, Springfield Virginia, 14 pages
2. Brett W. Larsen, Hugh Chung, Alfonso Dominguez, Jacob Sciacca, Narayan Kovvali, Antonia Papandreou, David R. Allee, "Applying matching pursuit decomposition to UGS footprint classification," *SPIE 2013 Defense Security & Sensing Symposium*, Baltimore, MD, 29 April to 3 May 2013, 6 pages
3. Israel Mejia, Ana L. Salas-Villasenor, John W. Murphy, George R. Kunnen, Kurtis D. Cantley, David R. Allee, Bruce E. Gnade, Manuel A. Quevedo-Lopez, "High performance logic circuits using solution based, low temperature semiconductors for flexible electronics," *SPIE 2013 Defense Security & Sensing Symposium*, Baltimore, MD, 29 April to 3 May 2013, 6 pages
4. Joseph T. Smith, Michael Marrs, Mark Strnad, Raj B. Apte, David R. Allee, Nicholas Colaneri, Eric Forsythe, David C. Morton, "Flexible digital x-ray technology for far forward remote diagnostic and conformal x-ray imaging applications," *SPIE 2013 Defense Security & Sensing Symposium*, Baltimore, MD, 29 April to 3 May 2013, 6 pages
5. John W. Murphy, George Kunnen, Israel Mejia, Kurtis D. Cantley, David R. Allee, Bruce E. Gnade, Manuel A. Quevedo-Lopez, "Sol gel ZnO films doped with Mg and Li evaluated for charged particle detectors," *SPIE 2013 Defense Security & Sensing Symposium*, Baltimore, MD, 29 April to 3 May 2013, 6 pages
6. Alfonso Dominguez, George R. Kunnen, Michael Vetrano, Joseph T. Smith, Michael Marrs, David R. Allee, "Development of a testbed for flexible sensing arrays," *SPIE 2013 Defense Security & Sensing Symposium*, Baltimore, MD, 29 April to 3 May 2013, 6 pages
7. George R. Kunnen, Daniel Pressler, Edward H. Lee, David R. Allee, John W. Murphy, Israel Mejia, Manuel Quevedo, and Bruce Gnade, "Large area sensing arrays for detection of thermal neutrons," *IEEE Nuclear Science Symposium*, Anaheim, CA, October 27- November 3, 2012, 6 pages
8. Aritra Dey, David R. Allee, "Amorphous silicon 5 bit flash analog to digital converter," *2012 Custom Integrated Circuits Conference*, San Jose, California, San Jose, California, Sept. 9-12, 2012, 4 pages
9. S. Kim, X. Zhang, R. Daugherty, E. Lee, G. Kunnen, D.R. Allee, E. Forsythe, and J. Chae, "Ultrasonic electrostatic actuators on a flexible substrate," *IEEE MEMS 2012*. Pp. 1193-1196
10. Aritra Dey, David R. Allee, "Amorphous silicon current steering digital to analog converter," *2011 Custom Integrated Circuits Conference*, San Jose, California, San Jose, California, Sept. 19-21, 2011, 4 pages

11. Ahmet Durgun, Constantine Balanis, Criag Birtcher, and David Allee, "Radiation Characteristics of a Flexible Bow-tie Antenna," *Proceedings of 2011 IEEE AP-S International Symposium on Antennas and Propagation & CNC-USNC/URSI Radio Science Meeting*, Spokane, Washington, USA, July 3-8, 2011, pp. 1239-1242
12. Aritra Dey, and David R. Allee, "Stability Improvement of a-ZIO TFT Circuits Using Low Temperature Anneal," *Proceedings of the International Reliability Physics Symposium*, April 10-14, 2011, Monterey, California, pp. TF.1.1 - TF.1.4
13. Michael A. Marrs, Sameer M. Venugopal, Curtis D. Moyer, Edward J. Bawolek, Dirk Bottesch, Barry P. O'Brien, Rita J. Cordova, Jovan Trujillo, Douglas P. Loy, Gregory B. Raupp, David R. Allee," Low Temperature Zinc Indium Oxide Backplane Development for Flexible OLED Displays in a Manufacturing Pilot Line Environment," *Materials Research Society Spring Proceedings*, San Francisco, California, April 25-29, 2011, 6 pages
14. Ahmet C. Durgun, Mark S. Reese, Constantine A. Balanis, Craig R. Birtcher, David R. Allee, and Sameer Venugopal, "Flexible Bow-Tie Antennas with Reduced Metallization," *Radio Wireless Week*, Phoenix, Arizona, January 16-19, 2011, pp. 50-53
15. D.R. Allee, S. Venugopal, M. Strnad, N. Colaneri, S. Phillips, E. Forsythe, and D. Morton, "Military Flexible Electronics: Potential and Reality," *27th Army Science Conference*, Orlando, Florida, Nov. 29 to Dec. 2, 2010, 6 pages
16. Aritra Dey, Sameer M.Venugopal, Adrian E. Avendano, David R Allee, Manuel Quevedo and Bruce E. Gnade, "Flexible Interface Electronics for Large Area Sensors," *27th Army Science Conference*, Orlando, Florida, Nov. 29 to Dec. 2, 2010, 8 pages
17. N. Lakamraju, S.M. Venugopal, D.R. Allee, and S.M. Phillips, "Flexible shock sensor tag with integrated display," *27th Army Science Conference*, Orlando, Florida, Nov. 29 to Dec. 2, 2010, 5 pages
18. N.V. Lakamraju, S.M. Venugopal, D.R. Allee and S.M. Phillips, "Shock wave pressure sensors on PEN substrate," *IEEE 2010 Sensors Conference*, Waikoloa, HI, Nov. 1-4, 2010, 4 pages
19. Aritra Dey, Hongjiang Song, Tofayel Ahmed, Sameer M.Venugopal and David R. Allee, "Amorphous Silicon 7-Bit Digital to Analog Converter," *2010 Custom Integrated Circuits Conference*, San Jose, California, San Jose, California, Sept. 19-22, 2010, 4 pages
20. A.C. Durgun, M.S. Reese, C.A. Balanis, C.R. Birtcher, D.R. Allee and S.M. Venugopal, "Flexible Bow-tie Antennas," *2010 IEEE International Symposium on Antennas and Propagation & CNC-USNC/URSI Radio Science Meeting*, Toronto, Ontario, Canada, July 11-17, 2010, 4 pages
21. S.M. Venugopal, M. Marrs, and D.R. Allee, "Integrated Source Drivers for Electrophoretic Displays Using Low Temperature IZO TFTs," *Society for Information Displays, International Symposium, Digest of Technical Papers*, May 23- 28, 2010, Seattle, Washington, 3 pages
22. S.M. Venugopal, D.R. Allee, M. Quevedo, B. Gnade, E. Forsythe, and D. Morton, "Flexible Electronics: What can it do? What should it do?" *Proceedings of the International Reliability Physics Symposium*, May 2-6, 2010, Anaheim, California, 6 pages
23. A. Indluru, S.M. Venugopal, D.R. Allee, and T. Alford, "Threshold Voltage Shift Variation of a-Si:H TFT's with Anneal Time," *Materials Research Society Spring Proceedings*, April 6-8, 2010, San Francisco, California, 9 pages
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27. S. Gowrisanker, M.A. Quevedo-Lopez, H. N. Alshareef, B. Gnade, S. Venugopal, R. Krishna, K. Kaftanoglu, D. Allee, "Low Temperature Integration of Hybrid CMOS Devices on Plastic Substrates," *Proceedings of the Flexible Electronics and Displays Conference*, Feb. 2-5, 2009, Phoenix, Arizona, 5 pages
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33. S.M. O'Rourke, D.E. Loy, C. Moyer, E.J. Bawolek, S.K. Ageno, B.P. O'Brien, M. Marrs, D. Bottesch, J. Dailey, R. Naujokaitas, J.P. Kaminski, D.R. Allee, S.M. Venugopal, J. Haq, N. Colaneri and G.B. Raupp, "Direct Fabrication of a-Si:H Thin Film Transistor Arrays on Flexible Substrates: Critical Challenges and Enabling Solutions," *Proceedings of the 8th International Meeting on Information Displays*, Kintex, South Korea, 13-17 October 2008
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39. Gregory Raupp, Shawn O'Rourke, Ed Bawolek, Doug Loy, Curt Moyer, Scott Ageno, Barry O'Brien, Dirk Bottesch, Mike Marrs, Jeff Dailey, Rita Cordova, Jovan Trujillo, Jann Kaminski, David Allee, Sameer Venugopal, "Design, Fabrication, and Integration of a Rugged Low-Power PDA Incorporating a Flexible Electrophoretic Ink Display," *Proceedings of Flexible Electronics and Displays Conference*, January 21-24, 2008, Phoenix, Arizona
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41. Gregory R. Raupp, Nicholas Colaneri, Shawn M. O'Rourke, Jann Kaminski, David R. Allee, Sameer M. Venugopal, Edward J. Bawolek, Douglas E. Loy, Curt Moyer, Scott K. Ageno, Barry P. O'Brien, Dirk Bottesch, Steve Rednour, Rob Blanchard, Michael Marrs, Jeff Dailey and Ke Long, "Flexible display technology development in a pilot line manufacturing environment," *Proceedings of the 24th Army Science Conference*, paper GO-05, November 27-30, 2006, Orlando, Florida
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45. K.R. Wissmiller, J.E. Knudsen, T.J. Alward, Z.P. Li, D.R. Allee, and L.T. Clark, "Reducing Power in Flexible a-Si Digital Circuits While Preserving State," *Proceedings of 2005 IEEE Custom Integrated Circuits Conference*, pp. 219-222

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48. A. Fifield, and D.R. Allee, "Dynamic Tuning of the Noise Transfer Function of High Order Delta-Sigma Analog to Digital Converters," *Proceedings of 2002 IEEE International Symposium on Circuits and Systems*, Vol. V, pp. 597-600.
49. M. Hasan, D.R. Allee, M. Kabir, and K. Rahman, "A 15-bit CMOS Cyclic A/D Converter with Correlated Double Sampling," *Proceedings of 2002 IEEE International Symposium on Circuits and Systems*, Vol. I, pp. 497-500.
50. J. Jaehnig, D.R. Allee, El-Badawy El-Sharawy, T.L. Alford, N. Yazdi, and D.J. Allstot, "Monolithic Transformers in a Five Metal CMOS Process," *Proceedings of 2002 IEEE International Symposium on Circuits and Systems*, Vol. II, pp. 807-810.
51. M.J. Pennell, M. Hasan, D.R. Allee, and W. Xie, "Behavioral Model of a 1.8V 6b CMOS Flash ADC Based on Device Parameters," *Proceedings of 1997 IEEE International Symposium on Circuits and Systems*, vol. 3, pp.1636-1639
52. H.J. Song, D.R. Allee, and K. Speed, "Bio-Data Acquisition CMOS IC with Digital Telemetry," *Proceedings of 1997 IEEE International Symposium on Circuits and Systems*, vol. 3, pp.1848-1851
53. B. Kanigicherla, S.H. Oh, and D.R. Allee, "Determination of Optimum On-chip Bypass Capacitor in CMOS VLSI Systems to Reduce Switching Noise," *Proceedings of 1997 IEEE International Symposium on Circuits and Systems*, vol. 3, pp.1724-1727
54. A.N. Broers, X. Pan, D.R. Allee, C.P. Umbach, "Nanolithography and Direct Exposure of SiO₂ Layers," *Molecular Electronics: Science and Technology*, St. Thomas, Virgin Islands, Dec. 1990, AIP Conference Proceedings, vol. 262, editor: Ari Aviram, pp.151-162, (1992).
55. D.R. Allee, P.R. de la Houssaye, D.G. Schlom, B.W. Langley, J.S. Harris, and R.F.W. Pease, "Sub-100nm Gate Length GaAs MESFETs Fabricated by Molecular Beam Epitaxy and Electron Beam Lithography," in *Proceedings IEEE/Cornell Conference on Advanced Concepts in High Speed Semiconductor Devices and Circuits*, pp.190-198, Aug. 10-12, 1987, Ithaca, New York.

International Conference Proceedings Abstracts and Presentations:

1. Eric Forsythe, David R. Allee, Jiamin Shi, David C. Morton, Nicholas Colaneri, "Flexible electronics for Army applications," *SPIE 2013 Defense Security & Sensing Symposium*, Baltimore, MD, 29 April to 3 May 2013
2. D.R. Allee, "Flexible Electronics, what is it good for?" *Flexible & Printed Electronics Conference*, 29 January to 2 February, 2013, Phoenix, Arizona
3. Kevin LaRosa, Bryan Vogt, and David R. Allee, "Ultra-Sensitive Gas Sensors Using Mesoporous Carbon Films and High Precision Time Interval Measurements," *Flexible Electronics and Displays Conference*, February 8-10, 2011, Phoenix, Arizona
4. Narendra V. Lakamraju, Sameer M. Venugopal, David R. Allee and Stephen M. Phillips, "Passive Blast Measurement System with Integrated Electrophoretic Readout," *Flexible Electronics and Displays Conference*, February 8-10, 2011, Phoenix, Arizona – Best Student Poster, 2nd place
5. Aritra Dey, Anil Indluru, Sameer M. Venugopal, Terry L. Alford and David R. Allee, "Mechanical Stress Testing of Amorphous Zinc Indium Oxide TFTs Fabricated at Low Temperature," *Flexible Electronics and Displays Conference*, February 8-10, 2011, Phoenix, Arizona
6. E.H. Lee, A. Indluru, D.R. Allee, L.T. Clark, K.E. Holbert, and T.L. Alford, "Electrical Reliability of a-Si:H TFTs with Gamma Radiation and Electrical Stress," *Flexible Electronics and Displays Conference*, February 1-4, 2010, Phoenix, Arizona
7. N.V. Lakamraju, K. Kaftanoglu, S.M. Venugopal, D.R. Allee and S.M. Phillips, "Integrated Blast Dosimeter on Flexible Substrate," *Flexible Electronics and Displays Conference*, February 1-4, 2010, Phoenix, Arizona
8. A. Dey, K. Kaftanoglu, and D.R. Allee, "Design of Analog to Digital Converter with Flexible Thin Film Transistors," *Flexible Electronics and Displays Conference*, February 1-4, 2010, Phoenix, Arizona
9. K. Kaftanoglu, A. Dey, S.M. Venugopal, and D.R. Allee, "Flexible CMOS Infra-Red Tag," *Flexible Electronics and Displays Conference*, February 1-4, 2010, Phoenix, Arizona
10. A. Indluru, S.M. Venugopal, D.R. Allee, and T. Alford, "Effect of Anneal Time on the Performance of a-Si:H TFT's on Flexible Substrates," *Flexible Electronics and Displays Conference*, February 1-4, 2010, Phoenix, Arizona

11. S.M. Venugopal, E. Bawolek, M. Marrs, K. Kaftanoglu, A. Dey, J. Wilson, A. Indluru, T. Alford, D.R. Allee and S. O'Rourke, "Effect of Bias Stress on Low Temperature Indium Zinc Oxide Thin Film Transistors on PEN Substrates," *Flexible Electronics and Displays Conference*, February 1-4, 2010, Phoenix, Arizona
12. M.A. Quevedo-Lopez, A. Avendano, D. Mao, H. Stiegler, and B. E. Gnade, S. Venugopal, D. Allee, "Reliability Improvement in Fully integrated CMOS Devices Using Low Temperature Hybrid Gate Dielectrics," *Flexible Electronics and Displays Conference*, February 1-4, 2010, Phoenix, Arizona
13. K. Kaftanoglu, S.M. Venugopal, and D.R. Allee, "Flexible CMOS Manchester Adder on PEN Substrate using Organic and a-Si:H TFTs," *Flexible Electronics and Displays Conference*, February 2-5, 2009, Phoenix, Arizona
14. D.R. Allee, "Flexible Display and Flexible Electronics," *IEEE Workshop on Emerging Device and Packaging Technologies*, 11 December 2007, Phoenix, Arizona
15. N.D. Hindman, Z. Wang, L.T. Clark, D.R. Allee, "Experimentally measured input referred voltage offsets and kickback noise in RHBD analog comparator arrays," *Nuclear and Space Radiation Effects Conference*, July 23-27, 2007, Honolulu, Hawaii
16. G.R. Raupp, N. Colaneri, S.M. O'Rourke, J. Kaminski, D.R. Allee, S.M. Venugopal, E.J. Bawolek, D.E. Loy, C. Moyer, S.K. Ageno, B.P. O'Brien, D. Bottesch, S. Rednour, J. Dailey, and K. Long, "AM TFT Technology Development and Pilot Line Manufacturing for Reflective and Emissive Flexible Displays," *Flexible Displays and Microelectronics Conference*, February 5-8, 2007, Phoenix, Arizona
17. Alex Z. Kattamis, Kunigunde Cherenack, Bahman Hekmatshoar, I-Chun Cheng, Sigurd Wagner, James C. Sturm, Sameer Venugopal, Daniel Toy, Douglas E. Loy, Shawn M. O'Rourke, and David R. Allee "Amorphous Silicon Thin-Film Transistor Backplanes Deposited at High Temperature on Clear Plastic for Electrophoretic Displays," *49th Electronic Materials Conference*, June 20-22, 2007, Notre Dame, Indiana
18. Mike Pennell, and David Allee, "Behavioral Model Correlation Based on Process Specific Device Parameters," *The IEEE/ACM International Workshop on Behavioral Modeling and Simulation (BMAS'98)* Oct 27-28, 1998, Orlando, FL.
19. B.J. Skromme, Y. Zhang, Q. Zhang, R. Droopad, C. Choi, R. Ramamurti, G.N. Maracas, R. Somasekharan, D.R. Allee, "Optical Properties of Heteroepitaxial InP/GaAs and GaAs/InP Grown by Gas Source Molecular Beam Epitaxy," in abstracts of the *1992 Electronic Materials Conference*, MIT, Cambridge Massachusetts, June 24-26, 1992.
20. D.R. Allee, A.N. Broers, and C.P. Umbach, "Direct Nanometer Scale Patterning of SiO₂ with Electron Beam Irradiation," in abstracts of the *1991 IEEE Workshop on Micrometer and Submicrometer Lithography*, Koloa, Kauai, Hawaii, August 19-23, 1991, Invited Talk
21. D.R. Allee, and A.N. Broers, "Resolution Limits of Nanostructure Fabrication Techniques," in *lecture notes of 14th Workshop on Electron Transport in Low Dimensional Structures*, Gwatt, Switzerland, Oct. 18-20, 1990, Invited Talk.
22. D.R. Allee, A.N. Broers, M. Van Rossum, S. Borghs, W. De Raedt, H. Launois, B. Etienne, Y. Jin, R. Adde, R. Castagne, A. Antonetti, and D. Hulin, "Performance and Physical Limits of Heterostructure Field Effect Transistors," *Esprit Conference 1990*, Brussels, Belgium.
23. S.Y. Chou, D.R. Allee, R.F.W. Pease, and J.S. Harris Jr., "Quantum Interference Devices Fabricated Using Molecular Beam Epitaxy and Ultra-High Resolution Electron Beam Lithography," in abstracts of the *47th Annual Device Research Conference*, June 19-21, 1989, MIT Cambridge, Massachusetts.
24. S.Y. Chou, J.S. Harris, R.F.W. Pease, D.R. Allee, P.R. de la Houssaye, M. McCord, D. Narum, D.G. Schlom, "Sub-100nm Fabrication and Devices," *1987 American Physical Society March Meeting*, New York, Invited Talk.
25. J. Lo, C.Hwang, T.C. Huang, R. Campbell, D.R. Allee, "Magnetic and Structural Properties of High Rate Dual Ion-Beam Sputtered NiFe Films," *Abstracts of 31st Annual Conference on Magnetism and Magnetic Materials*, p. 86, 1986.

Invited Presentations:

1. Flexible Hybrid Electronics, Semicon Korea 2015, Seoul, Korea, February 4, 2015, ~150 attendees
2. Military Applications of Flexible Electronics, Army Research Laboratory, Adelphi, Maryland, October 1, 2013, ~50 attendees
Because of the DoD travel ban, I presented the following two papers at the IEEE Sensors Conference on behalf of the Army Research Labs:
3. C.A. Browning, S.J. Vinci, J. Zhu, D.M. Hull, M.A. Noras, "An Evaluation of Electric-Field Sensors for Projectile Detection" presented at the IEEE Sensors Conference, Baltimore, MD, Nov. 3-6, 2013, audience ~30

4. S. Ghionea, G. Smith, J. Pulskamp, S. Bedair, C. Meyer, D. Hull, "MEMS electric field sensor with lead zirconate titanate (PZT) – actuated electrodes", presented at the IEEE Sensors Conference, Baltimore, MD, Nov. 3-6, 2013, audience ~100
5. D.R. Allee, Eric Forsythe, "Hybrid Flexible Electronics," Symposium on Materials and Processes for Flexible Devices and Electronics, University of Massachusetts at Amherst, 16 May 2013, ~150 people
6. D.R. Allee, "Flexible Electronics: Potential and Reality," FlexTech Alliance Workshop: Metal Oxide TFT Devices and Technology, San Francisco Marriott Marquis, San Francisco, CA, 11 July 2012, ~120 people
7. D.R. Allee, "Flexible Electronics: Potential and Reality," University of Akron, Akron, OH, 27 May 2012, ~100 people
8. D. Allee, "Flexible Electronics," City University of Hong Kong, 1 November 2011, audience 50
9. D. Allee, "Flexible Sensor Systems," to Dr. Zachary Lemnios, Assistant Secretary of Defense, 1 June 2011, audience 1
10. D. Allee, "Flexible Sensor Systems," to Glenn Gaffney, Deputy Director of National Intelligence, and Christopher Darby, CEO of InQTel, 28 October 2011, audience 2
11. D.R. Allee, "Flexible Electronics: What are the gaps from a designer's perspective?" Flex Tech Alliance Workshop, San Jose, CA, 10 November 2010, 40 people
12. D.R. Allee, "Flexible Electronics: Potential and Reality," International Materials Research Congress, Cancun, Mexico, Aug. 15-19, 2010, 60 people
13. D.R. Allee, "Flexible Electronics: What can/might/should it do?," CMOS Emerging Technologies Conference, Whistler, Canada, May 19-21, 2010, 50 people
14. D.R. Allee, "Flexible Electronic Integrated Systems," Distinguished Scholar Symposium on Display Technology, Hanyang University, South Korea, 18 June 2009, 200 people
15. D.R. Allee, "Flexible CMOS Circuits for Display Applications," Society for Information Displays Conference, San Antonio, Texas, 2009, 200 people
16. D.R. Allee, "Flexible Electronics," Army FDC Day, Phoenix, AZ, Feb 2009, 50 people
17. D.R. Allee, "Threshold Voltage Instability in a-Si:H TFTs and the Implications for Flexible Displays and Circuits," Presented at the 8th International Meeting on Information Displays, Kintex, South Korea, 13-17 October 2008.
18. D. Allee, "Degradation Effects in Amorphous Silicon Thin Film Transistors and Their Impact on Circuit Performance," presented at Sharp Laboratories of America, Portland, Oregon, 8 August 2008
19. D. Allee, "Degradation Effects in a-Si:H TFTs and Their Impact on Circuit Performance," presented at the IEEE International Reliability Physics Symposium, April 2008, Phoenix, Arizona
20. D. Allee, "Flexible Displays and Flexible Electronics," IEEE Workshop on Emerging Device and Packaging Technologies, 10 December 2007, Phoenix, Arizona
21. D. Allee, "Behavioral Models for Low Voltage Pipelined and Flash CMOS A/D Converters Based on Device Parameters," DARPA Workshop on the Development of Analog to Digital Converter Technology Suitable for High Density Integration with Sensor Arrays," 23-24 April 1998
22. D. Allee, "Low Voltage, Low Power, High Speed Data Converters," Low Voltage / Low Power Symposium, Hughes, El Segundo, California, 20 March 1997
23. D. Allee, "Switched Current Sigma Delta A to D Converter Compatible with a Low Voltage Digital CMOS Process," to the IEEE Waves and Devices Group, Phoenix chapter, 21 March 1996.
24. D. Allee, "Low Voltage, Low Power Switched Current Sigma Delta A to D Converter," to Intel Corporation, 24 January 1996.
25. D. Allee, "Nanometer Scale Fabrication," to the IEEE Waves and Devices Group, Phoenix chapter, December 3, 1992.
26. D. Allee, "Limits of Nanometer Scale Fabrication," to the IEEE CHMT Phoenix chapter, January 15, 1992.
27. D. Allee, "Fabrication Down to the Atomic Scale," to The Society of the Sigma Xi, Arizona State University chapter, March 5, 1992. D. Allee, "Ultra-high resolution electron beam patterning of SiO₂: a review," to the IAS Symposium on Science and Technology of Mesoscopic Structures, New Public Hall, Nara, Japan, November 6-8, 1991.
28. D. Allee, "Direct Nanometer Scale Patterning of SiO₂ with Electron Beam Irradiation," to the 1991 IEEE Workshop on Micrometer and Submicrometer Lithography, Koloa, Kauai, Hawaii, August 19-23, 1991.
29. D. Allee, "Resolution Limits of Nanostructure Fabrication Techniques," to the 14th Workshop on Electron Transport in Low Dimensional Structures, Gwatt, Switzerland, Oct. 18-20, 1990.